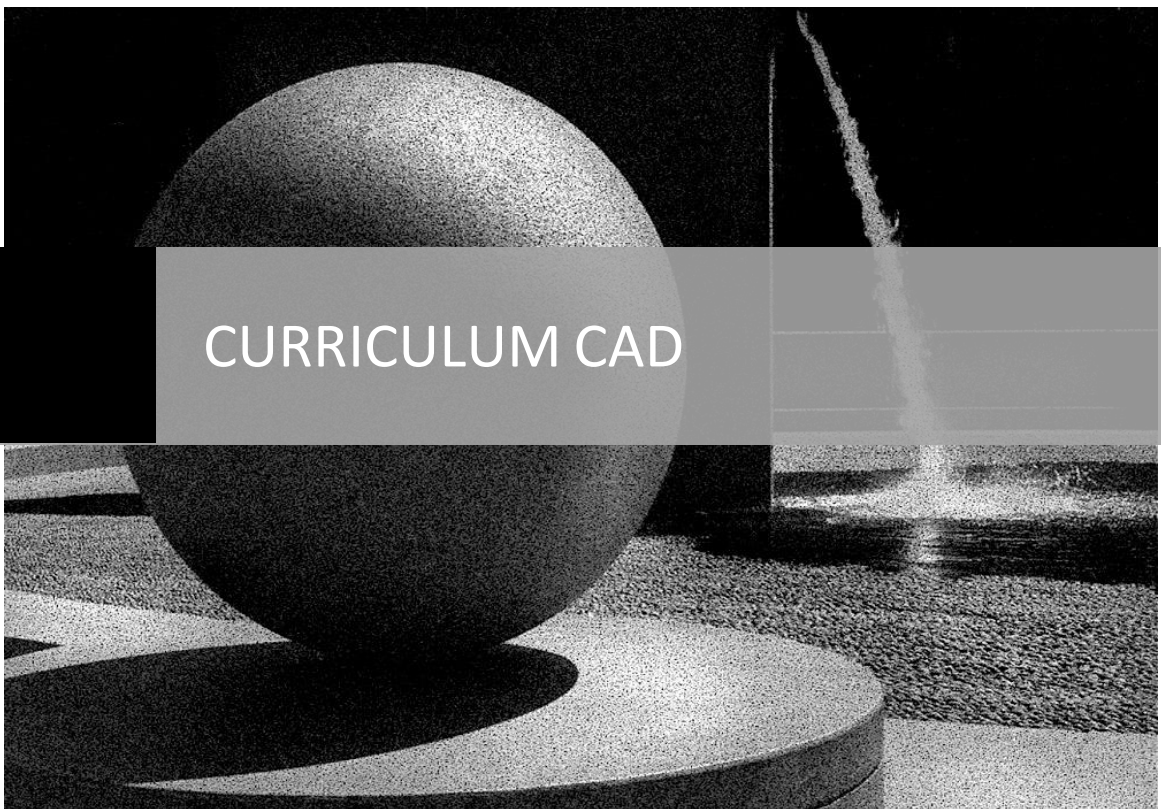


SESSION

2016-17



CURRICULUM CAD



A LEADING WOMEN'S UNIVERSITY

Undergraduate Program
Bachelor of Architecture

College of Architecture & Design

Mody University of Science & Technology

N.H. 11, Lakshmangarh, Sikar, Rajasthan - 332311

Academic Curriculum (2015 - 16 Onwards)
Undergraduate Program - Bachelor of Architecture
College of Architecture & Design, MODY University
Mody University of Science & Technology, Lakshmangarh, Rajasthan

B. Arch.

5 Years

(300 credits)

Background

A curriculum for Design Education evolves from the vision of the institution, its aspirations and its capability to deliver the knowledge. It defines the relationships between the teacher and the student and the institution. Curriculum for Architecture also connects creativity and physical reality.

Five-year Architecture undergraduate program is designed to provide an exceptional university education as well as comprehensive preparation for entry in the competitive and challenging career in architecture. Studies in architecture and other associated disciplines are undertaken in parallel throughout the five-year program. This five-year undergraduate professional program is a professional degree accredited by the **Council of Architecture, India**. The program is for a limited number of qualified students committed to the study of architecture. These students are admitted directly to the professional degree program and begin studies in architecture in the first year.

The **B. Arch** curriculum has two stages of study. The stage-1 (years 1, 2, 3) provides a foundation of understanding on which to build a second level of advanced study. Continuously through the course of the program runs the Design Studio, in which projects are selected as a means for developing the professional skills, knowledge, understanding and a platform to create exemplary architectural designs. At the end of the third year, the program culminates with a studio project helping students to summarize what they have learned with an introduction to prepare themselves for more independent studies in the advanced professional program.

The stage-2 (years 4 & 5) concludes with a **semester** (one or two) of Professional Training (forth year) and Final Year Dissertation program. The first semester of the final Year integrates an introduction to independent Research Methods. An integrated design research phase continues throughout the final two semesters. The final year project is selected by the students' themselves to provide them an opportunity to develop their individual point of view about the profession and create their own place in the building industry. Thesis or Dissertation is part of the course to investigate issues the student sees as significant to herself and to the profession.

The Objective

- Develop direct personal experience of social, environmental and technological contexts.
- Encourage exploration of the diversity of thoughts, techniques, working methods and material palettes.
- Develop capacities to think from simple first principles, using observation, common sense and intuition to build more elaborate conceptual frameworks.
- Develop ability to “learning how to question, absorb and analyze” rather than following “conventional” practices and solutions.
- Understand and connect to local realities as vehicles for solutions.
- Encourage sharing and collaboration and as well as individual achievement.
- Creativity, skills and initiative should be developed and encouraged to assist the involvement of the body, mind and therefore confidence.
- General awareness towards architectural heritage introduced from the beginning of the degree program through courses / electives by experts on conservation, restoration and re – adaptation of buildings.

The Curriculum (B. Arch)

The curriculum allows students to choose their own area of interest and allow for independent exploration in the later years (3+2-year model) by having option of choice based Studio and Theory subjects. This is important to have a more mature and self-driven Architect. The curriculum shall also encourage students to select subjects of their choice from allied disciplines at other Colleges of this University.

The curriculum is to allow for Inter-disciplinary teaching in areas of Technology, Humanities and Environment by conducting joint sessions and assignments. The course content is synchronized to facilitate the same. Moreover, each semester has a thematic emphasis to allow many different subject to address the same. This is done to facilitate further synthesis.

Curriculum structure allows for other means of learning such as travelling studios, joint studios or studios in other socio-cultural environment apart from exchange program. This can provide the necessary confidence to deal with the outside world.

The courses dealing with design studio, technology, humanities shall be taught in an inter-disciplinary manner and not as compartmentalized specializations.

History, theory & technology based courses are those, which let us understand and appreciate, social, cultural, technological and historical knowledge and skills for its application in design projects.

Course Structure

The course structure and relative emphasis between sub-disciplines vary depending on their position within the course.

First year, being a Foundation year, the emphasis shall be on the development of background knowledge such as sensibility, analytical skills, technical and general communication skills and associated disciplines.

During Second and Third, Advanced years the emphasis is on understanding and appreciation of in-depth relationships between various disciplines and use of their resolutions, complexity, techniques and methods of application. The Fourth and Fifth Years, termed as final years, emphasize the development of the individual’s maturity and establishment of direction. During last two years of the course student develops her theoretical and practical understandings and decide on personal choice of directions.

Credit Loads

The course is of 5 years / 10 semester's duration. Each year consists of 2 semesters of approximately 16 weeks each. Each semester carries a contact load of 30 - 32 credits, where 1 credit is equivalent to 1.0 lecture hour/week in theoretical subjects and studio, workshop, laboratory based courses.

Each semester normally consists of (including design studio) not more than 6 subjects and each subject is normally of at least 2 credits.

In addition to subjects that form the core of the curriculum, the course offers 10 credits out of a total of 300, as electives. These electives are offered within the disciplines of humanities, arts and crafts: history and theory, and technology, so that a student can develop her interest in these areas.

- 1 Credit = 1 Contact hour for Theory and Studio
- 1 Credit = 2 Contact hour for Workshop
- 1 Contact hour = 100 Marks

Assessment

Student's performance is continually evaluated through Time Problems, projects, Tests, Quizzes and periodic assessments of sessions work. Generally, **50 %** of the assessment is through this system, and **50 %** weight is assigned to end of semester examinations (Internal). All core subjects are examined at the end of the semester through project review (Juries), crits, viva-voce or examination papers. Electives are normally assessed through final results, assignments or papers.

In order to clear a subject a student must obtain at least **50 %** marks in all the assessments of the subject. While the teaching faculty in all subject areas does grading, the subjects at the end of the Third and Fifth Year are examined additionally by an external examiner.

First Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

First Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 111	Design Studio –I & Architectural Graphics Skills- Manual & Computers I	10 (5 + 5)	10	0	1000 500 + 500 (250 + 250) (250 +250)	50% 50%	0	3
	AR 121	Building Materials & Construction Technology I	6	6	100	500 250 + 250	50% 50%	3	3
	AR 131	Structure Design & Systems I	3	3	50	250 125 + 125	50% 50%	2	0
	AR 141	History & Humanities I	3	3	50	250 125 + 125	50% 50%	2	3
	AR 151	Basic Design & Workshops I	6	6	0	600 300 +300	50% 50%	0	0
	AR 161	Introduction To Building Industry	2	2	0	200 100 + 100	50% 50%	0	3
	TOTAL		30	30					12

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 112	Design Studio –II & Architectural Graphics Skills- Manual & Computers II	10 (5 + 5)	10	0	1000 500 + 500 (250 + 250) (250 +250)	50% 50%	0	3
	AR 122	Building Materials & Construction Technology II	6	6	100	500 250 + 250	50% 50%	3	3
	AR 132	Structure Design & Systems II	3	3	50	250 125 + 125	50% 50%	2	3
	AR 142	History & Humanities II	3	3	50	250 125 + 125	50% 50%	2	3
	AR 152	Basic Design & Workshops II	6	6	0	600 300 + 300	50% 50%	0	0
	MDC 003	Environmental Studies	4	4	400	0	50% 50%	0	0
	TOTAL		32	32					12

Second Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

Second Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 211	Design Studio – III, Computer Application I, Fundamentals of Design & Communication skills	15 (9 +6)	15	0	1500 900 + 600 (450 + 450) (300+300)	50% 50%	0	6
	AR 221	Building Materials & Construction Technology III	4	4	100	300 150 + 150	50% 50%	3	0
	AR 231	Structure Design & Systems III	3	3	50	250 125 + 125	50% 50%	2	3
	AR 241	History of Architecture	2	2	50	150 75 + 75	50% 50%	2	3
	AR 251	Building Services I	3	3	100	200 100 + 100	50% 50%	3	0
	AR 261	Elective/Workshop	3	6	0	300 150 + 150	50% 50%	0	0
TOTAL			30	33					12

AR 271 Related Study Programme

2 Credit

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 212	Design Studio – IV, Computer Application II & Theory of Design	16 (12+4)	16	0	1600 1200 + 400 (600 + 600) (200+200)	50% 50%	0	6
	AR 222	Building Materials & Construction Technology IV	4	4	100	300 150 + 150	50% 50%	3	0
	AR 232	Structure Design & Systems IV	3	3	100	200 100 + 100	50% 50%	3	0
	AR 242	Surveying & Levelling	2	2	50	150 75 + 75	50% 50%	2	3
	AR 252	Building Services II	3	3	100	200 100 + 100	50% 50%	0	3
	AR 262	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	0
TOTAL			30	32					12

Third Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

Third Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 311	Design Studio V	16	16	0	1600 800 + 800	50% 50%	0	6
	AR 321	Building Materials & Construction Technology V	4	4	100	300 150 + 150	50% 50%	3	0
	AR 331	Structure Design & Systems V	3	3	50	250 125 + 125	50% 50%	2	0
	AR 341	Landscape Architecture	3	3	0	300 150 + 150	50% 50%	0	0
	AR 351	Climatology	2	2	50	150 75 + 75	50% 50%	2	0
	AR 361	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	6
	TOTAL		30	32					12

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 312	Design Studio VI	16	16	0	1600 800 + 800	50% 50%	0	6
	AR 322	Quantity Estimation and Specification writing	3	3	100 50 + 50	200 100 + 100	50% 50%	3	0
	AR 332	Structure Design & Systems VI	3	3	50	250 125 + 125	50% 50%	2	0
	AR 342	Professional Practice	3	3	100	200 100 + 100	50% 50%	3	0
	AR 352	Town Planning & Building Bylaws	3	3	100	200 100 + 100	50% 50%	3	3
	AR 362	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	3
	TOTAL		30	32					12

Forth Year B. ARCH STAGE-2
Academic Curriculum (2015 - 16 Onwards)

Forth Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory Sessional Internal External Viva	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 411	Practical Training	28	0	0 2800 1400 + 700+700	0 100%	0	0
	TOTAL		28					0

Subject To Approval

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 412	Design Studio VIII	14	14	0 1400 700 + 700	50% 50%	0	9
	AR 422	Building Materials & Construction Technology VIII	5	5	100 400 200 + 200	50% 50%	3	0
Spring Semester	AR 432	Structure Design & Systems VIII	4	4	100 300 150 + 150	50% 50%	3	0
	AR 442	Intelligent Buildings	3	3	100 200 100 + 100	50% 50%	3	0
	AR 452	Thesis Orientation	2	2	0 200 100 + 100	50% 50%	0	0
	AR 462	Elective/Workshop	2	4	0 200 100 + 100	50% 50%	0	3
	TOTAL		30	32				12

Fifth Year B. ARCH STAGE-2
Academic Curriculum (2015 - 16 Onwards)

Fifth Year Subject To Approval

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal	External	Weightage Internal	ETE	Exam Duration	Field Trips / Semester
	AR 511	Advance Design Studio IX	14	14	0	1400	700 + 700	50%	50%	0	9
	AR 521	Professional Practice (Advance)	6	6	100	500	250 + 250	50%	50%	3	0
	AR 531	Advance Construction & Structures	6	6	100	500	250 + 250	50%	50%	3	0
	AR 541	Research Methodology	2	2	100	100	50 + 50	50%	50%	3	0
	AR 551	Advance Services	2	2	0	200	100 + 100	50%	50%	0	3
	TOTAL		30	30				50%	50%		12

Subject To Approval

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal	External Viva	Weightage Internal	ETE	Exam Duration	Field Trips / Semester
	AR 512	Dissertation/Thesis	24	24	0	2400	1200 + 600 + 600	50%	50%	0	12
	AR 522	Advance Elective I	3	3	0	300	150 + 150	50%	50%	0	0
	AR 532	Advance Elective II	3	3	0	300	150 + 150	50%	50%	0	0
	TOTAL		30	30							12

First Year B. ARCH STAGE-1

AR 111 Design Studio I	10 - 10

- Focus:**
- A.** Exploring principles of space making, introduction to the built environment and its creative exploration.
 - B.** Learning techniques and skills to represent different objects through 2D & 3D geometry.

Objectives

- To deliver an introduction to architecture through analysis of building elements, such as floors, walls, doors, stairs, rooms, etc.
- To have an understanding of relationship between the human body, scale and the built environment, context, creative and exploratory responses, scale and proportion, basic organizational principles, abstraction, order, constants and variations and design as a response.
- Understanding importance of technical drawing as medium of communication as basic vocabulary in design.

Contents

- Introduction to subject. Getting acquainted with necessary instruments of drawing. Learning to draw straight and curved lines with different qualities.
- Learning good lettering to improve and maintain quality of presentation.
- Learning meaning of terms 'Plan' & 'Elevations' and using them for drawing simple objects through 'Orthographic Projections'.
- Learning theory of 'Orthographic Projections' and drawing projections of points, lines, geometric solids.
- Dealing with sections of simple geometric solids and their combinations.
- Learning principles of development of lateral surfaces of solids, applying them to work out and drawing developed surfaces of simple geometric solids and using them to make models of some of them.
- Auxiliary orthographic projection of solids and its application to sections of solids by inclined plans.
- Principles of space - making.
- Abstract sketches, model making, pencil and ink drawing, idea of human scale: methods of measurement.
- Site visits, experiential exploration of built environment, Case Studies.
- Measure drawings, analytical studies to understand building order, anthropometric content in design inputs lectures on factors affecting design and design disciplines.
- Mental and visual 3D perception

Outcome

- Students will learn about observation and logical skills to involve understanding of a space creation.
- Students will learn desired written and presentations skills to express their designs.
- Students will be able to visualize the idea and concept with expression of thoughts via appropriate communication method.
- Students should learn all aspects of **technical representation of drawings** to express and document their design projects through graphical communication.
- Students will be able to express all drawing contents through all taught mediums of communication.

Examination Pattern:

- Sessional: 100 % {(25 % Internal continuous assessment + 25% External: Architectural Graphic and Techniques I) + (25% Internal continuous assessment + 25% External: Design Studio I) }

References:

- John Hanock, **Time Saver Standards for Architectural Design Data**, McGraw-Hill Professional Publishing
- Ramsay and Sleeper, **Architectural Graphic Standards**, Wiley
- ND Bhat, **Engineering Drawing**, Charotar
- IH Morris, **Geometrical Drawing for Arts Students**, Universities Press
- KR Gopalakrishna, **Engineering drawing Vol I and II**, Subhas

AR 122 Building Materials & Construction Technology I	6 - 6

Focus: Understanding of basic building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as mud, brick, stone, bamboo, timber, etc. and methods of preservation, treatment and types of uses.
- To help students understand the basic building elements, their function and behavior under various conditions with specific reference to 'load bearing construction' and simple non RCC frame structure.
- To develop strong sense of perception, understanding the basic principles of construction and materials.
- The emphasis should be on teaching the fundamental principles and constructional details suitable for Indian conditions.
- Students will be encouraged to study both in classroom and also outside at work sites in order to get the practical exposure.

Contents:

Construction

- Structural and nonstructural building elements and Terminologies.
- Basic wall section of load bearing and framed structures.
- Introduction to various tools and equipment's commonly used in construction
- Types of Masonry construction in brick and stone.
- Bamboo construction Methods.
- Stone construction joinery details.

Materials

Mud: Fundamentals of soil science, types of soils, principles of soil stabilization, types of stabilizers, requirements and types of mud wall building and surface protection, advantage and disadvantage of mud construction.

Stones: Formation in nature, geological classification, quarrying of stones, dressing, characteristics of stones, testing of stones, uses of stone. preservation of stones, deterioration of stones, behavior of stone, fabrication, physical and chemical properties, selection of stones, types of stones,

Bricks: Manufacturing process, Types of bricks, Classification of bricks, Characteristics, Ingredients of bricks, Forms of bricks, Testing of bricks, Types of bonding in bricks, Storage of bricks,

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Bamboo: Bamboo as plant classification, species, geographical distribution, anatomy of bamboo, properties, strength, processing, harvesting, working of bamboo tools, treatment and preservation of bamboo, uses of bamboo.

Timber: Classification of trees, structure of trees, characteristics, seasoning of timber, defects and diseases, decay of timber, preservation, fire resistance, conservation of timber, storage of timber, uses of timber, manufacturing process of timber, hard wood, soft wood, advantages of timber construction.

Outcome

- Students learn about construction of the building using intelligence, bamboo, brick, stone through drawing case study.
- Students will learn basic understanding of materials with respect to building components and their construction methods.
- Students will get practical experience of making small shelter structures.
- Students will learn making of plan, elevation and section along with sketches and details showing methods of construction.
- Students will also get to know some analysis fundamentals skills required for selection of materials as per design requirements.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, Construction **Technology**, Prentice Hall
- Barry, **Construction of Buildings**

AR 131 Structure Design & Systems I	3 - 3

Focus: Behavior of building elements and basic structural systems.

Objectives

- Understanding importance of structure and its contents with respect to behavior and language of building elements and components.
- To understand and link knowledge of architecture, civil engineering, statics and material in a natural way.

Contents

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with manmade structures.
- Functions of structures. Primary and secondary forces acting on structures – gravitational force, live load, wind, temperature variation. Types of supports & their characteristics.
- Analysis & design – Design criteria.
- Primary elements of structure and their behavior.
- Factor of safety & factors affecting it. Characteristics of structural design – strength, stiffness and stability. Discussion on factors affecting them and ways of satisfying these requirements.
- Study of behavior of structures through models and testing them for given load.

Outcome

- Enable students to understand the concepts of building Structures.
- Students shall understand about the structural action of various elements.
- Students will have sufficient knowledge about various long span structures.
- Students should understand freedom of creativity, and encourages exploration, cooperation and discussion in the multi-genre science in which architecture is located.
- Student should learn that, the architecture and structure create a homogeneous unit, if the structure is not an obstacle to perceive the work and the architectonic shape creates a logical structural solution.
- Students will able to handle basic structure problems with Perception of structure, which is connected with a typological kind of a building, its size and function.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- RK Bansal and Sanjay Bansal, **Engineering Mechanics** Third edition, Laxmi Publications, New Delhi.
- Ferdinand L Singer, **Engineering Mechanics** Third Edition, Harper Collins Publications.

AR 141 History & Humanities I	3 - 3

Focus: To develop appropriate skills of reading, discussion and writing as well as understanding of the physical experience of buildings in order to appreciate the complexity of the influences bearing on architecture, as reflected in the major historical periods.

Objectives

- To inform about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.
- To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to technology, style and character in the prehistoric world and in Ancient Egypt, West Asia, Greece and Rome.

Contents

- Introducing concepts of culture and civilization – Paleolithic and Neolithic culture – art forms and evolution of shelter – megaliths – agricultural revolution and its impact on culture and civilization.
- Landscape and culture of Ancient Egypt – history – religious and funerary beliefs and practices – monumentality – tomb architecture: evolution of the pyramid from the mastaba – temple architecture: mortuary temples and cult temples Great Pyramid of Cheops, Gizeh – temple of Ammon Ra, Karnak – temple of Abu Simbel (Rock Cut)
- Urbanization in the Fertile Crescent– evolution of city-states and their character – law and writing – theocracy and architecture – evolution of the Ziggurat – palaces.
- Landscape and culture of Greece – Minoan and Mycenaean cultures – Hellenic and Hellenistic cultures – Greek character – Greek polis and democracy – Greek city planning – architecture in the archaic and classic periods - orders in architecture: Doric, Ionic, Corinthian – optical illusions in architecture.
- Roman history: Republic and Empire – Roman religion and the Roman temple – Roman character – lifestyle – Roman urban planning – art and architecture as imperial propaganda: forums and basilicas – domestic architecture – structural forms, materials and techniques of construction – orders in architecture: Tuscan and Composite.

Outcome

- An understanding about the spatial and stylistic qualities.
- An understanding of the architecture as an outcome of various social, political and economic upheavals, and as a response to the cultural and climate conditions.
- Students will gain knowledge about the art & architecture of the European, Egyptian & Middle Eastern cultures, which have served as the cradle of human civilization, which will help them in building concepts for their design.
- They will be made aware, about the planning, construction, function and aesthetics of historical buildings and an appreciation of architectural style as a product of the time, place and culture in the western world.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Tadgell Christopher, **History of Architecture in India**, Phaidon Press.
- Brown Percy, **Indian Architecture, Buddhist and Hindu period**, Read Books
- Grover Satish, **Architecture of India, Buddhist and Hindu**

AR 151 Basic Design & Workshop I	6 - 6

Focus: Development of three dimensional visualizations, graphical abstraction and preliminary form exploration.

Objectives

- To create understanding and hands on skill based modes & methods of workshop art and its recording & analysis.
- To have knowledge of anthropometric content in Design, method of measurement. Human scale and proportion.
- To develop analytical thinking through exercises in fundamentals of composition, graphics, research and design process.

Contents

- Comprehensive understanding of the design field: relationship of basic design to architectural design and design field in general. Performance requirements and criteria for judgement of design.
- Observation and its expression: Field, mode and methods of observation, recording and analyzing observations: its expression.
- Visual perception, Ideas as abstraction. Graphic tools to express abstraction (geometric content); and abstraction of environmental and architectural observation.
- Human dimension: Anthropometric content in design, methods of measurement, idea of human scale and proportion.
- Basic shelter: Understanding of basic shelter and its related factors through chosen examples, methods of learning.
- WORKSHOP: - Hands on practical training and creation of 3D structures to express innovation and supernatural ideas.

Outcome

- Enable students to learn the various tools used in carpentry, metal work, masonry, painting etc. and get a reasonable skill in handling the materials and tools there off.
- Students will get an opportunity to see directly the craftsmen's work, and interact with them face to face.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

References:

- Wucius Wong, **Principles of three Dimensional Design**, Van Nostrand Reinhold Company
- Wucius Wong, **Principles of two Dimensional Design**, Wiley
- Wucius Wong, **Principles of color composition**
- Robert Gill, **Rendering with Pen and Ink**, Van Nostrand Reinhold Company

AR 161 Introduction to Building Industry	2 - 2

Focus: General introduction to building industry.

Objectives

- To familiarize students to all stakeholders and participants in building & construction industry.
- To understand role and responsibilities of various team members of building industry.
- To introduce students to local, national and global structure of building construction, product manufacturing infrastructure, production and delivery systems.

Contents

- Series of lectures, site visits (trade show), case studies, research, market survey, introduction to sales industry and manufacturing industries.
- General information re following team members and or stake holders, i.e. surveyors, contractors, developers, financiers, bankers, architects, landscape architects, artists, interior designers, project managers, construction managers, quantity surveyors, building economist, hydraulic engineer, civil engineer, structure engineer, mechanical engineer, electrical engineer, financial controller, acoustic designers, product designers, industrial designers, real estate personals, property managers etc.

Outcome

- Students will have knowledge of various stakeholder and team members of building involved in the industry, their roles and responsibilities and their professional contribution.
- Students shall have understanding of the structure of the building industry from pre-construction to delivery stage.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 112 Design Studio II	10 - 10

Focus: To shape spaces through an understanding of elements that builds a design language and continuing from previous semester, reinforcing the understanding & importance of representing different objects through 2D & 3D geometry and learning more complex skills in the same direction.

Objectives

- To have emphasis on relationship between the human body, scale and the built environment, context, creative and exploratory responses, scale and proportion, basic organizational principles, abstraction, order, constants and variations and design as a response.
- To teach design parameters with respect to site and environment.
- To design space through program, site analysis, area volume diagrams.
- To understand documentation of site, site analysis and basic report writing.
- Understanding importance of technical drawing as medium of communication as basic vocabulary in architecture and learning techniques & skills to represent different objects through 2D & 3D geometry thus developing visualization of geometric forms to use it in designing.

Contents

- Principles of abstraction, spatial ordering, kinds of form and their principles of combination light and perception of space and form.
- Elements of architecture, spatial order, modulation of space, space structure form co-relation, program interpretation, choice of theme, abstraction, spatial scales, ordering mechanisms, evolution of form.
- Different ways of presentation of solids in 3D projections, like Axonometric & Isometric.
- Studying sciography and methods of representing it in 2D projections.
- Applying sciography to 3D geometrical projections especially Isometric projections.
- Understanding basic principles of perspective drawings – relatively realistic way for presentation. Introduction of basic elements such as station point, picture plane, eye level, center of vision, cone of vision, vanishing points etc.
- Drawing one point and two point perspectives through
 - Plan and Elevation method
 - Plan and vanishing points method
 - Measuring point method.

Outcome

- Enable students to emphasis on analytical skill to develop design and its management.
- Student shall gain depth knowledge of visualization and enhanced conception of ideas.
- Enable students to understand shades and shadow, solar path and its relation to build masses.
- Students shall learn perspective drawing in 2D & 3D projection to accumulate space drawings with measurements.

Examination Pattern:

- Sessional: 100 % {(25 % Internal continuous assessment + 25% External: Architectural Graphic and Techniques I) + (25% Internal continuous assessment + 25% External: Design Studio I) }

References:

- ND Bhat, **Engineering Drawing**, Charotar
- IH Morris, **Geometrical Drawing for Arts Students**, Universities Press
- KR Gopalakrishna, **Engineering drawing Vol I and II**, Subhas
- SH Mullik, **Perspective**, Jyotsna Prakashan
- Chen John SM, **Architecture in Pen and Ink**, McGraw-Hill C
- Kemmerich, Carl, **Graphic Details for Architects**, Pall Mall P
- Kemmerich Carl, **Manual of Graphic Techniques for Architects**, Graphic Designers and Architects, Scribner Book Company
- **New Metric Handbook**; Planning and Design Data, Architectural Press
- Shankar Mulik, **A textbook of Perspective and Sciography**
- Alibert O. Halse, **Architectural Rendering**, Literary Licensing, LLC.
- Russel, James E, **Graphics for Architects and Planners**, McGraw-Hill C

AR 122 Building Materials & Construction Technology II	6 - 6

Focus: Understanding of advanced building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as paint, glass, tiles, lime and timber boards, etc. and methods of preservation, treatment and types of uses.
- To understand both in general and in detail the methods of construction by using Timber products such as ply wood.
- To understand in detail, the methods of construction by using basic materials such as clay products and natural timber for structural and non- structural components.
- To understand building industry through various market surveys.
- To gain basic knowledge of hardware, plumbing and sanitary products through case studies.

Contents

- Brick masonry (continued) – acute / obtuse angled joints, cavity wall construction.
- Types of foundation.
- Lintel & arches – types and their construction.
- Simple wooden joinery
- Construction details in door, window and staircase.
- Ferrous & nonferrous materials iron, steel, market forms of steel, aluminum and copper.

Outcome

- Student will learn Introduction to concrete technology and its materials i.e. composite buildings, complex buildings and steel buildings.
- Student also learns construction of Basic building elements such as door, window, staircase, floor, roof, dome and vault etc.
- An understanding of basic services and hardware and sanitary equipment's for construction methods.

CAD, MUST

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, Construction **Technology**, Prentice Hall
- Barry, **Construction of Buildings**

AR 132 Structures Design and Systems II	3 - 3

Focus: Behavior of building elements and basic structural systems.

Objectives

- Understanding importance of structure and its contents with respect to behavior and language of building elements and components.
- To understand and Join knowledge of architecture, civil engineering, statics and material in a natural way.

Contents

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with manmade structures.
- Functions of structures. Primary and secondary forces acting on structures – gravitational force, live load, wind, temperature variation. Types of supports & their characteristics.
- Analysis & design – Design criteria.
- Primary elements of structure and their behavior.
- Factor of safety & factors affecting it. Characteristics of structural design – strength, stiffness and stability. Discussion on factors affecting them and ways of satisfying these requirements.
- Study of behavior of structures through models and testing them for given load.

Outcome

- Enable students to understand the concepts of structures in architecture.
- Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.
- Analyze any type of determinate trusses with different end conditions.
- Enable students to solve the sectional properties for any geometrical shapes.
- The concepts of elastic constants and its applications for various types of problems with a
- Thorough understanding of stresses and strain.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- IB Prasad **Applied Mechanics and Strength of Materials**
 - RK Bansal, **Strength of Materials** Third Edition, Laxmi Publications, New Delhi
- 1.

AR 142 History & Humanities II	3 - 3

Focus: Continuing from previous semester, to emphasis on Indian, Islamic and Mughal architecture and style in India.

Objectives

- To understand Indian architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Indus valley civilization, Vedic period and manifestation of Buddhist and Hindu architecture in various parts of the country.

Contents

Harappa - Cultural Civilization

Buddhist era architecture in India

Indian temple architecture

Islamic architecture in India

Mughal architecture

The topics will be containing:

- Introduction to Unit, History, excavation, background, planning of town and cities, lifestyle, art and culture etc.
- Conclusion
- Summary of Unit

Outcome

- The students understand Indian architecture as a response to the political and socio cultural conditions present in India at different points of time.
- The architectural responses will be understood with respect to technology style and character.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Sir Bannister Fletcher, **History of Architecture**, Athlone Press
- Brown Percy, **Indian Architecture, Buddhist and Hindu period**, Read Books
- Grover Satish, **Architecture of India, Buddhist and Hindu**
- Tadmor Christopher, **History of Architecture in India**, Phaidon Press.
- Brown Percy, **Indian Architecture, Islamic period**, Palmer Press
- Volwahsen, **Living Architecture Vol 1 &2/A**

AR 152 Basic Design & Workshop II	6 - 6

Focus: Introduction to architectural design through basic design – elements of design

Objective

- To understand the elements and principles of Basic design as the building blocks of creative process.
Design through exercises that will develop the originality, expression, skill and creative thinking.
- To involve students in a number of exercises to understand the grammar of design and visual composition.
- To enable the understanding of 3D Composition by involving students in a number of exercises. This will help generation of a form from a two dimensional/abstract idea.
- To enable the understanding of the relationship between the grammar of design and architecture by involving the students in seminars/ workshops and simple exercises which will look at building form analytically.

Contents

- Elements and principles of visual composition using point, line, shape.
- Exploring color schemes and their application in a visual composition and in architectural forms and spaces.
- Study of texture and schemes of texture both applied and stimulated and their application.
- Study of linear and planar forms using simple material like mount board, metal foil, box boards, wire string, polystyrene etc.
- Study of solids and voids to evolve sculptural forms and spaces and explore the play of light and shade and application of color.
- Study of fluid and plastic forms using easily moldable materials like clay, plaster of paris etc.
- Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.
- Application of basic design in architectural design through the manipulation of line, plane, solid and voids and application of texture color, proportion etc.

Outcome

- An understanding of the qualities of different elements as well as their composite fusions.
- An ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

Reference:

- F. David Martin and Lee A Jacobus, **Humanities through the Arts**, McGraw-Hill

MDC 003 Environment Science and Studies	4 - 4

Focus: Architecture as a system of environmental control

Objective

- To study human heat balance and comfort.
- To familiarize students with the design and settings for buildings for daylight and factors That influence temperature
- To inform about the air pattern around buildings and the effect of wind on design and siting of buildings
- To expose the students to the various design strategies for building in different types of climatic zones.

Contents

- Climate- factors affecting, classification, modes of measurement, assessment tools
- Comfort- factors affecting, theories and proposed modes of measurement, assessment tools
- Introduction to building physics

Outcome

- Understanding of thermal balance in human beings
- Designing climate responsive structure
- Conceptual understanding of air flow in buildings

Examination Pattern:

- Continuous Evaluation Mid Term 1: I hour duration 25 marks Weightage: 12.5%
- Mid Term 2: I hour duration 25 marks Weightage: 12.5%
- End Term: 3-hour duration 100 marks Weightage: 50%
- Field work and Report writing: ----- Weightage: 25%

Second Year

AR 211	Design Studio III	15 - 15

Focus:

- B.** Basic Computer knowledge related to Architectural software
- C.** Understanding of context and implementation of principles in design
- D.** Understanding importance of spoken, written and visual communication.

Objectives

- Understanding fundamentals of theory of architecture
- Understanding importance of spoken, written and visual communication. basic vocabulary of design
- Studio design project
- Reinforcing spoken, written and presentation skills in English.

Content

Studio projects shall be structured to deal with two (or more) distinctly different contexts with program being identical. Studio could be divided into two groups with different sites and resulting solutions shall be discussed in the class to highlight the various differences, which can be attributed to the contextual reasons. In the second project, context with a number of constraints shall be chosen and the process of enhancing the context, in other words, place making shall be investigated. Studio shall attempt to define the nature of relation between built and un built spaces and the need of using un built spaces for programmatic needs shall be highlighted.

- Advanced English reading and writing exercises through book reviews, business letter writing, and presentation of design projects, group discussions and project reports.

Outcome

- Enable students to learn and understand theory of architecture in depth with practical approach in design.
- Enable students to gain confidence in spoken and written English language
- Understanding of context and relationship of functions

Examination Pattern:

- Sessional: 100% {(60 %: 30% Internal continuous assessment + 30 External) + (40 %: 20% Internal continuous assessment + 20% External)}

Reference:

- Francis DK Ching **Form, Space and Order**
- Prammar VS **Design Fundamentals in Architecture**

- Gideon Space Time and Architecture
- von Meiss, Pierre **Elements of Architecture from Form to place**
- Frank Lloyd Wright on **Architecture**
Wright
- Papadakis **Free Spirit in Architecture**
- Crouch June **Traditions in Architecture/Data Planning**. Johnson
- Snyder, James **Introduction to Architecture**
- Porter, Tom **Colour for Architecture**
- Chen John S M. **Architecture in Pen and Ink**
- Kemmerich Carl. **Graphic Details for Architects**
- Kemmerich Carl. **Manual of Graphic Techniques for Architects, Graphic Designers and Architects**
- **New Metric Handbook; Planning and Design Data**. Recent Edition
- Shankar Mulik. **A Textbook of Perspective and Sciography**
- Alibert O. Halse. **Architectural Rendering**
- N.D. Bhatt. **Engineering Graphics**
- Russel, James E. **Graphics for Architects and Planners**
- Robertson Howard. **The principles of Architectural Composition**. Architectural press, UK, qsasa

AR 221	Building Materials & Construction Technology III	4 - 4

Focus: Knowledge of various structural systems and methods of construction and detailing of buildings of medium complexity using natural and manmade materials.

Objective

- To acquaint the students with construction practices pertaining to RCC, floors, roofs and flooring with different materials. Load bearing and frame structures.

Content

- Construction** - Study of principles and methods of construction of RCC, one way, two way slabs-cantilever slabs, sloping RCC roof, vaults, domes including form-work techniques and reinforcement details. Construction with materials alternative to RCC.
- Flooring in mud, murrum, stones marble, granite, tandur/kota stone, mosaic, terrazzo, ceramic tiles and wooden flooring
- Paving Cast in situ concrete, concrete tiles, interlocking blocks, clay tiles, brick and stone
- Plaster Method of plastering a) Internal (use of various finishes viz., lime, cement, plaster of paris, puffing etc., b) External smooth, rough, textured, grit plaster.
- Materials** – Paints, varnishes and distempers, emulsions, cement base paints. Constituents of oil paints, characteristics of good paints, types of paints and process of painting different surfaces. Types of varnish, methods of applying varnish and French polish and melamine finish.

Outcome

- An Understanding of advanced materials, products and methods of construction and in detailing.

Examination Pattern:

- Theory: 20 %
- Sessional: 80% (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Duggal SK. **Building Materials**

AR 231	Structure Design & Systems III	3 - 3

Focus: Understanding the structural concepts and behavior of structural elements relating the knowledge acquired to architectural design

Objective

- To give an insight into the structural behavior of columns and beams

Content

- Introduction to Torsion theory with simple problems.
- Columns and struts effective length, critical load, slenderness ratio, Euler's equation for different end conditions.
- Formula for slope and deflections of cantilever, simply supported and overhang beam using double integration and Macaulay's method of different load conditions.
- Moment area method for simple case of loading. Expound the structural concepts introduced in non- mathematical terms with examples and application in architectural design.

Outcome

Students will have an insight into the structural behavior of columns and beams

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- SS Bhavikatti. **Strength of Materials**
- Basavarajaiah BS and Mahadevappa. **Strength of Materials**

AR 241	History of Architecture	2 - 2

Focus: Western architecture and its development

Objective

- To provide an understanding of Western architecture during Renaissance, Baroque, Neo classical and modern periods.

Content

- Background and influences on Renaissance architecture. Characteristics of Renaissance Architecture in general.
- General characteristics of Baroque.
- Transitional Period A brief account of the situation before the change over to Modern architecture in Europe. Palladian Revival in Britain, Greek Revival and Gothic Revival
- Impact of Industrial Revolution in Europe the social, economic and political changes effected, new requirements of the society, new materials and technological developments.
- The Chicago school works of Louis Sullivan, early industrial buildings, contributions of Bauhaus, De Stijl Movement, Italian Futurism, Art Nouveavau Movement and Arts and Crafts Movement to Modern Architecture
- Ideas and works of great masters Le Corbusier, FL Wright, MV Rohe, Walter Gropius contributions of Brazilian architect Oscar Niemeyer

Objective

- To understand architecture of different parts of world as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in architecture in various parts of the world.

Outcome

- The students will understand architecture as a response to the political and socio cultural conditions present in specific region at different points of time.
- The architectural responses will be understood with respect to technology style and character.

CAD, MUST

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Sir Bannister Fletcher. **History of Architecture**
- Henri Stierlin. **Architecture of the world – Greece**
- Henri Stierlin. **Architecture of the world - The Roman Empire**
- Henri Stierlin. **Architecture of the world – Romanesque**

AR 251	Building Services I	3 - 3

Focus: Understand building services as essential part of design

Objective

- To impart the knowledge and skills required for understanding the building services of water supply and sanitation and their integration with architectural design.
- Understanding rain water harvesting.

Content

- **Water supply** introduction, sources of water supply, qualitative and quantitative aspects, impurities, purification sedimentation, coagulants, filtration, disinfection, water softening and miscellaneous treatment of water. Sources of water pollution and preventive measures. Public water distribution system, methods of layout of distribution pipes.
- Pipe sizes, fittings, valves, types of taps, wash basins, sink, bath tubs, flushing cistern. Domestic water supply systems mains, ferrules, service pipe, water meter, sump, pumps, overhead tank, distribution pipes, cold water and hot water supply for single and multistoried buildings.
- Provision for fire fighting fire hydrants. Study of solar heating systems, gas and electric geysers.
- **Sanitation:** Introduction, importance and purpose of sanitation, definitions bacteria, invert, sewer, sewerage, types of refuse, collection and disposal of refuse, systems of drainage separate, combined and partially separate system, advantages and disadvantages of each system.
- Sanitary requirements for various types of buildings, types of pipes.
- Man holes drop manholes, manhole with intercepting trap, inspection chambers, self cleansing velocity, drains on sloping sites, sub soil drainage, storm water disposal catch basins, inlets, storm water regulators.
- Importance of pumps and sewage pumping stations, septic tanks soak pit, soak well, design aspects, disposal of effluent.
- House drainage principles, traps-floor trap, multi-trap, gully trap, grease and oil trap, urinals, Indian, European, Anglo Indian type of water closet, squatting urinal, bidet

CAD, MUST

- Definitions Siphonage, anti-siphonage pipe, cowl, fresh air inlet, soil and waste pipes, vent pipe
- Systems of plumbing single stack, one pipe, one pipe partially ventilated, two pipe disposal of waste water from buildings typical plan of residence with garage showing all the traps, inspection chambers, pipes connected to public sewer line alternatively connecting the same layout of pipes to septic tank. Testing of drains and drain pipes.
- Brief study - natural methods of sewage disposal by dilution and land treatment, self purification of natural waters, oxidation, sewage treatment, oxidation ponds, aqua privy, garage drainage and layout of simple drainage systems, sewers, materials, laying and testing of sewers, ventilation of sewers, surface drains, sewer, cleaning of sewers, recycling of sewage water. Rain water harvesting.
- Rural sanitation, biogas, different methods of collection and disposal of dry refuse and night soil
- Site visits Water treatment plant, sewage treatment plant, multistoried apartments for studying water supply and sanitary arrangements.

Outcome:

- Students will understand the importance of building services and their use in building
- Students will learn Rain Water Harvesting in buildings

Examination Pattern:

- Theory: 30 %
- Sessional: 70 % (35 % Internal continuous assessment + 35 % External)

References:

- RS Deshpande. **Sanitary Engineering** - (Vol I and II)
- S Birdii. **Water supply and Sanitary Engineering**
- Relevant **IS Codes of India**

AR 261	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 212	Design Studio IV	16 - 16

Focus: A. Urban context and architecture design

B. Basic Computer knowledge related to Architectural software

C. Basic vocabulary of design.

Objective

- To understand the issue of building and context, building bylaws, urban design.

Content

- The design of building will look into aspects of context, surrounding and building program. architectural dimension with issues of services.
- Designing in specific context. Detailed layouts and site planning for building program.

Outcome

Students will learn urban scale and handling of architectural design

Examination Pattern:

- Sessional: 100% {(60 %: 30% Internal continuous assessment + 30 External) + (40%: 20 % Internal continuous assessment + 20% External)}

Reference:

- Broadbent Geoffrey. **Design in Architecture**
- Lang Jon. **Creating Architectural Theory**

AR 222	Building Materials & Construction Technology IV	4 - 4

Focus: Understanding of materials with respect to the construction style and its function

Objective

To study construction systems with focus on roofing and techniques of pile foundation and metal doors, windows and partitions.

Content

Part A.

Construction – Mild steel and Aluminum doors and windows and partitions. Details of RC framed structures with reinforcements, beams including cantilever beams, columns, flat slab, ribbed filler slabs, waffle roof.

Pile foundation Precast piles, cast-in-situ piles, types of piles, method of driving piles, pile caps etc.

Part B.

Materials – Anti-termite treatment to foundation, masonry walls and wood work (pre construction) water proofing materials and weather proofing materials like chemical admixtures and surface applications. Lime and brick bats etc., Pest control treatment.

Outcome:

Students will get exposure of different materials and their practical usage on site.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Duggal SK. **Building Materials**

AR 232	Structure Design & Systems IV	3 - 3

Focus: Structural systems and implications in design

Objective

- To give an insight into the structural behavior of portal frames.

Content

- Analysis of propped cantilever, fixed beams, shear force diagrams and bending moment diagrams. Analysis of continuous beam (maximum three spans)
- Clapeyron's Three Moments Theorem b) Moment Distribution Method
- Analysis of portal frame (single bay, single story with sway and non-sway) by moment distribution method
- To explain the structural concepts introduced in non- mathematical terms with examples and application in architectural design.

Outcome:

Students will learn the applications of structural mathematical terms in design, through site visits and class lectures.

Examination Pattern:

- Theory: 30 to 35%
- Sessional: 65 to 70% (35 % Internal continuous assessment + 35 % External)

References:

- SS Bhavikatti. **Structural Analysis**
- Vazirani and Ratwani. **Theory of Structures**

AR 242	Surveying & Levelling	2 - 2

Focus: To develop the knowledge and skills related to surveying and levelling principles and practice.

Objective

- Understanding principles of surveying and leveling, use of various survey and leveling instruments, carrying out surveys of land of medium complexity and preparation of survey plans.

Content

- Surveying Definition, classification, principles of surveying, character of work, shrunk scale.
- Chain Survey Instruments used, types of chain, instruments for ranging. Setting out angles, erecting perpendiculars.
- Field work chain triangulation, recording and plotting, errors in survey.
- Plane table survey plane table and accessories. Methods of plane table survey, radiation, intersection, traversing and resection, field problems.
- Levelling definition, classification, booking and reduction of levels, longer levelling, errors
- Theodolite study of instruments, definition of different terms, temporary adjustments, uses, measuring horizontal and vertical angles, method of repetition, extension lines.
- Contouring Characteristics of contours, direct and indirect methods of contouring, interpolation, uses of contours, setting out works such as center lines of a building, grade for sewer, center line of a bridge.

Outcome

Students will learn different methods of understanding complex sites: contours, terrain, cliffs, valley and so on.

Examination Pattern:

- Theory: 20 to 25%
- Sessional: 75 to 80% (40 % Internal continuous assessment + 40 % External)

AR 252	Building Services II	3 - 3

Focus: Advance services in building industry

Objective

- To introduce students to electrical services and illumination and to sensitize them with respect to their integration into Architectural Design.

Content

Part A

- Importance of electrical services in buildings, introduction to commonly used terminology
- Supply and distribution of electricity to buildings substations (including high tension panels, transformers, low tension panels, generators) and overhead versus underground distribution systems, panel boards etc.
- Internal supply and distribution brief description of various cabling types, conduit, PVC casing and capping wiring systems;
- Earthing and brief description of protective devices fuses, MCBs, ELCB, etc., Electrical load estimation.
- Introduction to power and lighting circuits. Indian Electricity Rules-Relevant codes of Practice.

Part-B

- Quality and quantity of light;
- Methods of lighting: ambient, task and accent lighting
- Systems of luminaries: direct, indirect etc.
- Various types of electrical lamps incandescent, fluorescent/CFL, HID s, neon lamps and their lighting characteristics
- Design considerations for different types of occupancies and tasks Preparation of a lighting and electrical scheme

CAD, MUST

Outcome:

Students will learn to incorporate the element light with understanding of its impact in design

Examination Pattern:

- Theory: 30 %
- Sessional: 70 % (35 % Internal continuous assessment + 35 % External)

References:

- H Cotton. **Electrical Technology**
- L.Uppal. **Electrical Wiring, Estimating & Costing**
- Anwari. **Basic Electrical Engg**

CAD, MUST

AR 262	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

Third Year

AR 311	Design Studio V	16 - 16

Focus: Institutional building design and its fundamentals

Objectives

- To understand the differences and similarities between institutional goals and architectural goals.
- To understand creating of spaces for learning. Formal, informal and interactive processes of learning and role of the built environment.
- To understand the role of built environments in therapeutic and nurturing institutions
- Working drawings

Content

- Institutional projects like facilities of higher learning, vocational training or a small-scale campus may be given. Case studies of contemporary campus architecture (built since 1980s) shall be carried out.
- There are two distinct typologies of campuses, one that has integrated into the urban fabric at the edges of its boundary and the other that has ignored the urban fabric. Campus planning may be attempted as a two-stage project, with site planning, as one and other stage could be a detailed design of one of the identified buildings.
- The design has to respond to climatic, environmental and ecological factors.
- Detailing of architectural features of the major project like entrance lobby, skylights and staircases has to be attempted.

Outcome

- Students will learn the goals of the institutions regarding the role of built environment in its functioning.
- They will learn to sensitively design to the needs of disabled, aged people and children.
- One major project and one minor/ time problem to be tackled in semester

CAD, MUST

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 321	Building Materials & Construction Technology V	4 - 4

Focus: Detailing of building elements

Objective:

- To study constructional systems and detailing of special doors, windows, structural glazing and cladding

Content:

Part A

- **Construction** – PVC & FRP, frameless glass doors and windows and partitions. Wooden/Steel/Aluminum sliding and folding doors and partitions.
- Steel doors for garages and workshops. Collapsible gate and rolling shutters, remote control systems of doors and gates. Structural glazing, aluminum composite panel cladding.

Part B.

- **Materials** – Insulation materials Thermal and sound insulation materials. Glass its manufacture in its various types like plate, tinted, decorative, reinforced, laminated glass block, fiber glass, glass murals, partially colored glass, etching of glass and its applications in building industry for both exteriors and interiors.
- Glass fabrication techniques, fiber reinforced composite materials and products.

Outcome:

Students will learn to represent drawings with specific details which will bring clarity to the design as well as understanding

Examination Pattern:

- Theory: 20 to 25%
- Sessional: 75 to 80% (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Barry. **Construction of Buildings**

AR 331	Structure Design & Systems V	3 - 3

Focus: Concreate as a building material and its structural qualities

Objective

- To provide an introduction to design of reinforced concrete structures.

Content

- Concrete: Composition, basics of mix design, water cement ratio, strength, durability, workability requirements.
- Relevance of RCC in architectural practice. Advantages of RCC over other conventional structural practices. Steel for RCC Plain & Twisted bars, IS 456 code provisions.
- Working stress method of design basic concept, types of loads, assumptions. Calculation of MR for singly RC beam.
- Limit state method of design. Necessity and philosophy of limit state design. Limit state design of simply supported slabs, beams, T-beams, columns (axial and uniaxial bending) and footings (axially loaded square footing).
- Design of Dog legged and open well stairs (waist slab type)

Outcome:

Students will learn to demonstration models and experiments with materials and structural systems related to the above topics

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Ramachandra. **Design of steel Structures**
- Kazimi and Jindal. **Design of Steel Structures.**
- IS 800 - 1984, IS 883-1970
- IS special publication for the design of steel structures [SP-6 (1)]

AR 341	Landscape Architecture	3 - 3

Focus: Landscaping as a medium of design in architecture. Understanding of Landscape elements like trees, shrubs, plants, water, rocks and development of landscape planning and application in architectural design.

Objective

- To introduce students to the discipline of landscape architecture and to develop basic skills required in handling simple landscape design projects.

Content

- Introduction to landscape architecture, definitions.
- Noted landscape architects and their concepts and definitions
- Natural and manmade landscape, urban and rural landscape
- Elements of landscape architecture like vegetation, land forms and water bodies and their application in design
- Introduction to Site planning and site analysis
- Landscape materials and plant materials study, introduction to taxonomy
- Study and analysis of contemporary landscape designs
- Study of existing landscaped areas like courtyards, gardens, urban spaces etc.
- Street and site furniture Application of landscape design for site plans, small gardens, residential areas, urban spaces, courtyards etc.

Outcome:

- Students develop skills required in handling landscaping project.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

References:

- JO Simmonds. **Landscape Architecture**
- Michel Laurie. **Introduction to landscape architecture**

AR 351	Climatology	2 - 2

Focus: Climate responsive architectural design requires understanding of climatology

Objective:

- Understanding of Climate and its impact on architectural design, fundamentals of climatology and environmental studies, Passive climatic control.
- To apply the principles of Solar Passive Architecture to design of buildings.

Content:

- Introduction to passive techniques of cooling such as evaporative cooling, earth tubing, wind scoops, roof ponds, shaded courtyards etc.,
- Two design exercises (in hot dry and warm humid climate) with an objective to integrate passive cooling systems in the design.

Outcome:

Students will learn the impacts of climate on architectural design and dealing with them

Examination Pattern:

- Theory: 20 %
- Sessional: 80% (40 % Internal continuous assessment + 40 % External)

References:

- Koenigsberger. **Manual of Tropical Housing & Buildings (Part-II)**
- Martin Evans. **Housing, Climate and Comfort**
- Maxwell Fry. **Buildings in the tropics**
- Arvind Kishan, Baker & Szokolay. **Climate Responsive Architecture**

CAD, MUST

AR 361	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 312	Design Studio VI	16 - 16

Focus: A large scale housing project / Working Drawing

Objectives

- To understand the difference in housing as a process and a product, the role of an architect in creating the product and facilitating the process
- To understand the needs of privacy, communal spaces, efficiency of open spaces and ideas of extended living areas
- To differentiate and understand the nature of organic and planned communities.

Content

- Scale of the project shall be limited to allow for intensive study rather than repetition of typical configuration.
- Housing projects can be attempted with added complexities for example, dense context, occupation based, traditional urban fabric, social status and prevalent social strata.
- Details from the dwelling cell to immediate shared space to communal space shall be emphasized and worked out.
- Socio cultural layer of the occupants shall form a strong fabric in the ultimate weave of the design.
- Projects shall aim at developing a very sensitive attitude towards micro level human habitation and role of architecture in enhancing or curbing the quality of living.

One major project and one minor/ time problem to be tackled in the semester.

Outcome

Students will learn to handle projects with considering disabled, aged people and children. Students will learn to work in socio cultural harmony as well as towards all levels of requirement of housing.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 322	Quantity & Estimation	3 - 3

Focus: Systems of taking out quantities and estimating for all trades involved in construction of medium complexity, writing specifications for materials and various items of work.

Objective

- To develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

Content

- Introduction, importance of estimation, types of estimates, mode of measurement etc.,
- Study of local SR rates, market rates, measurement book (MB), RA bill, interim and final certificate
- Detailed rate analysis of building items as per current schedule of rates (CSR) of local PWD for information only
- Percentage of various materials used in building items like cement, steel, rubble, metal, sand, brick, tiles etc.,
- Abstract and detailed specifications for various materials and items of work used in building

Estimate of:

- Load bearing and RCC framed structure with one example for each
- Typical interior items of a residence and an office
- Various types of roofs like steel and wood including roofing materials like
- Mangalore tiles, AC, GI sheet etc.,
- Water supply and sanitary works
- A typical layout plan with roads, culverts etc.

Outcome:

- Students will develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

References:

- SK Dutta. **Estimating and Costing**
- SC Rangawala. **Estimating**

AR 332	Structure Design & Systems VI	3 - 3

Focus: Steel as the advance structural building material and its techniques.

Objective

- To give an introduction to the design of steel structures.

Content

- Design of simple and eccentric riveted and welded connections.
- Design of tension and compression members in trusses.
- Design of built-up columns (lacing only)
- Design of slab base (no gusseted base) and simple column and footing connection details
- Design of laterally restrained beams (simple and compound)
- Provision for fire protection for steel structures relevant code provision

Outcome

- Students will learn details and calculations of steel structure and its impact on design

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- N Krishna Raju. **Pre-stressed Concepts**
- DL Schodek. **Structures**
- Alexander Zamen. **Form and Structure in Architecture**
- N Krishna Raju and RN Pranesh. **RCC - design and practice**

AR 342	Professional Practice	3 - 3

Focus: Introduction to the profession of architecture, its division and sub divisions

Objective

- To understand the responsibilities & liabilities of the profession. To understand the process of contract management.

Content

Profession: Idea of profession and essential difference among profession, trade and business.

- Profession of architecture, its essential tenets, duties and liabilities.
- Types and extent of services offered by architects, scale of fees, stages of payment, and contract between client and architect.
- Code of Professional Conduct, Architects Act of 1972. Role of Council of Architecture and the Indian Institute of Architects in the functioning of the Profession.

Practice: Types of Architectural firms, proprietorship, partnership, associate ship, and private limited concerns. Advantages and disadvantages of each type of firm, various means of building client base and gaining projects, Architectural competitions.

- Guidelines of COA, procedure of conduct of such competitions.
- Administration and basic accounting procedures. Taxes and implications of service tax. Implication of GATS on the profession in India.

Building Industry: General overview of the industry. Various participants and dimensions of building industry. Finance, statutory controls, construction procedures, enforcement issues related to building industry and the role of architect, employer, and contractor.

Contract Management: Overview of procedures in contract management with a focus on Architect's role.

Tender: Procedure of calling for tender, documents necessary for tendering process. Tender document and its content. Types of tenders, suitability of different types to various categories of projects. Advantages and disadvantages of each type of tender. Tender notices, opening, scrutiny, process of selection and award. Architect's role in tender process. Essential characteristics of Tender Notice, Earnest Money Deposit, Security Deposit, Retention Amount, Mobilization Amount

CAD, MUST

and Bonus & Penalty Clauses.

- Various issues arising out of tendering process and the role of an architect in maintaining objectivity in the process.

Contract: General Principles, types of contract, definitions of various terms used in the contract document. Contract document, contents and sections dealing with various aspects of contract management. Conditions and Scope of Contract and the role of an architect in ensuring a positive completion of a contract. Architect's role in the contract and vested authority.

Issues of Contract: i) Termination of contract, ii) Certificates of value and quality, iii) Virtual completion and final completion, iv) Defects liability period, v) Latent and patent defects, vi) Liquidated and un-liquidated damages, vii) Extension of time, delays and penalty, viii) Non tendered items, extras, extra work, additional works, variations, rate analysis and architect's role in certification of variations, ix) Prime cost, provisional sum, x) Types of insurance necessary during contract including fire insurance for safeguarding client's interest.

Outcome

Students will learn the responsibilities & liabilities of the Profession and understand the process of Contract and project management.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

References:

- Roshan Namavathi. **Professional Practice for Architects & Engineers**
- Bob Greenstreet. **Legal and Contractual Procedures for Architects**
- AJ Legal Handbook
- KG Krishnamurthy and SV Ravindra. **Professional Practice**

AR 352	Town Planning & Building Bylaws	3 - 3

Focus: Urban and regional planning and the factors of planning

Objective

- To give an introduction to the discipline of urban and regional planning

Content

- Human settlements Urban settlements and Rural settlements, differences, origins, evolution and growth of settlements. Major functions of a city, city forming and city serving functions. Problems faced by a typical city. Relation between urban and rural settlements, characteristics and planning efforts of cities and towns of various historical periods like Egyptian, Greek, Roman, Medieval, Renaissance, Neo-classical. Industrial Revolution and its impact on cities, the contemporary city. Cities of Indus valley and Vedic period, cities of Moghul period and British period, typical Indo-Aryan cities, typical Dravidian temple city.
- Planning Theories enunciated by Ebenezer Howard, Patrick Geddes, Soria Y Mata, Doxiadis, Le-Corbusier, Clarence Stein, Clarence Arthur perry, Hilberseimer their relevance to Indian conditions.
- Land use planning, land use classification for cities and rural settlements, analysis of land uses in Indian cities.
- Urbanization, Industrialization and urban growth, definitions and inter relationship. Trends in urbanization in India since Independence. Growth of metropolitan cities, their growth and management problems, world urbanization trends.
- Components of a settlement activity pattern and land use, traffic and road network, density of population and population distribution. Central business district of a city, other business districts, urban nodes, rest of the city, fringe area and suburbs. Growth and aging of various parts of the city particularly the CBD, the problems caused due to this including slums, internal spatial structure of cities concentric zone theory, sector theory, multiple nuclei concept and work-home concept.
- Planning Techniques study and analysis of existing settlements, methodology of conducting diagnostic surveys and studies, land use survey, density survey, FSI survey, traffic surveys, presentation of data
- Regional Planning relation among various settlements of a region, pattern of settlements in a

region. Definition of a region, various types of regions, basic principles of regional planning

- Urban Renewal causes and consequences of urban blight and obsolescence slums and shanties methods of conducting surveys, analysis and presentation of data, prevention of formation of slums and squatter settlements. Environmental and management issues.

Outcome

Students will have an introduction to the discipline of urban and regional planning.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

Reference:

- Gallion and Eisner. **The Urban Pattern: City Planning and Design**
- Chapin. **Urban Planning**

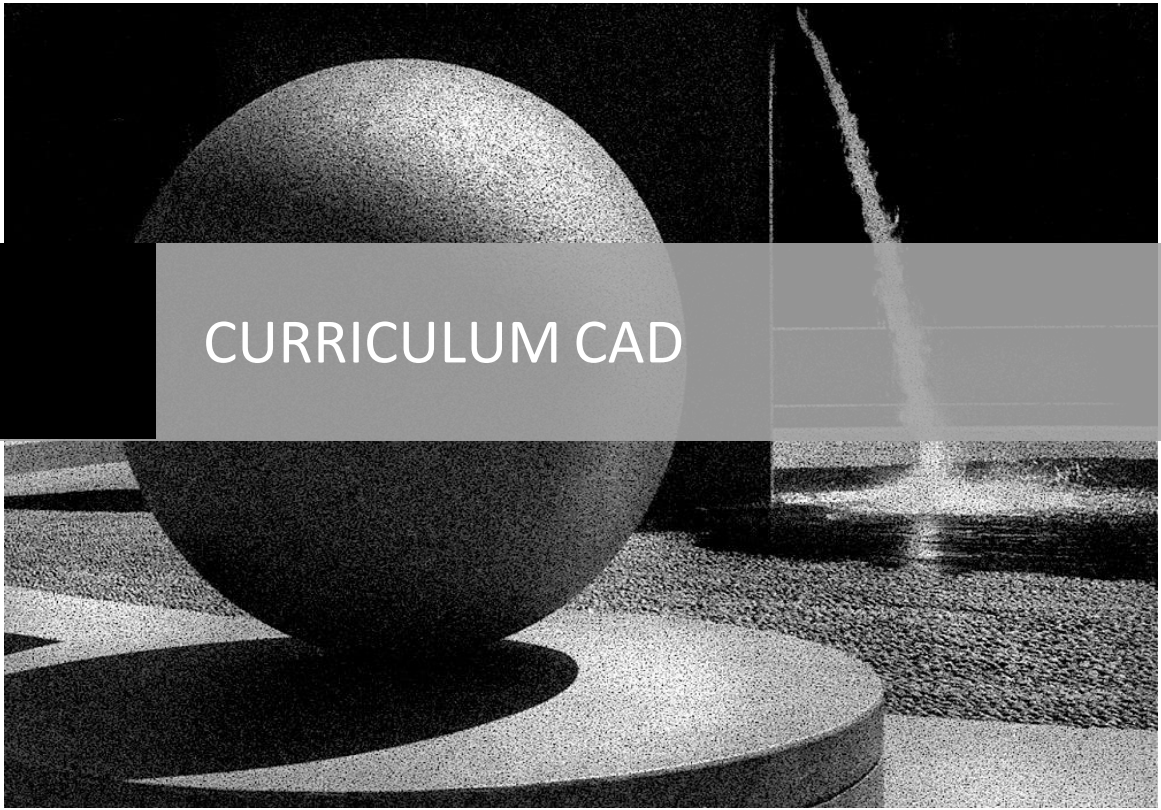
AR 362	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

SESSION

2017-18



CURRICULUM CAD



A LEADING WOMEN'S UNIVERSITY

Undergraduate Program
Bachelor of Architecture

College of Architecture & Design

Mody University of Science & Technology

N.H. 11, Lakshmangarh, Sikar, Rajasthan - 332311

Academic Curriculum (2015 - 16 Onwards)
Undergraduate Program - Bachelor of Architecture
College of Architecture & Design, MODY University
Mody University of Science & Technology, Lakshmangarh, Rajasthan

B. Arch.

5 Years

(300 credits)

Background

A curriculum for Design Education evolves from the vision of the institution, its aspirations and its capability to deliver the knowledge. It defines the relationships between the teacher and the student and the institution. Curriculum for Architecture also connects creativity and physical reality.

Five-year Architecture undergraduate program is designed to provide an exceptional university education as well as comprehensive preparation for entry in the competitive and challenging career in architecture. Studies in architecture and other associated disciplines are undertaken in parallel throughout the five-year program. This five-year undergraduate professional program is a professional degree accredited by the **Council of Architecture, India**. The program is for a limited number of qualified students committed to the study of architecture. These students are admitted directly to the professional degree program and begin studies in architecture in the first year.

The **B. Arch** curriculum has two stages of study. The stage-1 (years 1, 2, 3) provides a foundation of understanding on which to build a second level of advanced study. Continuously through the course of the program runs the Design Studio, in which projects are selected as a means for developing the professional skills, knowledge, understanding and a platform to create exemplary architectural designs. At the end of the third year, the program culminates with a studio project helping students to summarize what they have learned with an introduction to prepare themselves for more independent studies in the advanced professional program.

The stage-2 (years 4 & 5) concludes with a **semester** (one or two) of Professional Training (forth year) and Final Year Dissertation program. The first semester of the final Year integrates an introduction to independent Research Methods. An integrated design research phase continues throughout the final two semesters. The final year project is selected by the students' themselves to provide them an opportunity to develop their individual point of view about the profession and create their own place in the building industry. Thesis or Dissertation is part of the course to investigate issues the student sees as significant to herself and to the profession.

The Objective

- Develop direct personal experience of social, environmental and technological contexts.
- Encourage exploration of the diversity of thoughts, techniques, working methods and material palettes.
- Develop capacities to think from simple first principles, using observation, common sense and intuition to build more elaborate conceptual frameworks.
- Develop ability to “learning how to question, absorb and analyze” rather than following “conventional” practices and solutions.
- Understand and connect to local realities as vehicles for solutions.
- Encourage sharing and collaboration and as well as individual achievement.
- Creativity, skills and initiative should be developed and encouraged to assist the involvement of the body, mind and therefore confidence.
- General awareness towards architectural heritage introduced from the beginning of the degree program through courses / electives by experts on conservation, restoration and re – adaptation of buildings.

The Curriculum (B. Arch)

The curriculum allows students to choose their own area of interest and allow for independent exploration in the later years (3+2-year model) by having option of choice based Studio and Theory subjects. This is important to have a more mature and self-driven Architect. The curriculum shall also encourage students to select subjects of their choice from allied disciplines at other Colleges of this University.

The curriculum is to allow for Inter-disciplinary teaching in areas of Technology, Humanities and Environment by conducting joint sessions and assignments. The course content is synchronized to facilitate the same. Moreover, each semester has a thematic emphasis to allow many different subject to address the same. This is done to facilitate further synthesis.

Curriculum structure allows for other means of learning such as travelling studios, joint studios or studios in other socio-cultural environment apart from exchange program. This can provide the necessary confidence to deal with the outside world.

The courses dealing with design studio, technology, humanities shall be taught in an inter-disciplinary manner and not as compartmentalized specializations.

History, theory & technology based courses are those, which let us understand and appreciate, social, cultural, technological and historical knowledge and skills for its application in design projects.

Course Structure

The course structure and relative emphasis between sub-disciplines vary depending on their position within the course.

First year, being a Foundation year, the emphasis shall be on the development of background knowledge such as sensibility, analytical skills, technical and general communication skills and associated disciplines.

During Second and Third, Advanced years the emphasis is on understanding and appreciation of in-depth relationships between various disciplines and use of their resolutions, complexity, techniques and methods of application. The Fourth and Fifth Years, termed as final years, emphasize the development of the individual’s maturity and establishment of direction. During last two years of the course student develops her theoretical and practical understandings and decide on personal choice of directions.

Credit Loads

The course is of 5 years / 10 semester's duration. Each year consists of 2 semesters of approximately 16 weeks each. Each semester carries a contact load of 30 - 32 credits, where 1 credit is equivalent to 1.0 lecture hour/week in theoretical subjects and studio, workshop, laboratory based courses.

Each semester normally consists of (including design studio) not more than 6 subjects and each subject is normally of at least 2 credits.

In addition to subjects that form the core of the curriculum, the course offers 10 credits out of a total of 300, as electives. These electives are offered within the disciplines of humanities, arts and crafts: history and theory, and technology, so that a student can develop her interest in these areas.

- 1 Credit = 1 Contact hour for Theory and Studio
- 1 Credit = 2 Contact hour for Workshop
- 1 Contact hour = 100 Marks

Assessment

Student's performance is continually evaluated through Time Problems, projects, Tests, Quizzes and periodic assessments of sessions work. Generally, **50 %** of the assessment is through this system, and **50 %** weight is assigned to end of semester examinations (Internal). All core subjects are examined at the end of the semester through project review (Juries), crits, viva-voce or examination papers. Electives are normally assessed through final results, assignments or papers.

In order to clear a subject a student must obtain at least **50 %** marks in all the assessments of the subject. While the teaching faculty in all subject areas does grading, the subjects at the end of the Third and Fifth Year are examined additionally by an external examiner.

First Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

First Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 111	Design Studio –I & Architectural Graphics Skills- Manual & Computers I	10 (5 + 5)	10	0	1000 500 + 500 (250 + 250) (250 +250)	50% 50%	0	3
	AR 121	Building Materials & Construction Technology I	6	6	100	500 250 + 250	50% 50%	3	3
	AR 131	Structure Design & Systems I	3	3	50	250 125 + 125	50% 50%	2	0
	AR 141	History & Humanities I	3	3	50	250 125 + 125	50% 50%	2	3
	AR 151	Basic Design & Workshops I	6	6	0	600 300 +300	50% 50%	0	0
	AR 161	Introduction To Building Industry	2	2	0	200 100 + 100	50% 50%	0	3
	TOTAL		30	30					12

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 112	Design Studio –II & Architectural Graphics Skills- Manual & Computers II	10 (5 + 5)	10	0	1000 500 + 500 (250 + 250) (250 +250)	50% 50%	0	3
	AR 122	Building Materials & Construction Technology II	6	6	100	500 250 + 250	50% 50%	3	3
	AR 132	Structure Design & Systems II	3	3	50	250 125 + 125	50% 50%	2	3
	AR 142	History & Humanities II	3	3	50	250 125 + 125	50% 50%	2	3
	AR 152	Basic Design & Workshops II	6	6	0	600 300 + 300	50% 50%	0	0
	MDC 003	Environmental Studies	4	4	400	0	50% 50%	0	0
	TOTAL		32	32					12

Second Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

Second Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 211	Design Studio – III, Computer Application I, Fundamentals of Design & Communication skills	15 (9 +6)	15	0	1500 900 + 600 (450 + 450) (300+300)	50% 50%	0	6
	AR 221	Building Materials & Construction Technology III	4	4	100	300 150 + 150	50% 50%	3	0
	AR 231	Structure Design & Systems III	3	3	50	250 125 + 125	50% 50%	2	3
	AR 241	History of Architecture	2	2	50	150 75 + 75	50% 50%	2	3
	AR 251	Building Services I	3	3	100	200 100 + 100	50% 50%	3	0
	AR 261	Elective/Workshop	3	6	0	300 150 + 150	50% 50%	0	0
TOTAL			30	33					12

AR 271 Related Study Programme

2 Credit

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 212	Design Studio – IV, Computer Application II & Theory of Design	16 (12+4)	16	0	1600 1200 + 400 (600 + 600) (200+200)	50% 50%	0	6
	AR 222	Building Materials & Construction Technology IV	4	4	100	300 150 + 150	50% 50%	3	0
	AR 232	Structure Design & Systems IV	3	3	100	200 100 + 100	50% 50%	3	0
	AR 242	Surveying & Levelling	2	2	50	150 75 + 75	50% 50%	2	3
	AR 252	Building Services II	3	3	100	200 100 + 100	50% 50%	0	3
	AR 262	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	0
TOTAL			30	32					12

Third Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

Third Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 311	Design Studio V	16	16	0	1600 800 + 800	50% 50%	0	6
	AR 321	Building Materials & Construction Technology V	4	4	100	300 150 + 150	50% 50%	3	0
	AR 331	Structure Design & Systems V	3	3	50	250 125 + 125	50% 50%	2	0
	AR 341	Landscape Architecture	3	3	0	300 150 + 150	50% 50%	0	0
	AR 351	Climatology	2	2	50	150 75 + 75	50% 50%	2	0
	AR 361	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	6
	TOTAL		30	32					12

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 312	Design Studio VI	16	16	0	1600 800 + 800	50% 50%	0	6
	AR 322	Quantity Estimation and Specification writing	3	3	100 50 + 50	200 100 + 100	50% 50%	3	0
	AR 332	Structure Design & Systems VI	3	3	50	250 125 + 125	50% 50%	2	0
	AR 342	Professional Practice	3	3	100	200 100 + 100	50% 50%	3	0
	AR 352	Town Planning & Building Bylaws	3	3	100	200 100 + 100	50% 50%	3	3
	AR 362	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	3
	TOTAL		30	32					12

Forth Year B. ARCH STAGE-2
Academic Curriculum (2015 - 16 Onwards)

Forth Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory Sessional Internal External Viva	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 411	Practical Training	28	0	0 2800 1400 + 700+700	0 100%	0	0
	TOTAL		28					0

Subject To Approval

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 412	Design Studio VIII	14	14	0 1400 700 + 700	50% 50%	0	9
	AR 422	Building Materials & Construction Technology VIII	5	5	100 400 200 + 200	50% 50%	3	0
Spring Semester	AR 432	Structure Design & Systems VIII	4	4	100 300 150 + 150	50% 50%	3	0
	AR 442	Intelligent Buildings	3	3	100 200 100 + 100	50% 50%	3	0
	AR 452	Thesis Orientation	2	2	0 200 100 + 100	50% 50%	0	0
	AR 462	Elective/Workshop	2	4	0 200 100 + 100	50% 50%	0	3
	TOTAL		30	32				12

Fifth Year B. ARCH STAGE-2
Academic Curriculum (2015 - 16 Onwards)

Fifth Year Subject To Approval

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal	External	Weightage Internal	ETE	Exam Duration	Field Trips / Semester
	AR 511	Advance Design Studio IX	14	14	0	1400	700 + 700	50%	50%	0	9
	AR 521	Professional Practice (Advance)	6	6	100	500	250 + 250	50%	50%	3	0
	AR 531	Advance Construction & Structures	6	6	100	500	250 + 250	50%	50%	3	0
	AR 541	Research Methodology	2	2	100	100	50 + 50	50%	50%	3	0
	AR 551	Advance Services	2	2	0	200	100 + 100	50%	50%	0	3
	TOTAL		30	30				50%	50%		12

Subject To Approval

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal	External Viva	Weightage Internal	ETE	Exam Duration	Field Trips / Semester
	AR 512	Dissertation/Thesis	24	24	0	2400	1200 + 600 + 600	50%	50%	0	12
	AR 522	Advance Elective I	3	3	0	300	150 + 150	50%	50%	0	0
	AR 532	Advance Elective II	3	3	0	300	150 + 150	50%	50%	0	0
	TOTAL		30	30							12

First Year B. ARCH STAGE-1

AR 111 Design Studio I	10 - 10

Focus: **A.** Exploring principles of space making, introduction to the built environment and its creative exploration.

B. Learning techniques and skills to represent different objects through 2D & 3D geometry.

Objectives

- To deliver an introduction to architecture through analysis of building elements, such as floors, walls, doors, stairs, rooms, etc.
- To have an understanding of relationship between the human body, scale and the built environment, context, creative and exploratory responses, scale and proportion, basic organizational principles, abstraction, order, constants and variations and design as a response.
- Understanding importance of technical drawing as medium of communication as basic vocabulary in design.

Contents

- Introduction to subject. Getting acquainted with necessary instruments of drawing. Learning to draw straight and curved lines with different qualities.
- Learning good lettering to improve and maintain quality of presentation.
- Learning meaning of terms 'Plan' & 'Elevations' and using them for drawing simple objects through 'Orthographic Projections'.
- Learning theory of 'Orthographic Projections' and drawing projections of points, lines, geometric solids.
- Dealing with sections of simple geometric solids and their combinations.
- Learning principles of development of lateral surfaces of solids, applying them to work out and drawing developed surfaces of simple geometric solids and using them to make models of some of them.
- Auxiliary orthographic projection of solids and its application to sections of solids by inclined plans.
- Principles of space - making.
- Abstract sketches, model making, pencil and ink drawing, idea of human scale: methods of measurement.
- Site visits, experiential exploration of built environment, Case Studies.
- Measure drawings, analytical studies to understand building order, anthropometric content in design inputs lectures on factors affecting design and design disciplines.
- Mental and visual 3D perception

Outcome

- Students will learn about observation and logical skills to involve understanding of a space creation.
- Students will learn desired written and presentations skills to express their designs.
- Students will be able to visualize the idea and concept with expression of thoughts via appropriate communication method.
- Students should learn all aspects of **technical representation of drawings** to express and document their design projects through graphical communication.
- Students will be able to express all drawing contents through all taught mediums of communication.

Examination Pattern:

- Sessional: 100 % {(25 % Internal continuous assessment + 25% External: Architectural Graphic and Techniques I) + (25% Internal continuous assessment + 25% External: Design Studio I) }

References:

- John Hanock, **Time Saver Standards for Architectural Design Data**, McGraw-Hill Professional Publishing
- Ramsay and Sleeper, **Architectural Graphic Standards**, Wiley
- ND Bhat, **Engineering Drawing**, Charotar
- IH Morris, **Geometrical Drawing for Arts Students**, Universities Press
- KR Gopalakrishna, **Engineering drawing Vol I and II**, Subhas

AR 122 Building Materials & Construction Technology I	6 - 6

Focus: Understanding of basic building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as mud, brick, stone, bamboo, timber, etc. and methods of preservation, treatment and types of uses.
- To help students understand the basic building elements, their function and behavior under various conditions with specific reference to 'load bearing construction' and simple non RCC frame structure.
- To develop strong sense of perception, understanding the basic principles of construction and materials.
- The emphasis should be on teaching the fundamental principles and constructional details suitable for Indian conditions.
- Students will be encouraged to study both in classroom and also outside at work sites in order to get the practical exposure.

Contents:

Construction

- Structural and nonstructural building elements and Terminologies.
- Basic wall section of load bearing and framed structures.
- Introduction to various tools and equipment's commonly used in construction
- Types of Masonry construction in brick and stone.
- Bamboo construction Methods.
- Stone construction joinery details.

Materials

Mud: Fundamentals of soil science, types of soils, principles of soil stabilization, types of stabilizers, requirements and types of mud wall building and surface protection, advantage and disadvantage of mud construction.

Stones: Formation in nature, geological classification, quarrying of stones, dressing, characteristics of stones, testing of stones, uses of stone. preservation of stones, deterioration of stones, behavior of stone, fabrication, physical and chemical properties, selection of stones, types of stones,

Bricks: Manufacturing process, Types of bricks, Classification of bricks, Characteristics, Ingredients of bricks, Forms of bricks, Testing of bricks, Types of bonding in bricks, Storage of bricks,

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Bamboo: Bamboo as plant classification, species, geographical distribution, anatomy of bamboo, properties, strength, processing, harvesting, working of bamboo tools, treatment and preservation of bamboo, uses of bamboo.

Timber: Classification of trees, structure of trees, characteristics, seasoning of timber, defects and diseases, decay of timber, preservation, fire resistance, conservation of timber, storage of timber, uses of timber, manufacturing process of timber, hard wood, soft wood, advantages of timber construction.

Outcome

- Students learn about construction of the building using intelligence, bamboo, brick, stone through drawing case study.
- Students will learn basic understanding of materials with respect to building components and their construction methods.
- Students will get practical experience of making small shelter structures.
- Students will learn making of plan, elevation and section along with sketches and details showing methods of construction.
- Students will also get to know some analysis fundamentals skills required for selection of materials as per design requirements.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, Construction **Technology**, Prentice Hall
- Barry, **Construction of Buildings**

AR 131 Structure Design & Systems I	3 - 3

Focus: Behavior of building elements and basic structural systems.

Objectives

- Understanding importance of structure and its contents with respect to behavior and language of building elements and components.
- To understand and link knowledge of architecture, civil engineering, statics and material in a natural way.

Contents

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with manmade structures.
- Functions of structures. Primary and secondary forces acting on structures – gravitational force, live load, wind, temperature variation. Types of supports & their characteristics.
- Analysis & design – Design criteria.
- Primary elements of structure and their behavior.
- Factor of safety & factors affecting it. Characteristics of structural design – strength, stiffness and stability. Discussion on factors affecting them and ways of satisfying these requirements.
- Study of behavior of structures through models and testing them for given load.

Outcome

- Enable students to understand the concepts of building Structures.
- Students shall understand about the structural action of various elements.
- Students will have sufficient knowledge about various long span structures.
- Students should understand freedom of creativity, and encourages exploration, cooperation and discussion in the multi-genre science in which architecture is located.
- Student should learn that, the architecture and structure create a homogeneous unit, if the structure is not an obstacle to perceive the work and the architectonic shape creates a logical structural solution.
- Students will able to handle basic structure problems with Perception of structure, which is connected with a typological kind of a building, its size and function.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- RK Bansal and Sanjay Bansal, **Engineering Mechanics** Third edition, Laxmi Publications, New Delhi.
- Ferdinand L Singer, **Engineering Mechanics** Third Edition, Harper Collins Publications.

AR 141 History & Humanities I	3 - 3

Focus: To develop appropriate skills of reading, discussion and writing as well as understanding of the physical experience of buildings in order to appreciate the complexity of the influences bearing on architecture, as reflected in the major historical periods.

Objectives

- To inform about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.
- To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to technology, style and character in the prehistoric world and in Ancient Egypt, West Asia, Greece and Rome.

Contents

- Introducing concepts of culture and civilization – Paleolithic and Neolithic culture – art forms and evolution of shelter – megaliths – agricultural revolution and its impact on culture and civilization.
- Landscape and culture of Ancient Egypt – history – religious and funerary beliefs and practices – monumentality – tomb architecture: evolution of the pyramid from the mastaba – temple architecture: mortuary temples and cult temples Great Pyramid of Cheops, Gizeh – temple of Ammon Ra, Karnak – temple of Abu Simbel (Rock Cut)
- Urbanization in the Fertile Crescent– evolution of city-states and their character – law and writing – theocracy and architecture – evolution of the Ziggurat – palaces.
- Landscape and culture of Greece – Minoan and Mycenaean cultures – Hellenic and Hellenistic cultures – Greek character – Greek polis and democracy – Greek city planning – architecture in the archaic and classic periods - orders in architecture: Doric, Ionic, Corinthian – optical illusions in architecture.
- Roman history: Republic and Empire – Roman religion and the Roman temple – Roman character – lifestyle – Roman urban planning – art and architecture as imperial propaganda: forums and basilicas – domestic architecture – structural forms, materials and techniques of construction – orders in architecture: Tuscan and Composite.

Outcome

- An understanding about the spatial and stylistic qualities.
- An understanding of the architecture as an outcome of various social, political and economic upheavals, and as a response to the cultural and climate conditions.
- Students will gain knowledge about the art & architecture of the European, Egyptian & Middle Eastern cultures, which have served as the cradle of human civilization, which will help them in building concepts for their design.
- They will be made aware, about the planning, construction, function and aesthetics of historical buildings and an appreciation of architectural style as a product of the time, place and culture in the western world.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Tadgell Christopher, **History of Architecture in India**, Phaidon Press.
- Brown Percy, **Indian Architecture, Buddhist and Hindu period**, Read Books
- Grover Satish, **Architecture of India, Buddhist and Hindu**

AR 151 Basic Design & Workshop I	6 - 6

Focus: Development of three dimensional visualizations, graphical abstraction and preliminary form exploration.

Objectives

- To create understanding and hands on skill based modes & methods of workshop art and its recording & analysis.
- To have knowledge of anthropometric content in Design, method of measurement. Human scale and proportion.
- To develop analytical thinking through exercises in fundamentals of composition, graphics, research and design process.

Contents

- Comprehensive understanding of the design field: relationship of basic design to architectural design and design field in general. Performance requirements and criteria for judgement of design.
- Observation and its expression: Field, mode and methods of observation, recording and analyzing observations: its expression.
- Visual perception, Ideas as abstraction. Graphic tools to express abstraction (geometric content); and abstraction of environmental and architectural observation.
- Human dimension: Anthropometric content in design, methods of measurement, idea of human scale and proportion.
- Basic shelter: Understanding of basic shelter and its related factors through chosen examples, methods of learning.
- WORKSHOP: - Hands on practical training and creation of 3D structures to express innovation and supernatural ideas.

Outcome

- Enable students to learn the various tools used in carpentry, metal work, masonry, painting etc. and get a reasonable skill in handling the materials and tools there off.
- Students will get an opportunity to see directly the craftsmen's work, and interact with them face to face.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

References:

- Wucius Wong, **Principles of three Dimensional Design**, Van Nostrand Reinhold Company
- Wucius Wong, **Principles of two Dimensional Design**, Wiley
- Wucius Wong, **Principles of color composition**
- Robert Gill, **Rendering with Pen and Ink**, Van Nostrand Reinhold Company

AR 161 Introduction to Building Industry	2 - 2

Focus: General introduction to building industry.

Objectives

- To familiarize students to all stakeholders and participants in building & construction industry.
- To understand role and responsibilities of various team members of building industry.
- To introduce students to local, national and global structure of building construction, product manufacturing infrastructure, production and delivery systems.

Contents

- Series of lectures, site visits (trade show), case studies, research, market survey, introduction to sales industry and manufacturing industries.
- General information re following team members and or stake holders, i.e. surveyors, contractors, developers, financiers, bankers, architects, landscape architects, artists, interior designers, project managers, construction managers, quantity surveyors, building economist, hydraulic engineer, civil engineer, structure engineer, mechanical engineer, electrical engineer, financial controller, acoustic designers, product designers, industrial designers, real estate personals, property managers etc.

Outcome

- Students will have knowledge of various stakeholder and team members of building involved in the industry, their roles and responsibilities and their professional contribution.
- Students shall have understanding of the structure of the building industry from pre-construction to delivery stage.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 112 Design Studio II	10 - 10

Focus: To shape spaces through an understanding of elements that builds a design language and continuing from previous semester, reinforcing the understanding & importance of representing different objects through 2D & 3D geometry and learning more complex skills in the same direction.

Objectives

- To have emphasis on relationship between the human body, scale and the built environment, context, creative and exploratory responses, scale and proportion, basic organizational principles, abstraction, order, constants and variations and design as a response.
- To teach design parameters with respect to site and environment.
- To design space through program, site analysis, area volume diagrams.
- To understand documentation of site, site analysis and basic report writing.
- Understanding importance of technical drawing as medium of communication as basic vocabulary in architecture and learning techniques & skills to represent different objects through 2D & 3D geometry thus developing visualization of geometric forms to use it in designing.

Contents

- Principles of abstraction, spatial ordering, kinds of form and their principles of combination light and perception of space and form.
- Elements of architecture, spatial order, modulation of space, space structure form co-relation, program interpretation, choice of theme, abstraction, spatial scales, ordering mechanisms, evolution of form.
- Different ways of presentation of solids in 3D projections, like Axonometric & Isometric.
- Studying sciography and methods of representing it in 2D projections.
- Applying sciography to 3D geometrical projections especially Isometric projections.
- Understanding basic principles of perspective drawings – relatively realistic way for presentation. Introduction of basic elements such as station point, picture plane, eye level, center of vision, cone of vision, vanishing points etc.
- Drawing one point and two point perspectives through
 - Plan and Elevation method
 - Plan and vanishing points method
 - Measuring point method.

Outcome

- Enable students to emphasis on analytical skill to develop design and its management.
- Student shall gain depth knowledge of visualization and enhanced conception of ideas.
- Enable students to understand shades and shadow, solar path and its relation to build masses.
- Students shall learn perspective drawing in 2D & 3D projection to accumulate space drawings with measurements.

Examination Pattern:

- Sessional: 100 % {(25 % Internal continuous assessment + 25% External: Architectural Graphic and Techniques I) + (25% Internal continuous assessment + 25% External: Design Studio I) }

References:

- ND Bhat, **Engineering Drawing**, Charotar
- IH Morris, **Geometrical Drawing for Arts Students**, Universities Press
- KR Gopalakrishna, **Engineering drawing Vol I and II**, Subhas
- SH Mullik, **Perspective**, Jyotsna Prakashan
- Chen John SM, **Architecture in Pen and Ink**, McGraw-Hill C
- Kemmerich, Carl, **Graphic Details for Architects**, Pall Mall P
- Kemmerich Carl, **Manual of Graphic Techniques for Architects**, Graphic Designers and Architects, Scribner Book Company
- **New Metric Handbook**; Planning and Design Data, Architectural Press
- Shankar Mulik, **A textbook of Perspective and Sciography**
- Alibert O. Halse, **Architectural Rendering**, Literary Licensing, LLC.
- Russel, James E, **Graphics for Architects and Planners**, McGraw-Hill C

AR 122 Building Materials & Construction Technology II	6 - 6

Focus: Understanding of advanced building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as paint, glass, tiles, lime and timber boards, etc. and methods of preservation, treatment and types of uses.
- To understand both in general and in detail the methods of construction by using Timber products such as ply wood.
- To understand in detail, the methods of construction by using basic materials such as clay products and natural timber for structural and non- structural components.
- To understand building industry through various market surveys.
- To gain basic knowledge of hardware, plumbing and sanitary products through case studies.

Contents

- Brick masonry (continued) – acute / obtuse angled joints, cavity wall construction.
- Types of foundation.
- Lintel & arches – types and their construction.
- Simple wooden joinery
- Construction details in door, window and staircase.
- Ferrous & nonferrous materials iron, steel, market forms of steel, aluminum and copper.

Outcome

- Student will learn Introduction to concrete technology and its materials i.e. composite buildings, complex buildings and steel buildings.
- Student also learns construction of Basic building elements such as door, window, staircase, floor, roof, dome and vault etc.
- An understanding of basic services and hardware and sanitary equipment's for construction methods.

CAD, MUST

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, Construction **Technology**, Prentice Hall
- Barry, **Construction of Buildings**

AR 132 Structures Design and Systems II	3 - 3

Focus: Behavior of building elements and basic structural systems.

Objectives

- Understanding importance of structure and its contents with respect to behavior and language of building elements and components.
- To understand and Join knowledge of architecture, civil engineering, statics and material in a natural way.

Contents

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with manmade structures.
- Functions of structures. Primary and secondary forces acting on structures – gravitational force, live load, wind, temperature variation. Types of supports & their characteristics.
- Analysis & design – Design criteria.
- Primary elements of structure and their behavior.
- Factor of safety & factors affecting it. Characteristics of structural design – strength, stiffness and stability. Discussion on factors affecting them and ways of satisfying these requirements.
- Study of behavior of structures through models and testing them for given load.

Outcome

- Enable students to understand the concepts of structures in architecture.
- Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.
- Analyze any type of determinate trusses with different end conditions.
- Enable students to solve the sectional properties for any geometrical shapes.
- The concepts of elastic constants and its applications for various types of problems with a
- Thorough understanding of stresses and strain.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- IB Prasad **Applied Mechanics and Strength of Materials**
 - RK Bansal, **Strength of Materials** Third Edition, Laxmi Publications, New Delhi
- 1.

AR 142 History & Humanities II	3 - 3

Focus: Continuing from previous semester, to emphasis on Indian, Islamic and Mughal architecture and style in India.

Objectives

- To understand Indian architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Indus valley civilization, Vedic period and manifestation of Buddhist and Hindu architecture in various parts of the country.

Contents

Harappa - Cultural Civilization

Buddhist era architecture in India

Indian temple architecture

Islamic architecture in India

Mughal architecture

The topics will be containing:

- Introduction to Unit, History, excavation, background, planning of town and cities, lifestyle, art and culture etc.
- Conclusion
- Summary of Unit

Outcome

- The students understand Indian architecture as a response to the political and socio cultural conditions present in India at different points of time.
- The architectural responses will be understood with respect to technology style and character.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Sir Bannister Fletcher, **History of Architecture**, Athlone Press
- Brown Percy, **Indian Architecture, Buddhist and Hindu period**, Read Books
- Grover Satish, **Architecture of India, Buddhist and Hindu**
- Tadmor Christopher, **History of Architecture in India**, Phaidon Press.
- Brown Percy, **Indian Architecture, Islamic period**, Palmer Press
- Volwahsen, **Living Architecture Vol 1 &2/A**

AR 152 Basic Design & Workshop II	6 - 6

Focus: Introduction to architectural design through basic design – elements of design

Objective

- To understand the elements and principles of Basic design as the building blocks of creative process.
Design through exercises that will develop the originality, expression, skill and creative thinking.
- To involve students in a number of exercises to understand the grammar of design and visual composition.
- To enable the understanding of 3D Composition by involving students in a number of exercises. This will help generation of a form from a two dimensional/abstract idea.
- To enable the understanding of the relationship between the grammar of design and architecture by involving the students in seminars/ workshops and simple exercises which will look at building form analytically.

Contents

- Elements and principles of visual composition using point, line, shape.
- Exploring color schemes and their application in a visual composition and in architectural forms and spaces.
- Study of texture and schemes of texture both applied and stimulated and their application.
- Study of linear and planar forms using simple material like mount board, metal foil, box boards, wire string, polystyrene etc.
- Study of solids and voids to evolve sculptural forms and spaces and explore the play of light and shade and application of color.
- Study of fluid and plastic forms using easily moldable materials like clay, plaster of paris etc.
- Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.
- Application of basic design in architectural design through the manipulation of line, plane, solid and voids and application of texture color, proportion etc.

Outcome

- An understanding of the qualities of different elements as well as their composite fusions.
- An ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

Reference:

- F. David Martin and Lee A Jacobus, **Humanities through the Arts**, McGraw-Hill

MDC 003 Environment Science and Studies	4 - 4

Focus: Architecture as a system of environmental control

Objective

- To study human heat balance and comfort.
- To familiarize students with the design and settings for buildings for daylight and factors That influence temperature
- To inform about the air pattern around buildings and the effect of wind on design and siting of buildings
- To expose the students to the various design strategies for building in different types of climatic zones.

Contents

- Climate- factors affecting, classification, modes of measurement, assessment tools
- Comfort- factors affecting, theories and proposed modes of measurement, assessment tools
- Introduction to building physics

Outcome

- Understanding of thermal balance in human beings
- Designing climate responsive structure
- Conceptual understanding of air flow in buildings

Examination Pattern:

- Continuous Evaluation Mid Term 1: I hour duration 25 marks Weightage: 12.5%
- Mid Term 2: I hour duration 25 marks Weightage: 12.5%
- End Term: 3-hour duration 100 marks Weightage: 50%
- Field work and Report writing: ----- Weightage: 25%

Second Year

AR 211	Design Studio III	15 - 15

Focus:

- B.** Basic Computer knowledge related to Architectural software
- C.** Understanding of context and implementation of principles in design
- D.** Understanding importance of spoken, written and visual communication.

Objectives

- Understanding fundamentals of theory of architecture
- Understanding importance of spoken, written and visual communication. basic vocabulary of design
- Studio design project
- Reinforcing spoken, written and presentation skills in English.

Content

Studio projects shall be structured to deal with two (or more) distinctly different contexts with program being identical. Studio could be divided into two groups with different sites and resulting solutions shall be discussed in the class to highlight the various differences, which can be attributed to the contextual reasons. In the second project, context with a number of constraints shall be chosen and the process of enhancing the context, in other words, place making shall be investigated. Studio shall attempt to define the nature of relation between built and un built spaces and the need of using un built spaces for programmatic needs shall be highlighted.

- Advanced English reading and writing exercises through book reviews, business letter writing, and presentation of design projects, group discussions and project reports.

Outcome

- Enable students to learn and understand theory of architecture in depth with practical approach in design.
- Enable students to gain confidence in spoken and written English language
- Understanding of context and relationship of functions

Examination Pattern:

- Sessional: 100% {(60 %: 30% Internal continuous assessment + 30 External) + (40 %: 20% Internal continuous assessment + 20% External)}

Reference:

- Francis DK Ching **Form, Space and Order**
- Prammar VS **Design Fundamentals in Architecture**

- Gideon Space Time and Architecture
- von Meiss, Pierre **Elements of Architecture from Form to place**
- Frank Lloyd Wright on **Architecture**
Wright
- Papadakis **Free Spirit in Architecture**
- Crouch June **Traditions in Architecture/Data Planning**. Johnson
- Snyder, James **Introduction to Architecture**
- Porter, Tom **Colour for Architecture**
- Chen John S M. **Architecture in Pen and Ink**
- Kemmerich Carl. **Graphic Details for Architects**
- Kemmerich Carl. **Manual of Graphic Techniques for Architects, Graphic Designers and Architects**
- **New Metric Handbook; Planning and Design Data**. Recent Edition
- Shankar Mulik. **A Textbook of Perspective and Sciography**
- Alibert O. Halse. **Architectural Rendering**
- N.D. Bhatt. **Engineering Graphics**
- Russel, James E. **Graphics for Architects and Planners**
- Robertson Howard. **The principles of Architectural Composition**. Architectural press, UK, qsasa

AR 221	Building Materials & Construction Technology III	4 - 4

Focus: Knowledge of various structural systems and methods of construction and detailing of buildings of medium complexity using natural and manmade materials.

Objective

- To acquaint the students with construction practices pertaining to RCC, floors, roofs and flooring with different materials. Load bearing and frame structures.

Content

- Construction** - Study of principles and methods of construction of RCC, one way, two way slabs-cantilever slabs, sloping RCC roof, vaults, domes including form-work techniques and reinforcement details. Construction with materials alternative to RCC.
- Flooring in mud, murrum, stones marble, granite, tandur/kota stone, mosaic, terrazzo, ceramic tiles and wooden flooring
- Paving Cast in situ concrete, concrete tiles, interlocking blocks, clay tiles, brick and stone
- Plaster Method of plastering a) Internal (use of various finishes viz., lime, cement, plaster of paris, puffing etc., b) External smooth, rough, textured, grit plaster.
- Materials** – Paints, varnishes and distempers, emulsions, cement base paints. Constituents of oil paints, characteristics of good paints, types of paints and process of painting different surfaces. Types of varnish, methods of applying varnish and French polish and melamine finish.

Outcome

- An Understanding of advanced materials, products and methods of construction and in detailing.

Examination Pattern:

- Theory: 20 %
- Sessional: 80% (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Duggal SK. **Building Materials**

AR 231	Structure Design & Systems III	3 - 3

Focus: Understanding the structural concepts and behavior of structural elements relating the knowledge acquired to architectural design

Objective

- To give an insight into the structural behavior of columns and beams

Content

- Introduction to Torsion theory with simple problems.
- Columns and struts effective length, critical load, slenderness ratio, Euler's equation for different end conditions.
- Formula for slope and deflections of cantilever, simply supported and overhang beam using double integration and Macaulay's method of different load conditions.
- Moment area method for simple case of loading. Expound the structural concepts introduced in non- mathematical terms with examples and application in architectural design.

Outcome

Students will have an insight into the structural behavior of columns and beams

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- SS Bhavikatti. **Strength of Materials**
- Basavarajaiah BS and Mahadevappa. **Strength of Materials**

AR 241	History of Architecture	2 - 2

Focus: Western architecture and its development

Objective

- To provide an understanding of Western architecture during Renaissance, Baroque, Neo classical and modern periods.

Content

- Background and influences on Renaissance architecture. Characteristics of Renaissance Architecture in general.
- General characteristics of Baroque.
- Transitional Period A brief account of the situation before the change over to Modern architecture in Europe. Palladian Revival in Britain, Greek Revival and Gothic Revival
- Impact of Industrial Revolution in Europe the social, economic and political changes effected, new requirements of the society, new materials and technological developments.
- The Chicago school works of Louis Sullivan, early industrial buildings, contributions of Bauhaus, De Stijl Movement, Italian Futurism, Art Nouveavau Movement and Arts and Crafts Movement to Modern Architecture
- Ideas and works of great masters Le Corbusier, FL Wright, MV Rohe, Walter Gropius contributions of Brazilian architect Oscar Niemeyer

Objective

- To understand architecture of different parts of world as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in architecture in various parts of the world.

Outcome

- The students will understand architecture as a response to the political and socio cultural conditions present in specific region at different points of time.
- The architectural responses will be understood with respect to technology style and character.

CAD, MUST

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Sir Bannister Fletcher. **History of Architecture**
- Henri Stierlin. **Architecture of the world – Greece**
- Henri Stierlin. **Architecture of the world - The Roman Empire**
- Henri Stierlin. **Architecture of the world – Romanesque**

AR 251	Building Services I	3 - 3

Focus: Understand building services as essential part of design

Objective

- To impart the knowledge and skills required for understanding the building services of water supply and sanitation and their integration with architectural design.
- Understanding rain water harvesting.

Content

- **Water supply** introduction, sources of water supply, qualitative and quantitative aspects, impurities, purification sedimentation, coagulants, filtration, disinfection, water softening and miscellaneous treatment of water. Sources of water pollution and preventive measures. Public water distribution system, methods of layout of distribution pipes.
- Pipe sizes, fittings, valves, types of taps, wash basins, sink, bath tubs, flushing cistern. Domestic water supply systems mains, ferrules, service pipe, water meter, sump, pumps, overhead tank, distribution pipes, cold water and hot water supply for single and multistoried buildings.
- Provision for fire fighting fire hydrants. Study of solar heating systems, gas and electric geysers.
- **Sanitation:** Introduction, importance and purpose of sanitation, definitions bacteria, invert, sewer, sewerage, types of refuse, collection and disposal of refuse, systems of drainage separate, combined and partially separate system, advantages and disadvantages of each system.
- Sanitary requirements for various types of buildings, types of pipes.
- Man holes drop manholes, manhole with intercepting trap, inspection chambers, self cleansing velocity, drains on sloping sites, sub soil drainage, storm water disposal catch basins, inlets, storm water regulators.
- Importance of pumps and sewage pumping stations, septic tanks soak pit, soak well, design aspects, disposal of effluent.
- House drainage principles, traps-floor trap, multi-trap, gully trap, grease and oil trap, urinals, Indian, European, Anglo Indian type of water closet, squatting urinal, bidet

CAD, MUST

- Definitions Siphonage, anti-siphonage pipe, cowl, fresh air inlet, soil and waste pipes, vent pipe
- Systems of plumbing single stack, one pipe, one pipe partially ventilated, two pipe disposal of waste water from buildings typical plan of residence with garage showing all the traps, inspection chambers, pipes connected to public sewer line alternatively connecting the same layout of pipes to septic tank. Testing of drains and drain pipes.
- Brief study - natural methods of sewage disposal by dilution and land treatment, self purification of natural waters, oxidation, sewage treatment, oxidation ponds, aqua privy, garage drainage and layout of simple drainage systems, sewers, materials, laying and testing of sewers, ventilation of sewers, surface drains, sewer, cleaning of sewers, recycling of sewage water. Rain water harvesting.
- Rural sanitation, biogas, different methods of collection and disposal of dry refuse and night soil
- Site visits Water treatment plant, sewage treatment plant, multistoried apartments for studying water supply and sanitary arrangements.

Outcome:

- Students will understand the importance of building services and their use in building
- Students will learn Rain Water Harvesting in buildings

Examination Pattern:

- Theory: 30 %
- Sessional: 70 % (35 % Internal continuous assessment + 35 % External)

References:

- RS Deshpande. **Sanitary Engineering** - (Vol I and II)
- S Birdii. **Water supply and Sanitary Engineering**
- Relevant **IS Codes of India**

AR 261	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 212	Design Studio IV	16 - 16

Focus: A. Urban context and architecture design

B. Basic Computer knowledge related to Architectural software

C. Basic vocabulary of design.

Objective

- To understand the issue of building and context, building bylaws, urban design.

Content

- The design of building will look into aspects of context, surrounding and building program. architectural dimension with issues of services.
- Designing in specific context. Detailed layouts and site planning for building program.

Outcome

Students will learn urban scale and handling of architectural design

Examination Pattern:

- Sessional: 100% {(60 %: 30% Internal continuous assessment + 30 External) + (40%: 20 % Internal continuous assessment + 20% External)}

Reference:

- Broadbent Geoffrey. **Design in Architecture**
- Lang Jon. **Creating Architectural Theory**

AR 222	Building Materials & Construction Technology IV	4 - 4

Focus: Understanding of materials with respect to the construction style and its function

Objective

To study construction systems with focus on roofing and techniques of pile foundation and metal doors, windows and partitions.

Content

Part A.

Construction – Mild steel and Aluminum doors and windows and partitions. Details of RC framed structures with reinforcements, beams including cantilever beams, columns, flat slab, ribbed filler slabs, waffle roof.

Pile foundation Precast piles, cast-in-situ piles, types of piles, method of driving piles, pile caps etc.

Part B.

Materials – Anti-termite treatment to foundation, masonry walls and wood work (pre construction) water proofing materials and weather proofing materials like chemical admixtures and surface applications. Lime and brick bats etc., Pest control treatment.

Outcome:

Students will get exposure of different materials and their practical usage on site.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Duggal SK. **Building Materials**

AR 232	Structure Design & Systems IV	3 - 3

Focus: Structural systems and implications in design

Objective

- To give an insight into the structural behavior of portal frames.

Content

- Analysis of propped cantilever, fixed beams, shear force diagrams and bending moment diagrams. Analysis of continuous beam (maximum three spans)
- Clapeyron's Three Moments Theorem b) Moment Distribution Method
- Analysis of portal frame (single bay, single story with sway and non-sway) by moment distribution method
- To explain the structural concepts introduced in non- mathematical terms with examples and application in architectural design.

Outcome:

Students will learn the applications of structural mathematical terms in design, through site visits and class lectures.

Examination Pattern:

- Theory: 30 to 35%
- Sessional: 65 to 70% (35 % Internal continuous assessment + 35 % External)

References:

- SS Bhavikatti. **Structural Analysis**
- Vazirani and Ratwani. **Theory of Structures**

AR 242	Surveying & Levelling	2 - 2

Focus: To develop the knowledge and skills related to surveying and levelling principles and practice.

Objective

- Understanding principles of surveying and leveling, use of various survey and leveling instruments, carrying out surveys of land of medium complexity and preparation of survey plans.

Content

- Surveying Definition, classification, principles of surveying, character of work, shrunk scale.
- Chain Survey Instruments used, types of chain, instruments for ranging. Setting out angles, erecting perpendiculars.
- Field work chain triangulation, recording and plotting, errors in survey.
- Plane table survey plane table and accessories. Methods of plane table survey, radiation, intersection, traversing and resection, field problems.
- Levelling definition, classification, booking and reduction of levels, longer levelling, errors
- Theodolite study of instruments, definition of different terms, temporary adjustments, uses, measuring horizontal and vertical angles, method of repetition, extension lines.
- Contouring Characteristics of contours, direct and indirect methods of contouring, interpolation, uses of contours, setting out works such as center lines of a building, grade for sewer, center line of a bridge.

Outcome

Students will learn different methods of understanding complex sites: contours, terrain, cliffs, valley and so on.

Examination Pattern:

- Theory: 20 to 25%
- Sessional: 75 to 80% (40 % Internal continuous assessment + 40 % External)

AR 252	Building Services II	3 - 3

Focus: Advance services in building industry

Objective

- To introduce students to electrical services and illumination and to sensitize them with respect to their integration into Architectural Design.

Content

Part A

- Importance of electrical services in buildings, introduction to commonly used terminology
- Supply and distribution of electricity to buildings substations (including high tension panels, transformers, low tension panels, generators) and overhead versus underground distribution systems, panel boards etc.
- Internal supply and distribution brief description of various cabling types, conduit, PVC casing and capping wiring systems;
- Earthing and brief description of protective devices fuses, MCBs, ELCB, etc., Electrical load estimation.
- Introduction to power and lighting circuits. Indian Electricity Rules-Relevant codes of Practice.

Part-B

- Quality and quantity of light;
- Methods of lighting: ambient, task and accent lighting
- Systems of luminaries: direct, indirect etc.
- Various types of electrical lamps incandescent, fluorescent/CFL, HID s, neon lamps and their lighting characteristics
- Design considerations for different types of occupancies and tasks Preparation of a lighting and electrical scheme

CAD, MUST

Outcome:

Students will learn to incorporate the element light with understanding of its impact in design

Examination Pattern:

- Theory: 30 %
- Sessional: 70 % (35 % Internal continuous assessment + 35 % External)

References:

- H Cotton. **Electrical Technology**
- L.Uppal. **Electrical Wiring, Estimating & Costing**
- Anwari. **Basic Electrical Engg**

CAD, MUST

AR 262	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

Third Year

AR 311	Design Studio V	16 - 16

Focus: Institutional building design and its fundamentals

Objectives

- To understand the differences and similarities between institutional goals and architectural goals.
- To understand creating of spaces for learning. Formal, informal and interactive processes of learning and role of the built environment.
- To understand the role of built environments in therapeutic and nurturing institutions
- Working drawings

Content

- Institutional projects like facilities of higher learning, vocational training or a small-scale campus may be given. Case studies of contemporary campus architecture (built since 1980s) shall be carried out.
- There are two distinct typologies of campuses, one that has integrated into the urban fabric at the edges of its boundary and the other that has ignored the urban fabric. Campus planning may be attempted as a two-stage project, with site planning, as one and other stage could be a detailed design of one of the identified buildings.
- The design has to respond to climatic, environmental and ecological factors.
- Detailing of architectural features of the major project like entrance lobby, skylights and staircases has to be attempted.

Outcome

- Students will learn the goals of the institutions regarding the role of built environment in its functioning.
- They will learn to sensitively design to the needs of disabled, aged people and children.
- One major project and one minor/ time problem to be tackled in semester

CAD, MUST

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 321	Building Materials & Construction Technology V	4 - 4

Focus: Detailing of building elements

Objective:

- To study constructional systems and detailing of special doors, windows, structural glazing and cladding

Content:

Part A

- **Construction** – PVC & FRP, frameless glass doors and windows and partitions. Wooden/Steel/Aluminum sliding and folding doors and partitions.
- Steel doors for garages and workshops. Collapsible gate and rolling shutters, remote control systems of doors and gates. Structural glazing, aluminum composite panel cladding.

Part B.

- **Materials** – Insulation materials Thermal and sound insulation materials. Glass its manufacture in its various types like plate, tinted, decorative, reinforced, laminated glass block, fiber glass, glass murals, partially colored glass, etching of glass and its applications in building industry for both exteriors and interiors.
- Glass fabrication techniques, fiber reinforced composite materials and products.

Outcome:

Students will learn to represent drawings with specific details which will bring clarity to the design as well as understanding

Examination Pattern:

- Theory: 20 to 25%
- Sessional: 75 to 80% (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Barry. **Construction of Buildings**

AR 331	Structure Design & Systems V	3 - 3

Focus: Concreate as a building material and its structural qualities

Objective

- To provide an introduction to design of reinforced concrete structures.

Content

- Concrete: Composition, basics of mix design, water cement ratio, strength, durability, workability requirements.
- Relevance of RCC in architectural practice. Advantages of RCC over other conventional structural practices. Steel for RCC Plain & Twisted bars, IS 456 code provisions.
- Working stress method of design basic concept, types of loads, assumptions. Calculation of MR for singly RC beam.
- Limit state method of design. Necessity and philosophy of limit state design. Limit state design of simply supported slabs, beams, T-beams, columns (axial and uniaxial bending) and footings (axially loaded square footing).
- Design of Dog legged and open well stairs (waist slab type)

Outcome:

Students will learn to demonstration models and experiments with materials and structural systems related to the above topics

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Ramachandra. **Design of steel Structures**
- Kazimi and Jindal. **Design of Steel Structures.**
- IS 800 - 1984, IS 883-1970
- IS special publication for the design of steel structures [SP-6 (1)]

AR 341	Landscape Architecture	3 - 3

Focus: Landscaping as a medium of design in architecture. Understanding of Landscape elements like trees, shrubs, plants, water, rocks and development of landscape planning and application in architectural design.

Objective

- To introduce students to the discipline of landscape architecture and to develop basic skills required in handling simple landscape design projects.

Content

- Introduction to landscape architecture, definitions.
- Noted landscape architects and their concepts and definitions
- Natural and manmade landscape, urban and rural landscape
- Elements of landscape architecture like vegetation, land forms and water bodies and their application in design
- Introduction to Site planning and site analysis
- Landscape materials and plant materials study, introduction to taxonomy
- Study and analysis of contemporary landscape designs
- Study of existing landscaped areas like courtyards, gardens, urban spaces etc.
- Street and site furniture Application of landscape design for site plans, small gardens, residential areas, urban spaces, courtyards etc.

Outcome:

- Students develop skills required in handling landscaping project.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

References:

- JO Simmonds. **Landscape Architecture**
- Michel Laurie. **Introduction to landscape architecture**

AR 351	Climatology	2 - 2

Focus: Climate responsive architectural design requires understanding of climatology

Objective:

- Understanding of Climate and its impact on architectural design, fundamentals of climatology and environmental studies, Passive climatic control.
- To apply the principles of Solar Passive Architecture to design of buildings.

Content:

- Introduction to passive techniques of cooling such as evaporative cooling, earth tubing, wind scoops, roof ponds, shaded courtyards etc.,
- Two design exercises (in hot dry and warm humid climate) with an objective to integrate passive cooling systems in the design.

Outcome:

Students will learn the impacts of climate on architectural design and dealing with them

Examination Pattern:

- Theory: 20 %
- Sessional: 80% (40 % Internal continuous assessment + 40 % External)

References:

- Koenigsberger. **Manual of Tropical Housing & Buildings (Part-II)**
- Martin Evans. **Housing, Climate and Comfort**
- Maxwell Fry. **Buildings in the tropics**
- Arvind Kishan, Baker & Szokolay. **Climate Responsive Architecture**

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AR 361	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 312	Design Studio VI	16 - 16

Focus: A large scale housing project / Working Drawing

Objectives

- To understand the difference in housing as a process and a product, the role of an architect in creating the product and facilitating the process
- To understand the needs of privacy, communal spaces, efficiency of open spaces and ideas of extended living areas
- To differentiate and understand the nature of organic and planned communities.

Content

- Scale of the project shall be limited to allow for intensive study rather than repetition of typical configuration.
- Housing projects can be attempted with added complexities for example, dense context, occupation based, traditional urban fabric, social status and prevalent social strata.
- Details from the dwelling cell to immediate shared space to communal space shall be emphasized and worked out.
- Socio cultural layer of the occupants shall form a strong fabric in the ultimate weave of the design.
- Projects shall aim at developing a very sensitive attitude towards micro level human habitation and role of architecture in enhancing or curbing the quality of living.

One major project and one minor/ time problem to be tackled in the semester.

Outcome

Students will learn to handle projects with considering disabled, aged people and children. Students will learn to work in socio cultural harmony as well as towards all levels of requirement of housing.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 322	Quantity & Estimation	3 - 3

Focus: Systems of taking out quantities and estimating for all trades involved in construction of medium complexity, writing specifications for materials and various items of work.

Objective

- To develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

Content

- Introduction, importance of estimation, types of estimates, mode of measurement etc.,
- Study of local SR rates, market rates, measurement book (MB), RA bill, interim and final certificate
- Detailed rate analysis of building items as per current schedule of rates (CSR) of local PWD for information only
- Percentage of various materials used in building items like cement, steel, rubble, metal, sand, brick, tiles etc.,
- Abstract and detailed specifications for various materials and items of work used in building

Estimate of:

- Load bearing and RCC framed structure with one example for each
- Typical interior items of a residence and an office
- Various types of roofs like steel and wood including roofing materials like
- Mangalore tiles, AC, GI sheet etc.,
- Water supply and sanitary works
- A typical layout plan with roads, culverts etc.

Outcome:

- Students will develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

References:

- SK Dutta. **Estimating and Costing**
- SC Rangawala. **Estimating**

AR 332	Structure Design & Systems VI	3 - 3

Focus: Steel as the advance structural building material and its techniques.

Objective

- To give an introduction to the design of steel structures.

Content

- Design of simple and eccentric riveted and welded connections.
- Design of tension and compression members in trusses.
- Design of built-up columns (lacing only)
- Design of slab base (no gusseted base) and simple column and footing connection details
- Design of laterally restrained beams (simple and compound)
- Provision for fire protection for steel structures relevant code provision

Outcome

- Students will learn details and calculations of steel structure and its impact on design

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- N Krishna Raju. **Pre-stressed Concepts**
- DL Schodek. **Structures**
- Alexander Zamen. **Form and Structure in Architecture**
- N Krishna Raju and RN Pranesh. **RCC - design and practice**

AR 342	Professional Practice	3 - 3

Focus: Introduction to the profession of architecture, its division and sub divisions

Objective

- To understand the responsibilities & liabilities of the profession. To understand the process of contract management.

Content

Profession: Idea of profession and essential difference among profession, trade and business.

- Profession of architecture, its essential tenets, duties and liabilities.
- Types and extent of services offered by architects, scale of fees, stages of payment, and contract between client and architect.
- Code of Professional Conduct, Architects Act of 1972. Role of Council of Architecture and the Indian Institute of Architects in the functioning of the Profession.

Practice: Types of Architectural firms, proprietorship, partnership, associate ship, and private limited concerns. Advantages and disadvantages of each type of firm, various means of building client base and gaining projects, Architectural competitions.

- Guidelines of COA, procedure of conduct of such competitions.
- Administration and basic accounting procedures. Taxes and implications of service tax. Implication of GATS on the profession in India.

Building Industry: General overview of the industry. Various participants and dimensions of building industry. Finance, statutory controls, construction procedures, enforcement issues related to building industry and the role of architect, employer, and contractor.

Contract Management: Overview of procedures in contract management with a focus on Architect's role.

Tender: Procedure of calling for tender, documents necessary for tendering process. Tender document and its content. Types of tenders, suitability of different types to various categories of projects. Advantages and disadvantages of each type of tender. Tender notices, opening, scrutiny, process of selection and award. Architect's role in tender process. Essential characteristics of Tender Notice, Earnest Money Deposit, Security Deposit, Retention Amount, Mobilization Amount

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and Bonus & Penalty Clauses.

- Various issues arising out of tendering process and the role of an architect in maintaining objectivity in the process.

Contract: General Principles, types of contract, definitions of various terms used in the contract document. Contract document, contents and sections dealing with various aspects of contract management. Conditions and Scope of Contract and the role of an architect in ensuring a positive completion of a contract. Architect's role in the contract and vested authority.

Issues of Contract: i) Termination of contract, ii) Certificates of value and quality, iii) Virtual completion and final completion, iv) Defects liability period, v) Latent and patent defects, vi) Liquidated and un-liquidated damages, vii) Extension of time, delays and penalty, viii) Non tendered items, extras, extra work, additional works, variations, rate analysis and architect's role in certification of variations, ix) Prime cost, provisional sum, x) Types of insurance necessary during contract including fire insurance for safeguarding client's interest.

Outcome

Students will learn the responsibilities & liabilities of the Profession and understand the process of Contract and project management.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

References:

- Roshan Namavathi. **Professional Practice for Architects & Engineers**
- Bob Greenstreet. **Legal and Contractual Procedures for Architects**
- AJ Legal Handbook
- KG Krishnamurthy and SV Ravindra. **Professional Practice**

AR 352	Town Planning & Building Bylaws	3 - 3

Focus: Urban and regional planning and the factors of planning

Objective

- To give an introduction to the discipline of urban and regional planning

Content

- Human settlements Urban settlements and Rural settlements, differences, origins, evolution and growth of settlements. Major functions of a city, city forming and city serving functions. Problems faced by a typical city. Relation between urban and rural settlements, characteristics and planning efforts of cities and towns of various historical periods like Egyptian, Greek, Roman, Medieval, Renaissance, Neo-classical. Industrial Revolution and its impact on cities, the contemporary city. Cities of Indus valley and Vedic period, cities of Moghul period and British period, typical Indo-Aryan cities, typical Dravidian temple city.
- Planning Theories enunciated by Ebenezer Howard, Patrick Geddes, Soria Y Mata, Doxiadis, Le-Corbusier, Clarence Stein, Clarence Arthur perry, Hilberseimer their relevance to Indian conditions.
- Land use planning, land use classification for cities and rural settlements, analysis of land uses in Indian cities.
- Urbanization, Industrialization and urban growth, definitions and inter relationship. Trends in urbanization in India since Independence. Growth of metropolitan cities, their growth and management problems, world urbanization trends.
- Components of a settlement activity pattern and land use, traffic and road network, density of population and population distribution. Central business district of a city, other business districts, urban nodes, rest of the city, fringe area and suburbs. Growth and aging of various parts of the city particularly the CBD, the problems caused due to this including slums, internal spatial structure of cities concentric zone theory, sector theory, multiple nuclei concept and work-home concept.
- Planning Techniques study and analysis of existing settlements, methodology of conducting diagnostic surveys and studies, land use survey, density survey, FSI survey, traffic surveys, presentation of data
- Regional Planning relation among various settlements of a region, pattern of settlements in a

region. Definition of a region, various types of regions, basic principles of regional planning

- Urban Renewal causes and consequences of urban blight and obsolescence slums and shanties methods of conducting surveys, analysis and presentation of data, prevention of formation of slums and squatter settlements. Environmental and management issues.

Outcome

Students will have an introduction to the discipline of urban and regional planning.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

Reference:

- Gallion and Eisner. **The Urban Pattern: City Planning and Design**
- Chapin. **Urban Planning**

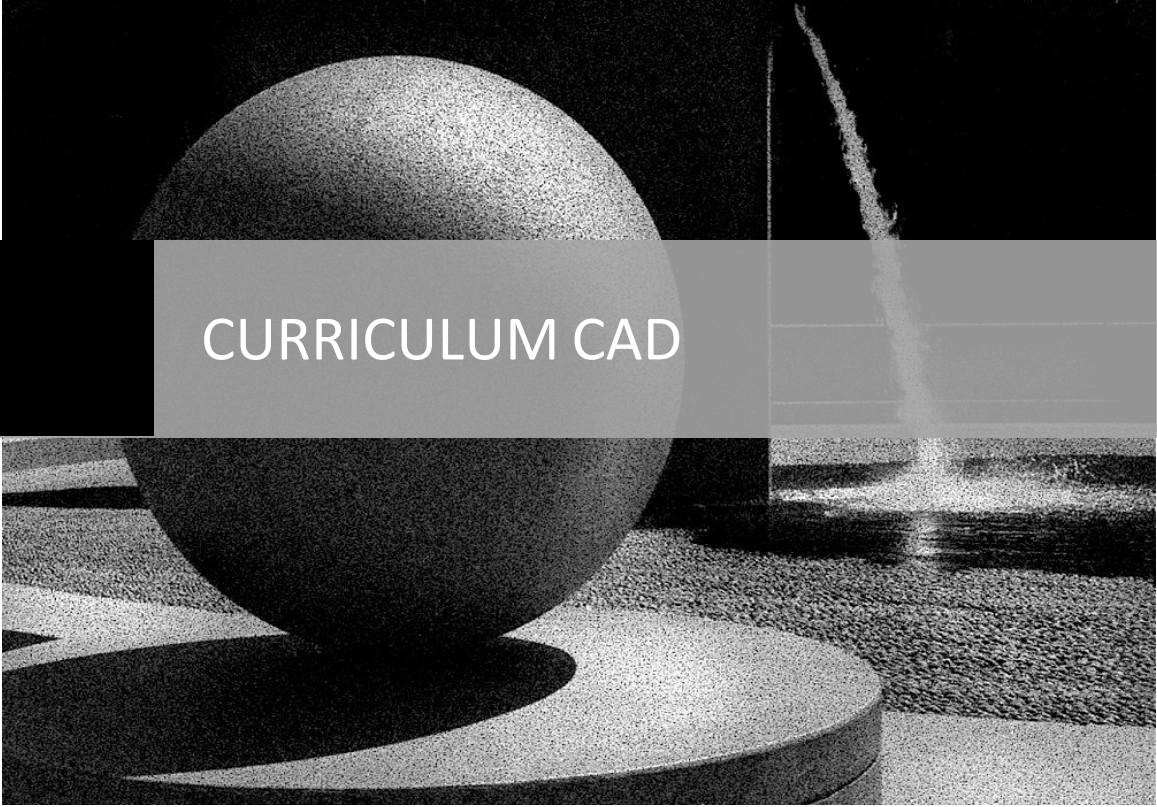
AR 362	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

SESSION

2018-19



CURRICULUM CAD



A LEADING WOMEN'S UNIVERSITY

Undergraduate Program
Bachelor of Architecture

College of Architecture & Design

Mody University of Science & Technology

N.H. 11, Lakshmangarh, Sikar, Rajasthan - 332311

Academic Curriculum (2015 - 16 Onwards)
Undergraduate Program - Bachelor of Architecture
College of Architecture & Design, MODY University
Mody University of Science & Technology, Lakshmangarh, Rajasthan

B. Arch.

5 Years

(300 credits)

Background

A curriculum for Design Education evolves from the vision of the institution, its aspirations and its capability to deliver the knowledge. It defines the relationships between the teacher and the student and the institution. Curriculum for Architecture also connects creativity and physical reality.

Five-year Architecture undergraduate program is designed to provide an exceptional university education as well as comprehensive preparation for entry in the competitive and challenging career in architecture. Studies in architecture and other associated disciplines are undertaken in parallel throughout the five-year program. This five-year undergraduate professional program is a professional degree accredited by the **Council of Architecture, India**. The program is for a limited number of qualified students committed to the study of architecture. These students are admitted directly to the professional degree program and begin studies in architecture in the first year.

The **B. Arch** curriculum has two stages of study. The stage-1 (years 1, 2, 3) provides a foundation of understanding on which to build a second level of advanced study. Continuously through the course of the program runs the Design Studio, in which projects are selected as a means for developing the professional skills, knowledge, understanding and a platform to create exemplary architectural designs. At the end of the third year, the program culminates with a studio project helping students to summarize what they have learned with an introduction to prepare themselves for more independent studies in the advanced professional program.

The stage-2 (years 4 & 5) concludes with a **semester** (one or two) of Professional Training (forth year) and Final Year Dissertation program. The first semester of the final Year integrates an introduction to independent Research Methods. An integrated design research phase continues throughout the final two semesters. The final year project is selected by the students' themselves to provide them an opportunity to develop their individual point of view about the profession and create their own place in the building industry. Thesis or Dissertation is part of the course to investigate issues the student sees as significant to herself and to the profession.

The Objective

- Develop direct personal experience of social, environmental and technological contexts.
- Encourage exploration of the diversity of thoughts, techniques, working methods and material palettes.
- Develop capacities to think from simple first principles, using observation, common sense and intuition to build more elaborate conceptual frameworks.
- Develop ability to “learning how to question, absorb and analyze” rather than following “conventional” practices and solutions.
- Understand and connect to local realities as vehicles for solutions.
- Encourage sharing and collaboration and as well as individual achievement.
- Creativity, skills and initiative should be developed and encouraged to assist the involvement of the body, mind and therefore confidence.
- General awareness towards architectural heritage introduced from the beginning of the degree program through courses / electives by experts on conservation, restoration and re – adaptation of buildings.

The Curriculum (B. Arch)

The curriculum allows students to choose their own area of interest and allow for independent exploration in the later years (3+2-year model) by having option of choice based Studio and Theory subjects. This is important to have a more mature and self-driven Architect. The curriculum shall also encourage students to select subjects of their choice from allied disciplines at other Colleges of this University.

The curriculum is to allow for Inter-disciplinary teaching in areas of Technology, Humanities and Environment by conducting joint sessions and assignments. The course content is synchronized to facilitate the same. Moreover, each semester has a thematic emphasis to allow many different subject to address the same. This is done to facilitate further synthesis.

Curriculum structure allows for other means of learning such as travelling studios, joint studios or studios in other socio-cultural environment apart from exchange program. This can provide the necessary confidence to deal with the outside world.

The courses dealing with design studio, technology, humanities shall be taught in an inter-disciplinary manner and not as compartmentalized specializations.

History, theory & technology based courses are those, which let us understand and appreciate, social, cultural, technological and historical knowledge and skills for its application in design projects.

Course Structure

The course structure and relative emphasis between sub-disciplines vary depending on their position within the course.

First year, being a Foundation year, the emphasis shall be on the development of background knowledge such as sensibility, analytical skills, technical and general communication skills and associated disciplines.

During Second and Third, Advanced years the emphasis is on understanding and appreciation of in-depth relationships between various disciplines and use of their resolutions, complexity, techniques and methods of application. The Fourth and Fifth Years, termed as final years, emphasize the development of the individual’s maturity and establishment of direction. During last two years of the course student develops her theoretical and practical understandings and decide on personal choice of directions.

Credit Loads

The course is of 5 years / 10 semester's duration. Each year consists of 2 semesters of approximately 16 weeks each. Each semester carries a contact load of 30 - 32 credits, where 1 credit is equivalent to 1.0 lecture hour/week in theoretical subjects and studio, workshop, laboratory based courses.

Each semester normally consists of (including design studio) not more than 6 subjects and each subject is normally of at least 2 credits.

In addition to subjects that form the core of the curriculum, the course offers 10 credits out of a total of 300, as electives. These electives are offered within the disciplines of humanities, arts and crafts: history and theory, and technology, so that a student can develop her interest in these areas.

- 1 Credit = 1 Contact hour for Theory and Studio
- 1 Credit = 2 Contact hour for Workshop
- 1 Contact hour = 100 Marks

Assessment

Student's performance is continually evaluated through Time Problems, projects, Tests, Quizzes and periodic assessments of sessions work. Generally, **50 %** of the assessment is through this system, and **50 %** weight is assigned to end of semester examinations (Internal). All core subjects are examined at the end of the semester through project review (Juries), crits, viva-voce or examination papers. Electives are normally assessed through final results, assignments or papers.

In order to clear a subject a student must obtain at least **50 %** marks in all the assessments of the subject. While the teaching faculty in all subject areas does grading, the subjects at the end of the Third and Fifth Year are examined additionally by an external examiner.

First Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

First Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 111	Design Studio –I & Architectural Graphics Skills- Manual & Computers I	10 (5 + 5)	10	0	1000 500 + 500 (250 + 250) (250 +250)	50% 50%	0	3
	AR 121	Building Materials & Construction Technology I	6	6	100	500 250 + 250	50% 50%	3	3
	AR 131	Structure Design & Systems I	3	3	50	250 125 + 125	50% 50%	2	0
	AR 141	History & Humanities I	3	3	50	250 125 + 125	50% 50%	2	3
	AR 151	Basic Design & Workshops I	6	6	0	600 300 +300	50% 50%	0	0
	AR 161	Introduction To Building Industry	2	2	0	200 100 + 100	50% 50%	0	3
	TOTAL		30	30					12

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 112	Design Studio –II & Architectural Graphics Skills- Manual & Computers II	10 (5 + 5)	10	0	1000 500 + 500 (250 + 250) (250 +250)	50% 50%	0	3
	AR 122	Building Materials & Construction Technology II	6	6	100	500 250 + 250	50% 50%	3	3
	AR 132	Structure Design & Systems II	3	3	50	250 125 + 125	50% 50%	2	3
	AR 142	History & Humanities II	3	3	50	250 125 + 125	50% 50%	2	3
	AR 152	Basic Design & Workshops II	6	6	0	600 300 + 300	50% 50%	0	0
	MDC 003	Environmental Studies	4	4	400	0	50% 50%	0	0
	TOTAL		32	32					12

Second Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

Second Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 211	Design Studio – III, Computer Application I, Fundamentals of Design & Communication skills	15 (9 +6)	15	0	1500 900 + 600 (450 + 450) (300+300)	50% 50%	0	6
	AR 221	Building Materials & Construction Technology III	4	4	100	300 150 + 150	50% 50%	3	0
	AR 231	Structure Design & Systems III	3	3	50	250 125 + 125	50% 50%	2	3
	AR 241	History of Architecture	2	2	50	150 75 + 75	50% 50%	2	3
	AR 251	Building Services I	3	3	100	200 100 + 100	50% 50%	3	0
	AR 261	Elective/Workshop	3	6	0	300 150 + 150	50% 50%	0	0
TOTAL			30	33					12

AR 271 Related Study Programme

2 Credit

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 212	Design Studio – IV, Computer Application II & Theory of Design	16 (12+4)	16	0	1600 1200 + 400 (600 + 600) (200+200)	50% 50%	0	6
	AR 222	Building Materials & Construction Technology IV	4	4	100	300 150 + 150	50% 50%	3	0
	AR 232	Structure Design & Systems IV	3	3	100	200 100 + 100	50% 50%	3	0
	AR 242	Surveying & Levelling	2	2	50	150 75 + 75	50% 50%	2	3
	AR 252	Building Services II	3	3	100	200 100 + 100	50% 50%	0	3
	AR 262	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	0
TOTAL			30	32					12

Third Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

Third Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 311	Design Studio V	16	16	0	1600 800 + 800	50% 50%	0	6
	AR 321	Building Materials & Construction Technology V	4	4	100	300 150 + 150	50% 50%	3	0
	AR 331	Structure Design & Systems V	3	3	50	250 125 + 125	50% 50%	2	0
	AR 341	Landscape Architecture	3	3	0	300 150 + 150	50% 50%	0	0
	AR 351	Climatology	2	2	50	150 75 + 75	50% 50%	2	0
	AR 361	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	6
	TOTAL		30	32					12

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 312	Design Studio VI	16	16	0	1600 800 + 800	50% 50%	0	6
	AR 322	Quantity Estimation and Specification writing	3	3	100 50 + 50	200 100 + 100	50% 50%	3	0
	AR 332	Structure Design & Systems VI	3	3	50	250 125 + 125	50% 50%	2	0
	AR 342	Professional Practice	3	3	100	200 100 + 100	50% 50%	3	0
	AR 352	Town Planning & Building Bylaws	3	3	100	200 100 + 100	50% 50%	3	3
	AR 362	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	3
	TOTAL		30	32					12

Forth Year B. ARCH STAGE-2
Academic Curriculum (2015 - 16 Onwards)

Forth Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory Sessional Internal External Viva	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 411	Practical Training	28	0	0 2800 1400 + 700+700	0 100%	0	0
	TOTAL		28					0

Subject To Approval

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 412	Design Studio VIII	14	14	0 1400 700 + 700	50% 50%	0	9
	AR 422	Building Materials & Construction Technology VIII	5	5	100 400 200 + 200	50% 50%	3	0
Spring Semester	AR 432	Structure Design & Systems VIII	4	4	100 300 150 + 150	50% 50%	3	0
	AR 442	Intelligent Buildings	3	3	100 200 100 + 100	50% 50%	3	0
	AR 452	Thesis Orientation	2	2	0 200 100 + 100	50% 50%	0	0
	AR 462	Elective/Workshop	2	4	0 200 100 + 100	50% 50%	0	3
	TOTAL		30	32				12

Fifth Year B. ARCH STAGE-2
Academic Curriculum (2015 - 16 Onwards)

Fifth Year Subject To Approval

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal	External	Weightage Internal	ETE	Exam Duration	Field Trips / Semester
	AR 511	Advance Design Studio IX	14	14	0	1400	700 + 700	50%	50%	0	9
	AR 521	Professional Practice (Advance)	6	6	100	500	250 + 250	50%	50%	3	0
	AR 531	Advance Construction & Structures	6	6	100	500	250 + 250	50%	50%	3	0
	AR 541	Research Methodology	2	2	100	100	50 + 50	50%	50%	3	0
	AR 551	Advance Services	2	2	0	200	100 + 100	50%	50%	0	3
	TOTAL		30	30				50%	50%		12

Subject To Approval

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal	External Viva	Weightage Internal	ETE	Exam Duration	Field Trips / Semester
	AR 512	Dissertation/Thesis	24	24	0	2400	1200 + 600 + 600	50%	50%	0	12
	AR 522	Advance Elective I	3	3	0	300	150 + 150	50%	50%	0	0
	AR 532	Advance Elective II	3	3	0	300	150 + 150	50%	50%	0	0
	TOTAL		30	30							12

First Year B. ARCH STAGE-1

AR 111 Design Studio I	10 - 10

Focus: **A.** Exploring principles of space making, introduction to the built environment and its creative exploration.

B. Learning techniques and skills to represent different objects through 2D & 3D geometry.

Objectives

- To deliver an introduction to architecture through analysis of building elements, such as floors, walls, doors, stairs, rooms, etc.
- To have an understanding of relationship between the human body, scale and the built environment, context, creative and exploratory responses, scale and proportion, basic organizational principles, abstraction, order, constants and variations and design as a response.
- Understanding importance of technical drawing as medium of communication as basic vocabulary in design.

Contents

- Introduction to subject. Getting acquainted with necessary instruments of drawing. Learning to draw straight and curved lines with different qualities.
- Learning good lettering to improve and maintain quality of presentation.
- Learning meaning of terms 'Plan' & 'Elevations' and using them for drawing simple objects through 'Orthographic Projections'.
- Learning theory of 'Orthographic Projections' and drawing projections of points, lines, geometric solids.
- Dealing with sections of simple geometric solids and their combinations.
- Learning principles of development of lateral surfaces of solids, applying them to work out and drawing developed surfaces of simple geometric solids and using them to make models of some of them.
- Auxiliary orthographic projection of solids and its application to sections of solids by inclined plans.
- Principles of space - making.
- Abstract sketches, model making, pencil and ink drawing, idea of human scale: methods of measurement.
- Site visits, experiential exploration of built environment, Case Studies.
- Measure drawings, analytical studies to understand building order, anthropometric content in design inputs lectures on factors affecting design and design disciplines.
- Mental and visual 3D perception

Outcome

- Students will learn about observation and logical skills to involve understanding of a space creation.
- Students will learn desired written and presentations skills to express their designs.
- Students will be able to visualize the idea and concept with expression of thoughts via appropriate communication method.
- Students should learn all aspects of **technical representation of drawings** to express and document their design projects through graphical communication.
- Students will be able to express all drawing contents through all taught mediums of communication.

Examination Pattern:

- Sessional: 100 % {(25 % Internal continuous assessment + 25% External: Architectural Graphic and Techniques I) + (25% Internal continuous assessment + 25% External: Design Studio I) }

References:

- John Hanock, **Time Saver Standards for Architectural Design Data**, McGraw-Hill Professional Publishing
- Ramsay and Sleeper, **Architectural Graphic Standards**, Wiley
- ND Bhat, **Engineering Drawing**, Charotar
- IH Morris, **Geometrical Drawing for Arts Students**, Universities Press
- KR Gopalakrishna, **Engineering drawing Vol I and II**, Subhas

AR 122 Building Materials & Construction Technology I	6 - 6

Focus: Understanding of basic building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as mud, brick, stone, bamboo, timber, etc. and methods of preservation, treatment and types of uses.
- To help students understand the basic building elements, their function and behavior under various conditions with specific reference to 'load bearing construction' and simple non RCC frame structure.
- To develop strong sense of perception, understanding the basic principles of construction and materials.
- The emphasis should be on teaching the fundamental principles and constructional details suitable for Indian conditions.
- Students will be encouraged to study both in classroom and also outside at work sites in order to get the practical exposure.

Contents:

Construction

- Structural and nonstructural building elements and Terminologies.
- Basic wall section of load bearing and framed structures.
- Introduction to various tools and equipment's commonly used in construction
- Types of Masonry construction in brick and stone.
- Bamboo construction Methods.
- Stone construction joinery details.

Materials

Mud: Fundamentals of soil science, types of soils, principles of soil stabilization, types of stabilizers, requirements and types of mud wall building and surface protection, advantage and disadvantage of mud construction.

Stones: Formation in nature, geological classification, quarrying of stones, dressing, characteristics of stones, testing of stones, uses of stone. preservation of stones, deterioration of stones, behavior of stone, fabrication, physical and chemical properties, selection of stones, types of stones,

Bricks: Manufacturing process, Types of bricks, Classification of bricks, Characteristics, Ingredients of bricks, Forms of bricks, Testing of bricks, Types of bonding in bricks, Storage of bricks,

CAD, MUST

Bamboo: Bamboo as plant classification, species, geographical distribution, anatomy of bamboo, properties, strength, processing, harvesting, working of bamboo tools, treatment and preservation of bamboo, uses of bamboo.

Timber: Classification of trees, structure of trees, characteristics, seasoning of timber, defects and diseases, decay of timber, preservation, fire resistance, conservation of timber, storage of timber, uses of timber, manufacturing process of timber, hard wood, soft wood, advantages of timber construction.

Outcome

- Students learn about construction of the building using intelligence, bamboo, brick, stone through drawing case study.
- Students will learn basic understanding of materials with respect to building components and their construction methods.
- Students will get practical experience of making small shelter structures.
- Students will learn making of plan, elevation and section along with sketches and details showing methods of construction.
- Students will also get to know some analysis fundamentals skills required for selection of materials as per design requirements.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, Construction **Technology**, Prentice Hall
- Barry, **Construction of Buildings**

AR 131 Structure Design & Systems I	3 - 3

Focus: Behavior of building elements and basic structural systems.

Objectives

- Understanding importance of structure and its contents with respect to behavior and language of building elements and components.
- To understand and link knowledge of architecture, civil engineering, statics and material in a natural way.

Contents

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with manmade structures.
- Functions of structures. Primary and secondary forces acting on structures – gravitational force, live load, wind, temperature variation. Types of supports & their characteristics.
- Analysis & design – Design criteria.
- Primary elements of structure and their behavior.
- Factor of safety & factors affecting it. Characteristics of structural design – strength, stiffness and stability. Discussion on factors affecting them and ways of satisfying these requirements.
- Study of behavior of structures through models and testing them for given load.

Outcome

- Enable students to understand the concepts of building Structures.
- Students shall understand about the structural action of various elements.
- Students will have sufficient knowledge about various long span structures.
- Students should understand freedom of creativity, and encourages exploration, cooperation and discussion in the multi-genre science in which architecture is located.
- Student should learn that, the architecture and structure create a homogeneous unit, if the structure is not an obstacle to perceive the work and the architectonic shape creates a logical structural solution.
- Students will able to handle basic structure problems with Perception of structure, which is connected with a typological kind of a building, its size and function.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- RK Bansal and Sanjay Bansal, **Engineering Mechanics** Third edition, Laxmi Publications, New Delhi.
- Ferdinand L Singer, **Engineering Mechanics** Third Edition, Harper Collins Publications.

AR 141 History & Humanities I	3 - 3

Focus: To develop appropriate skills of reading, discussion and writing as well as understanding of the physical experience of buildings in order to appreciate the complexity of the influences bearing on architecture, as reflected in the major historical periods.

Objectives

- To inform about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.
- To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to technology, style and character in the prehistoric world and in Ancient Egypt, West Asia, Greece and Rome.

Contents

- Introducing concepts of culture and civilization – Paleolithic and Neolithic culture – art forms and evolution of shelter – megaliths – agricultural revolution and its impact on culture and civilization.
- Landscape and culture of Ancient Egypt – history – religious and funerary beliefs and practices – monumentality – tomb architecture: evolution of the pyramid from the mastaba – temple architecture: mortuary temples and cult temples Great Pyramid of Cheops, Gizeh – temple of Ammon Ra, Karnak – temple of Abu Simbel (Rock Cut)
- Urbanization in the Fertile Crescent– evolution of city-states and their character – law and writing – theocracy and architecture – evolution of the Ziggurat – palaces.
- Landscape and culture of Greece – Minoan and Mycenaean cultures – Hellenic and Hellenistic cultures – Greek character – Greek polis and democracy – Greek city planning – architecture in the archaic and classic periods - orders in architecture: Doric, Ionic, Corinthian – optical illusions in architecture.
- Roman history: Republic and Empire – Roman religion and the Roman temple – Roman character – lifestyle – Roman urban planning – art and architecture as imperial propaganda: forums and basilicas – domestic architecture – structural forms, materials and techniques of construction – orders in architecture: Tuscan and Composite.

Outcome

- An understanding about the spatial and stylistic qualities.
- An understanding of the architecture as an outcome of various social, political and economic upheavals, and as a response to the cultural and climate conditions.
- Students will gain knowledge about the art & architecture of the European, Egyptian & Middle Eastern cultures, which have served as the cradle of human civilization, which will help them in building concepts for their design.
- They will be made aware, about the planning, construction, function and aesthetics of historical buildings and an appreciation of architectural style as a product of the time, place and culture in the western world.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Tadgell Christopher, **History of Architecture in India**, Phaidon Press.
- Brown Percy, **Indian Architecture, Buddhist and Hindu period**, Read Books
- Grover Satish, **Architecture of India, Buddhist and Hindu**

AR 151 Basic Design & Workshop I	6 - 6

Focus: Development of three dimensional visualizations, graphical abstraction and preliminary form exploration.

Objectives

- To create understanding and hands on skill based modes & methods of workshop art and its recording & analysis.
- To have knowledge of anthropometric content in Design, method of measurement. Human scale and proportion.
- To develop analytical thinking through exercises in fundamentals of composition, graphics, research and design process.

Contents

- Comprehensive understanding of the design field: relationship of basic design to architectural design and design field in general. Performance requirements and criteria for judgement of design.
- Observation and its expression: Field, mode and methods of observation, recording and analyzing observations: its expression.
- Visual perception, Ideas as abstraction. Graphic tools to express abstraction (geometric content); and abstraction of environmental and architectural observation.
- Human dimension: Anthropometric content in design, methods of measurement, idea of human scale and proportion.
- Basic shelter: Understanding of basic shelter and its related factors through chosen examples, methods of learning.
- WORKSHOP: - Hands on practical training and creation of 3D structures to express innovation and supernatural ideas.

Outcome

- Enable students to learn the various tools used in carpentry, metal work, masonry, painting etc. and get a reasonable skill in handling the materials and tools there off.
- Students will get an opportunity to see directly the craftsmen's work, and interact with them face to face.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

References:

- Wucius Wong, **Principles of three Dimensional Design**, Van Nostrand Reinhold Company
- Wucius Wong, **Principles of two Dimensional Design**, Wiley
- Wucius Wong, **Principles of color composition**
- Robert Gill, **Rendering with Pen and Ink**, Van Nostrand Reinhold Company

AR 161 Introduction to Building Industry	2 - 2

Focus: General introduction to building industry.

Objectives

- To familiarize students to all stakeholders and participants in building & construction industry.
- To understand role and responsibilities of various team members of building industry.
- To introduce students to local, national and global structure of building construction, product manufacturing infrastructure, production and delivery systems.

Contents

- Series of lectures, site visits (trade show), case studies, research, market survey, introduction to sales industry and manufacturing industries.
- General information re following team members and or stake holders, i.e. surveyors, contractors, developers, financiers, bankers, architects, landscape architects, artists, interior designers, project managers, construction managers, quantity surveyors, building economist, hydraulic engineer, civil engineer, structure engineer, mechanical engineer, electrical engineer, financial controller, acoustic designers, product designers, industrial designers, real estate personals, property managers etc.

Outcome

- Students will have knowledge of various stakeholder and team members of building involved in the industry, their roles and responsibilities and their professional contribution.
- Students shall have understanding of the structure of the building industry from pre-construction to delivery stage.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 112 Design Studio II	10 - 10

Focus: To shape spaces through an understanding of elements that builds a design language and continuing from previous semester, reinforcing the understanding & importance of representing different objects through 2D & 3D geometry and learning more complex skills in the same direction.

Objectives

- To have emphasis on relationship between the human body, scale and the built environment, context, creative and exploratory responses, scale and proportion, basic organizational principles, abstraction, order, constants and variations and design as a response.
- To teach design parameters with respect to site and environment.
- To design space through program, site analysis, area volume diagrams.
- To understand documentation of site, site analysis and basic report writing.
- Understanding importance of technical drawing as medium of communication as basic vocabulary in architecture and learning techniques & skills to represent different objects through 2D & 3D geometry thus developing visualization of geometric forms to use it in designing.

Contents

- Principles of abstraction, spatial ordering, kinds of form and their principles of combination light and perception of space and form.
- Elements of architecture, spatial order, modulation of space, space structure form co-relation, program interpretation, choice of theme, abstraction, spatial scales, ordering mechanisms, evolution of form.
- Different ways of presentation of solids in 3D projections, like Axonometric & Isometric.
- Studying sciography and methods of representing it in 2D projections.
- Applying sciography to 3D geometrical projections especially Isometric projections.
- Understanding basic principles of perspective drawings – relatively realistic way for presentation. Introduction of basic elements such as station point, picture plane, eye level, center of vision, cone of vision, vanishing points etc.
- Drawing one point and two point perspectives through
 - Plan and Elevation method
 - Plan and vanishing points method
 - Measuring point method.

Outcome

- Enable students to emphasis on analytical skill to develop design and its management.
- Student shall gain depth knowledge of visualization and enhanced conception of ideas.
- Enable students to understand shades and shadow, solar path and its relation to build masses.
- Students shall learn perspective drawing in 2D & 3D projection to accumulate space drawings with measurements.

Examination Pattern:

- Sessional: 100 % {(25 % Internal continuous assessment + 25% External: Architectural Graphic and Techniques I) + (25% Internal continuous assessment + 25% External: Design Studio I) }

References:

- ND Bhat, **Engineering Drawing**, Charotar
- IH Morris, **Geometrical Drawing for Arts Students**, Universities Press
- KR Gopalakrishna, **Engineering drawing Vol I and II**, Subhas
- SH Mullik, **Perspective**, Jyotsna Prakashan
- Chen John SM, **Architecture in Pen and Ink**, McGraw-Hill C
- Kemmerich, Carl, **Graphic Details for Architects**, Pall Mall P
- Kemmerich Carl, **Manual of Graphic Techniques for Architects**, Graphic Designers and Architects, Scribner Book Company
- **New Metric Handbook**; Planning and Design Data, Architectural Press
- Shankar Mulik, **A textbook of Perspective and Sciography**
- Alibert O. Halse, **Architectural Rendering**, Literary Licensing, LLC.
- Russel, James E, **Graphics for Architects and Planners**, McGraw-Hill C

AR 122 Building Materials & Construction Technology II	6 - 6

Focus: Understanding of advanced building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as paint, glass, tiles, lime and timber boards, etc. and methods of preservation, treatment and types of uses.
- To understand both in general and in detail the methods of construction by using Timber products such as ply wood.
- To understand in detail, the methods of construction by using basic materials such as clay products and natural timber for structural and non- structural components.
- To understand building industry through various market surveys.
- To gain basic knowledge of hardware, plumbing and sanitary products through case studies.

Contents

- Brick masonry (continued) – acute / obtuse angled joints, cavity wall construction.
- Types of foundation.
- Lintel & arches – types and their construction.
- Simple wooden joinery
- Construction details in door, window and staircase.
- Ferrous & nonferrous materials iron, steel, market forms of steel, aluminum and copper.

Outcome

- Student will learn Introduction to concrete technology and its materials i.e. composite buildings, complex buildings and steel buildings.
- Student also learns construction of Basic building elements such as door, window, staircase, floor, roof, dome and vault etc.
- An understanding of basic services and hardware and sanitary equipment's for construction methods.

CAD, MUST

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, Construction **Technology**, Prentice Hall
- Barry, **Construction of Buildings**

AR 132 Structures Design and Systems II	3 - 3

Focus: Behavior of building elements and basic structural systems.

Objectives

- Understanding importance of structure and its contents with respect to behavior and language of building elements and components.
- To understand and Join knowledge of architecture, civil engineering, statics and material in a natural way.

Contents

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with manmade structures.
- Functions of structures. Primary and secondary forces acting on structures – gravitational force, live load, wind, temperature variation. Types of supports & their characteristics.
- Analysis & design – Design criteria.
- Primary elements of structure and their behavior.
- Factor of safety & factors affecting it. Characteristics of structural design – strength, stiffness and stability. Discussion on factors affecting them and ways of satisfying these requirements.
- Study of behavior of structures through models and testing them for given load.

Outcome

- Enable students to understand the concepts of structures in architecture.
- Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.
- Analyze any type of determinate trusses with different end conditions.
- Enable students to solve the sectional properties for any geometrical shapes.
- The concepts of elastic constants and its applications for various types of problems with a
- Thorough understanding of stresses and strain.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- IB Prasad **Applied Mechanics and Strength of Materials**
 - RK Bansal, **Strength of Materials** Third Edition, Laxmi Publications, New Delhi
- 1.

AR 142 History & Humanities II	3 - 3

Focus: Continuing from previous semester, to emphasis on Indian, Islamic and Mughal architecture and style in India.

Objectives

- To understand Indian architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Indus valley civilization, Vedic period and manifestation of Buddhist and Hindu architecture in various parts of the country.

Contents

Harappa - Cultural Civilization

Buddhist era architecture in India

Indian temple architecture

Islamic architecture in India

Mughal architecture

The topics will be containing:

- Introduction to Unit, History, excavation, background, planning of town and cities, lifestyle, art and culture etc.
- Conclusion
- Summary of Unit

Outcome

- The students understand Indian architecture as a response to the political and socio cultural conditions present in India at different points of time.
- The architectural responses will be understood with respect to technology style and character.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Sir Bannister Fletcher, **History of Architecture**, Athlone Press
- Brown Percy, **Indian Architecture, Buddhist and Hindu period**, Read Books
- Grover Satish, **Architecture of India, Buddhist and Hindu**
- Tadmor Christopher, **History of Architecture in India**, Phaidon Press.
- Brown Percy, **Indian Architecture, Islamic period**, Palmer Press
- Volwahsen, **Living Architecture Vol 1 &2/A**

AR 152 Basic Design & Workshop II	6 - 6

Focus: Introduction to architectural design through basic design – elements of design

Objective

- To understand the elements and principles of Basic design as the building blocks of creative process.
Design through exercises that will develop the originality, expression, skill and creative thinking.
- To involve students in a number of exercises to understand the grammar of design and visual composition.
- To enable the understanding of 3D Composition by involving students in a number of exercises. This will help generation of a form from a two dimensional/abstract idea.
- To enable the understanding of the relationship between the grammar of design and architecture by involving the students in seminars/ workshops and simple exercises which will look at building form analytically.

Contents

- Elements and principles of visual composition using point, line, shape.
- Exploring color schemes and their application in a visual composition and in architectural forms and spaces.
- Study of texture and schemes of texture both applied and stimulated and their application.
- Study of linear and planar forms using simple material like mount board, metal foil, box boards, wire string, polystyrene etc.
- Study of solids and voids to evolve sculptural forms and spaces and explore the play of light and shade and application of color.
- Study of fluid and plastic forms using easily moldable materials like clay, plaster of paris etc.
- Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.
- Application of basic design in architectural design through the manipulation of line, plane, solid and voids and application of texture color, proportion etc.

Outcome

- An understanding of the qualities of different elements as well as their composite fusions.
- An ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

Reference:

- F. David Martin and Lee A Jacobus, **Humanities through the Arts**, McGraw-Hill

MDC 003 Environment Science and Studies	4 - 4

Focus: Architecture as a system of environmental control

Objective

- To study human heat balance and comfort.
- To familiarize students with the design and settings for buildings for daylight and factors That influence temperature
- To inform about the air pattern around buildings and the effect of wind on design and siting of buildings
- To expose the students to the various design strategies for building in different types of climatic zones.

Contents

- Climate- factors affecting, classification, modes of measurement, assessment tools
- Comfort- factors affecting, theories and proposed modes of measurement, assessment tools
- Introduction to building physics

Outcome

- Understanding of thermal balance in human beings
- Designing climate responsive structure
- Conceptual understanding of air flow in buildings

Examination Pattern:

- Continuous Evaluation Mid Term 1: I hour duration 25 marks Weightage: 12.5%
- Mid Term 2: I hour duration 25 marks Weightage: 12.5%
- End Term: 3-hour duration 100 marks Weightage: 50%
- Field work and Report writing: ----- Weightage: 25%

Second Year

AR 211	Design Studio III	15 - 15

Focus:

- B.** Basic Computer knowledge related to Architectural software
- C.** Understanding of context and implementation of principles in design
- D.** Understanding importance of spoken, written and visual communication.

Objectives

- Understanding fundamentals of theory of architecture
- Understanding importance of spoken, written and visual communication. basic vocabulary of design
- Studio design project
- Reinforcing spoken, written and presentation skills in English.

Content

Studio projects shall be structured to deal with two (or more) distinctly different contexts with program being identical. Studio could be divided into two groups with different sites and resulting solutions shall be discussed in the class to highlight the various differences, which can be attributed to the contextual reasons. In the second project, context with a number of constraints shall be chosen and the process of enhancing the context, in other words, place making shall be investigated. Studio shall attempt to define the nature of relation between built and un built spaces and the need of using un built spaces for programmatic needs shall be highlighted.

- Advanced English reading and writing exercises through book reviews, business letter writing, and presentation of design projects, group discussions and project reports.

Outcome

- Enable students to learn and understand theory of architecture in depth with practical approach in design.
- Enable students to gain confidence in spoken and written English language
- Understanding of context and relationship of functions

Examination Pattern:

- Sessional: 100% {(60 %: 30% Internal continuous assessment + 30 External) + (40 %: 20% Internal continuous assessment + 20% External)}

Reference:

- Francis DK Ching **Form, Space and Order**
- Prammar VS **Design Fundamentals in Architecture**

- Gideon Space Time and Architecture
- von Meiss, Pierre **Elements of Architecture from Form to place**
- Frank Lloyd Wright on **Architecture**
Wright
- Papadakis **Free Spirit in Architecture**
- Crouch June **Traditions in Architecture/Data Planning**. Johnson
- Snyder, James **Introduction to Architecture**
- Porter, Tom **Colour for Architecture**
- Chen John S M. **Architecture in Pen and Ink**
- Kemmerich Carl. **Graphic Details for Architects**
- Kemmerich Carl. **Manual of Graphic Techniques for Architects, Graphic Designers and Architects**
- **New Metric Handbook; Planning and Design Data**. Recent Edition
- Shankar Mulik. **A Textbook of Perspective and Sciography**
- Alibert O. Halse. **Architectural Rendering**
- N.D. Bhatt. **Engineering Graphics**
- Russel, James E. **Graphics for Architects and Planners**
- Robertson Howard. **The principles of Architectural Composition**. Architectural press, UK, qsasa

AR 221	Building Materials & Construction Technology III	4 - 4

Focus: Knowledge of various structural systems and methods of construction and detailing of buildings of medium complexity using natural and manmade materials.

Objective

- To acquaint the students with construction practices pertaining to RCC, floors, roofs and flooring with different materials. Load bearing and frame structures.

Content

- Construction** - Study of principles and methods of construction of RCC, one way, two way slabs-cantilever slabs, sloping RCC roof, vaults, domes including form-work techniques and reinforcement details. Construction with materials alternative to RCC.
- Flooring in mud, murrum, stones marble, granite, tandur/kota stone, mosaic, terrazzo, ceramic tiles and wooden flooring
- Paving Cast in situ concrete, concrete tiles, interlocking blocks, clay tiles, brick and stone
- Plaster Method of plastering a) Internal (use of various finishes viz., lime, cement, plaster of paris, puffing etc., b) External smooth, rough, textured, grit plaster.
- Materials** – Paints, varnishes and distempers, emulsions, cement base paints. Constituents of oil paints, characteristics of good paints, types of paints and process of painting different surfaces. Types of varnish, methods of applying varnish and French polish and melamine finish.

Outcome

- An Understanding of advanced materials, products and methods of construction and in detailing.

Examination Pattern:

- Theory: 20 %
- Sessional: 80% (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Duggal SK. **Building Materials**

AR 231	Structure Design & Systems III	3 - 3

Focus: Understanding the structural concepts and behavior of structural elements relating the knowledge acquired to architectural design

Objective

- To give an insight into the structural behavior of columns and beams

Content

- Introduction to Torsion theory with simple problems.
- Columns and struts effective length, critical load, slenderness ratio, Euler's equation for different end conditions.
- Formula for slope and deflections of cantilever, simply supported and overhang beam using double integration and Macaulay's method of different load conditions.
- Moment area method for simple case of loading. Expound the structural concepts introduced in non- mathematical terms with examples and application in architectural design.

Outcome

Students will have an insight into the structural behavior of columns and beams

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- SS Bhavikatti. **Strength of Materials**
- Basavarajaiah BS and Mahadevappa. **Strength of Materials**

AR 241	History of Architecture	2 - 2

Focus: Western architecture and its development

Objective

- To provide an understanding of Western architecture during Renaissance, Baroque, Neo classical and modern periods.

Content

- Background and influences on Renaissance architecture. Characteristics of Renaissance Architecture in general.
- General characteristics of Baroque.
- Transitional Period A brief account of the situation before the change over to Modern architecture in Europe. Palladian Revival in Britain, Greek Revival and Gothic Revival
- Impact of Industrial Revolution in Europe the social, economic and political changes effected, new requirements of the society, new materials and technological developments.
- The Chicago school works of Louis Sullivan, early industrial buildings, contributions of Bauhaus, De Stijl Movement, Italian Futurism, Art Nouveavau Movement and Arts and Crafts Movement to Modern Architecture
- Ideas and works of great masters Le Corbusier, FL Wright, MV Rohe, Walter Gropius contributions of Brazilian architect Oscar Niemeyer

Objective

- To understand architecture of different parts of world as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in architecture in various parts of the world.

Outcome

- The students will understand architecture as a response to the political and socio cultural conditions present in specific region at different points of time.
- The architectural responses will be understood with respect to technology style and character.

CAD, MUST

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Sir Bannister Fletcher. **History of Architecture**
- Henri Stierlin. **Architecture of the world – Greece**
- Henri Stierlin. **Architecture of the world - The Roman Empire**
- Henri Stierlin. **Architecture of the world – Romanesque**

AR 251	Building Services I	3 - 3

Focus: Understand building services as essential part of design

Objective

- To impart the knowledge and skills required for understanding the building services of water supply and sanitation and their integration with architectural design.
- Understanding rain water harvesting.

Content

- **Water supply** introduction, sources of water supply, qualitative and quantitative aspects, impurities, purification sedimentation, coagulants, filtration, disinfection, water softening and miscellaneous treatment of water. Sources of water pollution and preventive measures. Public water distribution system, methods of layout of distribution pipes.
- Pipe sizes, fittings, valves, types of taps, wash basins, sink, bath tubs, flushing cistern. Domestic water supply systems mains, ferrules, service pipe, water meter, sump, pumps, overhead tank, distribution pipes, cold water and hot water supply for single and multistoried buildings.
- Provision for fire fighting fire hydrants. Study of solar heating systems, gas and electric geysers.
- **Sanitation:** Introduction, importance and purpose of sanitation, definitions bacteria, invert, sewer, sewerage, types of refuse, collection and disposal of refuse, systems of drainage separate, combined and partially separate system, advantages and disadvantages of each system.
- Sanitary requirements for various types of buildings, types of pipes.
- Man holes drop manholes, manhole with intercepting trap, inspection chambers, self cleansing velocity, drains on sloping sites, sub soil drainage, storm water disposal catch basins, inlets, storm water regulators.
- Importance of pumps and sewage pumping stations, septic tanks soak pit, soak well, design aspects, disposal of effluent.
- House drainage principles, traps-floor trap, multi-trap, gully trap, grease and oil trap, urinals, Indian, European, Anglo Indian type of water closet, squatting urinal, bidet

CAD, MUST

- Definitions Siphonage, anti-siphonage pipe, cowl, fresh air inlet, soil and waste pipes, vent pipe
- Systems of plumbing single stack, one pipe, one pipe partially ventilated, two pipe disposal of waste water from buildings typical plan of residence with garage showing all the traps, inspection chambers, pipes connected to public sewer line alternatively connecting the same layout of pipes to septic tank. Testing of drains and drain pipes.
- Brief study - natural methods of sewage disposal by dilution and land treatment, self purification of natural waters, oxidation, sewage treatment, oxidation ponds, aqua privy, garage drainage and layout of simple drainage systems, sewers, materials, laying and testing of sewers, ventilation of sewers, surface drains, sewer, cleaning of sewers, recycling of sewage water. Rain water harvesting.
- Rural sanitation, biogas, different methods of collection and disposal of dry refuse and night soil
- Site visits Water treatment plant, sewage treatment plant, multistoried apartments for studying water supply and sanitary arrangements.

Outcome:

- Students will understand the importance of building services and their use in building
- Students will learn Rain Water Harvesting in buildings

Examination Pattern:

- Theory: 30 %
- Sessional: 70 % (35 % Internal continuous assessment + 35 % External)

References:

- RS Deshpande. **Sanitary Engineering** - (Vol I and II)
- S Birdii. **Water supply and Sanitary Engineering**
- Relevant **IS Codes of India**

AR 261	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 212	Design Studio IV	16 - 16

Focus: A. Urban context and architecture design

B. Basic Computer knowledge related to Architectural software

C. Basic vocabulary of design.

Objective

- To understand the issue of building and context, building bylaws, urban design.

Content

- The design of building will look into aspects of context, surrounding and building program. architectural dimension with issues of services.
- Designing in specific context. Detailed layouts and site planning for building program.

Outcome

Students will learn urban scale and handling of architectural design

Examination Pattern:

- Sessional: 100% {(60 %: 30% Internal continuous assessment + 30 External) + (40%: 20 % Internal continuous assessment + 20% External)}

Reference:

- Broadbent Geoffrey. **Design in Architecture**
- Lang Jon. **Creating Architectural Theory**

AR 222	Building Materials & Construction Technology IV	4 - 4

Focus: Understanding of materials with respect to the construction style and its function

Objective

To study construction systems with focus on roofing and techniques of pile foundation and metal doors, windows and partitions.

Content

Part A.

Construction – Mild steel and Aluminum doors and windows and partitions. Details of RC framed structures with reinforcements, beams including cantilever beams, columns, flat slab, ribbed filler slabs, waffle roof.

Pile foundation Precast piles, cast-in-situ piles, types of piles, method of driving piles, pile caps etc.

Part B.

Materials – Anti-termite treatment to foundation, masonry walls and wood work (pre construction) water proofing materials and weather proofing materials like chemical admixtures and surface applications. Lime and brick bats etc., Pest control treatment.

Outcome:

Students will get exposure of different materials and their practical usage on site.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Duggal SK. **Building Materials**

AR 232	Structure Design & Systems IV	3 - 3

Focus: Structural systems and implications in design

Objective

- To give an insight into the structural behavior of portal frames.

Content

- Analysis of propped cantilever, fixed beams, shear force diagrams and bending moment diagrams. Analysis of continuous beam (maximum three spans)
- Clapeyron's Three Moments Theorem b) Moment Distribution Method
- Analysis of portal frame (single bay, single story with sway and non-sway) by moment distribution method
- To explain the structural concepts introduced in non- mathematical terms with examples and application in architectural design.

Outcome:

Students will learn the applications of structural mathematical terms in design, through site visits and class lectures.

Examination Pattern:

- Theory: 30 to 35%
- Sessional: 65 to 70% (35 % Internal continuous assessment + 35 % External)

References:

- SS Bhavikatti. **Structural Analysis**
- Vazirani and Ratwani. **Theory of Structures**

AR 242	Surveying & Levelling	2 - 2

Focus: To develop the knowledge and skills related to surveying and levelling principles and practice.

Objective

- Understanding principles of surveying and leveling, use of various survey and leveling instruments, carrying out surveys of land of medium complexity and preparation of survey plans.

Content

- Surveying Definition, classification, principles of surveying, character of work, shrunk scale.
- Chain Survey Instruments used, types of chain, instruments for ranging. Setting out angles, erecting perpendiculars.
- Field work chain triangulation, recording and plotting, errors in survey.
- Plane table survey plane table and accessories. Methods of plane table survey, radiation, intersection, traversing and resection, field problems.
- Levelling definition, classification, booking and reduction of levels, longer levelling, errors
- Theodolite study of instruments, definition of different terms, temporary adjustments, uses, measuring horizontal and vertical angles, method of repetition, extension lines.
- Contouring Characteristics of contours, direct and indirect methods of contouring, interpolation, uses of contours, setting out works such as center lines of a building, grade for sewer, center line of a bridge.

Outcome

Students will learn different methods of understanding complex sites: contours, terrain, cliffs, valley and so on.

Examination Pattern:

- Theory: 20 to 25%
- Sessional: 75 to 80% (40 % Internal continuous assessment + 40 % External)

AR 252	Building Services II	3 - 3

Focus: Advance services in building industry

Objective

- To introduce students to electrical services and illumination and to sensitize them with respect to their integration into Architectural Design.

Content

Part A

- Importance of electrical services in buildings, introduction to commonly used terminology
- Supply and distribution of electricity to buildings substations (including high tension panels, transformers, low tension panels, generators) and overhead versus underground distribution systems, panel boards etc.
- Internal supply and distribution brief description of various cabling types, conduit, PVC casing and capping wiring systems;
- Earthing and brief description of protective devices fuses, MCBs, ELCB, etc., Electrical load estimation.
- Introduction to power and lighting circuits. Indian Electricity Rules-Relevant codes of Practice.

Part-B

- Quality and quantity of light;
- Methods of lighting: ambient, task and accent lighting
- Systems of luminaries: direct, indirect etc.
- Various types of electrical lamps incandescent, fluorescent/CFL, HID s, neon lamps and their lighting characteristics
- Design considerations for different types of occupancies and tasks Preparation of a lighting and electrical scheme

CAD, MUST

Outcome:

Students will learn to incorporate the element light with understanding of its impact in design

Examination Pattern:

- Theory: 30 %
- Sessional: 70 % (35 % Internal continuous assessment + 35 % External)

References:

- H Cotton. **Electrical Technology**
- L.Uppal. **Electrical Wiring, Estimating & Costing**
- Anwari. **Basic Electrical Engg**

CAD, MUST

AR 262	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

Third Year

AR 311	Design Studio V	16 - 16

Focus: Institutional building design and its fundamentals

Objectives

- To understand the differences and similarities between institutional goals and architectural goals.
- To understand creating of spaces for learning. Formal, informal and interactive processes of learning and role of the built environment.
- To understand the role of built environments in therapeutic and nurturing institutions
- Working drawings

Content

- Institutional projects like facilities of higher learning, vocational training or a small-scale campus may be given. Case studies of contemporary campus architecture (built since 1980s) shall be carried out.
- There are two distinct typologies of campuses, one that has integrated into the urban fabric at the edges of its boundary and the other that has ignored the urban fabric. Campus planning may be attempted as a two-stage project, with site planning, as one and other stage could be a detailed design of one of the identified buildings.
- The design has to respond to climatic, environmental and ecological factors.
- Detailing of architectural features of the major project like entrance lobby, skylights and staircases has to be attempted.

Outcome

- Students will learn the goals of the institutions regarding the role of built environment in its functioning.
- They will learn to sensitively design to the needs of disabled, aged people and children.
- One major project and one minor/ time problem to be tackled in semester

CAD, MUST

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 321	Building Materials & Construction Technology V	4 - 4

Focus: Detailing of building elements

Objective:

- To study constructional systems and detailing of special doors, windows, structural glazing and cladding

Content:

Part A

- **Construction** – PVC & FRP, frameless glass doors and windows and partitions. Wooden/Steel/Aluminum sliding and folding doors and partitions.
- Steel doors for garages and workshops. Collapsible gate and rolling shutters, remote control systems of doors and gates. Structural glazing, aluminum composite panel cladding.

Part B.

- **Materials** – Insulation materials Thermal and sound insulation materials. Glass its manufacture in its various types like plate, tinted, decorative, reinforced, laminated glass block, fiber glass, glass murals, partially colored glass, etching of glass and its applications in building industry for both exteriors and interiors.
- Glass fabrication techniques, fiber reinforced composite materials and products.

Outcome:

Students will learn to represent drawings with specific details which will bring clarity to the design as well as understanding

Examination Pattern:

- Theory: 20 to 25%
- Sessional: 75 to 80% (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Barry. **Construction of Buildings**

AR 331	Structure Design & Systems V	3 - 3

Focus: Concreate as a building material and its structural qualities

Objective

- To provide an introduction to design of reinforced concrete structures.

Content

- Concrete: Composition, basics of mix design, water cement ratio, strength, durability, workability requirements.
- Relevance of RCC in architectural practice. Advantages of RCC over other conventional structural practices. Steel for RCC Plain & Twisted bars, IS 456 code provisions.
- Working stress method of design basic concept, types of loads, assumptions. Calculation of MR for singly RC beam.
- Limit state method of design. Necessity and philosophy of limit state design. Limit state design of simply supported slabs, beams, T-beams, columns (axial and uniaxial bending) and footings (axially loaded square footing).
- Design of Dog legged and open well stairs (waist slab type)

Outcome:

Students will learn to demonstration models and experiments with materials and structural systems related to the above topics

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Ramachandra. **Design of steel Structures**
- Kazimi and Jindal. **Design of Steel Structures.**
- IS 800 - 1984, IS 883-1970
- IS special publication for the design of steel structures [SP-6 (1)]

AR 341	Landscape Architecture	3 - 3

Focus: Landscaping as a medium of design in architecture. Understanding of Landscape elements like trees, shrubs, plants, water, rocks and development of landscape planning and application in architectural design.

Objective

- To introduce students to the discipline of landscape architecture and to develop basic skills required in handling simple landscape design projects.

Content

- Introduction to landscape architecture, definitions.
- Noted landscape architects and their concepts and definitions
- Natural and manmade landscape, urban and rural landscape
- Elements of landscape architecture like vegetation, land forms and water bodies and their application in design
- Introduction to Site planning and site analysis
- Landscape materials and plant materials study, introduction to taxonomy
- Study and analysis of contemporary landscape designs
- Study of existing landscaped areas like courtyards, gardens, urban spaces etc.
- Street and site furniture Application of landscape design for site plans, small gardens, residential areas, urban spaces, courtyards etc.

Outcome:

- Students develop skills required in handling landscaping project.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

References:

- JO Simmonds. **Landscape Architecture**
- Michel Laurie. **Introduction to landscape architecture**

AR 351	Climatology	2 - 2

Focus: Climate responsive architectural design requires understanding of climatology

Objective:

- Understanding of Climate and its impact on architectural design, fundamentals of climatology and environmental studies, Passive climatic control.
- To apply the principles of Solar Passive Architecture to design of buildings.

Content:

- Introduction to passive techniques of cooling such as evaporative cooling, earth tubing, wind scoops, roof ponds, shaded courtyards etc.,
- Two design exercises (in hot dry and warm humid climate) with an objective to integrate passive cooling systems in the design.

Outcome:

Students will learn the impacts of climate on architectural design and dealing with them

Examination Pattern:

- Theory: 20 %
- Sessional: 80% (40 % Internal continuous assessment + 40 % External)

References:

- Koenigsberger. **Manual of Tropical Housing & Buildings (Part-II)**
- Martin Evans. **Housing, Climate and Comfort**
- Maxwell Fry. **Buildings in the tropics**
- Arvind Kishan, Baker & Szokolay. **Climate Responsive Architecture**

CAD, MUST

AR 361	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 312	Design Studio VI	16 - 16

Focus: A large scale housing project / Working Drawing

Objectives

- To understand the difference in housing as a process and a product, the role of an architect in creating the product and facilitating the process
- To understand the needs of privacy, communal spaces, efficiency of open spaces and ideas of extended living areas
- To differentiate and understand the nature of organic and planned communities.

Content

- Scale of the project shall be limited to allow for intensive study rather than repetition of typical configuration.
- Housing projects can be attempted with added complexities for example, dense context, occupation based, traditional urban fabric, social status and prevalent social strata.
- Details from the dwelling cell to immediate shared space to communal space shall be emphasized and worked out.
- Socio cultural layer of the occupants shall form a strong fabric in the ultimate weave of the design.
- Projects shall aim at developing a very sensitive attitude towards micro level human habitation and role of architecture in enhancing or curbing the quality of living.

One major project and one minor/ time problem to be tackled in the semester.

Outcome

Students will learn to handle projects with considering disabled, aged people and children. Students will learn to work in socio cultural harmony as well as towards all levels of requirement of housing.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 322	Quantity & Estimation	3 - 3

Focus: Systems of taking out quantities and estimating for all trades involved in construction of medium complexity, writing specifications for materials and various items of work.

Objective

- To develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

Content

- Introduction, importance of estimation, types of estimates, mode of measurement etc.,
- Study of local SR rates, market rates, measurement book (MB), RA bill, interim and final certificate
- Detailed rate analysis of building items as per current schedule of rates (CSR) of local PWD for information only
- Percentage of various materials used in building items like cement, steel, rubble, metal, sand, brick, tiles etc.,
- Abstract and detailed specifications for various materials and items of work used in building

Estimate of:

- Load bearing and RCC framed structure with one example for each
- Typical interior items of a residence and an office
- Various types of roofs like steel and wood including roofing materials like
- Mangalore tiles, AC, GI sheet etc.,
- Water supply and sanitary works
- A typical layout plan with roads, culverts etc.

Outcome:

- Students will develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

References:

- SK Dutta. **Estimating and Costing**
- SC Rangawala. **Estimating**

AR 332	Structure Design & Systems VI	3 - 3

Focus: Steel as the advance structural building material and its techniques.

Objective

- To give an introduction to the design of steel structures.

Content

- Design of simple and eccentric riveted and welded connections.
- Design of tension and compression members in trusses.
- Design of built-up columns (lacing only)
- Design of slab base (no gusseted base) and simple column and footing connection details
- Design of laterally restrained beams (simple and compound)
- Provision for fire protection for steel structures relevant code provision

Outcome

- Students will learn details and calculations of steel structure and its impact on design

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- N Krishna Raju. **Pre-stressed Concepts**
- DL Schodek. **Structures**
- Alexander Zamen. **Form and Structure in Architecture**
- N Krishna Raju and RN Pranesh. **RCC - design and practice**

AR 342	Professional Practice	3 - 3

Focus: Introduction to the profession of architecture, its division and sub divisions

Objective

- To understand the responsibilities & liabilities of the profession. To understand the process of contract management.

Content

Profession: Idea of profession and essential difference among profession, trade and business.

- Profession of architecture, its essential tenets, duties and liabilities.
- Types and extent of services offered by architects, scale of fees, stages of payment, and contract between client and architect.
- Code of Professional Conduct, Architects Act of 1972. Role of Council of Architecture and the Indian Institute of Architects in the functioning of the Profession.

Practice: Types of Architectural firms, proprietorship, partnership, associate ship, and private limited concerns. Advantages and disadvantages of each type of firm, various means of building client base and gaining projects, Architectural competitions.

- Guidelines of COA, procedure of conduct of such competitions.
- Administration and basic accounting procedures. Taxes and implications of service tax. Implication of GATS on the profession in India.

Building Industry: General overview of the industry. Various participants and dimensions of building industry. Finance, statutory controls, construction procedures, enforcement issues related to building industry and the role of architect, employer, and contractor.

Contract Management: Overview of procedures in contract management with a focus on Architect's role.

Tender: Procedure of calling for tender, documents necessary for tendering process. Tender document and its content. Types of tenders, suitability of different types to various categories of projects. Advantages and disadvantages of each type of tender. Tender notices, opening, scrutiny, process of selection and award. Architect's role in tender process. Essential characteristics of Tender Notice, Earnest Money Deposit, Security Deposit, Retention Amount, Mobilization Amount

CAD, MUST

and Bonus & Penalty Clauses.

- Various issues arising out of tendering process and the role of an architect in maintaining objectivity in the process.

Contract: General Principles, types of contract, definitions of various terms used in the contract document. Contract document, contents and sections dealing with various aspects of contract management. Conditions and Scope of Contract and the role of an architect in ensuring a positive completion of a contract. Architect's role in the contract and vested authority.

Issues of Contract: i) Termination of contract, ii) Certificates of value and quality, iii) Virtual completion and final completion, iv) Defects liability period, v) Latent and patent defects, vi) Liquidated and un-liquidated damages, vii) Extension of time, delays and penalty, viii) Non tendered items, extras, extra work, additional works, variations, rate analysis and architect's role in certification of variations, ix) Prime cost, provisional sum, x) Types of insurance necessary during contract including fire insurance for safeguarding client's interest.

Outcome

Students will learn the responsibilities & liabilities of the Profession and understand the process of Contract and project management.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

References:

- Roshan Namavathi. **Professional Practice for Architects & Engineers**
- Bob Greenstreet. **Legal and Contractual Procedures for Architects**
- AJ Legal Handbook
- KG Krishnamurthy and SV Ravindra. **Professional Practice**

AR 352	Town Planning & Building Bylaws	3 - 3

Focus: Urban and regional planning and the factors of planning

Objective

- To give an introduction to the discipline of urban and regional planning

Content

- Human settlements Urban settlements and Rural settlements, differences, origins, evolution and growth of settlements. Major functions of a city, city forming and city serving functions. Problems faced by a typical city. Relation between urban and rural settlements, characteristics and planning efforts of cities and towns of various historical periods like Egyptian, Greek, Roman, Medieval, Renaissance, Neo-classical. Industrial Revolution and its impact on cities, the contemporary city. Cities of Indus valley and Vedic period, cities of Moghul period and British period, typical Indo-Aryan cities, typical Dravidian temple city.
- Planning Theories enunciated by Ebenezer Howard, Patrick Geddes, Soria Y Mata, Doxiadis, Le-Corbusier, Clarence Stein, Clarence Arthur perry, Hilberseimer their relevance to Indian conditions.
- Land use planning, land use classification for cities and rural settlements, analysis of land uses in Indian cities.
- Urbanization, Industrialization and urban growth, definitions and inter relationship. Trends in urbanization in India since Independence. Growth of metropolitan cities, their growth and management problems, world urbanization trends.
- Components of a settlement activity pattern and land use, traffic and road network, density of population and population distribution. Central business district of a city, other business districts, urban nodes, rest of the city, fringe area and suburbs. Growth and aging of various parts of the city particularly the CBD, the problems caused due to this including slums, internal spatial structure of cities concentric zone theory, sector theory, multiple nuclei concept and work-home concept.
- Planning Techniques study and analysis of existing settlements, methodology of conducting diagnostic surveys and studies, land use survey, density survey, FSI survey, traffic surveys, presentation of data
- Regional Planning relation among various settlements of a region, pattern of settlements in a

region. Definition of a region, various types of regions, basic principles of regional planning

- Urban Renewal causes and consequences of urban blight and obsolescence slums and shanties methods of conducting surveys, analysis and presentation of data, prevention of formation of slums and squatter settlements. Environmental and management issues.

Outcome

Students will have an introduction to the discipline of urban and regional planning.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

Reference:

- Gallion and Eisner. **The Urban Pattern: City Planning and Design**
- Chapin. **Urban Planning**

AR 362	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

REVISED B.ARCH. CURRICULUM CAD
[BATCH 2015-2020]



A LEADING WOMEN'S UNIVERSITY

Undergraduate Program
Bachelor of Architecture

School of Architecture & Town Planning

Mody University of Science & Technology

N.H. 11, Lakshmangarh, Sikar, Rajasthan - 332311

Course Outline**School of Architecture & Town Planning, Mody University:**

- B. Arch.

5 Years

(300 credits)

Background

A curriculum for Design Education evolves from the vision of the institution, its aspirations and its capability to deliver the knowledge. It defines the relationships between the teacher and the student and the institution. Curriculum for Architecture also connects creativity and physical reality.

Five-year Architecture undergraduate program is designed to provide an exceptional university education as well as comprehensive preparation for entry in the competitive and challenging career in architecture. Studies in architecture and other associated disciplines are undertaken in parallel throughout the five-year program. This five-year undergraduate professional program is a professional degree accredited by the **Council of Architecture, India**. The program is for a limited number of qualified students committed to the study of architecture. These students are admitted directly to the professional degree program and begin studies in architecture in the first year.

The **B. Arch** curriculum has two stages of study. The stage-1 (years 1, 2, 3) provides a foundation of understanding on which to build a second level of advanced study. Continuously through the course of the program runs the Design Studio, in which projects are selected as a means for developing the professional skills, knowledge, understanding and a platform to create exemplary architectural designs. At the end of the third year, the program culminates with a studio project helping students to summarize what they have learned with an introduction to prepare themselves for more independent studies in the advanced professional program.

The stage-2 (years 4 & 5) concludes with a **semester** (one or two) of Professional Training (forth year) and Final Year Thesis program. The first semester of the final Year integrates an introduction to independent Research Methods. An integrated design research phase continues throughout the final two semesters. The final year project is selected by the students' themselves to provide them an opportunity to develop their individual point of view about the profession and create their own place in the building industry. Thesis or Dissertation is part of the course to investigate issues the student sees as significant to herself and to the profession.

The Objective

- Develop direct personal experience of social, environmental and technological contexts.
- Encourage exploration of the diversity of thoughts, techniques, working methods and material palettes.
- Develop capacities to think from simple first principles, using observation, common sense and intuition to build more elaborate conceptual frameworks.
- Develop ability to “learning how to question, absorb and analyze” rather than following “conventional” practices and solutions.
- Understand and connect to local realities as vehicles for solutions.
- Encourage sharing and collaboration and as well as individual achievement.
- Creativity, skills and initiative should be developed and encouraged to assist the involvement of the body, mind and therefore confidence.
- General awareness towards architectural heritage introduced from the beginning of the degree program through courses / electives by experts on conservation, restoration and re –adaptation of buildings.

The Curriculum (B. Arch)

The curriculum allows students to choose their own area of interest and allow for independent exploration in the later years (3+2-year model) by having option of choice based Studio and Theory subjects. This is important to have a more mature and self-driven Architect. The curriculum shall also encourage students to select subjects of their choice from allied disciplines at other Colleges of this University.

The curriculum is to allow for Inter-disciplinary teaching in areas of Technology, Humanities and Environment by conducting joint sessions and assignments. The course content is synchronized to facilitate the same. Moreover, each semester has a thematic emphasis to allow many different subject to address the same. This is done to facilitate further synthesis.

Curriculum structure allows for other means of learning such as travelling studios, joint studios or studios in other socio-cultural environment apart from exchange program. This can provide the necessary confidence to deal with the outside world.

The courses dealing with design studio, technology, humanities shall be taught in an inter-disciplinary manner and not as compartmentalized specializations.

History, theory & technology based courses are those, which let us understand and appreciate, social, cultural, technological and historical knowledge and skills for its application in design projects.

Course Structure

The course structure and relative emphasis between sub-disciplines vary depending on their position within the course.

First year, being a Foundation year, the emphasis shall be on the development of background knowledge such as sensibility, analytical skills, technical and general communication skills and associated disciplines.

During Second and Third, Advanced years the emphasis is on understanding and appreciation of in-depth relationships between various disciplines and use of their resolutions, complexity, techniques and methods of application. The Fourth and Fifth Years, termed as final years, emphasize the development of the individual's maturity and establishment of direction. During last two years of the course student develops her theoretical and practical understandings and decide on personal choice of directions.

Credit Loads

The course is of 5 years / 10 semester's duration. Each year consists of 2 semesters of approximately 16 weeks each. Each semester carries a contact load of 30 credits, where 1 credit is equivalent to 1.0 lecture hour/week in theoretical subjects and studio, workshop, laboratory based courses.

Each semester normally consists of (including design studio) not more than 6 subjects and each subject is normally of at least 2 credits.

In addition to subjects that form the core of the curriculum, the course offers 10 credits out of a total of 300, as electives. These electives are offered within the disciplines of humanities, arts and crafts: history and theory, and technology, so that a student can develop her interest in these areas.

- 1 Credit = 1 Contact hour for Theory/ Studio/ Workshop

Assessment

Student's performance is continually evaluated through Time Problems, projects, Tests, Quizzes and periodic assessments of sessions work. Generally, **50 %** of the assessment is through this system, and **50 %** weight is assigned to end of semester examinations (Internal). All core subjects are examined at the end of the semester through project review (Juries), crits, viva-voce or examination papers. Electives are normally assessed through final results, assignments or papers.

In order to clear a subject a student must obtain at least **50 %** marks in all the assessments of the subject. While the teaching faculty in all subject areas does grading, the subjects at the end of the Third and Fifth Year are examined additionally by an external examiner.

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 412 – Architectural Design VII

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	12	200	200	14	400

Objective: To learn about reading and documenting urban housing contexts and to understand the idea of urban housing development. To understand the role of architecture in shaping urban housing fabric. To create architecture which fits into a specific urban context.

Contents:
Unit 1: Introduction

Review of different forms of housing globally, Housing need & Demand, Housing resources and options available in housing

Unit 2: Research and data collection through case study

Finding details of housing in Indian context, collecting data and analyse case study

Unit 3: Design

Design project on given site; there may be a minor design project and a major design project.

Unit 4: Design development

Design development in stages using all the data collected through case studies.

Outcome: Students will have understanding about the housing fundamentals and design methods will get explored.

References:

- Babur Mumtaz and Patweikly, **Urban Housing Strategies**, Pitman Publishing, London, 1976.
- Geoffrey K.Payne, **Low Income Housing in the Development World**, John Wiley and Sons, Chichester, 1984.
- John F.C.Turner, **Housing by people**, Marison Boyars, London, 1976.
- Martin Evans, **Housing, Climate and Ocmfort**, Architectural Press, London, 1980.
- Forbes Davidson and Geoff Payne, **Urban Projects Manual**, Liverpool University Press, Liverpool, 1983.
- DL Schodek, **Structures**
- Alexander Zamen, **Form and Structure in Architecture**
- N Krishna Raju and RN Pranesh, **RCC - design and practice**

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 422 – Advance building Construction I

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	3	100	100	4	200

Objectives:

Study of the advanced and more complex aspects of construction. It also aims at making students aware of systems and techniques of construction systems of roofing for large span and complex buildings.

Contents:**Unit 1: Special concrete and concreting method**

High density, fiber Reinforced, polymer concrete, properties & uses. Ready mixed concrete, grouting, cold weather & underwater concreting, Lightweight concrete construction, Composition of lightweight concrete & its advantages, its application in building walls, roof, foundations & ornamental works.

Unit 2: Roofs and Water Proofing

Expansion Joints, Water-Proofing, false Ceiling, Suspended ceilings, roofs.

Unit 3: Space Structure

Introduction to space structures, possibilities in different materials, types of space structures and possibilities in different materials to cover large spans.

Unit 4: Steel Truss and Temporary Structure

General study of Grid structures and skeletal structures, space frames, domes etc. in steel, various types, constructional aspects, merits and demerits, etc. Steel trusses for various spans, ridged truss, saw tooth truss with lattice girders, roof lighting, a/c sheet and profiled MS sheet cladding and roof fixing details. Temporary structures, materials and techniques used, earthquake resistant structures.

Materials - Plastics - types, properties and uses of plastics such as polycarbonates, acrylics, PVC polymer films, fiber reinforced plastic. Rubber and Asbestos cement products. Water Proofing elements, construction chemicals and additives, adhesives, plaster of Paris, gypsum, Polystyrenes, sealants, Ferro-cement

Outcome:

Students will have understanding of material properties and construction techniques of Ferro cement, RCC and special concreting methods and appropriate material and technology.

References:

- EVANS, M. (1980). **Housing, climate and comfort**. London [etc.], The Architectural Press.
- PAYNE, G. (1985). **Low-income housing in the developing world: the role of sites and services and settlement upgrading**. Chichester, W.Sussex, Wiley.
- PAYNE, G. K., & DAVIDSON, F. (2000). **Urban projects manual**. [Liverpool], Liverpool University Press in association with Fairstead Press.
- TURNER, J. F. C. (1991). **Housing by people: towards autonomy in building environments**. London, Boyars.
- WAKELY, P. I., SCHMETZER, H., & MUMTAZ, B. (1976). **Urban housing strategies: education and realization**. London, Pitman.

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 432 – Structure Design & Systems VII

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Objectives:

Conceptual study of Advance Frame construction structures with reference to high rise buildings and surface structure.

Content:**Unit – I: TIMBER STRUCTURES – BEAMS, COLUMNS AND ROOF TRUSSES**

Properties, strength and types of timber used as structural components in timber construction – Permissible stresses in timber – Design of Columns and beams as per BIS codes. Types of Timber Roof Trusses used for different spans.

Unit – II: Foundation and Pre - Stressing

Raft foundations, **Pre-stressing** – Method and losses in pre-stressing, comparison of RCC and pre-stressing, Pre-stressing systems. Pre-tensioning and post-tensioning.

Unit – III: Cantilever and Truss

Types of **roof trusses** – Selection of trusses according to the span – Estimation of gravity loads and wind loads, Use of BIS and book SP-38 in analyzing and design of trusses, gusseted plate connections (Theory Only). Cylindrical, parabolic and flat arches, advantages and limitations. Beams and columns and various types of supporting systems cantilever and propped cantilever. Continuous and fixed beams and their behavior under load.

Unit – IV: Shell Structure

Simple framed structures and trusses-advantages and limitations. Conceptualizing and understanding of surface structures – shells, domes and folded plates.

Outcome:

Students will have understanding of advance frame construction, high rise building structure design, timber structures and shell structure.

References:

- V.S.Prasad, **Structural Mechanics & Analysis**,
- B.C.Punmia , **Strength of Material & Mechanics of Structure (Vol. II)**, M/s. Lax Publications, New Delhi - 2010
- C.S.Reddy, **Basic Structural Analysis**,
- Ramachandra .S, **Design of steel structures Vol. I**, Standard publication, New Delhi, 1992
- Vazirani .V.N, and Ratwani .M.M, **Steel structures**, Khanna Publications, New Delhi, 1995

B. ARCH. (STAGE II) - SEMESTER - VIII**AC 442 – Professional Practice-II (Valuation & Contract documents)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
1	1	0	50	50	2	100

Focus: Introduction to the profession of architecture, its division and sub divisions

Objective: To understand the responsibilities & liabilities of the profession. To understand the process of contract management.

Content:

Unit 1: Practice: Types of Architectural firms, proprietorship, partnership, associate ship, and private limited concerns. Advantages and disadvantages of each type of firm. Various means of building client base and gaining projects. Architectural competitions,

- Guidelines of COA, procedure of conduct of such competitions.
- Administration and basic accounting procedures. Taxes and implications of service tax. Implication of GATS on the profession in India.

Unit 2: Contract: General Principles, types of contract, definitions of various terms used in the contract document. Contract document, contents and sections dealing with various aspects of contract management. Conditions and Scope of Contract and the role of an architect in ensuring a positive completion of a contract. Architect's role in the contract and vested authority.

Unit 3: Valuation and Rent

Valuation – purpose of valuation, types of valuation- book value – salvage value- scrap value- depreciation obsolescence- sinking fund- land valuation- mortgage and lease- problems on valuation- Annuity- definition, Fixation of rent- out going- gross and net income – year's purchase- capital cost- standard rent- market rent economical rent

Unit 4: Outsourcing and Architectural competition

Basic introduction, Regulations governing the **conduct of competitions**, open & closed competitions, appointment & duties of Assessors, instructions to participants, award of premium. Role of development authorities & urban arts commissions, salient features of the DCR for CMA, **important regulations** in Rajasthan govt.,- Environmental acts & laws, special rules governing hill & desert area development, heritage act of India etc.

Outcome:

Students will understand complex technicality of the profession

References:

- Roshan Namavati, **Professional Practice**,
- **COA Handbook of Professional Documents**.
- **Hand book on Professional Practice**, I. I. A, Image systems, Mumbai, 1998.

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 451 – Dissertation

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	2	100	100	3	200

OBJECTIVES

- The primary objective of this subject is to enable students to establish a strong theoretical foundation, clarity of thought and also to orient the students to structured research in a focused manner.
- The process of study shall enable students to conduct in depth analysis and objective research on a topic of their interest.
- Students may be encouraged to select the topic which may eventually culminate in the further studies and research work.

COURSE CONTENTS

Students may choose a topic related to Architecture and allied subjects. The topics must be vetted by the faculty. Emphasis must be on critical understanding, logical reasoning and structured writing. Students can thus utilize this as an opportunity for writing research papers, amounting to literature review and relevant case studies which are otherwise required for Thesis. The study shall be conducted under the guidance of teacher or external expert in the department.

OUTCOMES –

- By the end of the semester, students will be submitting a written paper of approximately 3500 words.

SUGGESTED REFERENCES

1. Mukhi, H.R. Technical Report Writing: Specially prepared for Technical and Competitive Examinations, New Delhi: Satya Prakashan, 2000.
2. Barrass, Robert. Writing at Work \b a guide to better writing in administration, business and management, London: Routledge, 2003.
3. Seely, John. The Oxford guide to effective writing and speaking, 2nd ed., Oxford; New York : Oxford University Press, 2005.
4. Jo Ray McCuen, Anthony Winkler. Readings for writers, 9th ed., Fort Worth: Harcourt Brace College Publishers, 1998.
5. Treece, Malra. Effective reports, 2nd ed., Boston: Allyn and Bacon, 1985.
6. Anderson, J. and Poole, M. (1998). Thesis and assignment writing. Brisbane: John Wiley.
7. Borden, I. and Ray, K. R. (2006). The dissertation: an architecture student's handbook. 2nd Ed. Oxford: Architectural Press.
8. Fink, A. (1998). Conducting research literature reviews: from paper to the Internet. Thousand Oaks: Sage.
9. Murray, R. (2005). Writing for academic journals. Berkshire: Maidenhead, Open University Press.

B. ARCH. (STAGE II) - SEMESTER - IX
AD 511 – Architectural Design VIII

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	14	300	300	16	600

Objectives: To create an opportunity for the coordinated group work in conducting physical, socio-economic and traffic analysis: data collection, analysis and presentation as a prerequisite to the main design issues, including intervention into specialized aspects of landscaping, town planning and urban design through architectural design exercises.

Contents:
Unit 1: Building Project & the vicinity around

Correlation of design issues to land and surrounding areas, influences of neighbouring areas on the design development; Consideration of issues such as socio-economics, environment, technology in relation to urban design. (Prerequisites: Earlier design studios)

Unit 2: Urban Context

The basic aim of the studio is to relate the building/buildings, complexes, streets, public places and spaces, etc., to the urban or regional context for which the change in the scale would imply change in the complexity of design, change in the user profiles, change in the issues addressed and involvement of public in design. The large scale design would require variation in all stages of design; understanding Urban Sprawl.

Unit 3: Aspects of Urban Design

Aspects in Design: Introduction to historical development of urban design, various theories in modern times, aspects of planning, and cultural contribution in definition of spaces. Studies in urban design like behavioral studies and physical expression of socio-cultural aspects, morphology and typology in city structure, townscape and image ability of public spaces, communication systems, infrastructure development and network of open spaces, etc., are understood through examples or book reviews. Interpretive techniques and analyzing methods like visual analysis, questionnaire techniques, recording devices, mapping and vantage points, are reviewed and chosen.

Unit 4: Survey Methods

Observation, Methods of public participation in design are to be studied. Design proposal should consider all possibilities to achieve the aims and objectives of design. The class should provide a master-plan which would have design in the form of guidelines, bye-laws, phasing of design, prototype, design, or detailed design

Outcome:

Developing skill of higher design level of contextual-planning, neighborhood thinking

References

- Gallion Arthur B ; Eisner Simon, (1963) **Urban pattern city planning and design**, Van nostrand
- Cullen Gordon, (1968), **Townscape**, Architectural Press
- Spreiregen P D(1965), **Architecture of towns and cities**, McGraw Hill
- Chiara, J.D. (1984), **“Time Saver Standard for Site Planning”**, McGraw Hill Book Co., N.Y.
- Krier Rob, (1984) **Urban Space**, Academy editions
- Christopher Alexander,(1977), **Pattern Language**, Oxford University Press
- Sanoff Henry, (1991), **Visual research methods in Design**, Van Nostrand Reinhold
- Banargee Tridib Southworth Michael, (1990), **City Sense and City Design**, M I T Press
- Broadbent Geoffrey, (1990), **Emerging concepts in urban space design**, Van Nostrand Reinhold, London.

AD 521 – Professional Practice-III (Legal implications & business management)

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
4	0	0	50	50	4	100

Objectives:

The study of this subject is to enable the student to acquaint with the various responsibilities of an architect and understand the technicality of the profession. To understand complex issues and their solutions related to professional practice.

Content:**Unit 1: Business management of professional practice**

Office management practice, dealing with client, contractor specialist suppliers & services consultants, record keeping, methods of filing, business communication. Handling business management software. HR practices, feedback, planning & decision making, manpower management.

Unit 2: Financial & office management of professional practice

Budgeting of the project, office budgeting, profit & loss, receipts & payments, income & expenditures, taxation- professional tax, income tax, service tax etc. trial balance, inventory records, basics of internal & external auditing.

Unit 3: Legal implications of professional practice,

Definition, types of **Easements**, acquisition, protection and extinction of easements – Need for **Arbitration**: arbitration agreement, role of arbitrators, umpire etc, excepted matters, arbitral award, terms of contract between architect & client, client & contractor etc., Sale deed procedure.

Issues of Contract: i) Termination of contract, ii) Certificates of value and quality, iii) Virtual completion and final completion, iv) Defects liability period, v) Latent and patent defects, vi) Liquidated and un-liquidated damages, vii) Extension of time, delays and penalty, viii) Non tendered items, extras, extra work, additional works, variations, rate analysis and architect's role in certification of variations, ix) Prime cost, provisional sum, x) Types of insurance necessary during contract including fire insurance for safeguarding client's interest.

Unit 4: Special Architecture issues.

Local Rules and regulations, its effects on profession and education. General information and introduction to various acts and laws such as land acquisition Act, urban land ceiling Act. Building bye-laws, owner ship documents, Dilapidation and Demolition. Latest methods of assessing building age & ways of dismantling of buildings.

Outcome:

Students will understand complex technicality of the profession

References:

- Roshan Namavati, **Professional Practice**,
- **COA Handbook of Professional Documents**.
- **Hand book on Professional Practice**, I. I. A, Image systems, Mumbai, 1998.

AD 531 – Advance Building Construction - II

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
2	0	4	100	100	6	200

Objectives:

To inculcate the basic concepts related to the tall buildings structure and behavior and various types of shells. To introduce the basic concepts of Space Frames, Shells and folded plates and tensile structures, parametricism and biomimicry.

Content:**Unit 1: Special Structures**

Definitions, Types – single, double & multilayered grids – two way & three way space grids, connectors, Grids, Domes, various forms, Geodesic domes. Advanced Foundations: Pile and raft foundations, Lift slab construction, slip form construction etc. Analysis of three hinged arches. Diaphragm tension, Structure for pavilions.

Unit 2: Tall Buildings

High rise buildings, foundations structural systems and architectural design considerations, Brief outline of their Behavior and their applicability for various heights of buildings, advanced methods of multistory building construction, Sky Scrapers. General study of various external cladding materials and systems, curtain walling in various materials, construction details of glass curtain walling.

Unit 3: Design for Earthquake zone and Reconstruction

Earthquakes and its effects on buildings, earthquake zones in India, Architectural design considerations and construction detailing for earthquake resistance. Design and detailing of additions and alterations in existing buildings put to new use Process of modification and precautions to be taken. Arches: Basic concepts, Disaster resistant construction system.

Unit 4: Tensile Structures

Suspended cable structures, types of cable network systems, shapes of cable suspended systems, examples of tensile membrane structures, types of pneumatic structures. Space frames, unconventional buildings like TV towers, Geodesic domes – principles and construction, basics of parametricism and bio mimicry.

Outcome:

The student shall have conceptual understanding of designing Shells and Space Frames, appropriate knowledge to tall structural systems, shells and folded plates and tensile structure for the space coverage and other advanced design concepts.

References:

- Gurucharan Singh, **Building Construction and Material**, Standard Book House, Delhi - 2010
- Stephen Emmittand, Christopher George, **R. Barry's Advanced Construction of Buildings**, Black Well Publishing Oxford – 2006
- R. Barry – Affiliated East West Press, **The Construction of Building, Vol-1, IV**, New Delhi – 2004
- M.J.Tomilson, **Foundation Design and Construction**, Educational Low Priced Books Scheme with Longman London - 1995
- Francis D.K.Ching, **Building Construction Illustrated**, VAN Nostrand Reinhold, New York – 2010
- L.S.Beedle, **Advances in Tall Buildings**

AD 541 – Thesis Orientation

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	1	50	50	2	100

Objectives:

To develop faculty of critical thinking in student in orienting toward thesis design/research statement, leading to creation of comprehensive base of information relevant to the thesis project in the subsequent semester.

Content:**Unit 1: Reviewing**

Review of a book and a research paper; basics of a book review, selection of reading material for review; techniques of reviewing.

Unit 2: Case Study

Selection of a nagging problem for case study, basics of undertaking case study,

Unit 3: Basics of writing a Concept Paper

Selection of a topic of interest, finding out niche area in which to work, enumerating risks and advantages in the area selected, literature search, processing of pictures and data.

Unit 4: Preparation of a Research Paper

Preparation of points from the data processed, understanding the framework of technical writing, actual writing and reviewing, support text with illustrations, referencing and cross-referencing, writing bibliography and completing the paper.

Note: Each student shall select a topic related to Architecture/allied fields with the guidance of the faculty coordinator of Thesis Orientation course; who will check on the progress of the students work. It is important that the student should start thinking about the dissertation/thesis topic much earlier during the practical training. This will give the student an opportunity to interact with the professional architects and colleagues in the firm, where she undergoes professional training.

Outcome:

Students get equipped with the skill in the basics of dissertation writing and critical thinking.

References:

- DWIVEDI R.S. (2001), **Research Methods in behavioral science**. Mcmillan New Delhi
- SANOFF, H. (1991), **Visual research methods in design**. New York, Van Nostrand Reinhold.
- WANG, D. ET AL. (2013), **Architectural research methods**. Groat, Hoboken, N. J., Wiley
- ZEISEL, J., & EBERHARD, J. P. (2006), **Inquiry by design: environment, behaviour, neuroscience in architecture, interiors, landscape and planning**. New York, W. W. Norton & Company.

B. ARCH. (STAGE II) - SEMESTER - X
AD 512 – Architectural Design Thesis

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
0	0	8	400	400	24	800

Objectives:

- To develop assimilation, synthesis and application of research in Architecture
- To prepare a student to independently handle and present all aspects of an architectural design: from its evolution to final solution in totality;
- To understand the importance of the evolutionary stages of a design process and various techniques required for a successful presentation of an architectural design;
- To develop in students the ability to handle specific aspects of design relevant to the topic.

Course contents

Each student is required to conduct an intensive study and present a design thesis on any of the design topics. The students should submit synopsis for the least three different, designs or research oriented topics in the department, of which one will be approved to carry on the research and design. Each student shall be attached with a faculty member who will guide his work. The arrangement of the assessment of the progress through the semester for all the students and a Program Schedule 'will be declared separately for each session by the department.

The work of the student should result into a 'Design Proposal' based on the complete and detailed study of site including its selection, topography, climate, spatial requirements of the project, special functional and physical needs of the project, and the standard data, construction and services and all other factors that the involved with a particular thesis topic.

At least two of the following items, for complete design or an approved part thereof, should be covered in full detail and included in the design and presentation, along with the final design proposal-

1. Structural calculations and design.
2. Detailed estimate and specification.
3. Working drawing and construction details.
4. Proposal for Mechanical services to cover 'Air-conditioning & Mechanical conveying system'.
5. Proposal for Electrical Services and Illumination.
6. Proposal for Water supply and waste disposal services.
7. Proposal for Acoustical design & specification.
8. Proposal for Interior design – including furniture, fittings and finishes.
9. Landscape design proposals in detail.

The design proposal should be prepared and presented with the help of charts, Drawings, perspective views, models and other audio-visual aids. A thesis report must also be prepared and submitted in one soft copy (on CD) and three hard copies (one to be returned to the student) type written and bound together with prints and photographs of all the drawings & models. The thesis report should explain the objectives, scope, case studies, literature study – research and data, design concept/approach, design proposals, construction programming & financing etc.

The original drawings, models and one copy of the thesis report will be returned to the students in due course of time as decided by the department.

Outcomes:

- **Designs** a Thesis project responsive to the contextual and program requirements.
- **Combines** the systematic/methodological learning from various stages of study and analysis in design process towards culmination of an informed design.
- **Communicates** the ideas clearly using writing, verbal and visual presentation.
- **Demonstrates** self-reliance when working independently
- Integrates ideas with design requirements
- **Compares** data and information gathered from Pre-design research
- **Evaluates** data and information gathered from Pre-design research and summarizes the information to be used for design
- **Applies** various codes, standards and regulations governing the project.
- **Demonstrates** synthesis of creativity and technical knowledge
- **Demonstrate** the ability for decision making required to progress the understanding already developed.
- **Demonstrate** the ideas clearly using detailed physical Model.

References

1. Mukhi, H.R. Technical Report Writing: Specially prepared for Technical and Competitive Examinations, New Delhi: Satya Prakashan, 2000.
2. Barrass, Robert. Writing At Work \b a guide to better writing in administration, business and management, London: Routledge, 2003.
3. Seely, John. The Oxford guide to effective writing and speaking, 2nd ed., Oxford ; New York : Oxford University Press, 2005.
4. Jo Ray McCuen, Anthony Winkler. Readings for writers, 9th ed., Fort Worth : Harcourt Brace College Publishers, 1998.
5. Treece, Malra. Effective reports, 2nd ed., Boston: Allyn and Bacon, 1985.
6. Time Saver Standards
7. Neuferts Architects Data
8. A.J.Metric Handbook

B. ARCH. (STAGE II) - SEMESTER - X**AD 522 – Advance Elective I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
1	0	1	50	50	2	100

AD 522 INTERIOR DESIGN

Objectives: To study the Interior Design principles and their applications in interiors.

Detailed study of History, principles and elements that go into making of an interior space more aesthetic, pleasing and functional with a few projects as practical.

Contents:**Unit 1: Introduction to interior design**

Definition of interior design - **Interior design process** - Vocabulary of design in terms of principles and elements - Introduction to the design of interior spaces as related to typologies and functions, themes and concepts - Study and design.

Unit 2: History of interior design

Brief study of the **history of interior design** through the ages relating to historical context, design movements and ideas etc. - Brief study of folk arts and crafts. (vernacular design in India) with reference to interior design and decoration.

Unit 3: Elements of interior design - enclosing elements and furniture design & space planning

To understand passive architecture. Introduction to various **elements of interiors** like floors, ceilings, walls, staircases, openings, interior service elements, incidental elements etc. and various methods of their treatment involving use of materials and methods of construction in order to obtain certain specific functional, aesthetic and psychological effects.

Study of the relationship between furniture and spaces - human movements & **furniture design** as related to human comfort. Function, materials and methods of construction - changing trends and lifestyles – innovations and design ideas - Study on furniture for specific types of interiors like office furniture, children's furniture, residential furniture, display systems, etc. – Design Projects on Residential, Commercial and Office Interiors.

Unit 4: Elements of interior design– lighting accessories & interior landscaping

Study of **interior lighting** - Different types of lighting their effects types of lighting fixtures. Other elements of interiors like accessories used for enhancement of interiors – Paintings, objects de art, etc. Interior landscaping - Elements like rocks, plants, water, flowers, fountains, paving, artifacts, etc. their physical properties, effects on spaces and design values.

Outcome:

Expertize and better understanding of subject interior design and its application.

References:

- Francis .D.K. Ching, **Interior Design Illustrated**, V.N.R. Pub., NY 1987.
- Julius Penner and Martin Zelnik, **Human Dimensions and Interior space**, Whitney Library of Design, NY 1979.
- Steport - De Van Kness, Logan and Szebely, **Introduction to Interior Design** Macmillan Publishing Co., NY 1980.
- Inca / **Interior Design Register**, Inca Publications, Chennai, 1989.
- Kathryn .B. Hiesinger and George H.Marcus, **Landmarks of twentieth Century Design**; Abbey Ville Press, 1993.
- Syanne Slesin and Stafford Ceiff - **Indian Style**, Clarkson N. Potter, Newyork, 1990.
- The Impulse to adorn - **Studies in traditional Indian Architecture** - Editor Dr.Saranya Doshi, Marg Publications, 1982.

AD 532 SUSTAINABLE PASSIVE DESIGN

Objectives: To learn basics of passive architecture techniques and its impact on architectural design, fundamentals of passive architecture. To study passive design principles in old & new buildings of India.

Content:**Unit I: Concept of passive building design.**

Introduction. Need of passive architecture. Energy and Global environment, Energy use and Climate change – Its impact, Types of Energy. Introduction to passive and sustainable building designs. Summary & conclusion

Unit II: Passive techniques

Introduction. Global warming & heat Island effect. Heating cycle, Solar gains, Solar Geometry & Shading. Various passive heating techniques & passive cooling techniques. Day lighting & ventilation passive techniques. Summary & conclusion

Unit III: Sustainable building materials & construction.

Introduction. Impact of Construction on environment. Techniques of sustainable construction - technologies, methods of effectiveness. Alternative materials and construction methods. Summary & conclusion

Unit IV: Green Building Rating systems

Introduction. Green architecture and various international rating systems for sustainability. Indian systems – TERI GRIHA rating, LEED India rating, IGBC. Case studies. Summary & conclusion

Outcome:

Increased understanding of the concept of passive architecture & its impact on built environment.

References:

- N.K. Bansal; **Passive Building Design**
- D.K. Ching; **Green Building illustrated**
- SPIEGEL 3rd edition ; **Green Building Materials**
- Keith Robertson and Andreas Athienitis; **Solar Energy for Building**
- K. Athienitis and Mat Santamouris; **Thermal Analysis and Design of Passive Solar Buildings**
- Martin Evans ; **Housing, Climate and Comfort**
- Maxwell Fry ; **Buildings in the tropics**
- Arvind Kishan, Baker & Szokolay ; **Climate Responsive Architecture;**
- P. Kukreja ; **Tropical architecture**

AD 542 HERITAGE CONSERVATION**COURSE OBJECTIVES:**

- Moving from basic theories, the course touches upon the technical aspects and ethics of conservation.
- The course culminates with a module on sensitizing the students of architecture towards designing in historic environments.
- Explore the history, philosophy and science of architectural conservation through lectures and seminar discussions.
- Encourage appropriate methodologies and tools for recording, documentation and inventorying of heritage structures.
- Develop sensitivity to design in heritage environment.

COURSE CONTENTS

- **Unit - 1. Introduction to Conservation**
 - Definitions for the heritage components of built heritage;
 - An overview of national and international approaches from UNESCO, ICOMOS, ICCROM, A.S.I., GETTY foundation, INTACH, WMF, international charters, Civic bodies etc.
 - Search for an Indian approach; Legal Status of Heritage in India.
 - National Conservations Policy of ASI.
- **Unit - 2. Documentation & Mapping**
 - Listing of monuments and recording techniques,
 - Documentation techniques for buildings and other intangible heritage components; Understanding assessment and mapping the factors of deterioration;
- **Unit - 3. Conservation Concepts:**
 - Prevailing practices in conservation,
 - Concepts of restoration, retrofitting, rehabilitation, consolidation, preservation, revitalization etc.
 - Adaptive reuse;
- **Unit - 4. Conservation Techniques:**
 - Conservation of Built Heritage using traditional materials and techniques;
 - Approach and methodology for appropriate repairs
- **Unit - 5. Design Approach in Historic Context:**
 - Approaches in designing in the historic context,
 - Interpretation with examples in India and abroad;
 - Concepts of heritage zones,
 - Identification and delineation criteria for historic urban fabrics;

COURSE OUTCOMES:

- To understand the philosophy and science of architectural conservation.
- To learn the appropriate methodologies and tools for recording, documentation and inventorying of heritage structures.
- To acquire skills for documentation photography, surveys, research etc.
- To apply suitable methodology with reference to given context
- To critically evaluate and make assessment of heritage components
- To design in a heritage context
- To demonstrate respect for built and cultural heritage

SUGGESTED REFERENCES

1. Guidelines for Conservation: A technical Manual Bernard Feilden 1989 INTACH, New Delhi
2. ICOMOS Charters, (Venice Charter, Burra Charter, Nara Declaration) ICOMOS

3. Management Guidelines for World Cultural heritage Sites. Bernanrd Feilden & Jukka Jokilehto, 1998
ICCROM, Rome
4. Conservation Manual Sir John, Marshall 1923 Archaeological Survey of India.
5. National Conservation Policy 2013 Archaeological Survey of India

B. ARCH. (STAGE II) - SEMESTER - X**AD 532 – Advance Elective II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	1	50	50	2	100

AD 552 HOUSING

Objectives: To develop independent critical thinking in the sector of housing design.

Contents:**Unit 1: Basics of Housing**

- The definitions of housing, housing concepts, housing needs, supply and demand, socio-economic aspects, affordability, etc.

Unit 2: Housing typologies and standards

- Single unit housing; row housing; high density housing; low density housing; medium density housing; detached housing, housing standards and their relevance to development, new trends.

Unit 3: Housing approaches, dynamics and possibilities

- Density studies, massing studies, Built unit development; actors in housing; land allocation/plot provision; owner built housing; commercially developed housing; cooperative housing; social housing; public housing; mass housing; self help housing; dynamics of squatter settlements; community development issues; incremental housing development.

Unit 4: Planning and Design inputs and case studies

Upgrading; low cost approaches; consolidating; appropriate design options of building components; layout design including infrastructure and services, housing design as a result of environmental aspects, development of technology and community interests, case studies in Public sector housing, Industrial Housing, Government housing, private and cooperative housing, their advantages and disadvantages.

Outcome:

Students will understand the concept of Housing & its impact on built environment.

References:

- EVANS, M. (1980). **Housing, climate and comfort**. London [etc.], The Architectural Press.
- PAYNE, G. (1985). **Low-income housing in the developing world: the role of sites and services and settlement upgrading**. Chichester, W.Sussex, Wiley.
- PAYNE, G. K., & DAVIDSON, F. (2000). **Urban projects manual**. [Liverpool], Liverpool University Press in association with Fairstead Press.
- TURNER, J. F. C. (1991). **Housing by people: towards autonomy in building environments**. London, Boyars.
- WAKELY, P. I., SCHMETZER, H., & MUMTAZ, B. (1976). **Urban housing strategies: education and realization**. London, Pitman.

AD 562 REGIONAL & URBAN PLANNING**OBJECTIVES**

- To develop skills for a comprehensive design in areas of urban design, hospitality for making a complete design portfolio from the brief to tender drawings.
- Understanding design as a process of problem identification, space standards, formulation of requirements, evolution of design criteria and development of design of buildings in urban context, phasing and development.

COURSE CONTENTS**Unit 1:-**

Issues of urban structure, urban space and form: Issues of conservation: Issues in zoning, land use, density, development control: Issues of building in context, urban infill: Density, mixed land use, ground coverage, development controls: Urban systems, services and their integration with the project: User requirements (derived from surveys): Issues in appropriate technology and costs: Issues of hierarchy, identity of space, public and private scales of space: Integration of community institutions etc: Detailing for the disabled and the elderly:

Unit 2:-

Issue in preparation of Master Plan for academic: administrative, hospitality etc. environmental considerations: phases of development: scope for expansion for future developments: safe and comfortable vehicular and pedestrian movement: issues of character and landscaping.

EXPECTED OUTCOMES

The students looked at various components and aspects associated with the urban environment in terms of physical infrastructure, socio cultural aspects, gender issues etc. and looked at ways to address them through their designs. Mapping and diagramming techniques were explored in the design process to help explore the design process better.

The final submission shall necessarily include a model of one of the design outcome.

REFERENCES

1. Alexander, Christopher. Pattern language: Towns, Buildings, Construction. Oxford University Press, New York.
2. Richard. D. Dober. Campus Architecture: Building in the Groves of Academy. McGraw Hill, New York, 1996.
3. Chiara, De Joseph and Others. Timesaver's standard for Housing and Residential development, 2nd ed. McGraw Hill, Inc, New York.
4. Newman, Oscar and Others. Defensible space: People and Design in the Violent City. Architectural Press, London, 1972.
5. Neuferts Architects Data

AD 572 DISASTER MANAGEMENT**OBJECTIVES**

To understand the basic principles of disasters and its happening, management during the disasters and capacity building to cope with disasters.

COURSE CONTENTS**Unit 1. Introduction to Disaster Management:**

Define and describe disaster, hazard, emergency, vulnerability, risk and disaster management; Identify and describe the types of natural and non-natural disasters. Important phases of Disaster Management Cycle.

Unit 2. Disaster Mitigation and Preparedness:

Natural Hazards: causes, distribution pattern, consequences and mitigation measures for earth quake, tsunami, cyclone, flood, landslide drought etc. Man-made hazards: causes, consequences mitigation measures for various industrial hazards/disasters, Preparedness for natural disasters in urban areas.

Unit 3. Hazard and Risk Assessment:

Assessment of capacity, vulnerability and risk, vulnerability and risk mapping, stages in disaster recovery and associated problems.

Unit 4. Emergency Management Systems (EMS):

Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

Unit 5. Capacity Building:

Gender sensitive disaster management approach and inculcate new skills and sharpen existing skills of government officials, voluntary activists, development of professional and elected representative for effective disaster management, role of media in effective disaster management, overview of disaster management in India, role of agencies like NDMA, SDMA and other International agencies, organizational structure, role of insurance sector, DM act and NDMA guidelines.

Unit 6. Application of Geo-informatics and Advanced Techniques:

Use of Remote Sensing Systems (RSS) and GIS in disaster Management, role of knowledge based expert systems in hazard scenario, using risks-time charts to plan for the future, early warning systems.

Unit 7. Integration of public policy:

Planning and design of infrastructure for disaster management, Community based approach in disaster management, methods for effective dissemination of information, ecological and sustainable development models for disaster management.

CASE STUDIES

Lessons and experiences from various important disasters with specific reference to Civil Engineering.

OUTCOMES:

The students will be able to –

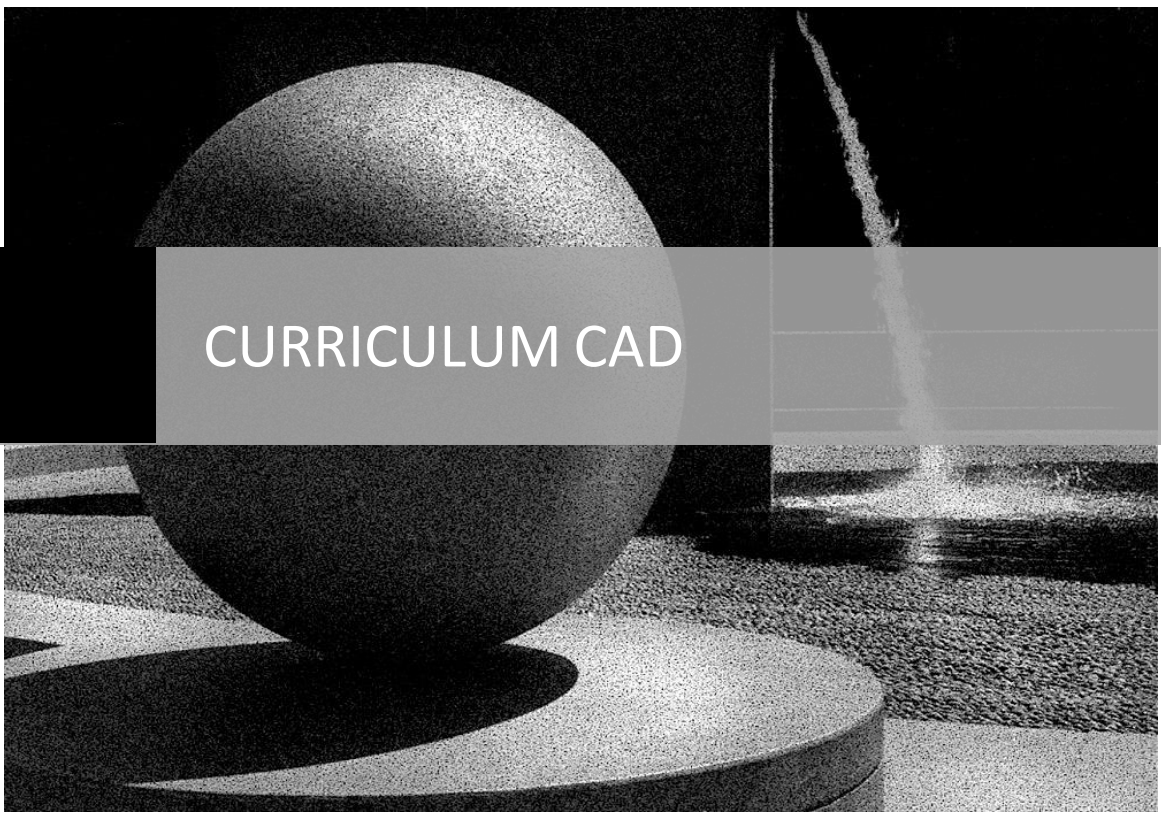
- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

REFERENCES

1. Introduction to International Disaster Management ,
 2. Disaster Management in Archives, Libraries and Museums,
 3. Disaster Management Handbook
 4. NIDM Guidelines
- NDMA Catalogues

SESSION

2019-20



CURRICULUM CAD



A LEADING WOMEN'S UNIVERSITY

Undergraduate Program
Bachelor of Architecture

College of Architecture & Design

Mody University of Science & Technology

N.H. 11, Lakshmangarh, Sikar, Rajasthan - 332311

Academic Curriculum (2015 - 16 Onwards)
Undergraduate Program - Bachelor of Architecture
College of Architecture & Design, MODY University
Mody University of Science & Technology, Lakshmangarh, Rajasthan

B. Arch.

5 Years

(300 credits)

Background

A curriculum for Design Education evolves from the vision of the institution, its aspirations and its capability to deliver the knowledge. It defines the relationships between the teacher and the student and the institution. Curriculum for Architecture also connects creativity and physical reality.

Five-year Architecture undergraduate program is designed to provide an exceptional university education as well as comprehensive preparation for entry in the competitive and challenging career in architecture. Studies in architecture and other associated disciplines are undertaken in parallel throughout the five-year program. This five-year undergraduate professional program is a professional degree accredited by the **Council of Architecture, India**. The program is for a limited number of qualified students committed to the study of architecture. These students are admitted directly to the professional degree program and begin studies in architecture in the first year.

The **B. Arch** curriculum has two stages of study. The stage-1 (years 1, 2, 3) provides a foundation of understanding on which to build a second level of advanced study. Continuously through the course of the program runs the Design Studio, in which projects are selected as a means for developing the professional skills, knowledge, understanding and a platform to create exemplary architectural designs. At the end of the third year, the program culminates with a studio project helping students to summarize what they have learned with an introduction to prepare themselves for more independent studies in the advanced professional program.

The stage-2 (years 4 & 5) concludes with a **semester** (one or two) of Professional Training (forth year) and Final Year Dissertation program. The first semester of the final Year integrates an introduction to independent Research Methods. An integrated design research phase continues throughout the final two semesters. The final year project is selected by the students' themselves to provide them an opportunity to develop their individual point of view about the profession and create their own place in the building industry. Thesis or Dissertation is part of the course to investigate issues the student sees as significant to herself and to the profession.

The Objective

- Develop direct personal experience of social, environmental and technological contexts.
- Encourage exploration of the diversity of thoughts, techniques, working methods and material palettes.
- Develop capacities to think from simple first principles, using observation, common sense and intuition to build more elaborate conceptual frameworks.
- Develop ability to “learning how to question, absorb and analyze” rather than following “conventional” practices and solutions.
- Understand and connect to local realities as vehicles for solutions.
- Encourage sharing and collaboration and as well as individual achievement.
- Creativity, skills and initiative should be developed and encouraged to assist the involvement of the body, mind and therefore confidence.
- General awareness towards architectural heritage introduced from the beginning of the degree program through courses / electives by experts on conservation, restoration and re – adaptation of buildings.

The Curriculum (B. Arch)

The curriculum allows students to choose their own area of interest and allow for independent exploration in the later years (3+2-year model) by having option of choice based Studio and Theory subjects. This is important to have a more mature and self-driven Architect. The curriculum shall also encourage students to select subjects of their choice from allied disciplines at other Colleges of this University.

The curriculum is to allow for Inter-disciplinary teaching in areas of Technology, Humanities and Environment by conducting joint sessions and assignments. The course content is synchronized to facilitate the same. Moreover, each semester has a thematic emphasis to allow many different subject to address the same. This is done to facilitate further synthesis.

Curriculum structure allows for other means of learning such as travelling studios, joint studios or studios in other socio-cultural environment apart from exchange program. This can provide the necessary confidence to deal with the outside world.

The courses dealing with design studio, technology, humanities shall be taught in an inter-disciplinary manner and not as compartmentalized specializations.

History, theory & technology based courses are those, which let us understand and appreciate, social, cultural, technological and historical knowledge and skills for its application in design projects.

Course Structure

The course structure and relative emphasis between sub-disciplines vary depending on their position within the course.

First year, being a Foundation year, the emphasis shall be on the development of background knowledge such as sensibility, analytical skills, technical and general communication skills and associated disciplines.

During Second and Third, Advanced years the emphasis is on understanding and appreciation of in-depth relationships between various disciplines and use of their resolutions, complexity, techniques and methods of application. The Fourth and Fifth Years, termed as final years, emphasize the development of the individual’s maturity and establishment of direction. During last two years of the course student develops her theoretical and practical understandings and decide on personal choice of directions.

Credit Loads

The course is of 5 years / 10 semester's duration. Each year consists of 2 semesters of approximately 16 weeks each. Each semester carries a contact load of 30 - 32 credits, where 1 credit is equivalent to 1.0 lecture hour/week in theoretical subjects and studio, workshop, laboratory based courses.

Each semester normally consists of (including design studio) not more than 6 subjects and each subject is normally of at least 2 credits.

In addition to subjects that form the core of the curriculum, the course offers 10 credits out of a total of 300, as electives. These electives are offered within the disciplines of humanities, arts and crafts: history and theory, and technology, so that a student can develop her interest in these areas.

- 1 Credit = 1 Contact hour for Theory and Studio
- 1 Credit = 2 Contact hour for Workshop
- 1 Contact hour = 100 Marks

Assessment

Student's performance is continually evaluated through Time Problems, projects, Tests, Quizzes and periodic assessments of sessions work. Generally, **50 %** of the assessment is through this system, and **50 %** weight is assigned to end of semester examinations (Internal). All core subjects are examined at the end of the semester through project review (Juries), crits, viva-voce or examination papers. Electives are normally assessed through final results, assignments or papers.

In order to clear a subject a student must obtain at least **50 %** marks in all the assessments of the subject. While the teaching faculty in all subject areas does grading, the subjects at the end of the Third and Fifth Year are examined additionally by an external examiner.

First Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

First Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 111	Design Studio –I & Architectural Graphics Skills- Manual & Computers I	10 (5 + 5)	10	0	1000 500 + 500 (250 + 250) (250 +250)	50% 50%	0	3
	AR 121	Building Materials & Construction Technology I	6	6	100	500 250 + 250	50% 50%	3	3
	AR 131	Structure Design & Systems I	3	3	50	250 125 + 125	50% 50%	2	0
	AR 141	History & Humanities I	3	3	50	250 125 + 125	50% 50%	2	3
	AR 151	Basic Design & Workshops I	6	6	0	600 300 +300	50% 50%	0	0
	AR 161	Introduction To Building Industry	2	2	0	200 100 + 100	50% 50%	0	3
	TOTAL		30	30					12

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 112	Design Studio –II & Architectural Graphics Skills- Manual & Computers II	10 (5 + 5)	10	0	1000 500 + 500 (250 + 250) (250 +250)	50% 50%	0	3
	AR 122	Building Materials & Construction Technology II	6	6	100	500 250 + 250	50% 50%	3	3
	AR 132	Structure Design & Systems II	3	3	50	250 125 + 125	50% 50%	2	3
	AR 142	History & Humanities II	3	3	50	250 125 + 125	50% 50%	2	3
	AR 152	Basic Design & Workshops II	6	6	0	600 300 + 300	50% 50%	0	0
	MDC 003	Environmental Studies	4	4	400	0	50% 50%	0	0
	TOTAL		32	32					12

Second Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

Second Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 211	Design Studio – III, Computer Application I, Fundamentals of Design & Communication skills	15 (9 +6)	15	0	1500 900 + 600 (450 + 450) (300+300)	50% 50%	0	6
	AR 221	Building Materials & Construction Technology III	4	4	100	300 150 + 150	50% 50%	3	0
	AR 231	Structure Design & Systems III	3	3	50	250 125 + 125	50% 50%	2	3
	AR 241	History of Architecture	2	2	50	150 75 + 75	50% 50%	2	3
	AR 251	Building Services I	3	3	100	200 100 + 100	50% 50%	3	0
	AR 261	Elective/Workshop	3	6	0	300 150 + 150	50% 50%	0	0
TOTAL			30	33					12

AR 271 Related Study Programme

2 Credit

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 212	Design Studio – IV, Computer Application II & Theory of Design	16 (12+4)	16	0	1600 1200 + 400 (600 + 600) (200+200)	50% 50%	0	6
	AR 222	Building Materials & Construction Technology IV	4	4	100	300 150 + 150	50% 50%	3	0
	AR 232	Structure Design & Systems IV	3	3	100	200 100 + 100	50% 50%	3	0
	AR 242	Surveying & Levelling	2	2	50	150 75 + 75	50% 50%	2	3
	AR 252	Building Services II	3	3	100	200 100 + 100	50% 50%	0	3
	AR 262	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	0
TOTAL			30	32					12

Third Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

Third Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 311	Design Studio V	16	16	0	1600 800 + 800	50% 50%	0	6
	AR 321	Building Materials & Construction Technology V	4	4	100	300 150 + 150	50% 50%	3	0
	AR 331	Structure Design & Systems V	3	3	50	250 125 + 125	50% 50%	2	0
	AR 341	Landscape Architecture	3	3	0	300 150 + 150	50% 50%	0	0
	AR 351	Climatology	2	2	50	150 75 + 75	50% 50%	2	0
	AR 361	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	6
	TOTAL		30	32					12

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 312	Design Studio VI	16	16	0	1600 800 + 800	50% 50%	0	6
	AR 322	Quantity Estimation and Specification writing	3	3	100 50 + 50	200 100 + 100	50% 50%	3	0
	AR 332	Structure Design & Systems VI	3	3	50	250 125 + 125	50% 50%	2	0
	AR 342	Professional Practice	3	3	100	200 100 + 100	50% 50%	3	0
	AR 352	Town Planning & Building Bylaws	3	3	100	200 100 + 100	50% 50%	3	3
	AR 362	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	3
	TOTAL		30	32					12

Forth Year B. ARCH STAGE-2
Academic Curriculum (2015 - 16 Onwards)

Forth Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory Sessional Internal External Viva	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 411	Practical Training	28	0	0 2800 1400 + 700+700	0 100%	0	0
	TOTAL		28					0

Subject To Approval

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 412	Design Studio VIII	14	14	0 1400 700 + 700	50% 50%	0	9
	AR 422	Building Materials & Construction Technology VIII	5	5	100 400 200 + 200	50% 50%	3	0
Spring Semester	AR 432	Structure Design & Systems VIII	4	4	100 300 150 + 150	50% 50%	3	0
	AR 442	Intelligent Buildings	3	3	100 200 100 + 100	50% 50%	3	0
	AR 452	Thesis Orientation	2	2	0 200 100 + 100	50% 50%	0	0
	AR 462	Elective/Workshop	2	4	0 200 100 + 100	50% 50%	0	3
	TOTAL		30	32				12

Fifth Year B. ARCH STAGE-2
Academic Curriculum (2015 - 16 Onwards)

Fifth Year Subject To Approval

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal	External	Weightage Internal	ETE	Exam Duration	Field Trips / Semester
	AR 511	Advance Design Studio IX	14	14	0	1400	700 + 700	50%	50%	0	9
	AR 521	Professional Practice (Advance)	6	6	100	500	250 + 250	50%	50%	3	0
	AR 531	Advance Construction & Structures	6	6	100	500	250 + 250	50%	50%	3	0
	AR 541	Research Methodology	2	2	100	100	50 + 50	50%	50%	3	0
	AR 551	Advance Services	2	2	0	200	100 + 100	50%	50%	0	3
	TOTAL		30	30				50%	50%		12

Subject To Approval

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal	External Viva	Weightage Internal	ETE	Exam Duration	Field Trips / Semester
	AR 512	Dissertation/Thesis	24	24	0	2400	1200 + 600 + 600	50%	50%	0	12
	AR 522	Advance Elective I	3	3	0	300	150 + 150	50%	50%	0	0
	AR 532	Advance Elective II	3	3	0	300	150 + 150	50%	50%	0	0
	TOTAL		30	30							12

First Year B. ARCH STAGE-1

AR 111 Design Studio I	10 - 10

- Focus:**
- A.** Exploring principles of space making, introduction to the built environment and its creative exploration.
 - B.** Learning techniques and skills to represent different objects through 2D & 3D geometry.

Objectives

- To deliver an introduction to architecture through analysis of building elements, such as floors, walls, doors, stairs, rooms, etc.
- To have an understanding of relationship between the human body, scale and the built environment, context, creative and exploratory responses, scale and proportion, basic organizational principles, abstraction, order, constants and variations and design as a response.
- Understanding importance of technical drawing as medium of communication as basic vocabulary in design.

Contents

- Introduction to subject. Getting acquainted with necessary instruments of drawing. Learning to draw straight and curved lines with different qualities.
- Learning good lettering to improve and maintain quality of presentation.
- Learning meaning of terms 'Plan' & 'Elevations' and using them for drawing simple objects through 'Orthographic Projections'.
- Learning theory of 'Orthographic Projections' and drawing projections of points, lines, geometric solids.
- Dealing with sections of simple geometric solids and their combinations.
- Learning principles of development of lateral surfaces of solids, applying them to work out and drawing developed surfaces of simple geometric solids and using them to make models of some of them.
- Auxiliary orthographic projection of solids and its application to sections of solids by inclined plans.
- Principles of space - making.
- Abstract sketches, model making, pencil and ink drawing, idea of human scale: methods of measurement.
- Site visits, experiential exploration of built environment, Case Studies.
- Measure drawings, analytical studies to understand building order, anthropometric content in design inputs lectures on factors affecting design and design disciplines.
- Mental and visual 3D perception

Outcome

- Students will learn about observation and logical skills to involve understanding of a space creation.
- Students will learn desired written and presentations skills to express their designs.
- Students will be able to visualize the idea and concept with expression of thoughts via appropriate communication method.
- Students should learn all aspects of **technical representation of drawings** to express and document their design projects through graphical communication.
- Students will be able to express all drawing contents through all taught mediums of communication.

Examination Pattern:

- Sessional: 100 % {(25 % Internal continuous assessment + 25% External: Architectural Graphic and Techniques I) + (25% Internal continuous assessment + 25% External: Design Studio I) }

References:

- John Hanock, **Time Saver Standards for Architectural Design Data**, McGraw-Hill Professional Publishing
- Ramsay and Sleeper, **Architectural Graphic Standards**, Wiley
- ND Bhat, **Engineering Drawing**, Charotar
- IH Morris, **Geometrical Drawing for Arts Students**, Universities Press
- KR Gopalakrishna, **Engineering drawing Vol I and II**, Subhas

AR 122 Building Materials & Construction Technology I	6 - 6

Focus: Understanding of basic building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as mud, brick, stone, bamboo, timber, etc. and methods of preservation, treatment and types of uses.
- To help students understand the basic building elements, their function and behavior under various conditions with specific reference to 'load bearing construction' and simple non RCC frame structure.
- To develop strong sense of perception, understanding the basic principles of construction and materials.
- The emphasis should be on teaching the fundamental principles and constructional details suitable for Indian conditions.
- Students will be encouraged to study both in classroom and also outside at work sites in order to get the practical exposure.

Contents:

Construction

- Structural and nonstructural building elements and Terminologies.
- Basic wall section of load bearing and framed structures.
- Introduction to various tools and equipment's commonly used in construction
- Types of Masonry construction in brick and stone.
- Bamboo construction Methods.
- Stone construction joinery details.

Materials

Mud: Fundamentals of soil science, types of soils, principles of soil stabilization, types of stabilizers, requirements and types of mud wall building and surface protection, advantage and disadvantage of mud construction.

Stones: Formation in nature, geological classification, quarrying of stones, dressing, characteristics of stones, testing of stones, uses of stone. preservation of stones, deterioration of stones, behavior of stone, fabrication, physical and chemical properties, selection of stones, types of stones,

Bricks: Manufacturing process, Types of bricks, Classification of bricks, Characteristics, Ingredients of bricks, Forms of bricks, Testing of bricks, Types of bonding in bricks, Storage of bricks,

CAD, MUST

Bamboo: Bamboo as plant classification, species, geographical distribution, anatomy of bamboo, properties, strength, processing, harvesting, working of bamboo tools, treatment and preservation of bamboo, uses of bamboo.

Timber: Classification of trees, structure of trees, characteristics, seasoning of timber, defects and diseases, decay of timber, preservation, fire resistance, conservation of timber, storage of timber, uses of timber, manufacturing process of timber, hard wood, soft wood, advantages of timber construction.

Outcome

- Students learn about construction of the building using intelligence, bamboo, brick, stone through drawing case study.
- Students will learn basic understanding of materials with respect to building components and their construction methods.
- Students will get practical experience of making small shelter structures.
- Students will learn making of plan, elevation and section along with sketches and details showing methods of construction.
- Students will also get to know some analysis fundamentals skills required for selection of materials as per design requirements.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, Construction **Technology**, Prentice Hall
- Barry, **Construction of Buildings**

AR 131 Structure Design & Systems I	3 - 3

Focus: Behavior of building elements and basic structural systems.

Objectives

- Understanding importance of structure and its contents with respect to behavior and language of building elements and components.
- To understand and link knowledge of architecture, civil engineering, statics and material in a natural way.

Contents

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with manmade structures.
- Functions of structures. Primary and secondary forces acting on structures – gravitational force, live load, wind, temperature variation. Types of supports & their characteristics.
- Analysis & design – Design criteria.
- Primary elements of structure and their behavior.
- Factor of safety & factors affecting it. Characteristics of structural design – strength, stiffness and stability. Discussion on factors affecting them and ways of satisfying these requirements.
- Study of behavior of structures through models and testing them for given load.

Outcome

- Enable students to understand the concepts of building Structures.
- Students shall understand about the structural action of various elements.
- Students will have sufficient knowledge about various long span structures.
- Students should understand freedom of creativity, and encourages exploration, cooperation and discussion in the multi-genre science in which architecture is located.
- Student should learn that, the architecture and structure create a homogeneous unit, if the structure is not an obstacle to perceive the work and the architectonic shape creates a logical structural solution.
- Students will able to handle basic structure problems with Perception of structure, which is connected with a typological kind of a building, its size and function.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- RK Bansal and Sanjay Bansal, **Engineering Mechanics** Third edition, Laxmi Publications, New Delhi.
- Ferdinand L Singer, **Engineering Mechanics** Third Edition, Harper Collins Publications.

AR 141 History & Humanities I	3 - 3

Focus: To develop appropriate skills of reading, discussion and writing as well as understanding of the physical experience of buildings in order to appreciate the complexity of the influences bearing on architecture, as reflected in the major historical periods.

Objectives

- To inform about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.
- To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to technology, style and character in the prehistoric world and in Ancient Egypt, West Asia, Greece and Rome.

Contents

- Introducing concepts of culture and civilization – Paleolithic and Neolithic culture – art forms and evolution of shelter – megaliths – agricultural revolution and its impact on culture and civilization.
- Landscape and culture of Ancient Egypt – history – religious and funerary beliefs and practices – monumentality – tomb architecture: evolution of the pyramid from the mastaba – temple architecture: mortuary temples and cult temples Great Pyramid of Cheops, Gizeh – temple of Ammon Ra, Karnak – temple of Abu Simbel (Rock Cut)
- Urbanization in the Fertile Crescent– evolution of city-states and their character – law and writing – theocracy and architecture – evolution of the Ziggurat – palaces.
- Landscape and culture of Greece – Minoan and Mycenaean cultures – Hellenic and Hellenistic cultures – Greek character – Greek polis and democracy – Greek city planning – architecture in the archaic and classic periods - orders in architecture: Doric, Ionic, Corinthian – optical illusions in architecture.
- Roman history: Republic and Empire – Roman religion and the Roman temple – Roman character – lifestyle – Roman urban planning – art and architecture as imperial propaganda: forums and basilicas – domestic architecture – structural forms, materials and techniques of construction – orders in architecture: Tuscan and Composite.

Outcome

- An understanding about the spatial and stylistic qualities.
- An understanding of the architecture as an outcome of various social, political and economic upheavals, and as a response to the cultural and climate conditions.
- Students will gain knowledge about the art & architecture of the European, Egyptian & Middle Eastern cultures, which have served as the cradle of human civilization, which will help them in building concepts for their design.
- The will be made aware, about the planning, construction, function and aesthetics of historical buildings and an appreciation of architectural style as a product of the time, place and culture in the western world.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Tadgell Christopher, **History of Architecture in India**, Phaidon Press.
- Brown Percy, **Indian Architecture, Buddhist and Hindu period**, Read Books
- Grover Satish, **Architecture of India, Buddhist and Hindu**

AR 151 Basic Design & Workshop I	6 - 6

Focus: Development of three dimensional visualizations, graphical abstraction and preliminary form exploration.

Objectives

- To create understanding and hands on skill based modes & methods of workshop art and its recording & analysis.
- To have knowledge of anthropometric content in Design, method of measurement. Human scale and proportion.
- To develop analytical thinking through exercises in fundamentals of composition, graphics, research and design process.

Contents

- Comprehensive understanding of the design field: relationship of basic design to architectural design and design field in general. Performance requirements and criteria for judgement of design.
- Observation and its expression: Field, mode and methods of observation, recording and analyzing observations: its expression.
- Visual perception, Ideas as abstraction. Graphic tools to express abstraction (geometric content); and abstraction of environmental and architectural observation.
- Human dimension: Anthropometric content in design, methods of measurement, idea of human scale and proportion.
- Basic shelter: Understanding of basic shelter and its related factors through chosen examples, methods of learning.
- WORKSHOP: - Hands on practical training and creation of 3D structures to express innovation and supernatural ideas.

Outcome

- Enable students to learn the various tools used in carpentry, metal work, masonry, painting etc. and get a reasonable skill in handling the materials and tools there off.
- Students will get an opportunity to see directly the craftsmen's work, and interact with them face to face.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

References:

- Wucius Wong, **Principles of three Dimensional Design**, Van Nostrand Reinhold Company
- Wucius Wong, **Principles of two Dimensional Design**, Wiley
- Wucius Wong, **Principles of color composition**
- Robert Gill, **Rendering with Pen and Ink**, Van Nostrand Reinhold Company

AR 161 Introduction to Building Industry	2 - 2

Focus: General introduction to building industry.

Objectives

- To familiarize students to all stakeholders and participants in building & construction industry.
- To understand role and responsibilities of various team members of building industry.
- To introduce students to local, national and global structure of building construction, product manufacturing infrastructure, production and delivery systems.

Contents

- Series of lectures, site visits (trade show), case studies, research, market survey, introduction to sales industry and manufacturing industries.
- General information re following team members and or stake holders, i.e. surveyors, contractors, developers, financiers, bankers, architects, landscape architects, artists, interior designers, project managers, construction managers, quantity surveyors, building economist, hydraulic engineer, civil engineer, structure engineer, mechanical engineer, electrical engineer, financial controller, acoustic designers, product designers, industrial designers, real estate personals, property managers etc.

Outcome

- Students will have knowledge of various stakeholder and team members of building involved in the industry, their roles and responsibilities and their professional contribution.
- Students shall have understanding of the structure of the building industry from pre-construction to delivery stage.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 112 Design Studio II	10 - 10

Focus: To shape spaces through an understanding of elements that builds a design language and continuing from previous semester, reinforcing the understanding & importance of representing different objects through 2D & 3D geometry and learning more complex skills in the same direction.

Objectives

- To have emphasis on relationship between the human body, scale and the built environment, context, creative and exploratory responses, scale and proportion, basic organizational principles, abstraction, order, constants and variations and design as a response.
- To teach design parameters with respect to site and environment.
- To design space through program, site analysis, area volume diagrams.
- To understand documentation of site, site analysis and basic report writing.
- Understanding importance of technical drawing as medium of communication as basic vocabulary in architecture and learning techniques & skills to represent different objects through 2D & 3D geometry thus developing visualization of geometric forms to use it in designing.

Contents

- Principles of abstraction, spatial ordering, kinds of form and their principles of combination light and perception of space and form.
- Elements of architecture, spatial order, modulation of space, space structure form co-relation, program interpretation, choice of theme, abstraction, spatial scales, ordering mechanisms, evolution of form.
- Different ways of presentation of solids in 3D projections, like Axonometric & Isometric.
- Studying sciography and methods of representing it in 2D projections.
- Applying sciography to 3D geometrical projections especially Isometric projections.
- Understanding basic principles of perspective drawings – relatively realistic way for presentation. Introduction of basic elements such as station point, picture plane, eye level, center of vision, cone of vision, vanishing points etc.
- Drawing one point and two point perspectives through
 - Plan and Elevation method
 - Plan and vanishing points method
 - Measuring point method.

Outcome

- Enable students to emphasis on analytical skill to develop design and its management.
- Student shall gain depth knowledge of visualization and enhanced conception of ideas.
- Enable students to understand shades and shadow, solar path and its relation to build masses.
- Students shall learn perspective drawing in 2D & 3D projection to accumulate space drawings with measurements.

Examination Pattern:

- Sessional: 100 % {(25 % Internal continuous assessment + 25% External: Architectural Graphic and Techniques I) + (25% Internal continuous assessment + 25% External: Design Studio I) }

References:

- ND Bhat, **Engineering Drawing**, Charotar
- IH Morris, **Geometrical Drawing for Arts Students**, Universities Press
- KR Gopalakrishna, **Engineering drawing Vol I and II**, Subhas
- SH Mullik, **Perspective**, Jyotsna Prakashan
- Chen John SM, **Architecture in Pen and Ink**, McGraw-Hill C
- Kemmerich, Carl, **Graphic Details for Architects**, Pall Mall P
- Kemmerich Carl, **Manual of Graphic Techniques for Architects**, Graphic Designers and Architects, Scribner Book Company
- **New Metric Handbook**; Planning and Design Data, Architectural Press
- Shankar Mulik, **A textbook of Perspective and Sciography**
- Alibert O. Halse, **Architectural Rendering**, Literary Licensing, LLC.
- Russel, James E, **Graphics for Architects and Planners**, McGraw-Hill C

AR 122 Building Materials & Construction Technology II	6 - 6

Focus: Understanding of advanced building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as paint, glass, tiles, lime and timber boards, etc. and methods of preservation, treatment and types of uses.
- To understand both in general and in detail the methods of construction by using Timber products such as ply wood.
- To understand in detail, the methods of construction by using basic materials such as clay products and natural timber for structural and non- structural components.
- To understand building industry through various market surveys.
- To gain basic knowledge of hardware, plumbing and sanitary products through case studies.

Contents

- Brick masonry (continued) – acute / obtuse angled joints, cavity wall construction.
- Types of foundation.
- Lintel & arches – types and their construction.
- Simple wooden joinery
- Construction details in door, window and staircase.
- Ferrous & nonferrous materials iron, steel, market forms of steel, aluminum and copper.

Outcome

- Student will learn Introduction to concrete technology and its materials i.e. composite buildings, complex buildings and steel buildings.
- Student also learns construction of Basic building elements such as door, window, staircase, floor, roof, dome and vault etc.
- An understanding of basic services and hardware and sanitary equipment's for construction methods.

CAD, MUST

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, Construction **Technology**, Prentice Hall
- Barry, **Construction of Buildings**

AR 132 Structures Design and Systems II	3 - 3

Focus: Behavior of building elements and basic structural systems.

Objectives

- Understanding importance of structure and its contents with respect to behavior and language of building elements and components.
- To understand and Join knowledge of architecture, civil engineering, statics and material in a natural way.

Contents

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with manmade structures.
- Functions of structures. Primary and secondary forces acting on structures – gravitational force, live load, wind, temperature variation. Types of supports & their characteristics.
- Analysis & design – Design criteria.
- Primary elements of structure and their behavior.
- Factor of safety & factors affecting it. Characteristics of structural design – strength, stiffness and stability. Discussion on factors affecting them and ways of satisfying these requirements.
- Study of behavior of structures through models and testing them for given load.

Outcome

- Enable students to understand the concepts of structures in architecture.
- Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.
- Analyze any type of determinate trusses with different end conditions.
- Enable students to solve the sectional properties for any geometrical shapes.
- The concepts of elastic constants and its applications for various types of problems with a
- Thorough understanding of stresses and strain.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- IB Prasad **Applied Mechanics and Strength of Materials**
 - RK Bansal, **Strength of Materials** Third Edition, Laxmi Publications, New Delhi
- 1.

AR 142 History & Humanities II	3 - 3

Focus: Continuing from previous semester, to emphasis on Indian, Islamic and Mughal architecture and style in India.

Objectives

- To understand Indian architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Indus valley civilization, Vedic period and manifestation of Buddhist and Hindu architecture in various parts of the country.

Contents

Harappa - Cultural Civilization

Buddhist era architecture in India

Indian temple architecture

Islamic architecture in India

Mughal architecture

The topics will be containing:

- Introduction to Unit, History, excavation, background, planning of town and cities, lifestyle, art and culture etc.
- Conclusion
- Summary of Unit

Outcome

- The students understand Indian architecture as a response to the political and socio cultural conditions present in India at different points of time.
- The architectural responses will be understood with respect to technology style and character.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Sir Bannister Fletcher, **History of Architecture**, Athlone Press
- Brown Percy, **Indian Architecture, Buddhist and Hindu period**, Read Books
- Grover Satish, **Architecture of India, Buddhist and Hindu**
- Tadmor Christopher, **History of Architecture in India**, Phaidon Press.
- Brown Percy, **Indian Architecture, Islamic period**, Palmer Press
- Volwahsen, **Living Architecture Vol 1 &2/A**

AR 152 Basic Design & Workshop II	6 - 6

Focus: Introduction to architectural design through basic design – elements of design

Objective

- To understand the elements and principles of Basic design as the building blocks of creative process.
Design through exercises that will develop the originality, expression, skill and creative thinking.
- To involve students in a number of exercises to understand the grammar of design and visual composition.
- To enable the understanding of 3D Composition by involving students in a number of exercises. This will help generation of a form from a two dimensional/abstract idea.
- To enable the understanding of the relationship between the grammar of design and architecture by involving the students in seminars/ workshops and simple exercises which will look at building form analytically.

Contents

- Elements and principles of visual composition using point, line, shape.
- Exploring color schemes and their application in a visual composition and in architectural forms and spaces.
- Study of texture and schemes of texture both applied and stimulated and their application.
- Study of linear and planar forms using simple material like mount board, metal foil, box boards, wire string, polystyrene etc.
- Study of solids and voids to evolve sculptural forms and spaces and explore the play of light and shade and application of color.
- Study of fluid and plastic forms using easily moldable materials like clay, plaster of paris etc.
- Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.
- Application of basic design in architectural design through the manipulation of line, plane, solid and voids and application of texture color, proportion etc.

Outcome

- An understanding of the qualities of different elements as well as their composite fusions.
- An ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

Reference:

- F. David Martin and Lee A Jacobus, **Humanities through the Arts**, McGraw-Hill

MDC 003 Environment Science and Studies	4 - 4

Focus: Architecture as a system of environmental control

Objective

- To study human heat balance and comfort.
- To familiarize students with the design and settings for buildings for daylight and factors That influence temperature
- To inform about the air pattern around buildings and the effect of wind on design and siting of buildings
- To expose the students to the various design strategies for building in different types of climatic zones.

Contents

- Climate- factors affecting, classification, modes of measurement, assessment tools
- Comfort- factors affecting, theories and proposed modes of measurement, assessment tools
- Introduction to building physics

Outcome

- Understanding of thermal balance in human beings
- Designing climate responsive structure
- Conceptual understanding of air flow in buildings

Examination Pattern:

- Continuous Evaluation Mid Term 1: I hour duration 25 marks Weightage: 12.5%
- Mid Term 2: I hour duration 25 marks Weightage: 12.5%
- End Term: 3-hour duration 100 marks Weightage: 50%
- Field work and Report writing: ----- Weightage: 25%

Second Year

AR 211	Design Studio III	15 - 15

Focus:

- B.** Basic Computer knowledge related to Architectural software
- C.** Understanding of context and implementation of principles in design
- D.** Understanding importance of spoken, written and visual communication.

Objectives

- Understanding fundamentals of theory of architecture
- Understanding importance of spoken, written and visual communication. basic vocabulary of design
- Studio design project
- Reinforcing spoken, written and presentation skills in English.

Content

Studio projects shall be structured to deal with two (or more) distinctly different contexts with program being identical. Studio could be divided into two groups with different sites and resulting solutions shall be discussed in the class to highlight the various differences, which can be attributed to the contextual reasons. In the second project, context with a number of constraints shall be chosen and the process of enhancing the context, in other words, place making shall be investigated. Studio shall attempt to define the nature of relation between built and un built spaces and the need of using un built spaces for programmatic needs shall be highlighted.

- Advanced English reading and writing exercises through book reviews, business letter writing, and presentation of design projects, group discussions and project reports.

Outcome

- Enable students to learn and understand theory of architecture in depth with practical approach in design.
- Enable students to gain confidence in spoken and written English language
- Understanding of context and relationship of functions

Examination Pattern:

- Sessional: 100% {(60 %: 30% Internal continuous assessment + 30 External) + (40 %: 20% Internal continuous assessment + 20% External)}

Reference:

- Francis DK Ching **Form, Space and Order**
- Prammar VS **Design Fundamentals in Architecture**

- Gideon Space Time and Architecture
- von Meiss, Pierre **Elements of Architecture from Form to place**
- Frank Lloyd Wright on **Architecture**
Wright
- Papadakis **Free Spirit in Architecture**
- Crouch June **Traditions in Architecture/Data Planning**. Johnson
- Snyder, James **Introduction to Architecture**
- Porter, Tom **Colour for Architecture**
- Chen John S M. **Architecture in Pen and Ink**
- Kemmerich Carl. **Graphic Details for Architects**
- Kemmerich Carl. **Manual of Graphic Techniques for Architects, Graphic Designers and Architects**
- **New Metric Handbook; Planning and Design Data**. Recent Edition
- Shankar Mulik. **A Textbook of Perspective and Sciography**
- Alibert O. Halse. **Architectural Rendering**
- N.D. Bhatt. **Engineering Graphics**
- Russel, James E. **Graphics for Architects and Planners**
- Robertson Howard. **The principles of Architectural Composition**. Architectural press, UK, qsasa

AR 221	Building Materials & Construction Technology III	4 - 4

Focus: Knowledge of various structural systems and methods of construction and detailing of buildings of medium complexity using natural and manmade materials.

Objective

- To acquaint the students with construction practices pertaining to RCC, floors, roofs and flooring with different materials. Load bearing and frame structures.

Content

- Construction** - Study of principles and methods of construction of RCC, one way, two way slabs-cantilever slabs, sloping RCC roof, vaults, domes including form-work techniques and reinforcement details. Construction with materials alternative to RCC.
- Flooring in mud, murrum, stones marble, granite, tandur/kota stone, mosaic, terrazzo, ceramic tiles and wooden flooring
- Paving Cast in situ concrete, concrete tiles, interlocking blocks, clay tiles, brick and stone
- Plaster Method of plastering a) Internal (use of various finishes viz., lime, cement, plaster of paris, puffing etc., b) External smooth, rough, textured, grit plaster.
- Materials** – Paints, varnishes and distempers, emulsions, cement base paints. Constituents of oil paints, characteristics of good paints, types of paints and process of painting different surfaces. Types of varnish, methods of applying varnish and French polish and melamine finish.

Outcome

- An Understanding of advanced materials, products and methods of construction and in detailing.

Examination Pattern:

- Theory: 20 %
- Sessional: 80% (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Duggal SK. **Building Materials**

AR 231	Structure Design & Systems III	3 - 3

Focus: Understanding the structural concepts and behavior of structural elements relating the knowledge acquired to architectural design

Objective

- To give an insight into the structural behavior of columns and beams

Content

- Introduction to Torsion theory with simple problems.
- Columns and struts effective length, critical load, slenderness ratio, Euler's equation for different end conditions.
- Formula for slope and deflections of cantilever, simply supported and overhang beam using double integration and Macaulay's method of different load conditions.
- Moment area method for simple case of loading. Expound the structural concepts introduced in non- mathematical terms with examples and application in architectural design.

Outcome

Students will have an insight into the structural behavior of columns and beams

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- SS Bhavikatti. **Strength of Materials**
- Basavarajaiah BS and Mahadevappa. **Strength of Materials**

AR 241	History of Architecture	2 - 2

Focus: Western architecture and its development

Objective

- To provide an understanding of Western architecture during Renaissance, Baroque, Neo classical and modern periods.

Content

- Background and influences on Renaissance architecture. Characteristics of Renaissance Architecture in general.
- General characteristics of Baroque.
- Transitional Period A brief account of the situation before the change over to Modern architecture in Europe. Palladian Revival in Britain, Greek Revival and Gothic Revival
- Impact of Industrial Revolution in Europe the social, economic and political changes effected, new requirements of the society, new materials and technological developments.
- The Chicago school works of Louis Sullivan, early industrial buildings, contributions of Bauhaus, De Stijl Movement, Italian Futurism, Art Nouveavau Movement and Arts and Crafts Movement to Modern Architecture
- Ideas and works of great masters Le Corbusier, FL Wright, MV Rohe, Walter Gropius contributions of Brazilian architect Oscar Niemeyer

Objective

- To understand architecture of different parts of world as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in architecture in various parts of the world.

Outcome

- The students will understand architecture as a response to the political and socio cultural conditions present in specific region at different points of time.
- The architectural responses will be understood with respect to technology style and character.

CAD, MUST

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Sir Bannister Fletcher. **History of Architecture**
- Henri Stierlin. **Architecture of the world – Greece**
- Henri Stierlin. **Architecture of the world - The Roman Empire**
- Henri Stierlin. **Architecture of the world – Romanesque**

AR 251	Building Services I	3 - 3

Focus: Understand building services as essential part of design

Objective

- To impart the knowledge and skills required for understanding the building services of water supply and sanitation and their integration with architectural design.
- Understanding rain water harvesting.

Content

- **Water supply** introduction, sources of water supply, qualitative and quantitative aspects, impurities, purification sedimentation, coagulants, filtration, disinfection, water softening and miscellaneous treatment of water. Sources of water pollution and preventive measures. Public water distribution system, methods of layout of distribution pipes.
- Pipe sizes, fittings, valves, types of taps, wash basins, sink, bath tubs, flushing cistern. Domestic water supply systems mains, ferrules, service pipe, water meter, sump, pumps, overhead tank, distribution pipes, cold water and hot water supply for single and multistoried buildings.
- Provision for fire fighting fire hydrants. Study of solar heating systems, gas and electric geysers.
- **Sanitation:** Introduction, importance and purpose of sanitation, definitions bacteria, invert, sewer, sewerage, types of refuse, collection and disposal of refuse, systems of drainage separate, combined and partially separate system, advantages and disadvantages of each system.
- Sanitary requirements for various types of buildings, types of pipes.
- Man holes drop manholes, manhole with intercepting trap, inspection chambers, self cleansing velocity, drains on sloping sites, sub soil drainage, storm water disposal catch basins, inlets, storm water regulators.
- Importance of pumps and sewage pumping stations, septic tanks soak pit, soak well, design aspects, disposal of effluent.
- House drainage principles, traps-floor trap, multi-trap, gully trap, grease and oil trap, urinals, Indian, European, Anglo Indian type of water closet, squatting urinal, bidet

CAD, MUST

- Definitions Siphonage, anti-siphonage pipe, cowl, fresh air inlet, soil and waste pipes, vent pipe
- Systems of plumbing single stack, one pipe, one pipe partially ventilated, two pipe disposal of waste water from buildings typical plan of residence with garage showing all the traps, inspection chambers, pipes connected to public sewer line alternatively connecting the same layout of pipes to septic tank. Testing of drains and drain pipes.
- Brief study - natural methods of sewage disposal by dilution and land treatment, self purification of natural waters, oxidation, sewage treatment, oxidation ponds, aqua privy, garage drainage and layout of simple drainage systems, sewers, materials, laying and testing of sewers, ventilation of sewers, surface drains, sewer, cleaning of sewers, recycling of sewage water. Rain water harvesting.
- Rural sanitation, biogas, different methods of collection and disposal of dry refuse and night soil
- Site visits Water treatment plant, sewage treatment plant, multistoried apartments for studying water supply and sanitary arrangements.

Outcome:

- Students will understand the importance of building services and their use in building
- Students will learn Rain Water Harvesting in buildings

Examination Pattern:

- Theory: 30 %
- Sessional: 70 % (35 % Internal continuous assessment + 35 % External)

References:

- RS Deshpande. **Sanitary Engineering** - (Vol I and II)
- S Birdii. **Water supply and Sanitary Engineering**
- Relevant **IS Codes of India**

AR 261	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 212	Design Studio IV	16 - 16

Focus: A. Urban context and architecture design

B. Basic Computer knowledge related to Architectural software

C. Basic vocabulary of design.

Objective

- To understand the issue of building and context, building bylaws, urban design.

Content

- The design of building will look into aspects of context, surrounding and building program. architectural dimension with issues of services.
- Designing in specific context. Detailed layouts and site planning for building program.

Outcome

Students will learn urban scale and handling of architectural design

Examination Pattern:

- Sessional: 100% {(60 %: 30% Internal continuous assessment + 30 External) + (40%: 20 % Internal continuous assessment + 20% External)}

Reference:

- Broadbent Geoffrey. **Design in Architecture**
- Lang Jon. **Creating Architectural Theory**

AR 222	Building Materials & Construction Technology IV	4 - 4

Focus: Understanding of materials with respect to the construction style and its function

Objective

To study construction systems with focus on roofing and techniques of pile foundation and metal doors, windows and partitions.

Content

Part A.

Construction – Mild steel and Aluminum doors and windows and partitions. Details of RC framed structures with reinforcements, beams including cantilever beams, columns, flat slab, ribbed filler slabs, waffle roof.

Pile foundation Precast piles, cast-in-situ piles, types of piles, method of driving piles, pile caps etc.

Part B.

Materials – Anti-termite treatment to foundation, masonry walls and wood work (pre construction) water proofing materials and weather proofing materials like chemical admixtures and surface applications. Lime and brick bats etc., Pest control treatment.

Outcome:

Students will get exposure of different materials and their practical usage on site.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Duggal SK. **Building Materials**

AR 232	Structure Design & Systems IV	3 - 3

Focus: Structural systems and implications in design

Objective

- To give an insight into the structural behavior of portal frames.

Content

- Analysis of propped cantilever, fixed beams, shear force diagrams and bending moment diagrams. Analysis of continuous beam (maximum three spans)
- Clapeyron's Three Moments Theorem b) Moment Distribution Method
- Analysis of portal frame (single bay, single story with sway and non-sway) by moment distribution method
- To explain the structural concepts introduced in non- mathematical terms with examples and application in architectural design.

Outcome:

Students will learn the applications of structural mathematical terms in design, through site visits and class lectures.

Examination Pattern:

- Theory: 30 to 35%
- Sessional: 65 to 70% (35 % Internal continuous assessment + 35 % External)

References:

- SS Bhavikatti. **Structural Analysis**
- Vazirani and Ratwani. **Theory of Structures**

AR 242	Surveying & Levelling	2 - 2

Focus: To develop the knowledge and skills related to surveying and levelling principles and practice.

Objective

- Understanding principles of surveying and leveling, use of various survey and leveling instruments, carrying out surveys of land of medium complexity and preparation of survey plans.

Content

- Surveying Definition, classification, principles of surveying, character of work, shrunk scale.
- Chain Survey Instruments used, types of chain, instruments for ranging. Setting out angles, erecting perpendiculars.
- Field work chain triangulation, recording and plotting, errors in survey.
- Plane table survey plane table and accessories. Methods of plane table survey, radiation, intersection, traversing and resection, field problems.
- Levelling definition, classification, booking and reduction of levels, longer levelling, errors
- Theodolite study of instruments, definition of different terms, temporary adjustments, uses, measuring horizontal and vertical angles, method of repetition, extension lines.
- Contouring Characteristics of contours, direct and indirect methods of contouring, interpolation, uses of contours, setting out works such as center lines of a building, grade for sewer, center line of a bridge.

Outcome

Students will learn different methods of understanding complex sites: contours, terrain, cliffs, valley and so on.

Examination Pattern:

- Theory: 20 to 25%
- Sessional: 75 to 80% (40 % Internal continuous assessment + 40 % External)

AR 252	Building Services II	3 - 3

Focus: Advance services in building industry

Objective

- To introduce students to electrical services and illumination and to sensitize them with respect to their integration into Architectural Design.

Content

Part A

- Importance of electrical services in buildings, introduction to commonly used terminology
- Supply and distribution of electricity to buildings substations (including high tension panels, transformers, low tension panels, generators) and overhead versus underground distribution systems, panel boards etc.
- Internal supply and distribution brief description of various cabling types, conduit, PVC casing and capping wiring systems;
- Earthing and brief description of protective devices fuses, MCBs, ELCB, etc., Electrical load estimation.
- Introduction to power and lighting circuits. Indian Electricity Rules-Relevant codes of Practice.

Part-B

- Quality and quantity of light;
- Methods of lighting: ambient, task and accent lighting
- Systems of luminaries: direct, indirect etc.
- Various types of electrical lamps incandescent, fluorescent/CFL, HID s, neon lamps and their lighting characteristics
- Design considerations for different types of occupancies and tasks Preparation of a lighting and electrical scheme

CAD, MUST

Outcome:

Students will learn to incorporate the element light with understanding of its impact in design

Examination Pattern:

- Theory: 30 %
- Sessional: 70 % (35 % Internal continuous assessment + 35 % External)

References:

- H Cotton. **Electrical Technology**
- L.Uppal. **Electrical Wiring, Estimating & Costing**
- Anwari. **Basic Electrical Engg**

CAD, MUST

AR 262	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

Third Year

AR 311	Design Studio V	16 - 16

Focus: Institutional building design and its fundamentals

Objectives

- To understand the differences and similarities between institutional goals and architectural goals.
- To understand creating of spaces for learning. Formal, informal and interactive processes of learning and role of the built environment.
- To understand the role of built environments in therapeutic and nurturing institutions
- Working drawings

Content

- Institutional projects like facilities of higher learning, vocational training or a small-scale campus may be given. Case studies of contemporary campus architecture (built since 1980s) shall be carried out.
- There are two distinct typologies of campuses, one that has integrated into the urban fabric at the edges of its boundary and the other that has ignored the urban fabric. Campus planning may be attempted as a two-stage project, with site planning, as one and other stage could be a detailed design of one of the identified buildings.
- The design has to respond to climatic, environmental and ecological factors.
- Detailing of architectural features of the major project like entrance lobby, skylights and staircases has to be attempted.

Outcome

- Students will learn the goals of the institutions regarding the role of built environment in its functioning.
- They will learn to sensitively design to the needs of disabled, aged people and children.
- One major project and one minor/ time problem to be tackled in semester

CAD, MUST

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 321	Building Materials & Construction Technology V	4 - 4

Focus: Detailing of building elements

Objective:

- To study constructional systems and detailing of special doors, windows, structural glazing and cladding

Content:

Part A

- **Construction** – PVC & FRP, frameless glass doors and windows and partitions. Wooden/Steel/Aluminum sliding and folding doors and partitions.
- Steel doors for garages and workshops. Collapsible gate and rolling shutters, remote control systems of doors and gates. Structural glazing, aluminum composite panel cladding.

Part B.

- **Materials** – Insulation materials Thermal and sound insulation materials. Glass its manufacture in its various types like plate, tinted, decorative, reinforced, laminated glass block, fiber glass, glass murals, partially colored glass, etching of glass and its applications in building industry for both exteriors and interiors.
- Glass fabrication techniques, fiber reinforced composite materials and products.

Outcome:

Students will learn to represent drawings with specific details which will bring clarity to the design as well as understanding

Examination Pattern:

- Theory: 20 to 25%
- Sessional: 75 to 80% (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Barry. **Construction of Buildings**

AR 331	Structure Design & Systems V	3 - 3

Focus: Concreate as a building material and its structural qualities

Objective

- To provide an introduction to design of reinforced concrete structures.

Content

- Concrete: Composition, basics of mix design, water cement ratio, strength, durability, workability requirements.
- Relevance of RCC in architectural practice. Advantages of RCC over other conventional structural practices. Steel for RCC Plain & Twisted bars, IS 456 code provisions.
- Working stress method of design basic concept, types of loads, assumptions. Calculation of MR for singly RC beam.
- Limit state method of design. Necessity and philosophy of limit state design. Limit state design of simply supported slabs, beams, T-beams, columns (axial and uniaxial bending) and footings (axially loaded square footing).
- Design of Dog legged and open well stairs (waist slab type)

Outcome:

Students will learn to demonstration models and experiments with materials and structural systems related to the above topics

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Ramachandra. **Design of steel Structures**
- Kazimi and Jindal. **Design of Steel Structures.**
- IS 800 - 1984, IS 883-1970
- IS special publication for the design of steel structures [SP-6 (1)]

AR 341	Landscape Architecture	3 - 3

Focus: Landscaping as a medium of design in architecture. Understanding of Landscape elements like trees, shrubs, plants, water, rocks and development of landscape planning and application in architectural design.

Objective

- To introduce students to the discipline of landscape architecture and to develop basic skills required in handling simple landscape design projects.

Content

- Introduction to landscape architecture, definitions.
- Noted landscape architects and their concepts and definitions
- Natural and manmade landscape, urban and rural landscape
- Elements of landscape architecture like vegetation, land forms and water bodies and their application in design
- Introduction to Site planning and site analysis
- Landscape materials and plant materials study, introduction to taxonomy
- Study and analysis of contemporary landscape designs
- Study of existing landscaped areas like courtyards, gardens, urban spaces etc.
- Street and site furniture Application of landscape design for site plans, small gardens, residential areas, urban spaces, courtyards etc.

Outcome:

- Students develop skills required in handling landscaping project.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

References:

- JO Simmonds. **Landscape Architecture**
- Michel Laurie. **Introduction to landscape architecture**

AR 351	Climatology	2 - 2

Focus: Climate responsive architectural design requires understanding of climatology

Objective:

- Understanding of Climate and its impact on architectural design, fundamentals of climatology and environmental studies, Passive climatic control.
- To apply the principles of Solar Passive Architecture to design of buildings.

Content:

- Introduction to passive techniques of cooling such as evaporative cooling, earth tubing, wind scoops, roof ponds, shaded courtyards etc.,
- Two design exercises (in hot dry and warm humid climate) with an objective to integrate passive cooling systems in the design.

Outcome:

Students will learn the impacts of climate on architectural design and dealing with them

Examination Pattern:

- Theory: 20 %
- Sessional: 80% (40 % Internal continuous assessment + 40 % External)

References:

- Koenigsberger. **Manual of Tropical Housing & Buildings (Part-II)**
- Martin Evans. **Housing, Climate and Comfort**
- Maxwell Fry. **Buildings in the tropics**
- Arvind Kishan, Baker & Szokolay. **Climate Responsive Architecture**

CAD, MUST

AR 361	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 312	Design Studio VI	16 - 16

Focus: A large scale housing project / Working Drawing

Objectives

- To understand the difference in housing as a process and a product, the role of an architect in creating the product and facilitating the process
- To understand the needs of privacy, communal spaces, efficiency of open spaces and ideas of extended living areas
- To differentiate and understand the nature of organic and planned communities.

Content

- Scale of the project shall be limited to allow for intensive study rather than repetition of typical configuration.
- Housing projects can be attempted with added complexities for example, dense context, occupation based, traditional urban fabric, social status and prevalent social strata.
- Details from the dwelling cell to immediate shared space to communal space shall be emphasized and worked out.
- Socio cultural layer of the occupants shall form a strong fabric in the ultimate weave of the design.
- Projects shall aim at developing a very sensitive attitude towards micro level human habitation and role of architecture in enhancing or curbing the quality of living.

One major project and one minor/ time problem to be tackled in the semester.

Outcome

Students will learn to handle projects with considering disabled, aged people and children. Students will learn to work in socio cultural harmony as well as towards all levels of requirement of housing.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 322	Quantity & Estimation	3 - 3

Focus: Systems of taking out quantities and estimating for all trades involved in construction of medium complexity, writing specifications for materials and various items of work.

Objective

- To develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

Content

- Introduction, importance of estimation, types of estimates, mode of measurement etc.,
- Study of local SR rates, market rates, measurement book (MB), RA bill, interim and final certificate
- Detailed rate analysis of building items as per current schedule of rates (CSR) of local PWD for information only
- Percentage of various materials used in building items like cement, steel, rubble, metal, sand, brick, tiles etc.,
- Abstract and detailed specifications for various materials and items of work used in building

Estimate of:

- Load bearing and RCC framed structure with one example for each
- Typical interior items of a residence and an office
- Various types of roofs like steel and wood including roofing materials like
- Mangalore tiles, AC, GI sheet etc.,
- Water supply and sanitary works
- A typical layout plan with roads, culverts etc.

Outcome:

- Students will develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

References:

- SK Dutta. **Estimating and Costing**
- SC Rangawala. **Estimating**

AR 332	Structure Design & Systems VI	3 - 3

Focus: Steel as the advance structural building material and its techniques.

Objective

- To give an introduction to the design of steel structures.

Content

- Design of simple and eccentric riveted and welded connections.
- Design of tension and compression members in trusses.
- Design of built-up columns (lacing only)
- Design of slab base (no gusseted base) and simple column and footing connection details
- Design of laterally restrained beams (simple and compound)
- Provision for fire protection for steel structures relevant code provision

Outcome

- Students will learn details and calculations of steel structure and its impact on design

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- N Krishna Raju. **Pre-stressed Concepts**
- DL Schodek. **Structures**
- Alexander Zamen. **Form and Structure in Architecture**
- N Krishna Raju and RN Pranesh. **RCC - design and practice**

AR 342	Professional Practice	3 - 3

Focus: Introduction to the profession of architecture, its division and sub divisions

Objective

- To understand the responsibilities & liabilities of the profession. To understand the process of contract management.

Content

Profession: Idea of profession and essential difference among profession, trade and business.

- Profession of architecture, its essential tenets, duties and liabilities.
- Types and extent of services offered by architects, scale of fees, stages of payment, and contract between client and architect.
- Code of Professional Conduct, Architects Act of 1972. Role of Council of Architecture and the Indian Institute of Architects in the functioning of the Profession.

Practice: Types of Architectural firms, proprietorship, partnership, associate ship, and private limited concerns. Advantages and disadvantages of each type of firm, various means of building client base and gaining projects, Architectural competitions.

- Guidelines of COA, procedure of conduct of such competitions.
- Administration and basic accounting procedures. Taxes and implications of service tax. Implication of GATS on the profession in India.

Building Industry: General overview of the industry. Various participants and dimensions of building industry. Finance, statutory controls, construction procedures, enforcement issues related to building industry and the role of architect, employer, and contractor.

Contract Management: Overview of procedures in contract management with a focus on Architect's role.

Tender: Procedure of calling for tender, documents necessary for tendering process. Tender document and its content. Types of tenders, suitability of different types to various categories of projects. Advantages and disadvantages of each type of tender. Tender notices, opening, scrutiny, process of selection and award. Architect's role in tender process. Essential characteristics of Tender Notice, Earnest Money Deposit, Security Deposit, Retention Amount, Mobilization Amount

CAD, MUST

and Bonus & Penalty Clauses.

- Various issues arising out of tendering process and the role of an architect in maintaining objectivity in the process.

Contract: General Principles, types of contract, definitions of various terms used in the contract document. Contract document, contents and sections dealing with various aspects of contract management. Conditions and Scope of Contract and the role of an architect in ensuring a positive completion of a contract. Architect's role in the contract and vested authority.

Issues of Contract: i) Termination of contract, ii) Certificates of value and quality, iii) Virtual completion and final completion, iv) Defects liability period, v) Latent and patent defects, vi) Liquidated and un-liquidated damages, vii) Extension of time, delays and penalty, viii) Non tendered items, extras, extra work, additional works, variations, rate analysis and architect's role in certification of variations, ix) Prime cost, provisional sum, x) Types of insurance necessary during contract including fire insurance for safeguarding client's interest.

Outcome

Students will learn the responsibilities & liabilities of the Profession and understand the process of Contract and project management.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

References:

- Roshan Namavathi. **Professional Practice for Architects & Engineers**
- Bob Greenstreet. **Legal and Contractual Procedures for Architects**
- AJ Legal Handbook
- KG Krishnamurthy and SV Ravindra. **Professional Practice**

AR 352	Town Planning & Building Bylaws	3 - 3

Focus: Urban and regional planning and the factors of planning

Objective

- To give an introduction to the discipline of urban and regional planning

Content

- Human settlements Urban settlements and Rural settlements, differences, origins, evolution and growth of settlements. Major functions of a city, city forming and city serving functions. Problems faced by a typical city. Relation between urban and rural settlements, characteristics and planning efforts of cities and towns of various historical periods like Egyptian, Greek, Roman, Medieval, Renaissance, Neo-classical. Industrial Revolution and its impact on cities, the contemporary city. Cities of Indus valley and Vedic period, cities of Moghul period and British period, typical Indo-Aryan cities, typical Dravidian temple city.
- Planning Theories enunciated by Ebenezer Howard, Patrick Geddes, Soria Y Mata, Doxiadis, Le-Corbusier, Clarence Stein, Clarence Arthur perry, Hilberseimer their relevance to Indian conditions.
- Land use planning, land use classification for cities and rural settlements, analysis of land uses in Indian cities.
- Urbanization, Industrialization and urban growth, definitions and inter relationship. Trends in urbanization in India since Independence. Growth of metropolitan cities, their growth and management problems, world urbanization trends.
- Components of a settlement activity pattern and land use, traffic and road network, density of population and population distribution. Central business district of a city, other business districts, urban nodes, rest of the city, fringe area and suburbs. Growth and aging of various parts of the city particularly the CBD, the problems caused due to this including slums, internal spatial structure of cities concentric zone theory, sector theory, multiple nuclei concept and work-home concept.
- Planning Techniques study and analysis of existing settlements, methodology of conducting diagnostic surveys and studies, land use survey, density survey, FSI survey, traffic surveys, presentation of data
- Regional Planning relation among various settlements of a region, pattern of settlements in a

region. Definition of a region, various types of regions, basic principles of regional planning

- Urban Renewal causes and consequences of urban blight and obsolescence slums and shanties methods of conducting surveys, analysis and presentation of data, prevention of formation of slums and squatter settlements. Environmental and management issues.

Outcome

Students will have an introduction to the discipline of urban and regional planning.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

Reference:

- Gallion and Eisner. **The Urban Pattern: City Planning and Design**
- Chapin. **Urban Planning**

AR 362	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

REVISED B.ARCH. CURRICULUM CAD
[BATCH 2015-2020]



A LEADING WOMEN'S UNIVERSITY

Undergraduate Program
Bachelor of Architecture

School of Architecture & Town Planning

Mody University of Science & Technology

N.H. 11, Lakshmangarh, Sikar, Rajasthan - 332311

Course Outline**School of Architecture & Town Planning, Mody University:**

- B. Arch.

5 Years

(300 credits)

Background

A curriculum for Design Education evolves from the vision of the institution, its aspirations and its capability to deliver the knowledge. It defines the relationships between the teacher and the student and the institution. Curriculum for Architecture also connects creativity and physical reality.

Five-year Architecture undergraduate program is designed to provide an exceptional university education as well as comprehensive preparation for entry in the competitive and challenging career in architecture. Studies in architecture and other associated disciplines are undertaken in parallel throughout the five-year program. This five-year undergraduate professional program is a professional degree accredited by the **Council of Architecture, India**. The program is for a limited number of qualified students committed to the study of architecture. These students are admitted directly to the professional degree program and begin studies in architecture in the first year.

The **B. Arch** curriculum has two stages of study. The stage-1 (years 1, 2, 3) provides a foundation of understanding on which to build a second level of advanced study. Continuously through the course of the program runs the Design Studio, in which projects are selected as a means for developing the professional skills, knowledge, understanding and a platform to create exemplary architectural designs. At the end of the third year, the program culminates with a studio project helping students to summarize what they have learned with an introduction to prepare themselves for more independent studies in the advanced professional program.

The stage-2 (years 4 & 5) concludes with a **semester** (one or two) of Professional Training (forth year) and Final Year Thesis program. The first semester of the final Year integrates an introduction to independent Research Methods. An integrated design research phase continues throughout the final two semesters. The final year project is selected by the students' themselves to provide them an opportunity to develop their individual point of view about the profession and create their own place in the building industry. Thesis or Dissertation is part of the course to investigate issues the student sees as significant to herself and to the profession.

The Objective

- Develop direct personal experience of social, environmental and technological contexts.
- Encourage exploration of the diversity of thoughts, techniques, working methods and material palettes.
- Develop capacities to think from simple first principles, using observation, common sense and intuition to build more elaborate conceptual frameworks.
- Develop ability to “learning how to question, absorb and analyze” rather than following “conventional” practices and solutions.
- Understand and connect to local realities as vehicles for solutions.
- Encourage sharing and collaboration and as well as individual achievement.
- Creativity, skills and initiative should be developed and encouraged to assist the involvement of the body, mind and therefore confidence.
- General awareness towards architectural heritage introduced from the beginning of the degree program through courses / electives by experts on conservation, restoration and re –adaptation of buildings.

The Curriculum (B. Arch)

The curriculum allows students to choose their own area of interest and allow for independent exploration in the later years (3+2-year model) by having option of choice based Studio and Theory subjects. This is important to have a more mature and self-driven Architect. The curriculum shall also encourage students to select subjects of their choice from allied disciplines at other Colleges of this University.

The curriculum is to allow for Inter-disciplinary teaching in areas of Technology, Humanities and Environment by conducting joint sessions and assignments. The course content is synchronized to facilitate the same. Moreover, each semester has a thematic emphasis to allow many different subject to address the same. This is done to facilitate further synthesis.

Curriculum structure allows for other means of learning such as travelling studios, joint studios or studios in other socio-cultural environment apart from exchange program. This can provide the necessary confidence to deal with the outside world.

The courses dealing with design studio, technology, humanities shall be taught in an inter-disciplinary manner and not as compartmentalized specializations.

History, theory & technology based courses are those, which let us understand and appreciate, social, cultural, technological and historical knowledge and skills for its application in design projects.

Course Structure

The course structure and relative emphasis between sub-disciplines vary depending on their position within the course.

First year, being a Foundation year, the emphasis shall be on the development of background knowledge such as sensibility, analytical skills, technical and general communication skills and associated disciplines.

During Second and Third, Advanced years the emphasis is on understanding and appreciation of in-depth relationships between various disciplines and use of their resolutions, complexity, techniques and methods of application. The Fourth and Fifth Years, termed as final years, emphasize the development of the individual's maturity and establishment of direction. During last two years of the course student develops her theoretical and practical understandings and decide on personal choice of directions.

Credit Loads

The course is of 5 years / 10 semester's duration. Each year consists of 2 semesters of approximately 16 weeks each. Each semester carries a contact load of 30 credits, where 1 credit is equivalent to 1.0 lecture hour/week in theoretical subjects and studio, workshop, laboratory based courses.

Each semester normally consists of (including design studio) not more than 6 subjects and each subject is normally of at least 2 credits.

In addition to subjects that form the core of the curriculum, the course offers 10 credits out of a total of 300, as electives. These electives are offered within the disciplines of humanities, arts and crafts: history and theory, and technology, so that a student can develop her interest in these areas.

- 1 Credit = 1 Contact hour for Theory/ Studio/ Workshop

Assessment

Student's performance is continually evaluated through Time Problems, projects, Tests, Quizzes and periodic assessments of sessions work. Generally, **50 %** of the assessment is through this system, and **50 %** weight is assigned to end of semester examinations (Internal). All core subjects are examined at the end of the semester through project review (Juries), crits, viva-voce or examination papers. Electives are normally assessed through final results, assignments or papers.

In order to clear a subject a student must obtain at least **50 %** marks in all the assessments of the subject. While the teaching faculty in all subject areas does grading, the subjects at the end of the Third and Fifth Year are examined additionally by an external examiner.

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 412 – Architectural Design VII

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	12	200	200	14	400

Objective: To learn about reading and documenting urban housing contexts and to understand the idea of urban housing development. To understand the role of architecture in shaping urban housing fabric. To create architecture which fits into a specific urban context.

Contents:

Unit 1: Introduction

Review of different forms of housing globally, Housing need & Demand, Housing resources and options available in housing

Unit 2: Research and data collection through case study

Finding details of housing in Indian context, collecting data and analyse case study

Unit 3: Design

Design project on given site; there may be a minor design project and a major design project.

Unit 4: Design development

Design development in stages using all the data collected through case studies.

Outcome: Students will have understanding about the housing fundamentals and design methods will get explored.

References:

- Babur Mumtaz and Patweikly, **Urban Housing Strategies**, Pitman Publishing, London, 1976.
- Geoffrey K.Payne, **Low Income Housing in the Development World**, John Wiley and Sons, Chichester, 1984.
- John F.C.Turner, **Housing by people**, Marison Boyars, London, 1976.
- Martin Evans, **Housing, Climate and Ocmfort**, Architectural Press, London, 1980.
- Forbes Davidson and Geoff Payne, **Urban Projects Manual**, Liverpool University Press, Liverpool, 1983.
- DL Schodek, **Structures**
- Alexander Zamen, **Form and Structure in Architecture**
- N Krishna Raju and RN Pranesh, **RCC - design and practice**

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 422 – Advance building Construction I

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	3	100	100	4	200

Objectives:

Study of the advanced and more complex aspects of construction. It also aims at making students aware of systems and techniques of construction systems of roofing for large span and complex buildings.

Contents:**Unit 1: Special concrete and concreting method**

High density, fiber Reinforced, polymer concrete, properties & uses. Ready mixed concrete, grouting, cold weather & underwater concreting, Lightweight concrete construction, Composition of lightweight concrete & its advantages, its application in building walls, roof, foundations & ornamental works.

Unit 2: Roofs and Water Proofing

Expansion Joints, Water-Proofing, false Ceiling, Suspended ceilings, roofs.

Unit 3: Space Structure

Introduction to space structures, possibilities in different materials, types of space structures and possibilities in different materials to cover large spans.

Unit 4: Steel Truss and Temporary Structure

General study of Grid structures and skeletal structures, space frames, domes etc. in steel, various types, constructional aspects, merits and demerits, etc. Steel trusses for various spans, ridged truss, saw tooth truss with lattice girders, roof lighting, a/c sheet and profiled MS sheet cladding and roof fixing details. Temporary structures, materials and techniques used, earthquake resistant structures.

Materials - Plastics - types, properties and uses of plastics such as polycarbonates, acrylics, PVC polymer films, fiber reinforced plastic. Rubber and Asbestos cement products. Water Proofing elements, construction chemicals and additives, adhesives, plaster of Paris, gypsum, Polystyrenes, sealants, Ferro-cement

Outcome:

Students will have understanding of material properties and construction techniques of Ferro cement, RCC and special concreting methods and appropriate material and technology.

References:

- EVANS, M. (1980). **Housing, climate and comfort**. London [etc.], The Architectural Press.
- PAYNE, G. (1985). **Low-income housing in the developing world: the role of sites and services and settlement upgrading**. Chichester, W.Sussex, Wiley.
- PAYNE, G. K., & DAVIDSON, F. (2000). **Urban projects manual**. [Liverpool], Liverpool University Press in association with Fairstead Press.
- TURNER, J. F. C. (1991). **Housing by people: towards autonomy in building environments**. London, Boyars.
- WAKELY, P. I., SCHMETZER, H., & MUMTAZ, B. (1976). **Urban housing strategies: education and realization**. London, Pitman.

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 432 – Structure Design & Systems VII

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
3	0	0	50	50	3	100

Objectives:

Conceptual study of Advance Frame construction structures with reference to high rise buildings and surface structure.

Content:**Unit – I: TIMBER STRUCTURES – BEAMS, COLUMNS AND ROOF TRUSSES**

Properties, strength and types of timber used as structural components in timber construction – Permissible stresses in timber – Design of Columns and beams as per BIS codes. Types of Timber Roof Trusses used for different spans.

Unit – II: Foundation and Pre - Stressing

Raft foundations, **Pre-stressing** – Method and losses in pre-stressing, comparison of RCC and pre-stressing, Pre-stressing systems. Pre-tensioning and post-tensioning.

Unit – III: Cantilever and Truss

Types of **roof trusses** – Selection of trusses according to the span – Estimation of gravity loads and wind loads, Use of BIS and book SP-38 in analyzing and design of trusses, gusseted plate connections (Theory Only). Cylindrical, parabolic and flat arches, advantages and limitations. Beams and columns and various types of supporting systems cantilever and propped cantilever. Continuous and fixed beams and their behavior under load.

Unit – IV: Shell Structure

Simple framed structures and trusses-advantages and limitations. Conceptualizing and understanding of surface structures – shells, domes and folded plates.

Outcome:

Students will have understanding of advance frame construction, high rise building structure design, timber structures and shell structure.

References:

- V.S.Prasad, **Structural Mechanics & Analysis**,
- B.C.Punmia , **Strength of Material & Mechanics of Structure (Vol. II)**, M/s. Lax Publications, New Delhi - 2010
- C.S.Reddy, **Basic Structural Analysis**,
- Ramachandra .S, **Design of steel structures Vol. I**, Standard publication, New Delhi, 1992
- Vazirani .V.N, and Ratwani .M.M, **Steel structures**, Khanna Publications, New Delhi, 1995

B. ARCH. (STAGE II) - SEMESTER - VIII**AC 442 – Professional Practice-II (Valuation & Contract documents)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	1	0	50	50	2	100

Focus: Introduction to the profession of architecture, its division and sub divisions

Objective: To understand the responsibilities & liabilities of the profession. To understand the process of contract management.

Content:

Unit 1: Practice: Types of Architectural firms, proprietorship, partnership, associate ship, and private limited concerns. Advantages and disadvantages of each type of firm. Various means of building client base and gaining projects. Architectural competitions,

- Guidelines of COA, procedure of conduct of such competitions.
- Administration and basic accounting procedures. Taxes and implications of service tax. Implication of GATS on the profession in India.

Unit 2: Contract: General Principles, types of contract, definitions of various terms used in the contract document. Contract document, contents and sections dealing with various aspects of contract management. Conditions and Scope of Contract and the role of an architect in ensuring a positive completion of a contract. Architect's role in the contract and vested authority.

Unit 3: Valuation and Rent

Valuation – purpose of valuation, types of valuation- book value – salvage value- scrap value- depreciation obsolescence- sinking fund- land valuation- mortgage and lease- problems on valuation- Annuity- definition, Fixation of rent- out going- gross and net income – year's purchase- capital cost- standard rent- market rent economical rent

Unit 4: Outsourcing and Architectural competition

Basic introduction, Regulations governing the **conduct of competitions**, open & closed competitions, appointment & duties of Assessors, instructions to participants, award of premium. Role of development authorities & urban arts commissions, salient features of the DCR for CMA, **important regulations** in Rajasthan govt.,- Environmental acts & laws, special rules governing hill & desert area development, heritage act of India etc.

Outcome:

Students will understand complex technicality of the profession

References:

- Roshan Namavati, **Professional Practice**,
- **COA Handbook of Professional Documents.**
- **Hand book on Professional Practice**, I. I. A, Image systems, Mumbai, 1998.

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 451 – Dissertation

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	2	100	100	3	200

OBJECTIVES

- The primary objective of this subject is to enable students to establish a strong theoretical foundation, clarity of thought and also to orient the students to structured research in a focused manner.
- The process of study shall enable students to conduct in depth analysis and objective research on a topic of their interest.
- Students may be encouraged to select the topic which may eventually culminate in the further studies and research work.

COURSE CONTENTS

Students may choose a topic related to Architecture and allied subjects. The topics must be vetted by the faculty. Emphasis must be on critical understanding, logical reasoning and structured writing.

Students can thus utilize this as an opportunity for writing research papers, amounting to literature review and relevant case studies which are otherwise required for Thesis. The study shall be conducted under the guidance of teacher or external expert in the department.

OUTCOMES –

- By the end of the semester, students will be submitting a written paper of approximately 3500 words.

SUGGESTED REFERENCES

1. Mukhi, H.R. Technical Report Writing: Specially prepared for Technical and Competitive Examinations, New Delhi: Satya Prakashan, 2000.
2. Barrass, Robert. Writing at Work \b a guide to better writing in administration, business and management, London: Routledge, 2003.
3. Seely, John. The Oxford guide to effective writing and speaking, 2nd ed., Oxford; New York : Oxford University Press, 2005.
4. Jo Ray McCuen, Anthony Winkler. Readings for writers, 9th ed., Fort Worth: Harcourt Brace College Publishers, 1998.
5. Treece, Malra. Effective reports, 2nd ed., Boston: Allyn and Bacon, 1985.
6. Anderson, J. and Poole, M. (1998). Thesis and assignment writing. Brisbane: John Wiley.
7. Borden, I. and Ray, K. R. (2006). The dissertation: an architecture student's handbook. 2nd Ed. Oxford: Architectural Press.
8. Fink, A. (1998). Conducting research literature reviews: from paper to the Internet. Thousand Oaks: Sage.
9. Murray, R. (2005). Writing for academic journals. Berkshire: Maidenhead, Open University Press.

B. ARCH. (STAGE II) - SEMESTER - IX
AD 511 – Architectural Design VIII

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	14	300	300	16	600

Objectives: To create an opportunity for the coordinated group work in conducting physical, socio-economic and traffic analysis: data collection, analysis and presentation as a prerequisite to the main design issues, including intervention into specialized aspects of landscaping, town planning and urban design through architectural design exercises.

Contents:
Unit 1: Building Project & the vicinity around

Correlation of design issues to land and surrounding areas, influences of neighbouring areas on the design development; Consideration of issues such as socio-economics, environment, technology in relation to urban design. (Prerequisites: Earlier design studios)

Unit 2: Urban Context

The basic aim of the studio is to relate the building/buildings, complexes, streets, public places and spaces, etc., to the urban or regional context for which the change in the scale would imply change in the complexity of design, change in the user profiles, change in the issues addressed and involvement of public in design. The large scale design would require variation in all stages of design; understanding Urban Sprawl.

Unit 3: Aspects of Urban Design

Aspects in Design: Introduction to historical development of urban design, various theories in modern times, aspects of planning, and cultural contribution in definition of spaces. Studies in urban design like behavioral studies and physical expression of socio-cultural aspects, morphology and typology in city structure, townscape and image ability of public spaces, communication systems, infrastructure development and network of open spaces, etc., are understood through examples or book reviews. Interpretive techniques and analyzing methods like visual analysis, questionnaire techniques, recording devices, mapping and vantage points, are reviewed and chosen.

Unit 4: Survey Methods

Observation, Methods of public participation in design are to be studied. Design proposal should consider all possibilities to achieve the aims and objectives of design. The class should provide a master-plan which would have design in the form of guidelines, bye-laws, phasing of design, prototype, design, or detailed design

Outcome:

Developing skill of higher design level of contextual-planning, neighborhood thinking

References

- Gallion Arthur B ; Eisner Simon, (1963) **Urban pattern city planning and design**, Van nostrand
- Cullen Gordon, (1968), **Townscape**, Architectural Press
- Spreiregen P D(1965), **Architecture of towns and cities**, McGraw Hill
- Chiara, J.D. (1984), **“Time Saver Standard for Site Planning”**, McGraw Hill Book Co., N.Y.
- Krier Rob, (1984) **Urban Space**, Academy editions
- Christopher Alexander,(1977), **Pattern Language**, Oxford University Press
- Sanoff Henry, (1991), **Visual research methods in Design**, Van Nostrand Reinhold
- Banargee Tridib Southworth Michael, (1990), **City Sense and City Design**, M I T Press
- Broadbent Geoffrey, (1990), **Emerging concepts in urban space design**, Van Nostrand Reinhold, London.

AD 521 – Professional Practice-III (Legal implications & business management)

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
4	0	0	50	50	4	100

Objectives:

The study of this subject is to enable the student to acquaint with the various responsibilities of an architect and understand the technicality of the profession. To understand complex issues and their solutions related to professional practice.

Content:**Unit 1: Business management of professional practice**

Office management practice, dealing with client, contractor specialist suppliers & services consultants, record keeping, methods of filing, business communication. Handling business management software. HR practices, feedback, planning & decision making, manpower management.

Unit 2: Financial & office management of professional practice

Budgeting of the project, office budgeting, profit & loss, receipts & payments, income & expenditures, taxation- professional tax, income tax, service tax etc. trial balance, inventory records, basics of internal & external auditing.

Unit 3: Legal implications of professional practice.

Definition, types of Easements, acquisition, protection and extinction of easements – Need for Arbitration: arbitration agreement, role of arbitrators, umpire etc, excepted matters, arbitral award, terms of contract between architect & client, client & contractor etc., Sale deed procedure.

Issues of Contract: i) Termination of contract, ii) Certificates of value and quality, iii) Virtual completion and final completion, iv) Defects liability period, v) Latent and patent defects, vi) Liquidated and un-liquidated damages, vii) Extension of time, delays and penalty, viii) Non tendered items, extras, extra work, additional works, variations, rate analysis and architect's role in certification of variations, ix) Prime cost, provisional sum, x) Types of insurance necessary during contract including fire insurance for safeguarding client's interest.

Unit 4: Special Architecture issues.

Local Rules and regulations, its effects on profession and education. General information and introduction to various acts and laws such as land acquisition Act, urban land ceiling Act. Building bye-laws, owner ship documents, Dilapidation and Demolition. Latest methods of assessing building age & ways of dismantling of buildings.

Outcome:

Students will understand complex technicality of the profession

References:

- Roshan Namavati, **Professional Practice**,
- **COA Handbook of Professional Documents**.
- **Hand book on Professional Practice**, I. I. A, Image systems, Mumbai, 1998.

AD 531 – Advance Building Construction - II

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
2	0	4	100	100	6	200

Objectives:

To inculcate the basic concepts related to the tall buildings structure and behavior and various types of shells. To introduce the basic concepts of Space Frames, Shells and folded plates and tensile structures, parametricism and biomimicry.

Content:**Unit 1: Special Structures**

Definitions, Types – single, double & multilayered grids – two way & three way space grids, connectors, Grids, Domes, various forms, Geodesic domes. Advanced Foundations: Pile and raft foundations, Lift slab construction, slip form construction etc. Analysis of three hinged arches. Diaphragm tension, Structure for pavilions.

Unit 2: Tall Buildings

High rise buildings, foundations structural systems and architectural design considerations, Brief outline of their Behavior and their applicability for various heights of buildings, advanced methods of multistory building construction, Sky Scrapers. General study of various external cladding materials and systems, curtain walling in various materials, construction details of glass curtain walling.

Unit 3: Design for Earthquake zone and Reconstruction

Earthquakes and its effects on buildings, earthquake zones in India, Architectural design considerations and construction detailing for earthquake resistance. Design and detailing of additions and alterations in existing buildings put to new use Process of modification and precautions to be taken. Arches: Basic concepts, Disaster resistant construction system.

Unit 4: Tensile Structures

Suspended cable structures, types of cable network systems, shapes of cable suspended systems, examples of tensile membrane structures, types of pneumatic structures. Space frames, unconventional buildings like TV towers, Geodesic domes – principles and construction, basics of parametricism and biomimicry.

Outcome:

The student shall have conceptual understanding of designing Shells and Space Frames, appropriate knowledge to tall structural systems, shells and folded plates and tensile structure for the space coverage and other advanced design concepts.

References:

- Gurucharan Singh, **Building Construction and Material**, Standard Book House, Delhi - 2010
- Stephen Emmittand, Christopher George, **R. Barry's Advanced Construction of Buildings**, Black Well Publishing Oxford – 2006
- R. Barry – Affiliated East West Press, **The Construction of Building, Vol-1, IV**, New Delhi – 2004
- M.J.Tomilson, **Foundation Design and Construction**, Educational Low Priced Books Scheme with Longman London - 1995
- Francis D.K.Ching, **Building Construction Illustrated**, VAN Nostrand Reinhold, New York – 2010
- L.S.Beedle, **Advances in Tall Buildings**

AD 541 – Thesis Orientation

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	1	50	50	2	100

Objectives:

To develop faculty of critical thinking in student in orienting toward thesis design/research statement, leading to creation of comprehensive base of information relevant to the thesis project in the subsequent semester.

Content:**Unit 1: Reviewing**

Review of a book and a research paper; basics of a book review, selection of reading material for review; techniques of reviewing.

Unit 2: Case Study

Selection of a nagging problem for case study, basics of undertaking case study.

Unit 3: Basics of writing a Concept Paper

Selection of a topic of interest, finding out niche area in which to work, enumerating risks and advantages in the area selected, literature search, processing of pictures and data.

Unit 4: Preparation of a Research Paper

Preparation of points from the data processed, understanding the framework of technical writing, actual writing and reviewing, support text with illustrations, referencing and cross-referencing, writing bibliography and completing the paper.

Note: Each student shall select a topic related to Architecture/allied fields with the guidance of the faculty coordinator of Thesis Orientation course; who will check on the progress of the students work. It is important that the student should start thinking about the dissertation/thesis topic much earlier during the practical training. This will give the student an opportunity to interact with the professional architects and colleagues in the firm, where she undergoes professional training.

Outcome:

Students get equipped with the skill in the basics of dissertation writing and critical thinking.

References:

- DWIVEDI R.S. (2001), **Research Methods in behavioral science**. Mcmillan New Delhi
- SANOFF, H. (1991), **Visual research methods in design**. New York, Van Nostrand Reinhold.
- WANG, D. ET AL. (2013), **Architectural research methods**. Groat, Hoboken, N. J., Wiley
- ZEISEL, J., & EBERHARD, J. P. (2006), **Inquiry by design: environment, behaviour, neuroscience in architecture, interiors, landscape and planning**. New York, W. W. Norton & Company.

B. ARCH. (STAGE II) - SEMESTER - X
AD 512 – Architectural Design Thesis

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
0	0	8	400	400	24	800

Objectives:

- To develop assimilation, synthesis and application of research in Architecture
- To prepare a student to independently handle and present all aspects of an architectural design: from its evolution to final solution in totality;
- To understand the importance of the evolutionary stages of a design process and various techniques required for a successful presentation of an architectural design;
- To develop in students the ability to handle specific aspects of design relevant to the topic.

Course contents

Each student is required to conduct an intensive study and present a design thesis on any of the design topics. The students should submit synopsis for the least three different, designs or research oriented topics in the department, of which one will be approved to carry on the research and design. Each student shall be attached with a faculty member who will guide his work. The arrangement of the assessment of the progress through the semester for all the students and a Program Schedule will be declared separately for each session by the department.

The work of the student should result into a 'Design Proposal' based on the complete and detailed study of site including its selection, topography, climate, spatial requirements of the project, special functional and physical needs of the project, and the standard data, construction and services and all other factors that the involved with a particular thesis topic.

At least two of the following items, for complete design or an approved part thereof, should be covered in full detail and included in the design and presentation, along with the final design proposal-

1. Structural calculations and design.
2. Detailed estimate and specification.
3. Working drawing and construction details.
4. Proposal for Mechanical services to cover 'Air-conditioning & Mechanical conveying system'.
5. Proposal for Electrical Services and Illumination.
6. Proposal for Water supply and waste disposal services.
7. Proposal for Acoustical design & specification.
8. Proposal for Interior design – including furniture, fittings and finishes.
9. Landscape design proposals in detail.

The design proposal should be prepared and presented with the help of charts, Drawings, perspective views, models and other audio-visual aids. A thesis report must also be prepared and submitted in one soft copy (on CD) and three hard copies (one to be returned to the student) type written and bound together with prints and photographs of all the drawings & models. The thesis report should explain the objectives, scope, case studies, literature study – research and data, design concept/approach, design proposals, construction programming & financing etc.

The original drawings, models and one copy of the thesis report will be returned to the students in due course of time as decided by the department.

Outcomes:

- **Designs** a Thesis project responsive to the contextual and program requirements.
- **Combines** the systematic/methodological learning from various stages of study and analysis in design process towards culmination of an informed design.
- **Communicates** the ideas clearly using writing, verbal and visual presentation.
- **Demonstrates** self-reliance when working independently
- Integrates ideas with design requirements
- **Compares** data and information gathered from Pre-design research
- **Evaluates** data and information gathered from Pre-design research and summarizes the information to be used for design
- **Applies** various codes, standards and regulations governing the project.
- **Demonstrates** synthesis of creativity and technical knowledge
- **Demonstrate** the ability for decision making required to progress the understanding already developed.
- **Demonstrate** the ideas clearly using detailed physical Model.

References

1. Mukhi, H.R. Technical Report Writing: Specially prepared for Technical and Competitive Examinations, New Delhi: Satya Prakashan, 2000.
2. Barrass, Robert. Writing At Work \b a guide to better writing in administration, business and management, London: Routledge, 2003.
3. Seely, John. The Oxford guide to effective writing and speaking, 2nd ed., Oxford ; New York : Oxford University Press, 2005.
4. Jo Ray McCuen, Anthony Winkler. Readings for writers, 9th ed., Fort Worth : Harcourt Brace College Publishers, 1998.
5. Treece, Malra. Effective reports, 2nd ed., Boston: Allyn and Bacon, 1985.
6. Time Saver Standards
7. Neuferts Architects Data
8. A.J.Metric Handbook

B. ARCH. (STAGE II) - SEMESTER - X**AD 522 – Advance Elective I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	1	50	50	2	100

AD 522 INTERIOR DESIGN

Objectives: To study the Interior Design principles and their applications in interiors.

Detailed study of History, principles and elements that go into making of an interior space more aesthetic, pleasing and functional with a few projects as practical.

ContentS:**Unit 1: Introduction to interior design**

Definition of interior design - **Interior design process** - Vocabulary of design in terms of principles and elements - Introduction to the design of interior spaces as related to typologies and functions, themes and concepts - Study and design.

Unit 2: History of interior design

Brief study of the **history of interior design** through the ages relating to historical context, design movements and ideas etc. - Brief study of folk arts and crafts. (vernacular design in India) with reference to interior design and decoration.

Unit 3: Elements of interior design - enclosing elements and furniture design & space planning

To understand passive architecture. Introduction to various **elements of interiors** like floors, ceilings, walls, staircases, openings, interior service elements, incidental elements etc. and various methods of their treatment involving use of materials and methods of construction in order to obtain certain specific functional, aesthetic and psychological effects.

Study of the relationship between furniture and spaces - human movements & **furniture design** as related to human comfort. Function, materials and methods of construction - changing trends and lifestyles – innovations and design ideas - Study on furniture for specific types of interiors like office furniture, children's furniture, residential furniture, display systems, etc. – Design Projects on Residential, Commercial and Office Interiors.

Unit 4: Elements of interior design– lighting accessories & interior landscaping

Study of **interior lighting** - Different types of lighting their effects types of lighting fixtures. Other elements of interiors like accessories used for enhancement of interiors – Paintings, objects de art, etc. Interior landscaping - Elements like rocks, plants, water, flowers, fountains, paving, artifacts, etc. their physical properties, effects on spaces and design values.

Outcome:

Expertize ad better understanding of subject interior design and its application.

References:

- Francis .D.K. Ching, **Interior Design Illustrated**, V.N.R. Pub., NY 1987.
- Julius Pendero and Martin Zelnik, **Human Dimensions and Interior space**, Whitney Library of Design, NY 1979.
- Steport - De Van Kness, Logan and Szebely, **Introduction to Interior Design** Macmillan Publishing Co., NY 1980.
- Inca / **Interior Design Register**, Inca Publications, Chennai, 1989.
- Kathryn .B. Hiesinger and George H.Marcus, **Landmarks of twentieth Century Design**; Abbey Ville Press, 1993.
- Syanne Slesin and Stafford Ceiff - **Indian Style**, Clarkson N. Potter, Newyork, 1990.
- The Impulse to adorn - **Studies in traditional Indian Architecture** - Editor Dr.Saranya Doshi, Marg Publications, 1982.

AD 532 SUSTAINABLE PASSIVE DESIGN

Objectives: To learn basics of passive architecture techniques and its impact on architectural design, fundamentals of passive architecture. To study passive design principles in old & new buildings of India.

Content:**Unit I: Concept of passive building design.**

Introduction. Need of passive architecture. Energy and Global environment, Energy use and Climate change – Its impact, Types of Energy. Introduction to passive and sustainable building designs. Summary & conclusion

Unit II: Passive techniques

Introduction. Global warming & heat Island effect. Heating cycle, Solar gains, Solar Geometry & Shading. Various passive heating techniques & passive cooling techniques. Day lighting & ventilation passive techniques. Summary & conclusion

Unit III: Sustainable building materials & construction.

Introduction. Impact of Construction on environment. Techniques of sustainable construction - technologies, methods of effectiveness. Alternative materials and construction methods. Summary & conclusion

Unit IV: Green Building Rating systems

Introduction. Green architecture and various international rating systems for sustainability. Indian systems – TERI GRIHA rating, LEED India rating, IGBC. Case studies. Summary & conclusion

Outcome:

Increased understanding of the concept of passive architecture & its impact on built environment.

References:

- N.K. Bansal; **Passive Building Design**
- D.K. Ching; **Green Building illustrated**
- SPIEGEL 3rd edition ; **Green Building Materials**
- Keith Robertson and Andreas Athienitis; **Solar Energy for Building**
- K. Athienitis and Mat Santamouris; **Thermal Analysis and Design of Passive Solar Buildings**
- Martin Evans ; **Housing, Climate and Comfort**
- Maxwell Fry ; **Buildings in the tropics**
- Arvind Kishan, Baker & Szokolay ; **Climate Responsive Architecture;**
- P. Kukreja ; **Tropical architecture**

AD 542 HERITAGE CONSERVATION**COURSE OBJECTIVES:**

- Moving from basic theories, the course touches upon the technical aspects and ethics of conservation.
- The course culminates with a module on sensitizing the students of architecture towards designing in historic environments.
- Explore the history, philosophy and science of architectural conservation through lectures and seminar discussions.
- Encourage appropriate methodologies and tools for recording, documentation and inventorying of heritage structures.
- Develop sensitivity to design in heritage environment.

COURSE CONTENTS

- **Unit - 1. Introduction to Conservation**

- Definitions for the heritage components of built heritage;
- An overview of national and international approaches from UNESCO, ICOMOS, ICCROM, A.S.I., GETTY foundation, INTACH, WMF, international charters, Civic bodies etc.
- Search for an Indian approach; Legal Status of Heritage in India.
- National Conservations Policy of ASI.

- **Unit - 2. Documentation & Mapping**

- Listing of monuments and recording techniques,
- Documentation techniques for buildings and other intangible heritage components; Understanding assessment and mapping the factors of deterioration;

- **Unit - 3. Conservation Concepts:**

- Prevailing practices in conservation,
- Concepts of restoration, retrofitting, rehabilitation, consolidation, preservation, revitalization etc.
- Adaptive reuse;

- **Unit - 4. Conservation Techniques:**

- Conservation of Built Heritage using traditional materials and techniques;
- Approach and methodology for appropriate repairs

- **Unit - 5. Design Approach in Historic Context:**

- Approaches in designing in the historic context,
- Interpretation with examples in India and abroad;
- Concepts of heritage zones,
- Identification and delineation criteria for historic urban fabrics;

COURSE OUTCOMES:

- To understand the philosophy and science of architectural conservation.
- To learn the appropriate methodologies and tools for recording, documentation and inventorying of heritage structures.
- To acquire skills for documentation photography, surveys, research etc.
- To apply suitable methodology with reference to given context
- To critically evaluate and make assessment of heritage components
- To design in a heritage context
- To demonstrate respect for built and cultural heritage

SUGGESTED REFERENCES

1. Guidelines for Conservation: A technical Manual Bernard Feilden 1989 INTACH, New Delhi
2. ICOMOS Charters, (Venice Charter, Burra Charter, Nara Declaration) ICOMOS

3. Management Guidelines for World Cultural heritage Sites. Bernanrd Feilden & Jukka Jokilehto, 1998
ICCROM, Rome
4. Conservation Manual Sir John, Marshall 1923 Archaeological Survey of India.
5. National Conservation Policy 2013 Archaeological Survey of India

B. ARCH. (STAGE II) - SEMESTER - X**AD 532 – Advance Elective II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	1	50	50	2	100

AD 552 HOUSING

Objectives: To develop independent critical thinking in the sector of housing design.

Contents:**Unit 1: Basics of Housing**

- The definitions of housing, housing concepts, housing needs, supply and demand, socio-economic aspects, affordability, etc.

Unit 2: Housing typologies and standards

- Single unit housing; row housing; high density housing; low density housing; medium density housing; detached housing, housing standards and their relevance to development, new trends.

Unit 3: Housing approaches, dynamics and possibilities

- Density studies, massing studies, Built unit development; actors in housing; land allocation/plot provision; owner built housing; commercially developed housing; cooperative housing; social housing; public housing; mass housing; self help housing; dynamics of squatter settlements; community development issues; incremental housing development.

Unit 4: Planning and Design inputs and case studies

Upgrading; low cost approaches; consolidating; appropriate design options of building components; layout design including infrastructure and services, housing design as a result of environmental aspects, development of technology and community interests, case studies in Public sector housing, Industrial Housing, Government housing, private and cooperative housing, their advantages and disadvantages.

Outcome:

Students will understand the concept of Housing & its impact on built environment.

References:

- EVANS, M. (1980). **Housing, climate and comfort**. London [etc.], The Architectural Press.
- PAYNE, G. (1985). **Low-income housing in the developing world: the role of sites and services and settlement upgrading**. Chichester, W.Sussex, Wiley.
- PAYNE, G. K., & DAVIDSON, F. (2000). **Urban projects manual**. [Liverpool], Liverpool University Press in association with Fairstead Press.
- TURNER, J. F. C. (1991). **Housing by people: towards autonomy in building environments**. London, Boyars.
- WAKELY, P. I., SCHMETZER, H., & MUMTAZ, B. (1976). **Urban housing strategies: education and realization**. London, Pitman.

AD 562 REGIONAL & URBAN PLANNING**OBJECTIVES**

- To develop skills for a comprehensive design in areas of urban design, hospitality for making a complete design portfolio from the brief to tender drawings.
- Understanding design as a process of problem identification, space standards, formulation of requirements, evolution of design criteria and development of design of buildings in urban context, phasing and development.

COURSE CONTENTS**Unit 1:-**

Issues of urban structure, urban space and form: Issues of conservation: Issues in zoning, land use, density, development control: Issues of building in context, urban infill: Density, mixed land use, ground coverage, development controls: Urban systems, services and their integration with the project: User requirements (derived from surveys): Issues in appropriate technology and costs: Issues of hierarchy, identity of space, public and private scales of space: Integration of community institutions etc: Detailing for the disabled and the elderly;

Unit 2:-

Issue in preparation of Master Plan for academic: administrative, hospitality etc. environmental considerations: phases of development: scope for expansion for future developments: safe and comfortable vehicular and pedestrian movement: issues of character and landscaping.

EXPECTED OUTCOMES

The students looked at various components and aspects associated with the urban environment in terms of physical infrastructure, socio cultural aspects, gender issues etc. and looked at ways to address them through their designs. Mapping and diagramming techniques were explored in the design process to help explore the design process better.

The final submission shall necessarily include a model of one of the design outcome.

REFERENCES

1. Alexander, Christopher. Pattern language: Towns, Buildings, Construction. Oxford University Press, New York.
2. Richard. D. Dober. Campus Architecture: Building in the Groves of Academy. McGraw Hill, New York, 1996.
3. Chiara, De Joseph and Others. Timesaver's standard for Housing and Residential development, 2nd ed. McGraw Hill, Inc, New York.
4. Newman, Oscar and Others. Defensible space: People and Design in the Violent City. Architectural Press, London, 1972.
5. Neuferts Architects Data

AD 572 DISASTER MANAGEMENT**OBJECTIVES**

To understand the basic principles of disasters and its happening, management during the disasters and capacity building to cope with disasters.

COURSE CONTENTS**Unit 1. Introduction to Disaster Management:**

Define and describe disaster, hazard, emergency, vulnerability, risk and disaster management; Identify and describe the types of natural and non-natural disasters. Important phases of Disaster Management Cycle.

Unit 2. Disaster Mitigation and Preparedness:

Natural Hazards: causes, distribution pattern, consequences and mitigation measures for earth quake, tsunami, cyclone, flood, landslide drought etc. Man-made hazards: causes, consequences mitigation measures for various industrial hazards/disasters, Preparedness for natural disasters in urban areas.

Unit 3. Hazard and Risk Assessment:

Assessment of capacity, vulnerability and risk, vulnerability and risk mapping, stages in disaster recovery and associated problems.

Unit 4. Emergency Management Systems (EMS):

Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

Unit 5. Capacity Building:

Gender sensitive disaster management approach and inculcate new skills and sharpen existing skills of government officials, voluntary activists, development of professional and elected representative for effective disaster management, role of media in effective disaster management, overview of disaster management in India, role of agencies like NDMA, SDMA and other International agencies, organizational structure, role of insurance sector, DM act and NDMA guidelines.

Unit 6. Application of Geo-informatics and Advanced Techniques:

Use of Remote Sensing Systems (RSS) and GIS in disaster Management, role of knowledge based expert systems in hazard scenario, using risks-time charts to plan for the future, early warning systems.

Unit 7. Integration of public policy:

Planning and design of infrastructure for disaster management, Community based approach in disaster management, methods for effective dissemination of information, ecological and sustainable development models for disaster management.

CASE STUDIES

Lessons and experiences from various important disasters with specific reference to Civil Engineering.

OUTCOMES:

The students will be able to –

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

REFERENCES

1. Introduction to International Disaster Management ,
 2. Disaster Management in Archives, Libraries and Museums,
 3. Disaster Management Handbook
 4. NIDM Guidelines
- NDMA Catalogues

B. Arch. Semester-I**BR 111 - Basic Design & workshop- I**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	Lab	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	4	100	100	8	200

Objectives

- The aim of this subject is to familiarize students with visual grammar, elements of design and methods of visual composition with various mediums and colour.
- In addition to the earlier, the intention of space design activity will be limited to the level of visual composition of architectural spaces considering human activity and anthropometry. There would be several studio/ design thinking exercises based on the module contents as is described below. The module may be taken up by the faculty in order of preference. The order should be common in both the sections of the same year. The faculty may achieve stated minimum outcome using various strategies and approaches.
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Contents:**Unit-1: Colour theory and its application, Study and Application of elements of design, visual grammar and Gestalt principles in basic composition**

- Lecture on Elements of Design, Visual Grammar & Gestalt principles
- Creation of Color wheel and relationships among various color
- Application of colors in built form and objects
- Elements of Design in basic composition
- Application of visual grammar and gestalt principles
- Evaluation of two-dimensional composition with the help of above aspects

Unit-2: Application of colour theory and visual grammar in composition.

- Design of two-dimensional composition in black and white medium
- Design of two-dimensional composition in color medium
- Evaluate the composition with Visual Grammar

Unit-3: Transformation from two-dimensional shape to three-dimensional form

- Form generation techniques – from 2D to 3D, Additive and Subtractive form
- Construction of 3D form with various material and colors
- Evaluation and Analysis of 3D form with visual grammar

Unit-4: Anthropological study of human activity space

- Study of relationship between human body movement and human activity
- Relationship between human activity and built space
- Measured drawing of human activity space – a case study

Unit-5: Architectural design process and product

- Design brief - its importance and interpretation
- Preparation of circulation/flow diagrams
- Design parameters- physical, socio-cultural, economic, climatic etc.
- Study and design of small spaces like drawing room, dining room, bed room, kitchen, toilets, study room, class room, offices etc. And making their measured drawings.

Unit-6: Design problem-II

- Design of simple structure like Bus Shelter, Milk Bar, Small Ice Cream Parlor, Gift Shop, Florist Kiosk, Enquiry, Snack Bar, Suvidha Kendra etc.

Course Outcome:

S. N o.	Outcome	Taxonomy
1	To understand the analytical skill to develop design and its management.	Understand
2	To understand the depth knowledge of visualization and enhanced conception of ideas.	Understand
3	To apply the observation and logical skills to involve understanding of a space creation.	Apply
4	To analyze the desired written and presentations skills to express their designs.	Analyze
5	To understand the idea and concept with expression of thoughts via appropriate communication method.	Understand
6	To understand about the design minor architectural projects as mentioned above.	Understand

References:

- John Hancock, Time Saver Standards for Architectural Design Data, McGraw-Hill Professional Publishing
- Smithies, K.W; “Principles of Design in Architecture”, Chapman & Hall, London, 1983
- Ching, Francis D.K; “Architectural Form, Space and Order”, Van Nostrand Reinhold International Thomson Publishing, Inc.: New York, 1996.
- Rompilla, Ethel; “Color for Interior Design”, Harry N. Abrams ,New York, First Edition, 2005
- Chiara, Joseph De; “Time Saver Standards for Building Types” McGraw–Hill Professional- Publishing, 2001
- Wucius Wong, Principles of three Dimensional Design, Van Nostrand Reinhold Company
- Wucius Wong, Principles of two Dimensional Design, Wiley
- Wucius Wong, Principles of color composition
- Rendering with Pen and Ink by Robert W. Gill

B. Arch. Semester-I**BR 121 Building Materials & Construction- I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus: Understanding of basic building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as mud, stone, bamboo, timber, etc. and methods of preservation, treatment and types of uses.
- To help students understand the basic building elements, their function and behavior under various conditions with specific reference to 'load bearing construction' and simple non RCC frame structure.
- To develop a strong sense of perception, understanding the basic principles of construction and materials.
- The emphasis on teaching the fundamental principles and constructional details suitable for Indian conditions.
- Students will be encouraged to study both in the classroom and also outside at work sites in order to get the practical exposure.

Contents:**A. Building Construction:****Unit-1: Introduction to Super and Sub- Structures**

- Introduction to basic elements of buildings and their importance.
- General introduction to types of foundation.
- Cross-section of a wall showing elements of building.
- Various construction tools, used on construction sites.

Unit-2: Mud Construction

- The nature of material, visual and textural properties.
- Construction details of COB, Adobe, Wattle & Daub, Compressed Stabilized Earth Blocks & Rammed Earth Construction
- Properties and characteristics of mud used for binding material in masonry.
- Identification and selection processes

Unit-3: Introduction to Stone Masonry

- Types of stone masonry
- Random rubble masonry – Coursed & un-coursed,
- Square rubble brought to course, Square rubble course
- Ashlar Masonry

B. Building Materials:**Unit-4: STONE**

- Rocks - Classification and basic nature of each classified rock.
- Processing of stones and forms of stone available in market
- Structural, Visual and textural properties of stones
- Identification and selection for application purposes
- Application in construction of buildings
- Artificial Stones

Unit-5: TIMBER & BAMBOO

- Trees - Classification and basic nature of each classified tree.
- Processing and storage of timber and forms of timber available in market.
- Structural, Visual and textural properties of timber.
- Identification and selection for application purposes.
- Application in construction of buildings
- Seasoning, storage and preservation of timber, properties and strength of manufactured products, veneer, plywood, block boards, fiberboard, etc.
- Bamboo as plant classification, species, geographical distribution, anatomy of bamboo, properties, strength, processing, harvesting, working of bamboo tools, treatment and preservation of bamboo, uses of bamboo.
- Construction details of Bamboo frame and joinery

Unit-6: LIME

- General introduction of lime,
- Classification and types of lime- Quick & Fat lime,
- Properties of Quick and Fat lime; application of lime based on its properties.
- Sources of lime and constituents of limestone, slacking of quicklime.
- Tests for lime, storing lime,
- Process of making lime mortar for masonry.
- Curing requirements and shrinkage properties of lime.

Course Outcome:

S.No	Outcome	Taxonomy
1	To define basic building elements	understand
2	To explain the types and necessity of stone masonry	Analyze
3	To define mud as a building material & types of mud construction technology.	understand
4	To able to make construction details of stone, timber & bamboo construction.	Create
5	To be aware of the properties and applications of Timber, bamboo & lime as a building material.	understand
6	To apply construction techniques in design projects.	Apply

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, **Construction Technology**, Prentice Hall
- Barry, **Construction of Buildings**,
- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W B Mackay (Volume 1 and Volume 2)
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B C Punmia, Ashok K. Jain and Arun K. Jain
- Building Materials by Gurcharan Singh
- Building Construction Handbook by R. Chudely

B. Arch. Semester-I**BR 131 –Architectural Structure-I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: Behavior of building elements and basic structural systems.

Objectives

- The course covers mechanical properties of common engineering materials and introduces simple types of structural elements followed by determination of forces and stresses in the elements.

Contents:**Unit-1: Simple Stresses and Strains**

- Introduction to structures
- Types of engineering materials, their mechanical properties and the tests for their mechanical properties.
- Stress and strain

Unit-2 Structural Elements

- Introduction to structural elements
- Function of each structural element
- Primary & secondary loading on structure
- Working stresses and factors of safety, partial safety factors for load and stresses at limit state of collapse.

Unit-3 Elastic Constants

- Elastic constants and their mutual relationships
- Lateral strain, longitudinal strain, poisson's ratio,
- Relation between modulus of elasticity and modulus of rigidity.

Unit-4 Centre of gravity & moment of inertia

- Centre of gravity
- Moment of Inertia of sectional elements
- C.G of simple plan figures
- Theorem of parallel axis theorem of perpendicular axis.

Unit-5 Shear Force and Bending Moment

- Introduction
- Types of loads and beams
- Types of support conditions
- Bending moment and shear force diagrams for determinate beams under simple types of loads
- Methods of superposition.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To describe mechanical properties of materials.	Understand
2	To Draw stress strain curves for structural materials.	Apply
3	To analyze simply supported and cantilever structural elements	Evaluate
4	Describe the various structural elements and their function.	Understand
5	Explain the loads acting on structures.	Understand

Text books

- Kumar. A., “Stability Theory of Structures”, Tata McGraw Hill Co. Ltd.
- R.K Bansal and Sanjay Bansal, Engineering Mechanics Third edition, Laxmi Publications, New Delhi.
- Jain, A.K., “Strength of Materials and Structural Analysis”, 2nd Ed., Nem Chand & Bros.

References:

- C.S Reddy “Basic Structural Analysis”, McGraw Hill Education, 3 edition (1 July 2017).
- S S Bhavikatti “Structural Analysis Vol-2”, Vikas Publishing House, Fourth edition (2013).

Web link

- <https://nptel.ac.in/courses/105105108/>

B. Arch. Semester-I**BR 141 – Introduction to History of Architecture**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an insight to the architecture of prehistoric period and early civilizations.

Objectives

- To inform about the development of architecture in the Ancient Western World.
- To understand the architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to style and character in the prehistoric world and in Ancient Egypt and West Asia.

Contents:**Unit-1: Introduction to Prehistoric / Primitive**

Introduction to the concept of culture and civilization: Paleolithic and Neolithic culture, art forms and evolution of shelter, primitive people, shelters, settlements, megaliths and memorials. Examples of Oval huts, Dolmen tomb, Tumulus, Houses at Catal Huyuk, Stonehenge etc. Agricultural revolution and its impact on culture and civilization.

Unit-2: Ancient Egyptian Civilization

Study of socio-cultural, religious and political systems, people's beliefs, climate and other factors influencing Architecture, character of human settlements, typology of Shelters and buildings, Religious burial systems and Cult temples of Egypt, construction methods and materials used. Tomb architecture: evolution of the pyramid from the Mastaba, mortuary temples and cult temples Great Pyramid of Cheops, Gizeh, temple of Ammon Ra, Karnak, temple of Abu Simbel (Rock Cut).

Unit-3: Ancient Mesopotamian Civilization

Architectural character as a reflection of climate and geology, planning of Palaces of Assyria and Persia, Ziggurats and corbelled drains of Assyria, Staircases of Persepolis, physical planning of Babylonia, Ur-Sumar.

Unit-4: Indus Valley Civilization

Contributions of Archaeologists, Timeline, socio-cultural, religious and political systems, settlement planning pattern, typology of Shelters and civic buildings, Citadel- Granary-Great baths, civic utility systems.

Unit-5: Aryan / Vedic Civilization

Timeline with reference to Indus Valley Civilisation, settlement planning pattern and Town forms by planning pattern namely; Dandaka, Nandyavarta etc., typical Vedic village, shelter types by shape and material used, Torana and Sacred railings.

Unit-6: Chinese Civilization

Architectural character, building typologies, settlement pattern, Settlement layout and planning principles adopted.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire the development and architecture of ancient civilizations.	Understand
2	Acquire the various architectural form and character in the historical period.	Understand
3	Evaluate various civilizations in ancient era	Analyze
4	Make sheets with free hand sketching on all the civilizations.	Create
5	Exposure to the various architectural styles through presentations.	Understand
6	Make sketchbook and models on the architectural styles with respect to the timeline.	Create

Text book

- History of Architecture in India by Tadgell Christopher.
- The Great Ages of World Architecture by G.K Hiraskar.
- A History of Architecture by Sir Banister Fletcher's.

References:

- Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai: D.B. Taraporevala Sons and Co.
- Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London: Verona Printed.
- Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London: McGraw-Hill.
- Dutt, B. B. (2009). Town Planning in Ancient India. Delhi: Isha Books.
- Kimball, F. and Edgell, G. H. (2012). A History of Architecture. Amazon: Ulan Press.
- Faulkner, H. T. (1953). Architecture through the Ages. New York: Putnam Adult.
- Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.
- Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers.
- Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York: M. Courier Dover Publications.
- Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford: Oxford University Press.
- Prammar, V. S. (2005). A social history of Indian architecture. New Delhi: Oxford University Press India.
- SenGupta, B. K. (2006). Reading material on the History of Human Settlements. New Delhi: ITPI.
- Singh, U. (2009). A history of ancient and early medieval India: from the Stone age to the 12th century. Delhi: Pearson India.
- Watkin, D. (2005). A History of Western Architecture. 4th Ed. London: Laurence King Publishing.

Web link

- https://www.pssurvival.com/PS/Rebuilding_Infrastructure/History_of_Architecture-2016.pdf
- <https://www.amazon.in/Banister-Fletchers-History-Architecture-Cruickshank/dp/0750622679>
- <http://www.archinomy.com>

B. Arch. Semester-I**BR 151 – Art and Graphics - I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	2	0	100	100	2	200

Focus: Development of three dimensional visualizations, graphical abstraction and preliminary form exploration and Rendering.

Objectives

- Understanding the importance of technical drawing as medium of communication as basic vocabulary in design.
- To learn the utility and art of using the potential of Pencil as a powerful tool of Graphic Communication.
- To understand representation of forms using basic semiotics.
- To understand the fundamentals, use, role and importance of Colours and proportion in Graphics.

Contents:**A. Art and Graphics I:****Unit-1: Pencil as an effective presentation tool**

- Free hand line work with different strokes/grades in pencil.
- Effect of light and shade on simple geometrical solids.
- Textures of different building materials in pencil through shading
- Outdoor sketching of simple building forms
- Sketches of scenes and activities from memory involving public spaces, markets, festivals, recreational spaces etc...

Unit-2: Visual perception and Color Theory

- Ideas as abstraction: composition with points, lines, 2D shapes,
- Graphic tools to express abstraction (geometric content)
- Color Theory and basic technique using Pencil color
- Abstraction of environmental and architectural observation: Dichotomy of seasonal changes
- Graphics to represent communication: visually interactive designs using colors

Unit-3: Perspective Drawings:

- Free hand perspective (one point and two point) drawing of an enclosed space, open space
- Concept of light and Shadow in a space

Unit-4: Scale and Proportion

- methods of measurement (unconventional)
- Idea of human/tree scale and proportion

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will be able to coagulate concept of a space creation.	Understand
2	Students will deduce learn desired written and presentations skills to express their designs	Understand
3	Students will able to visualize the idea and concept with expression of thoughts via appropriate communication method.	analyze
4	Students express all aspects of visually interactive design	analyze
5	Students will be able to express all drawing contents through all taught mediums of communication.	Apply

Text book

- Robert Gill, **Rendering with Pen and Ink**, Van Nostrand Reinhold Company

References:

- Wucius Wong, **Principles of three Dimensional Design**, Van Nostrand Reinhold Company
- Wucius Wong, **Principles of two Dimensional Design**, Wiley
- Wucius Wong, **Principles of color composition**,
- Robert Gill, **Rendering with Pen and Ink**, Van Nostrand Reinhold Company

B. Arch. Semester-I**BR 161 – Architectural Drawing – I (Manual)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	2	0	50	50	3	100

Objectives

- Introducing and familiarizing students with drafting tools and accessories and provide basic knowledge and skill to draft a drawing manually.
- Developing drafting skills through different types of lines, their intensity and interpretation. Also understanding the scale of drawing, dimensioning, lettering techniques and layout of sheets.
- Visualizing and drawing geometric forms in different positions using orthographic projections and sciography will help the student to understand and develop drawings for various design proposals.
- Familiarizing students to three dimensional drawings/objects and its application used to enhance and communicating design ideas.
- Development of surfaces to develop understanding of 2-dimensional drawings and 3-dimensional models.
- Introducing the importance of rendering and exploring different methods/ techniques of rendering in various exercises. The subject will be taught in congruence with the current Design studio and other subjects like Mathematics for Architecture and Workshop. The assignments for the subject may be linked to design exercises to achieve a higher level of learning and understanding the practical application of the same.

Contents:**Unit-1: Introduction**

- Drawing instruments and its uses
- Sheet layout and sketches
- Lines, lettering , scales and dimensioning

Unit-2: Orthographic Projections

- Introduction to Projections
- Concept, Principle and Methods of Projections
- Orthographic Projections of Point, Line and Plane
- Projections of Solids in different positions
- Application of Projection for preparing architectural drawings
- Application of Sciography in 2 dimensional drawings with rendering techniques

Unit-3: Application of Sections in Architectural Drawings

- Introduction of section of solids with simple forms
- Concept and methods of drawing section of solids
- Application of sections for simple building drawings
- Section of complex form or structures

Unit-4: Metric Drawing - Architectural Drawing Techniques

- Types used & advantage
- Isometric, Axonometric & Oblique view
- Metric drawings, projections and their dimensions
- Difference between perspective and metric projections

Unit-5: Development of Surfaces

- Introduction to development of surfaces and its uses.
- Methods of development of surfaces

Unit-6: Development of complex Surfaces

- Development of lateral surfaces of simple solids as cube, cone, pyramids and prisms.
- Development of complex solids, when two or more simple solids are joined together.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To understand and select drawing tools and techniques for drafting basic drawing	understand
2	To analyze a type of line, intensity, thickness, text to draw a shape.	analyze
3	To apply a scale, dimension for a layout of sheet or drawing	apply
4	To create a line, plane or solid into drawing using orthographic projections	create
5	To create the drawings of complex compositions	create
6	To evaluate the 2 dimensional drawings and 3 dimension form using development of surfaces and metric projection	evaluate

References:

- Elementary Engineering Drawing: Plane and Solid Geometry by N. D. Bhatt
- Rendering with Pen and Ink by Robert W. Gill
- Architectural Graphics by Francis D. K. Ching
- Engineering Drawing by B.V.R. Gupta
- Engineering Drawing: With Creative Design, Volume 2, by Hiram. E. Grant
- Architectural Drawing: Perspective, Light and Shadow, Rendering by Sherley W.Morgan
- Rendering in Pen and Ink by Arthur L. Gupatil

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

FOCUS:

- Behavior of Design and creativity of thinking.
- The course introduces the different tools and techniques of creativity as applicable to various Projects in Design (it may be termed as problem solving for a design project)

OBJECTIVES:

- Understanding the importance of Creative thinking in Design, its contents with respect to behavior and language of building elements and components.
- To understand and Join knowledge of architecture, civil engineering, statics and material in a natural way.
- To introduce lateral(adjacent/ horizontal/ sideways) thinking and facilitate innovative design solutions.

Course Methodology/ Content

BEFORE MID TERM TEST (MTT)

UNIT-1:

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with man made structures.

UNIT-2:

- Thinking techniques - Principles in generative, convergent, lateral, interactive, graphical thinking, check lists, analysis and synthesis simulation, action ability and implementations of intentions. Blocks in creative thinking. Simple exercises based on thinking techniques

UNIT-3:

- Tools and techniques of creativity - mind mapping, brainstorming with related stimuli and unrelated stimuli, positive techniques for creativity, creative pause, Focus, Challenge,

AFTER MID TERM TEST (MTT)

UNIT-4:

- Alternatives, concepts, provocation, movement, setting up provocations, sensitizing techniques, group or individual techniques. Simple design exercises.

UNIT-5:

- Problem statements - Brain writing with unrelated stimuli, idea mapping, random input, storyboarding exercises, problem solving techniques - Divide and conquer, hill climbing strategy, means -ends analysis, trial and error, brainstorming, morphological analysis, method of focal objects, lateral thinking, steps developed by Polya, Dekker, De Bono and others, research, analogy, reduction (complexity), TRIZ, Halpern's techniques etc. Simple Design exercises

UNIT-6:

- Functional Design,
- Creative solutions applicable to designs - Design, Invention, opportunity, problems, improvement, planning, projects, conflicts. Simple Design exercises. Creative Design process - conceptual design, embodiment design, detail design, Iterations

OUTCOME:

S.No .	Outcome	Taxonomy
1	Enable students to understand the concepts of design in architecture.	understand
2	Apply the concepts of action of forces on a body and design.	Apply
3	Enable students to think in creative ways.	Create
4	Enable students to think in creative ways. The concepts of elastic/ flexible/ variable constants and its applications for various types of problems with thorough understanding of creative thinking.	Create

REFERENCE BOOKS:

1. Geoffrey Broadbent. **Design in Architecture**, London:D.Fulton
2. Christopher Alexander. **Pattern Language**. New York: Oxford University Press
3. Thomas Mitchell. **Redefining Designing: Form to Experience**
4. Edward De Bono, **Lateral Thinking**
5. James Snyder and Anthony Y catanse, **Introduction to Architecture**, Mc Graw-Hill Book company, New York, 1979.
6. Bryan L. Peterson, **Design Basics for Creative Results**, F&W Publications, Inc.
7. Noone, Donald.J, **Creative Problem solving**, Hauppauge, 1993.
8. De Bono, Edward, **Serious Creativity: Using the power of Lateral thinking to create new ideas**, Harper Collins publishers, 1992.

B. Arch. Semester-I
BR 181 Environmental Studies

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
4	0	0	50	50	4	100

Focus: Understanding the importance of ecology & environment with respect to architecture.

Objectives

- To provide fundamental knowledge about natural and built environment.
- To introduce the students to fundamental concepts to understand environmental processes.
- The curriculum further incorporates understanding in relation to Indian context.
- An attempt to have a detailed understanding of India's natural environment and the threats to them.

Contents:

Unit-1: Fundamental of ecosystem

- Fundamentals of ecosystem,
- Components of an Ecosystem – Abiotic and Biotic
- Relationship cycles between Abiotic and Biotic components within an ecosystem
- Types of Ecosystem

Unit-2: Our Earth's Environment

- Global Climatic factors, altitude, latitude and longitude
- Major climatic zones of world
- Climatic Zones of India
- Global warming

Unit-3: Resource and Environment

- Sources of natural resources used in construction industry
- Environmental impact on extraction of natural resources used for construction.
- Pollution caused in processing of natural construction material
- Concept of Alternate Building Material
- Concept of Generating Construction Material out of waste like stone dust, fly ash bricks

Unit-4: Human Impact on Environment

- Introduction to waste generated by human habitat at a single dwelling unit level and urban level
- Generation of waste from construction sites and its appropriate disposal
- Generation of Industrial Waste and its impact on Environment

Unit-5: Management of Environment

- Treatment of solid, liquid and gaseous waste generated by human habitat
- Treatment of waste from construction sites
- Water conservation and harvesting

Unit-6: Applications of Ecological Methods and Techniques in Architecture

- Ecological conservation methods at site planning and master planning scale.

Course Outcome:

S.No .	Outcome	Taxonomy
1	students will aware about the scientific knowledge and current debates on the environment at three nested scales, including their interlink ages – Global, Regional and Local.	Understand
2	students will understand cause-and-effect relationships between various human, natural and climatic factors that impinges upon ecological systems and their linkages.	Evaluate
3	Students will be sensitive with global & national environmental issues, the scale of impacts, important conventions, laws and policies in the field of biodiversity, and environmental protection.	Remember
4	Students will understand about global warming effects.	Understand
5	Students will be able to analyze various climatic zones of india.	Analyze
6	Students will include environmental and ecological concerns in their designs.	Apply

References:

- The Environment – Principles & Applications *by Charis Park*
- Dictionary of Ecology and Environment *by P.H.Collin*
- Ecology *by M. Begon etal*
- Theoretical Ecology *by R.May & A.McLean*

B. Arch. Semester-II**BR 112 - Basic Design & workshop- II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	4	100	100	8	200

Objectives

- The aim of this subject is to familiarize the students with architectural design process through small scale projects of human habitat.
- The design activity will be limited to the level of visual composition of architectural spaces considering human activity and anthropometry, building material exploration, colour etc. There would be several studio/ design thinking exercises based on the module contents as is described below.
- The module may be taken up by the faculty in order of preference. The order should be common in both sections of the same year. The faculty may achieve stated minimum outcome using various strategies and approaches.
- **Examples of project:** Small living space, Home stay, Small showroom, Shop, Exhibition space, Meditation hall etc.
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Contents: Parameter to understand & Study**Design process and human as user of space**

- Study and differentiate human needs, wants and desires
- Study of cases for different user's requirements
- Transform the behavioral requirements into space form
- Study of relationship among spaces with proximity chart, storytelling etc.

Human activity and context

- Study of a context and its surroundings and collect information
- Analyze the above information in favour of the usage perspective
- Understanding of human scale to the context

Planning of Spaces

- Distribution of the human activity spaces along the context considering the context as visual background
- Analyze the relationship among the spaces
- Verbal presentation on planning of built environment with different mediums

Architectural Composition

- Composition of spaces with geometric or non-geometric forms
- Visualization of Architectural composition from different positions on context
- Colour composition of exterior and interior spaces
- Application of building materials according to colour composition and texture
- Verbal presentation with technical drawings of built form

Detail design of interior spaces with a theme

- Detail planning and design of Interior spaces considering human needs and human anthropometric data with a theme
- Application of building materials with colour and texture in detail design
- Verbal presentation of Interior spaces

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will aware about the application of the architectural design process for small scale projects of human habitat	Understand
2	To evaluate the human behavioral needs into architectural program requirements	Evaluate
3	To understand about the information on context and the human-space relationship	Understand
4	Students will be able to analyze the desired written and presentations skills to express their designs.	Analyze
5	To understand the architectural spaces in a design project	Understand
6	Students will be able to understand the communication of the architectural drawings with the help of various mediums.	Understand

References:

- Audio/visual presentation, model making, sketching with different techniques, photography
- All the above modules will be evaluated in the form of verbal presentation of design work, write up material, drawing work, model making, photography etc.
- Architectural Design by Jane Anderson
- Elements of Space Making by Yatin Pandya

B. Arch. Semester-II**BR 122 Building Materials & Construction -II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus: Knowledge of various methods of construction and detailing of buildings of medium complexity using manmade materials.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as brick, cement, sand and coarse aggregates etc.
- To understand building industry through various market surveys.
- To develop understanding about the principles, construction techniques in shallow and deep foundations.
- Study of openings will proceed to the study of Arches and its classification.

Contents:**A. Building Construction:****Unit-1: Introduction to Brick Masonry**

- Types of brick bats,
- Types of Brick bonds for wall masonry- half, single, one & half thick wall,
- Cavity wall, Jointing & pointing & bonding of bricks
- Brick walls in different ends, corners and junctions

Unit-2: Shallow Foundation

- General introduction to types of foundation
- Foundation in brick & stone masonry
- Shallow foundation: Types, Isolated, combined and raft foundations and their construction techniques.

Unit-3: Spanning of Openings

- Lintels in Stone and brick masonry, Construction of Brick & Stone arches
- Classification of Arches on the basis of geometrical shape, materials, construction techniques, viz. flat, segmental, semicircular, Tudor, circular, elliptical, semi-elliptical, venetian, florentine arches, etc. Illustration of terminology for arches, construction detailing and methods of centering

B. Building Materials:**Unit-4: BRICK**

- Nature of bricks,
- Classification and manufacturing process
- Structural, Visual and textural properties of bricks
- Identification and selection for application

Unit-5: CEMENT

- General introduction about cement,
- Composition and properties of cement,
- functions of cement ingredients,
- manufacturing of cement, tests for cement,
- storage of cement,
- varieties of cement and their application
- Process of making cement mortar for masonry
- Curing requirements

Unit-6: Fine & Coarse aggregates (Sand & Stone grit)**Sand-**

- General introduction,
- Sources of sand & impurities in sand, processing of sand
- Classification of sand- pit & river sand, and their properties
- Tests for qualities of sand
- Alternate fine aggregate: Stone dust

Stone Grit-

- General introduction,
- Storing, handling, sampling and testing of aggregates,
- Strength of aggregates and reaction with alkali
- Classification on the basis of particle size and their particular application

Course Outcome:

S.No	Outcome	Taxonomy
1	Students will have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as brick, cement, sand and coarse aggregates etc.	Understand
2	Students will learn about types of brick bonds & methods of brick construction.	Remember
3	Students will understand the construction details & construction method of shallow foundations.	Understand
4	Students will be able to draw the details of Arches in stone & brick masonry.	Create
5	Students will learn about binding materials for walls.	Remember
6	Students will be able to incorporate building materials & construction technologies in their design projects.	Apply

References:

- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- Building Materials: Materials of Construction by Gurcharan Singh
- Building Construction Handbook, R. Chudely

B. Arch. Semester-II**BR 132 – Architectural Structure-II**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Behavior of building elements and basic structural systems.

Objectives

- The course covers analyses of trusses, bending stresses in structural elements, shear stresses in various plan figures, limit state approach for design.

Contents:**Unit-1: Limit State Approach**

- Introduction to limit states
- Types of limit states
- Limit states as per IS 456:2000
- Partial safety factors for materials
- Load combinations for design.

Unit-2: Trusses

- Types of trusses
- Stability of trusses
- Analysis of trusses
- Method of joints and methods of sections

Unit-3: Direct and Bending stresses

- Theory of simple bending
- Bending and shear stresses in symmetrical sections
- Combined direct and bending stresses.

Unit-4: Shear force and bending moment

- Introduction
- Types of beams
- Types of loads
- SFD and BMD for cantilever and overhang cases.

Unit-5: Basic rules for Preliminary Sizing of members

- Introduction to materials (Steel & Concrete)
- Thumb rules for column spacing and grid lines
- Member sizes for beam, column and slab.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To describe the limit state approach for design.	Understand
2	To analyze the simple trusses.	Analyse
3	To analyze beams with any type of loading and to draw SFD and BMD	Analyse
4	Solve for bending stresses in cross-section of member	Apply
5	Draw grid for architectural plan and preliminary sizing of members.	Create

Text books:

- Kumar. A., “Stability Theory of Structures”, Tata McGraw Hill Co. Ltd.
- R.K Bansal and Sanjay Bansal, Engineering Mechanics Third edition, Laxmi Publications, New Delhi.
- Jain, A.K., “Strength of Materials and Structural Analysis”, 2nd Ed., Nem Chand & Bros.

References:

- C.S Reddy “Basic Structural Analysis”, McGraw Hill Education, 3 edition (1 July 2017).
- S S Bhavikatti “Structural Analysis Vol-2”, Vikas Publishing House, Fourth edition (2013).

Web link

- <https://nptel.ac.in/courses/105105108/>

B. Arch. Semester-II**BR 142 – History of Architecture-I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an insight to the architectural period of Classical antiquity in western world and to develop an understanding of Indian and Islamic Architecture.

Objectives

- To gain knowledge of the development of architectural form with reference to technology, style and character in Greece and Rome.
- To provide an understanding of rock-cut architecture in India.
- To provide an understanding of manifestation of Buddhist and Jain architecture.
- To provide an understanding of the Indian Temple Architecture and Islamic Architecture in its various stylistic modes characterized by technology, ornamentation and planning practices.

Contents:**Unit-1: Greek Architecture**

Landscape and culture of Greece, Hellenic and Hellenistic periods, study of principles of design, proportion, Optical corrections and Classical Orders in architecture: Doric, Ionic, Corinthian. Greek city planning and building types viz., Temples, Sanctuaries, Agora, etc. and their effect on settlement planning.

Unit-2: Roman Architecture

Roman history, Republic and Empire, Roman Architectural character, materials and techniques of construction, orders in architecture: Tuscan and Composite. Building types viz., Temples, Thermae, Amphi-theatres, Circus, Aqueducts, Forum, basilicas etc.

Unit-3: Buddhist and Jain Architecture in India

Study of religious philosophy, evolution of building typologies, Types of structures and elements developed eg: Stupas, Viharas, Chaityas, Stambhas, Toranas, sacred railing etc. in India. Study of form variations across various countries. Introduction and study of Jain Architecture with significant examples.

Unit-4: Indo Aryan Architecture

Development of fortification, walled towns and settlement patterns. Role of Shilpa sashtra and Artha sashtra in settlement planning. Study of worshipping places in Indo Aryan/ Nagara style, design of buttressed shikharas, rock-cut and structural examples of temples.

Unit-5: Dravidian Architecture

Development of fortification, walled towns and settlement patterns. Role of Shilpa sashtra in settlement planning. Study of worshipping places in Dravidian style (Chola, Chalukya, Pallava, Satavahana, Hoysala, Vijayanagara etc.), Design of Gopuram and Shikhara, Jain cave and rock-cut temple architecture.

Unit-6: Islamic Architecture

History of Islam: advent, development and principles, architectural character of the Islamic style, Establishment of the Delhi Sultanate: Imperial style. Development of basic dome, mosque and tomb prototypes. Evolution of Indo-Islamic architecture under the Mughal emperors. Influence of specific Emperors such as Akbar and Shah Jahan; Building of Fatehpur-Sikri and Shahjahanabad and Mughal gardens.

Course Outcome:

S.No.	Outcomes	Taxonomy
1	Acquire the development and architecture in the classical period.	Understand
2	Acquire the various architectural form, character and planning in India.	Understand
3	Evaluate and analyze the architectural form of northern and southern India.	Analyze
4	Make sheets with free hand sketching on the architectural styles.	Create
5	Exposure to the Islamic architectural style through case studies.	Understand
6	Make sketchbook and models on the architectural styles with respect to the timeline.	Create

Text book

- History of Architecture in India by Tadgell Christopher.
- The Great Ages of World Architecture by G.K Hiraskar.
- A History of Architecture by Sir Banister Fletcher's.

References:

- Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai: D.B. Taraporevala Sons and Co.
- Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London: Verona Printed.
- Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London: McGraw-Hill.
- Dutt, B. B. (2009). Town Planning in Ancient India. Delhi: Isha Books.
- Kimball, F. and Edgell, G. H. (2012). A History of Architecture. Amazon: Ulan Press.
- Faulkner, H. T. (1953). Architecture through the Ages. New York: Putnam Adult.
- Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.
- Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers.
- Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York: M. Courier Dover Publications.
- Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford: Oxford University Press.
- Pramari, V. S. (2005). A social history of Indian architecture. New Delhi: Oxford University Press India.
- SenGupta, B. K. (2006). Reading material on the History of Human Settlements. New Delhi: ITPL.
- Singh, U. (2009). A history of ancient and early medieval India: from the Stone Age to the 12th century. Delhi: Pearson India.
- Watkin, D. (2005). A History of Western Architecture. 4th Ed. London: Laurence King Publishing.

Web link

- https://www.pssurvival.com/PS/Rebuilding_Infrastructure/History_of_Architecture-2016.pdf
- <https://www.amazon.in/Banister-Fletchers-History-Architecture-Cruickshank/dp/0750622679>
- <http://www.archinomy.com>

B. Arch. Semester-I**BR 152 – Art and Graphics - II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	2	-	50	50	3	100

Focus: To familiarize students with the 3-dimensional drawings of the building and perspective views and ways of Presenting it.

Objectives

- To nurture more with the elements and principles of design as the building blocks of creative process.
- Design through exercises that will develop the originality, expression, skill and creative thinking.
- To introduce various rendering and shading techniques.
- To introduce various art forms: commercial, graffiti, Logo Design, Poster Design using various mediums: Linocut, Fabric
- Composition and Presentation of Design Sheet : Inking, Dot rendering, sciography

Contents:**Unit-1** Executing principal and elements of design for complex forms

- Isometric /Axonometric of simple forms| black and white
- Composition with Different Isometric Forms| Rendered

Unit-2 Advanced Rendering Techniques for Perspective Drawings

- Use of Water color
- Relief and Closure principle in water colour composition.
- Charcoal shading

Unit-3

- Advanced Graphics Technique
- Rendering technique on Fabric
- Printing technique using Linocut
- Poster, Book cover and Logo using shading Technique

Unit-4: Sciography and Sheet Presentation

- Understanding various technique to determine the shadow angle of an object
- To Determine the composition with direction of light on an object
- Dot Rendering and Inking Techniques
- **Presentation and Composition** using above techniques

Course Outcome:

S.No.	Outcome	Taxonomy
1	To understand about the analytical skills to develop design and its management.	Understand
2	To understand about the depth knowledge of visualization and enhanced conception of ideas.	Understand
3	Students will be able to create shades and shadows, solar path and its relation to build masses.	Create
4	Students will be able to create various rendering mediums on different materials.	Create
5	To understand about the analytical skills to develop design and its management.	Understand

Text book

Design Rendering Techniques by Dick Powell

References:

- F. David Martin and Lee A Jacobus, **Humanities through the Arts**, McGraw-Hill
- Criss. B. M. (2011). Designing with models: A Studio Guide to Architectural Process Models. 3rd Ed. Hoboken : John Wiley & Sons.
- Kieran, S. and Timberlake, J. (2008). Lobolly House : Elements of a New Architecture. New York : Princeton Architectural Press.
- Morgan, C. L. and Nouvel, J. (2002). The Elements of Architecture. London : Thames & Hudson.
- Werner, M. (2011). Model Making. New York : Princeton Architectural Press.

B. Arch. Semester-II**BR 162 – Architectural Drawing – II (Manual)**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	2	0	50	50	3	100

Objectives

- Architectural Graphics-II intends to develop essential manual skills such as proficiency in drawing, largely used as primary mode of communication of ideas in architectural design.
- Students will be introduced to a variety of tools and techniques for visual expression with emphasis on manual drawing.
- A continuation of Architectural Graphics-I, Architectural Graphics-II intends to introduce the students to various essentials of architectural drawings such as principles, tools and techniques for communicating design ideas.
- The course would help students identify suitable methods of representation and methods in different built environment scenarios.
- Architectural Graphics-II introduces advanced techniques for architectural drawing such as perspective projection, mix-media renderings etc.
- The course would help students identify suitable methods of representation and methods in different built environment scenarios.
- The subject will be taught is congruence with the Design studio, and assignments for the subject will be linked to the design exercises to achieve higher level of learning and understanding the practical application of the same.

Contents:**Unit-1: Basics of perspective drawings**

- Anatomy of perspective: Station point, Eye level, Cone of vision, Picture plane, Horizon line, Ground line, Vanishing points
- Types of perspectives : One point, Two point, Three point

Unit-2: Perspective drawings for exteriors

- 2 point perspectives of building exterior
- 3 point perspectives of simple architectural forms

Unit-3: Perspective drawings of interior spaces

- One point and two points perspectives of interiors
- Perspectives of simple household furniture items

Unit-4: Perspective drawing by innovative methods

- Preparation of Perspective by innovative methods like approximate method, Diagonal Method, Grid Method etc. Other innovative methods of perspective presentation.
- Introduction to shortcut methods in perspective drawing.
- Perspectives of Residences.
- Sciography in perspectives

Unit-5: Freehand presentations and rendering techniques

- Freehand perspective sketching, Rendering, shades and shadows.
- Introduction to represent different textures and finishes in plan and elevation of interior and exterior spaces.
- Graphical representation of furniture, automobiles, human figures, etc. in plans and elevations and 3-dimensions.

Unit-6: Manual techniques for painting/colouring of Architectural Drawings

- Techniques Colouring of architectural presentation drawings in various medium
- Monochromatic shades, Shades and shadows in multi-coloured drawings

Course Outcome:

S.No.	Outcome	Taxonomy
1	Evaluate the need to combine the use of manual drawing tools and techniques for drafting and freehand drawing for architectural design communication	Evaluate
2	Apply the projected drawing method of exterior and interior perspective	Apply
3	Create one and two point perspective drawings from floor plans and elevations	Create
4	Create by Drawing/sketching 3- Dimensional Architectural drawings using and freehand techniques.	Create
5	Analyse an understanding of furniture, people and accessories in one and two point projected perspective drawing.	Analyze
6	Create conceptual and presentation drawings as a design presentation tool for various purposes	Create

References:

- This course employs a lab strategy where instructor introduces, demonstrates the use of a tool/techniques. Students are supervised on-to-one basis. Primarily stress is given to skill development by hands-on experience with support of reference material.
- Architectural Graphics, 4th Edition by Francis D.K. Ching
- Design Drawing by Francis D.K. Ching

B. Arch. Semester-II**BR 172 - Vernacular and Traditional Architecture**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: To expose the students with the vernacular and traditional architecture in the various regions of India.

Objectives

- To introduce the study of vernacular architecture as a process and not a product.
- To provide an overview of the various approaches and concepts of vernacular architecture.
- To study the various vernacular architecture forms in the various regions of the country.
- To look at the impact of Colonial rule on the vernacular architecture of India.

Contents:**Unit-1: Introduction to Vernacular Architecture**

Overview, Definition and classification of Vernacular architecture. Survey and study of vernacular architecture. Methodology- Cultural and contextual responsiveness of vernacular architecture.

Unit-2: Approaches and Concepts

Different approaches and concepts to the study of vernacular architecture: an overview – Aesthetic, Architectural and anthropological studies in detail. Determinants of vernacular architecture: the Role of social, cultural, political, economic symbolic, climatic, technological context in creation of form with suitable examples.

Unit-3: Vernacular Architecture in the Northern Region of India

Hill Architecture of Himachal Pradesh and Uttarakhand influencing the planning aspects, materials of construction & construction details.

Unit-4: Vernacular Architecture in the Western Region of India

Forms spatial planning, cultural aspects, symbolism, color, art, materials of construction and construction technique of vernacular architecture in the Deserts of Kutch.

Planning aspects in Rajasthan; materials used, constructional details, climatic factors influencing the buildings with examples of Haveli.

Unit-5: Vernacular Architecture in Southern Region of India

Dravidian south planning aspects, materials of construction, constructional details & settlement planning in context to religious practices, beliefs, culture & climatic factors influencing the planning of buildings with examples of Kerala: Houses of the Nair & Namboothiri community; Koothambalam, Padmanabhapuram palace and Tamil Nadu: Houses and palaces of the Chettinad region; Agraharams.

Unit-6: Western Influences on Vernacular Architecture of India

Colonial influences on the Traditional Goan house - Evolution of the Bungalow from the traditional bangla, Victoria Villas – Planning principles and materials and methods of construction. Settlement pattern and house typologies in Pondicherry and Cochin.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire knowledge about the vernacular architecture of India	Understand
2	Acquire various approaches and concepts in Traditional architecture	Understand
3	Analyze the settlement pattern and housing typologies in various regions.	Analyze
4	Make sheets with free hand sketching on the various traditional techniques.	Create
5	Exposure to the various traditional material and techniques by case studies.	Understand
6	Make models of the vernacular traditional houses.	Create

Text book

- Encyclopedia of Vernacular Architecture of the World
- Invitation to Vernacular Architecture: A Guide to the Study of Ordinary Buildings and Landscapes
- Vernacular Architecture (Material Culture)
- Vernacular Architecture in the 21st Century: Theory, Education and Practice

References:

- Paul Oliver, Encyclopedia of Vernacular Architecture of the World, Cambridge University Press, 1997.
- Amos Rapoport, House, Form & Culture, Prentice Hall Inc. 1969.
- R W Brunskill: Illustrated Handbook on Vernacular Architecture, 1987.
- V.S. Pramar, Haveli – Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
- Kulbhushan Jain and Minakshi Jain – Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad 1992.
- G.H.R. Tillotsum – The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.
- Carmen Kagal, VISTARA – The Architecture of India, Pub: The Festival of India, 1986.
- S. Muthiah and others: The Chettiar Heritage; Chettiar Heritage 2000

Web link

- https://www.academia.edu/26930475/An_Out_Line_of_Vernacular_Architecture_of_Himachal_Pradesh
- https://www.researchgate.net/publication/236014050_Prathaa_Kathkhuni_Architecture_of_Himachal_Pradesh
- <https://www.archdaily.com/tag/vernacular-architecture>
- https://www.academia.edu/28564645/SOUTH_INDIAN_VERNACULAR_ARCHITECTURE_-_A_EXECUTIVE_SUMMARY

B. Arch. Semester-II						
BR 182 - Theory Of Design						
PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	3	100

Focus:

Objectives

Study about theory of design is a very important aspect of design industry. This subject gives an idea about the history as well as present day life in respect of structures, materials. It provides a brief idea about the buildings, style, beauty, proportion, symmetry etc. The idea of any design comes from the study of these fundamentals. As an Architect, you should know how the tradition follows. And in future when you will design good and elegant buildings it would help you a lot. It acts as a base to number of other subjects which you will encounter in your coming semesters.

Contents:

Unit-1: Organization of forms and spaces

- Introduction to Unit
- Primary elements of architecture – point, line, plane, volume,
- Primary forms, properties of form, transformation of forms – dimensional transformation, subtractive, additive forms, organization of additive form – articulation of forms,
- Space defining elements – horizontal, vertical, opening in space defining elements, spatial relationship, spatial organization.
- Classification of Spaces based on a notion of enclosure.
- Conclusion and Summary of Unit

Unit-2: Formulation of design

- Introduction to Unit
- Formulation of design through elements and principles of architectural design.
- Applications of Ordering principle such as axis, symmetry, hierarchy, datum, rhythms, repetition, visual perception, proximity, repetition, simplest and largest figure, continuity and closure, figure and ground relationship

Unit-3: Principles and design Philosophies

- Introduction to Unit
- To appreciate the guiding principles in the words and philosophies of Master Architects
- Study of time, life, works and philosophies of Louis Sullivan, Frank Lloyd Wright, Walter Gropius, and Mies Vander Rohe, Le Corbusier.
- Chicago School

Unit-4: Concept and individual work of Architects

- Introduction of Unit
- Concepts of their individual work as entity in itself.
 - Louis Sullivan: Guaranty Building, Wainwright building, Auditorium building etc.
 - Walter Gropius: Bauhaus, Fagus Shoe Last Factory etc.
 - Mies Vander Rohe: Farnsworth Houses, Lake Shore Apartment, Seagram Building etc.
 - Frank Lloyd Wright: Prairie Houses organic Architecture etc.

Unit-5: Works of Master Architects in India

- Introduction to Unit
- Le Corbusier: Early and later works in Chandigarh & Ahmadabad as well as specific study of Chandigarh.
- Louis-I-Kahn: IIM Ahmedabad

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will be able to understand the organization of forms and spaces	Understand
2	Students will learn Formulation of design	Understand
3	Students will remember the Principles and design Philosophies of famous architects.	Remember
4	Students will learn the Concept and individual work of Architects of world	Understand
5	Students will analyze the Works of Master Architects of India	Analyze
6	Students will apply the principles of theory of design in their architectural project.	Apply

References:

- Pattern language, by christopher alexander
- Principles of sociology, by tabussum, henna
- Architecture elements, materials, form, by prina
- Form, space, and order, by francis d.k. ching

B. Arch. Semester-III**BR-211- Architectural Design- III**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	7	100	100	12	200

Focus: To develop sensitivity towards existing habitat spaces with its building elements.

Objective

The students are now well versed with visual grammar dealt in the previous semesters. The current semester will involve the formulation of design concepts and developing simple single storied load bearing structures in the immediate or observable environment. The semester focuses on the understanding of context and elements of the built form in an existing setting. The projects would connect horizontal circulation reflecting their creative approach drawn from data analysis and climatic consideration to the physical setting. They will address spatial requirements from activities and known spaces to sites without formal byelaws.

There will be at least one major and one minor design exercise. The faculty can take up the exercises as per their order of preference. The order should be common in both sections. The faculty may achieve the stated minimum outcomes using appropriate strategies. The subject will be integrated with Visual Arts, Art Appreciation, History, BMC, Climate Responsive Architecture, Water Supply and Sanitation and Structures. The design process should result in form and function.

Suggested typologies: residences, community centre, aanganwadi, primary health centre, public toilet, Visitor's centre, petrol pumps etc. Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Content: Design Pedagogy

- Students will study the context and elements of built and unbuilt spaces in an observable setting to develop an understanding of socio-cultural attributes of the physical environment, methods of construction emerging out of the way of life of the people in a given place including topographical and climatic survey. The information of visited physical setting will be gathered.
- Students will present the documentation work through visual, verbal and graphical communication skills. The students may work in groups at this stage. They may use some of the techniques like measured drawings, rendered hand drawn sheets, models, role play, etc. Students will integrate attributes in terms of facilitation, plan form, volume, orientation, climatic considerations and space organization.
- Students will integrate knowledge from other associated subjects mentioned earlier to evolve a design for simple single storied load bearing structures. Students will keep in mind the spatial requirements emerging out of activities, aesthetic appeal, functional quality and elementary structural concepts required to evolve the specific form.
- Climatic consideration for the design, orientation of building on site their application in elevations as functional/aesthetic solutions will also be a part of the design exercise.
- The assessment/ evaluation strategy to be based on review in the form of desk crits/ informal crits /interim crits/group crits.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To apply the learning of the previous semesters	Apply
2	To develop sensitivity towards existing informal settings and elements of built space.	Develop
3	To map gathered information of visited physical setting	Map
4	To critique the materials, construction techniques and structural systems used in the elements of built forms.	Critique
5	To compose the architectural spaces in a design project	Compose
6	To apply climate responsive techniques to simple single storied load bearing structures.	Apply

References:

- Encyclopaedia Of Vernacular Architecture by Paul Oliver
- Vernacular Architecture In The Twenty First Century by Macel Vellinga & Lindsay Asquith
- Architecture without Architects by Bernard Rudofsky
- Architecture For The Poor by Hassan Fathy

B. Arch. Semester-III**BR 221 Building Materials & Construction -III**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus:

Knowledge of various structural systems and methods of construction and detailing of buildings of medium complexity using natural and manmade materials.

Objectives

- To familiarize students with basic information about construction procedures and reinforcement detailing about RCC elements like Columns, Beams and Slabs. Also to make students aware of joining details of columns, beams and slabs.
- To introduce to the students with the classification and types and details of construction of roofs
- To give complete knowledge about the various types of flooring and its construction details
- To create drawings and designs based on the acquired knowledge

Contents:**A. Building Construction:****Unit-1: RCC Roofing, Flooring**

- Introduction to RCC elements like Columns, Beams and Slabs.
- Reinforcement detailing of RCC building elements like columns, beams and slabs through sketches and site visits.
- Construction details of Flat RCC roof with waterproofing details and study of different RCC roof forms and its connection with structure.
- Typical details of application of floor finishes – stones, (inlay work), vinyl floor, tile flooring, cement concrete block flooring, glass flooring etc.

Unit-2: Wooden Joints & Wooden openings.

- Types of timber / wooden joints.
- Classification of doors; (a) paneled doors. (b) ledged and battened doors, (c) ledged, braced and battened doors, (d) framed, ledged, braced, and battened doors (e) flush doors
- Windows: Timber windows; Casement window and its details

Unit-3: Timber Construction:

- Types of wooden flooring systems
- Construction details of flooring of wood plank & beam framing and wood decking
- Types of wooden roofing - flat roof and pitched roofs
- Construction details of roofing of wood plank & beam framing and wooden trusses
- various timber foundations and their construction details
- Types of wooden walls – structural and non-structural

B. Building Materials:

Unit-4: CEMENT-CONCRETE

- Mortars, concrete and RCC preparation, application technique, test concreting under special Conditions, special varieties of concrete etc, uses, properties etc.

Unit-5: Glass

- Introduction to Unit
- Classification, composition, properties, types, manufacturing process, treatment of glass, special varieties of glass etc.
- Conclusion and Summary of Unit

Unit-6: FLOOR FINISHES

- terrazzo, stone slabs, brick and terracotta tiles, Synthetic materials (PVC, Timber).
- Floors of industrial buildings & warehouses.
- Ceramic wall & floor tiles.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will learn about construction procedures and reinforcement detailing about RCC elements like Columns, Beams and Slabs.	Understand
2	Students will learn about joining details of columns, beams and slabs.	Remember
3	Students will be able to draw details of timber single and double roofs and timber floors.	Create
4	Students will be able to analyze wooden joints & their uses in wooden openings.	Analyze
5	Students will learn about glass & floor finishes used in building materials.	Remember
6	Students will create drawings and designs based on the acquired knowledge.	Create

References:

- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- Building Materials: Materials of Construction by Gurcharan Singh
- Building Construction Handbook by R. Chudel

B. Arch. Semester-III**BR 231 – Architectural Structure-III**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Understanding the structural concepts and behavior of structural elements relating the knowledge acquired to architectural design.

Objectives

- To evaluate elastic deformations in beams and to find forces and deflection in redundant structures.

Contents:**Unit-1 Slope & Deflection**

- Introduction
- Slope and deflection for beams
- Moment area method
- Conjugate beam method

Unit-2 Columns and struts

- Introduction
- Columns and struts effective length
- Critical load
- Slenderness ratio
- Euler's equation for different end conditions.

Unit-3 Slope & Deflection

- Formula for slope and deflections of cantilever, simply supported and overhang beam
- Double integration method
- Macaulay's method for different load conditions.

Unit-4 Slope deflection method

- Introduction
- Slope deflection equation
- Application of slope deflection equations for analysis of beams

Course Outcome:

S.No.	Outcome	Taxonomy
1	To develop slope deflection equations for various load cases on beams	understand
2	To find ultimate load carrying capacity of column.	Analyze
3	To describe failure theory for short and long column	Understand
4	Analyze continuous beams using slope deflection method	Evaluate

Text books:

- S. Ramamrutham r. Narayan "Theory of structures 9th edition" Dhanpat Rai.
- Kumar. A., "Stability Theory of Structures", Tata McGraw Hill Co. Ltd.
- R.K Bansal and Sanjay Bansal, Engineering Mechanics Third edition, Laxmi Publications, New Delhi.
- Jain, A.K., "Strength of Materials and Structural Analysis", 2nd Ed., Nem Chand & Bros.

References:

- C.S Reddy "Basic Structural Analysis", McGraw Hill Education, 3 edition (1 July 2017).
- S S Bhavikatti "Structural Analysis Vol-2", Vikas Publishing House, Fourth edition (2013).
- Jain, A.K., "Strength of Materials and Structural Analysis", 2nd Ed., Nem Chand & Bros.

Web link

- <https://nptel.ac.in/downloads/105101085/>
- www.pdfdrive.net

B. Arch. Semester-III**BR 241 – History of Architecture-II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an insight to the architecture of western world.

Objectives

- To inform about the development of architecture in the Western World.
- To understand the architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to technology, style and character in High & Late Medieval period.

Contents:**Unit-1: Early Christian Architecture**

Architectural character during the period, evolution of Church form, building typologies, and building elements, Baptisteries, Early Basilica churches and settlement planning. Examples of St. Peters Basilica of Rome, and S. Maria Maggiore Rome.

Unit-2: Byzantine Architecture

Study of structural and construction system, development of Pendentive. Representative examples of St. Sophia, Constantinople.

Unit-3: Romanesque Architecture

General study of evolution and development of early church and vaulting system. Representative examples of Pisa Cathedral, Church of the Apostles.

Unit-4: Gothic Architecture

Characteristics of Gothic Architecture, evolution and development of pointed arches, flying buttresses and ribs. Examples of Notre Dame Paris, Abbey Church at Reims.

Unit-5: Renaissance Architecture

Revival of classical period and reintroduction of anthropomorphic classical orders. Study of periods: Early Renaissance, High Renaissance, Baroque and Rococo. Study of Piazza and the development of centralized church form. Dynamism and systemization of Baroque Architecture. Representative examples of Piazza of St. Peters of Rome, Château De Chambord, St. Paul at England.

Unit-6: 18-19th Century Revival- The Industrial Revolution Era

Impact of the Industrial Revolution and its effects, Technological innovations, Development of the railways and changes in settlement systems. New and emerging building types; Building of factory towns and rapid urbanization. New building technologies and implications on architecture –use of concrete, steel and glass. Architectural periods in Britain and Europe. Art Nouveau, Arts and Crafts Movement. Representative examples of Westminster New place in London, The University Museum at Oxford.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire the development and architecture during the medieval period.	Understand
2	Acquire the various architectural form and character in the western world.	Understand
3	Evaluate and analyze various architectural styles.	Analyze
4	Make sheets with free hand sketching on all the architectural styles.	Create
5	Exposure to the various architectural styles through presentations.	Understand
6	Make sketchbook and models on the architectural styles with respect to the timeline.	Create

Text book

- History of Architecture in India by Tadgell Christopher.
- The Great Ages of World Architecture by G.K Hiraskar.
- A History of Architecture by Sir Banister Fletcher's.

References:

- Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai: D.B. Taraporevala Sons and Co.
- Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London: Verona Printed.
- Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London: McGraw-Hill.
- Dutt, B. B. (2009). Town Planning in Ancient India. Delhi: Isha Books.
- Kimball, F. and Edgell, G. H. (2012). A History of Architecture. Amazon: Ulan Press.
- Faulkner, H. T. (1953). Architecture through the Ages. New York: Putnam Adult.
- Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.
- Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers.
- Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York: M. Courier Dover Publications.
- Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford: Oxford University Press.
- Prammar, V. S. (2005). A social history of Indian architecture. New Delhi: Oxford University Press India.
- SenGupta, B. K. (2006). Reading material on the History of Human Settlements. New Delhi: ITPI.
- Singh, U. (2009). A history of ancient and early medieval India: from the Stone Age to the 12th century. Delhi: Pearson India.
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Web link

- https://www.pssurvival.com/PS/Rebuilding_Infrastructure/History_of_Architecture-2016.pdf
- <https://www.amazon.in/Banister-Fletchers-History-Architecture-Cruickshank/dp/0750622679>
- <http://www.archinomy.com>

B. Arch. Semester-III

BR 251 - Building Services - I (Water supply & Sanitation)

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To introduce Plumbing systems and to understand its considerations in architectural design.

Objectives

- To understand the need and importance of building services.
- To understand the water supply system at urban level.
- To apply knowledge gained on water supply system in small buildings.
- To design water supply system in a residential building.
- To understand the components of various sewage systems at domestic level.
- To design sewage system for a residential building.
- To understand rainwater disposal system in small buildings.
- To design rainwater disposal system for a residential building.
- To design domestic water supply and sewage network for a small residential building.

Contents:

Unit-1: Importance of Building Services

- Importance of water supply and sewerage.
- Historical overview of development of water/ sewerage systems.

Unit-2: Water Supply for Urban Area

- Sources of water
- Quality of water, impurities in water and its treatment.
- Water demand calculations; norms and standards.
- Water storage, overhead tank, and sump.
- Water distribution system at city/ neighbourhood overview.
- Water treatment plant.
- Types of water distribution networks.
- Water pipe materials, apparatus, joints, fixtures and valves.
- Guidelines for laying of water mains, distribution.

Unit-3: Domestic Water Supply

- Principles of water supply in domestic buildings.
- Water supply in low-rise and multi-storeyed buildings.
- Hot-cold water supply network and connections.
- Pipe materials, fixtures, joints, equipment.
- Roof top water drainage.

Unit-4: Domestic Sewage System

- Principles of domestic sewer systems norms and standards.
- Types of pipe systems.
- Types of traps, use and water seal.
- Domestic sewer conveyance network.
- Components of sewer conveyance network.
- Basic terminology, Gully trap, inspection chamber, intercepting trap, man holes etc.
- Calculation for Gradient and slope in sewage disposal.
- Various sanitary fixtures and its connections.
- Sewage disposal to septic tank, cesspool, soak pit.
- Connection of house drainage to public sewer.

Unit-5: Rain Water and Storm Water Disposal System

- Techniques to divide surface area for rainwater disposal.
- Details of collection point/ Khurra.
- Conveyance network for waste / rain water.
- Apparatus for conveyance of water, catch basin, gully traps, calculation for gradient/ slopes.

Unit-6: Design of Domestic Water Supply and Sewage Network

- Applications of knowledge water supply and sewage design
- Preparation of drawings excluding hydraulic design

Course Outcomes:

S.No.	Outcomes	Taxonomy
1.	Discuss the active and passive components of plumbing.	Analyse
2.	Value the importance of building services	Understand
3.	Develop understanding of water supply system at city levels	Understand
4.	Design water supply in residential and other small buildings	Evaluate
5.	Design rain and wastewater system in domestic building	Apply
6.	Design of water-sewer system in buildings (except hydraulics design calculation parts)	Apply

Text books

- Building Construction by Sushil Kumar
- Building Construction by B.C Punmia
- Building Construction by Rangwala
- Building Construction by P.C Varghese

References:

- Plumbing Engineering by Dr. Subhash Patil
- International Plumbing Code by Indian Code Council
- Modern Plumbing by E. Keith Blankerbaker
- Plumbing Basics by Dr. Rick Peters
- Building Construction Illustrated by Dr. F.D.K Ching
- Mechanical And Electrical Equipment For Building by Walter T. Gondzik

Web links

- https://www.youtube.com/watch?v=WL_xM7Po15A
- https://www.youtube.com/watch?v=f2faanH0_Ww
- <https://www.youtube.com/watch?v=deugZdFIcew>
- <https://www.youtube.com/watch?v=oWhKUNCCAtk>
- <https://www.youtube.com/watch?v=QpMxEgQ1-gw>
- <https://www.youtube.com/watch?v=Zgz33tfSu8M>
- <https://www.youtube.com/watch?v=TO0IC0XlvoY>
- https://www.slideshare.net/SiddharthKhanna11/history-lecture-1?qid=81f05e4d-44b8-4432-8524-0f0d8f59c3fc&v=&b=&from_search=11

B. Arch. Semester-III**BR 261 – Computer Application in Architecture -I**

PERIODS	EVALUATION SCHEME		

LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT	CREDITS	SUBJECT TOTAL
0	2	0	50	50	1	100

Focus: To expose students to prepare presentation drawings and to generate 3D models.

Objectives

- To develop a theoretical understanding of AutoCAD and its relevance in Architecture. Students would develop skills of 2D drafting using various tools and techniques. They would be able to generate 3D from 2D drawing using the rendering skills like material, lighting, background etc.

Contents:

Unit-1: Introduction to Computer Aided Drafting

- Introduction to computer aided drafting
- To develop and understand the tools and basic set up for computer aided drafting
- Theoretical understanding of CAD

Unit-2: Computer Aided Drafting Methods and Techniques – 2D

- To comprehend tools and systems for 2d drafting
- Develops and draws various architectural plans, elevations and sections through 2 d Cad
- Manipulate and alter through various tools and techniques existing architectural drawings in 2D Cad

Unit-3: COMPUTER AIDED DRAFTING METHODS AND TECHNIQUES – 2D – DEMONSTRATION

- To apply more complex tools and methods to edit drawings in 2D Cad
- Demonstrate presentation drawings in 2D Cad
- Draw and create a complete set of architectural drawings for a dwelling unit in 2 D Cad

Unit-4: Computer Aided Drafting Methods and Techniques – 3d

- To comprehend tools and systems for 3d modelling in CAD
- Develops and draws various architectural volumes, forms and surfaces through 2 d Cad
- Convert and draw 2 d architectural drawings to 3d forms

Unit-5: Computer Aided Drafting Methods and Techniques – 3d – Demonstration

- To apply more complex tools and methods to edit drawings in 3D Cad
- Demonstrate presentation drawings , material application and lighting in 3D Cad
- Draw and create a complete set of architectural drawings for a dwelling unit in 3 D Cad

Course Outcomes:

S. No.	Outcomes	Taxonomy
1	Develop understanding of computer aided drafting	Understand
2	Comprehends computer aided drafting and its parameter as tools and its application in architecture	Apply

3	Demonstrate the concepts of CAD drafting methods and techniques in 2D and 3D through various architectural projects of progressive complexity	Create
4	Evaluates CAD techniques for quicker methods and presentation skills	Evaluate
5	Develop understanding of computer aided drafting	Understand
6	Comprehends computer aided drafting and its parameter as tools and its application in architecture	Apply

Text books

- Fundamentals Of Three-Dimensional Computer Graphics by Watt
- Computer Aided Design guide For Architecture, Engineering And Construction by Aouad

References:

- The Illustrated AutoCAD 2002 Quick Reference First Edition by Ralph Grabowski
- Autocad 2000: A Problem-Solving Approach by Tickoo Sham
- CAD For Interiors Beyond The Basics by J.A. Fiorello

Web links

- <https://www.youtube.com/watch?v=TehtsatwiiU>
- <https://www.youtube.com/watch?v=hO865EIE0p0>
- <https://www.youtube.com/watch?v=-iX-ZyvOiQA>
- <https://www.youtube.com/watch?v=2n5AikPvIjA>
- <https://www.youtube.com/watch?v=zM3TTdGNNrQ>
- <https://www.youtube.com/watch?v=swWcUxrDR1g>
- <https://www.youtube.com/watch?v=-mTh-Aj4JiA>
- <https://www.youtube.com/watch?v=4MtUWTI0YWY>

B. Arch. Semester-III**BR 271 - Climatology**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: Understanding of Climate responsive architectural design.

Objectives

- To familiarize students with the design and settings for buildings for daylight and factors that influence temperature.
- Understanding of Climate and its impact on architectural design, fundamentals of climatology and environmental studies, Passive climatic control.
- To apply the principles of Solar Passive Architecture to design of buildings.

Contents:**Unit-1: Elements of climate**

- Climate and Weather
- Elements of Climate
- Classification of climate
- Climate balanced Architecture

Unit-2: Effect of climate on man

- Human Comfort- definitions and concepts
- Relation of climatic elements to comfort
- Body heat balances, Thermal Comfort Factors..
- The Bioclimatic Chart

Unit-3: Environment and Building Forms

- Impact of External forces on Building
- Heat flow, heat transfer, heat storage and time lag of various building materials and elements.
- Day lighting, air movement and ventilation.
- Reading of Psychometric chart and its applicability.
- Building configuration and climate response.

Unit-4: Site & Building Design

- Site Selection, Site Planning
- Sun path diagram
- Building Orientation and Placement
- Solar movement and sun shading devices. Analytical and illustrative exercises, related to the above topics.
- Effect of Landscaping

Unit-5: Wind & Building Design

- Wind effect and Air Flow Pattern
- Ventilation Techniques
- Air movement around the buildings
- Stack Effect and Thermally induced air currents
- Evaporative cooling

Unit-6: Architectural Application

- Shelter for warm-humid climates
- Shelter for hot-dry climates
- Shelter for composite climate
- Shelter for moderate climate
- Shelter for cold –cloudy and cold- sunny climates.
- Application of software in climate responsive design

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will be able to classify the factors of comfort.	Understand
2	Students will infer the impact of climatic forces on built structures	Understand
3	Students will examine through mathematical formulae the thermal comfort levels of built form	Analyze
4	Students will assess the effects of site, sun and wind in building response	Analyze
5	Students will Identify the unique design requirements according to climate	Analyze
6	Students will learn the impacts of climate on architectural design and dealing with them	Remember

References:

- The Environment – Principles & Applications *by Charis Park*
- "Housing, Climate and Comfort" by Martin Evans
- "Buildings in the tropics" by Maxwell Fry
- Climate Responsive Architecture "by Arvind Kishan, Baker & Szokolay".
- Man, Climate and Architecture by Givoni, B.,
- An Introduction To Building Physics by Narashimhan
- Manual Of Tropical Housing And Building – Part I – Climatic Design by O.H. Koenigsberger
- Housing Climate & Comfort by M.Evans
- Climatic Design by Donald Watson

B. Arch. Semester-IV**BR 212 – Architectural Design - IV**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	7	100	100	12	200

Focus: To develop sensitivity towards existing habitat spaces with its building elements.

Objective

The study of design shall continue with further progress and complexity in aesthetic qualities with more emphasis on architectural and functional aspects. The semester will focus on studying functional patterns in horizontal and vertical circulation for double storied framed structures with application of services. The design project will involve complexities like site restrictions and introduction to basic byelaws. The subject will be integrated with Art Appreciation, BMC, Contemporary History, Site Planning and Landscape Architecture, Electrical and Illumination, Concrete Structures.

There will be at least two design problems, one major and one minor, arranged in sequence leading to more and more complexity. The faculty can take up the exercises as per their order of preference. The order should be common in both sections. The faculty may achieve the stated minimum outcomes using appropriate strategies.

Suggestive Typologies: school, nursing home, Childcare centre, homestead, Motel.

Content: Design Pedagogy**Pre-Design Study:**

- This stage will involve at least two projects- one major and one minor in continuation with the previous semester in an increasing order of complexity with considerations relating to horizontal and vertical circulation to a double-storey framed structure.
- Introduction to byelaws with site restrictions is also initiated at this stage. Functional aspects of building services like drainage, water supply and electricity with structural concepts in the design will be a major part of the exercise. Site Planning and Landscape intentions shall also be involved in related stages of the design process.
- The student will study and collect data using case studies through literature reviews, site visits and gathering of data/ information through literary sources. The project outcome / design solutions will be in the form of sheets, elevations- sections, perspective views, etc.

Presentation of the previous module

- Documentation of historical- socio- cultural information,
- Use of locally available materials leading to construction techniques in elements of built forms and in response to the climate of the region.
- Structural System in the built forms
- Identification of possible design intervention in the region/ settlement.

Design Intervention in the Region mentioned in the above modules

- Justification of the Design Intervention
- Conceptual Design
- Design development/ Form Development
- Presentation/ Crits

Introduction to the Design Problem, Site study and Area Programming

- Introduction to the Design Exercise/ Problem
- Site Visit and Site Analysis
- Case studies
- Collecting relevant data for the given design problem
- Synthesising and Analysing the above data
- Deriving Area Requirements for the Design Exercise

Design Development

- Relation to various functional aspects of the design problem: Use of bubble diagrams, flow diagrams, zoning of site, etc.
- Conceptual Design
- Finalization of design proposals: schematic 2D/ 3D / single line/ conceptual level site plan, floor plan, elevations and sections should be finalized

Final Design Proposals

- Final developed to- scale drawings- site plan, plans, elevations, sections, elevations
- Facilitation to the floor plan for justification of provided spatial proposals
- Detailed Site Plan with built and unbuilt spaces and landscaping features
- Development of views and construction details
- Model of the proposed design

Course Outcome:

S.No.	Outcome	Taxonomy
1	To Analyze the learning of the previous semesters	Analyze
2	To understand the given project in terms of the design process with requirements for the same	Understand
3	To Analyze data from standards, case studies and site visits for the current project.	Analyze
4	To analyze data collected with relevance to the current project.	Analyze
5	To Create design concepts required for the given project	Create
6	To Apply & integrate learning from other allied subjects to the design proposal	Apply

B. Arch. Semester-IV**BR 222 Building Materials & Construction -IV**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus:

Understanding of materials with respect to the construction type and its functions.

Objectives

- To familiarize students with the different types of vertical circulation possibilities in the form of Stairs.
- To give complete knowledge about the various types of Cladding and surface finishes.
- To have an understanding of the grillage foundation & various types of steel trusses.

Contents:**A. Building Construction:****Unit-1: Staircase**

- Technical terminology involved, Different types of staircases-Dog legged, Circular, Open Well, Spiral, Elliptical, etc. Classification also based on materials like wooden, steel and RCC.
- Staircase layout and its construction details, different elements of staircases, etc.

Unit-2: Cladding

- Various materials and fixing details of surface cladding.
- Types of Stone cladding (Dry & wet).
- ACP Cladding on external building facades.

Unit-3: Grillage foundation & Steel trusses

- Construction details of Grillage foundation
- Construction of steel structures (Factory shed/ large span)
- Details of Roof and roof trusses
- Waterproofing and rain water disposal from roofs
- Steel columns, portal frames, etc.
- North light truss, tubular monitor roof truss

B. Building Materials:**Unit-4: Wood and its derivatives**

Veneers, ply boards (advantages and disadvantages of ply boards), industrial timber, industrial form batten, baulk, board, deal, end, hog, plak, pole, quartering, scantling.

Unit-5: Paits, Distempers & Varnishes

SURFACE FINISHES: Paints and surface finishes; Composition, properties and methods of application of different types of paints: Oil, synthetic enamels, acrylic and other plastic emulsions and formulations, interior and exterior grade paints. Natural and synthetic clear varnishes, French polish. Cement based paints.

Unit-6: MISCELLANEOUS MATERIALS

Cork, rubber, Gypsum, sealants, heat and sound insulation materials.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will become aware of vertical circulation through staircases with all technical terms.	Understand
2	Students be able to analyze various types of staircases with reference to its placement, geometry and material used.	Analyze
3	Students will be able to compare and analyze various materials used for cladding purposes for building components along with their construction details	Evaluate
4	Students will be able to make construction details of steel trusses.	Create
5	Students will learn about wall finishes.	Remember
6	Students will create drawings and designs based on the acquired knowledge.	Create

References:

- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- Building Materials: Materials of Construction, Gurcharan Singh
- Building Construction Handbook, R. Chudel

B. Arch. Semester-IV**BR 232 – Architectural Structure-IV**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Analysis of Plane Frame Structures and continuous structures.

Objectives

- To give an insight into the behavior of propped cantilever, fixed beams and portal frames.

Contents:**Unit-1 Fixed and Continuous Beams**

- Analysis of propped cantilever
- Fixed beams
- Shear force diagrams and bending moment diagrams
- Analysis of continuous beam (maximum three spans)

Unit-2 Clapeyron's Theorem

- Clapeyron's Three Moments Theorem
- Application of clapeyron's theorem for analysis of continuous beams.
- Moment Distribution Method

Unit-3 Moment Distribution Method

- Stiffness of members
- Distribution factors
- Carry over moment
- Analysis of portal frame without sway (single bay, single story with sway and non-sway) by moment distribution method
- Analysis of portal frame without sway (single bay, single story non-sway) by moment distribution method

Unit-4 Rotation Contribution Method (Kani's Method)

- Introduction
- Application of Kani's method for frame and beam analysis.

Course Outcome:

S.No	Outcome	Taxonomy
1	To analyze propped cantilever and fixed beams	Analyse
2	To analyze continuous beams with application of clapeyron's three moment theorem	Analyse
3	To Analyze portal frame both sway and non-sway using moment distribution method.	Analyse

Text books:

- S. Ramamrutham r. Narayan "Theory of structures 9th edition" Dhanpat Rai.
- Kumar. A., "Stability Theory of Structures", Tata McGraw Hill Co. Ltd.
- R.K Bansal and Sanjay Bansal, Engineering Mechanics Third edition, Laxmi Publications, New Delhi.
- Jain, A.K., "Strength of Materials and Structural Analysis", 2nd Ed., Nem Chand & Bros.

References:

- C.S Reddy “Basic Structural Analysis”, McGraw Hill Education, 3 edition (1 July 2017).
- S S Bhavikatti “Structural Analysis Vol-I”, Vikas Publishing House, Fourth edition (2013).
- Jain, A.K., “Strength of Materials and Structural Analysis”, 2nd Ed., Nem Chand & Bros.

Web links:

- <https://nptel.ac.in/downloads/105101085/>
- www.pdfdrive.net

B. Arch. Semester-IV**BR 242 – History of Architecture-III**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an insight understanding of the architectural developments in modern era.

Objectives

- To introduce the condition of modernity and bring out its impact in the realm of architecture.
- To study modern architecture as evolving from various aspects; industrialization, urbanization, material development, modern art as well as society's reaction to them.
- To study the changing developmental trajectories in modern architecture.
- To develop an overall understanding of the architectural developments.

Contents:**Unit-1: Modern Movement**

Return to the fundamentals and origins, nature and geometry, new invention of iron and glass, horizontal and vertical expansions. Emergence of Modern Architecture; Bauhaus movement and CIAM, Post War reconstruction in Europe, and its influences on Modern Architecture, Philosophies of minimalism and Form Follows Function. Works of great modern masters; Peter Behrens, Walter Gropius, Mies Van der Rohe, Le Corbusier, later works of Frank Lloyd Wright; Louis Kahn, Alvar Alto etc.

Unit-2: The International Style

Simplification of the modern architecture into steel and glass cubes; an overview of the work of Philip Johnson.

Unit-3: Post Modern Architecture: Reaction

Architecture entrenched in place and history, sarcastic approval of expression, ornament, symbolism and context. An overview of the works of James Stirling, Michael Graves, Charles Moore.

Unit-4: Post Modern Architecture: Resistance

Disregard for historical imagery, revival of the ideals of the modern architecture of the 20's, exaggerated and sophisticated revival of the grid and Corbusier's geometry. An overview of the works of Richard Rogers, Norman Foster, Richard Meier.

Unit-5: Hi-Tech Architecture

Synthesis of the Hi-Tech and Historicism, an overview of the works of Cesar Pelli, Aldo Rossi.

Unit-6: Deconstruction

Reaction to the post-modern, non-perfection as important as perfection, narrative and representational, fragmentation of structures. An overview of the works of Zaha Hadid, Frank O. Gehry and Rem Koolhaas.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire the development and technological advancements in modern era.	Understand
2	Acquire the various architectural form and character of the modern architecture.	Understand
3	Evaluate and analyze various architectural styles	Analyze
4	Make sheets with free hand sketching on all architectural styles.	Create
5	Exposure to the various architectural styles through presentations.	Understand
6	Make sketchbook and models on the architectural styles with respect to the timeline.	Create

Text book

- History of Architecture in India by Tadgell Christopher.
- The Great Ages of World Architecture by G.K Hiraskar.
- A History of Architecture by Sir Banister Fletcher's.

References:

- Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai: D.B. Taraporevala Sons and Co.
- Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London: Verona Printed.
- Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London: McGraw-Hill.
- Dutt, B. B. (2009). Town Planning in Ancient India. Delhi: Isha Books.
- Kimball, F. and Edgell, G. H. (2012). A History of Architecture. Amazon: Ulan Press.
- Faulkner, H. T. (1953). Architecture through the Ages. New York: Putnam Adult.
- Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.
- Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers.
- Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York: M. Courier Dover Publications.
- Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford: Oxford University Press.
- Prammar, V. S. (2005). A social history of Indian architecture. New Delhi: Oxford University Press India.
- SenGupta, B. K. (2006). Reading material on the History of Human Settlements. New Delhi: ITPI.
- Singh, U. (2009). A history of ancient and early medieval India: from the Stone Age to the 12th century. Delhi: Pearson India.
- Watkin, D. (2005). A History of Western Architecture. 4th Ed. London: Laurence King Publishing.

Web link

- <https://www.amazon.in/Banister-Fletchers-History-Architecture-Cruickshank/dp/0750622679>
- <http://www.archinomy.com>

B. Arch. Semester-IV**BR 252 - Building Services - II (Electrical & Firefighting)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To enable students to understand various systems of Electrical services, Firefighting, Illumination and Elevators/Escalator services; and its design application for a small and large building.

Objectives

- To develop an understanding of building services involved in the built environment.
- Knowledge of electrical systems at site level and building level
- To understand the Illumination systems involved at domestic level.
- To develop skills to prepare design of illumination system for a residential and commercial building.
- Knowledge of essential component of firefighting system systems at domestic level.
- Skill to prepare design of Fire Fighting system for buildings
- Knowledge of vertical transportation system.
- Skill to prepare design of vertical transportation system for buildings
- Knowledge of building services coordination system.
- Skill to prepare coordinated building services plan for entire buildings.

Contents:**Unit-1: Importance of Building Services**

- Importance of Electrical, Firefighting, illumination and vertical transportation system
- Historical overview of the development of Electrical, Firefighting, illumination and vertical transportation system.

Unit-2: Electrical Services

- Basic principles of electricity
- Electricity demand calculations; norms and standards
- High side electrical system at site level - Transformers and switch gears – Layout of substations
- Electrical distribution system at site level overview
- Types of distribution networks at site level and building level.
- Planning electrical wiring for building – Main and distribution boards
- Types of wires, wiring systems and conduit
- Fixing of electrical fixtures and switches
- Materials, apparatus, joints, fixtures and breakers –Market survey
- Low voltage supply (data and telephone)

Unit-3: Illumination

- Visual tasks – Factors affecting visual tasks
- Modern theory of light and colour – Synthesis of light –
- Additive and subtractive synthesis of colour – Luminous flux – Candela – Solid angle illumination – Utilisation factor – Depreciation factor
- Classification of lighting – Artificial light sources – Spectral energy distribution – Luminous efficiency – Colour temperature – Colour rendering.
- Design of modern lighting – Lighting for stores, offices, schools, hospitals and house lighting. Elementary idea of special features required and minimum level of illumination required for physically handicapped and elderly in building types.

Unit-4: Fire Fighting System

- Causes and spread of fire, Combustibility of materials and safety norms.
- Passive Fire Protection Strategies.
- Active Fire Protection Systems.
 - Fire Detection Systems.
 - Alarm Systems.
 - Fire Extinguishing Systems.
 - Smoke Control.
- Designing Fire Escapes for Life Safety.
- Code Provisions

Unit-5: Vertical Transportation System

- Types of Elevators, Escalators and Auto-walks and their suppliers.
- Factors guiding their placement and layout in a building envelope.
- Designing Elevators – no. of elevators, capacity, elevator bank, etc.
- Design and construction of pit, well and machine rooms for elevators and escalators.
- Elevator, escalator and auto-walks design applications.
- Exchange of Information.
- Installation and commissioning

Unit-6: Coordination of Building Services

- Coordination of building services with other service layouts, architectural layouts and structural layouts.
- Preparation of Coordination drawings.

Course Outcomes:

S. No.	Outcomes	Taxonomy
1	To discuss the active and passive components of Electrical system and various principles.	Understand
2	To develop understanding for Electrical, Firefighting, illumination and vertical transportation system for Small building	Understand
3	To develop skills to design Electrical, Firefighting, illumination and vertical transportation system for domestic building	Apply
4	To develop skills to design water supply in domestic building	Apply
5	To apply of learning to design of Electrical, Firefighting, illumination and vertical transportation systems in buildings (except detail design calculations)	Analyze

Text books

- Basic electrical engineering by D.P Kothari, I.J Nagrath
- Handbook of electrical design details by Neil Sclater Building construction illustrated by Dr. D.K. Ching

References:

- Introduction to the design and analysis of building electrical system by John Mathew Electrical design guide for commercial buildings by William H. Clark
- Mechanical and electrical equipment for building by Walter T. Gondzik

Web links

- <https://www.youtube.com/watch?v=mc979OhitAg>
 - https://www.youtube.com/watch?v=TTh8eT_g9yI
 - <https://www.youtube.com/watch?v=YLe5XTmm64A>
 - <https://www.youtube.com/watch?v=X27QTSDZle8>
 - <https://www.youtube.com/watch?v=Eh6-Fy9Yr6k>
 - <https://www.youtube.com/watch?v=F-jRMFz6pEE>
 - <https://www.youtube.com/watch?v=Ujg05YWNYt4>
 - https://www.youtube.com/watch?v=3-4mvq_Ixx8
 - <https://www.slideshare.net/ghghfgd/liftescalator-moving-walk>
 - <https://www.slideshare.net/ihudhaif/topic-lift-escalator-walkway-1130-anlev>
 - <https://www.youtube.com/watch?v=-tqYeFJgex8>
 - <https://www.youtube.com/watch?v=WHt3wvRnJHQ>
- https://www.slideshare.net/E185/bs-2-lift-presentation-1?qid=38e659dd-2a6e-441a-9a8b-28dca6c830e0&v=&b=&from_search=1

B. Arch. Semester-IV**BR 262 – Computer Application in Architecture -II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
0	2	0	50	50	1	100

Focus: To expose students to use SketchUP for model building to flesh out ideas and present their ideas and to use v-ray for SketchUP to create renderings with proper lighting and photo realism.

Objectives

- To develop practical understanding of SketchUP and its relevance in Architecture. Students would develop skills of 3D modelling using various tools and techniques. They would be able to generate 3D from 2D drawing using the rendering skills like material, lighting, background etc.
- To learn SketchUP layouts to create presentations including the renders, floor plans, sections and elevations in an organized manner.

Contents:**Unit-1: Introduction to SketchUP**

Toolbars, Camera controls, Pan, Zoom, orbit, Basic tools, Rectangle, Circle, Select, pencil, push /pull, Groups, Components, Move, Rotate, copy, offset, Paint bucket etc.

Modelling

- Walls + floor, Windows, Doors, Frames, tables, Roof, etc.
- Openings

Materials

- Creating materials - Search online for materials, Create new material
- Edit materials – Scale, Rotate, Edit
- Modeling practice – Chair, Shelves, Accessories
- Warehouse - Download models, Edit models, Groups vs components, Scale

Unit-2: 3D project modeling

- Interior Space – Residence
- Object placement
 - Locking to axis
 - Reference points

Unit-3: Section & Layouts

- Sections – Elevations, Floor plans, Layouts, Preparing views, Sending to layouts, Positioning, Sizing, Moving, copy, Using scenes, Scale, Dimensions, Updating model reference, Styles in layout, Title block

Unit-4: Structures

- Floor, Walls / store front, Doorways, Window frames, Stairs, Columns, Rails etc.

Unit-5: Detailing & Lighting

- Tables, Counters, Rugs, Picture frames / posters, Light fixtures, Doors, Windows, Planters, Accessories
- Lights and settings, Lighting with shades, Directional lights, Ambient lights, General lights, Accent lights, Test renders 2.1.

Unit-6: Render & Presentation

- Fixing the lighting, Editing materials, V-Ray material effects, Camera positioning, Render settings
- Views, Views in SketchUP for use in Layouts, Set up layout, Image hierarchy, scale, Inserting renderings, Dimensions and labels, Title block, Presentation Tips

Course Outcomes:

S. No.	Outcomes	Taxonomy
1	Develop understanding of 3d modelling with sketchup	Understand
2	Comprehends sketchup modelling and its parameter as tools and its application in architecture	Apply
3	Demonstrate the tools & concepts of sketchup modelling methods and techniques in 3D through various architectural projects of progressive complexity	Apply
4	Comprehends sketchup modelling with structural parts of the building.	Apply
5	Demonstrate the detailing & lighting in 3D models, preparing for the rendering	Apply
6	Comprehends Sketchup model for rendering & presentation using various plugins.	Apply

Web links

- [Getting started with Google SketchUp Part 1 - YouTube](#)
- [Google SketchUp 8 For Dummies aidanchopra.com](#)
- [Chaos Group / Chaos Software official website - home - V-Ray® - award winning, produc...chaosgroup.com](#)
- [Fine Woodworking's Google SketchUp® Guide for Woodworkers: The Basics - Woodworking - ...tauntonstore.com](#)
- [Gallery : Corona Renderer corona-renderer.com](#)
- <https://forums.sketchup.com/t/recommended-book-for-sketchup-starter/23832>
- <https://3dwarehouse.sketchup.com/?hl=en>

B. Arch. Semester-IV**BR 272 – Surveying & Levelling**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	2	0	50	50	2	100

Focus: To cultivate the knowledge and skills related to surveying and levelling principles and practice. **Objectives:**

- Understanding principles of surveying and leveling
- Use of various survey and leveling instruments
- Carrying out surveys of land of medium complexity and preparation of survey plans.

Content:**Unit-1: Introduction**

- Surveying Definition
- Classification of surveying
- Principles of surveying
- Character of work, shrunk scale.

Unit-2: Chain Surveying

- Chain Survey Instruments
- Types of chain
- Instruments for ranging
- Setting out angles
- Erecting perpendiculars
- Field work chain triangulation
- Recording and plotting, errors in survey.

Unit-3: Compass Traversing

- Introduction
- Types of compass
- Fore bearing, back bearing, adjustment of closing error.

Unit-4: Plane Table Surveying

- Plane table survey
- Plane table and accessories
- Methods of plane table survey, radiation, intersection, traversing and resection, field problems.

Unit-5: Levelling

- Levelling definition,
- Classification,
- Booking of reduced levels
- longer levelling, errors

Unit-6: Theodolite

- Study of theodolite,
- Definition of different terms,
- Measuring horizontal and vertical angles,
- Method of repetition.

Unit-7: Contouring

- Contouring
- Characteristics of contours,
- Direct and indirect methods of contouring, interpolation,
- Uses of contours
- Setting out works such as center lines of a building, grade for sewer, centerline of a bridge.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To explain basic principles of surveying.	Understand
2	To Explain the use of various surveying equipments	Understand
3	To develop L-section profile a road	Analyse
4	To draw contours map for a given area	create
5	Use theodolite for surveying	Apply

Text books:

- N.N Basak., “Surveying & Levelling”, Tata McGraw Hill Education Private Limited.
- C. L. Kochher., “Text book of Surveying”, Katson Publishing House, 1979.
- R. Subramanian., “Surveying & Levelling”, Oxford University Press, 2007.

Web links:

- <https://nptel.ac.in/courses/105107122/1>

B. Arch. Semester-V**BR 311 – Architectural Design - V**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	8	150	150	13	300

Objectives

- The studio emphasizes on site planning. Design-problem should focus (but not limited to) on a multi-functional large span public building in an urban setting. Emphasis of the problem would be on design parameters, graphical presentation of design details and architectural expression in functional and constructional elements rather than detailed structural analysis. Site restrictions (bye-laws) should be imposed in framing design problems.
- Design exercises could be sports complex, exhibition hall(s), interpretation centre, cultural centre, showrooms, auditorium, temporary canopy, Hospice or Old age home etc.
- There would be minimum one major and one minor exercise/project based on the module contents.
- The modules may be taken up by the faculty in order of preference. The order should be Common in both sections of same year. The faculty may achieve stated minimum outcomes using various strategies and approaches.
- This course shall be integrated with building construction studio and services (mechanical services & acoustics).
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Contents:

- Students are required to be well versed with all the building structural systems, so that they will be able to categorize and choose structural systems for a multistoried (2-3 storeys) building. This could be done through literature study/ lectures/ discussions/ videos, study models, presentation etc.
- Students should explore various new building materials appropriate for the building typology – An exhaustive list of materials could be prepared through market survey/ case studies/ books/ papers/ reports, presentation, display etc.
- Students must practice various written and verbal skills developed in previous semesters during this module.
- The concerned faculties may open a dialogue in the studio on latest technology/ material. Mapping of students' participation in the discussion may help in evaluating the learning progress of the student(s). (Like in focused group).

Learning outcome could be achieved after completing the initial design process steps (in any preferred order/ or using any of design teaching model) stated below: -

- Introducing Design Problem
- Site Visit
- Site Analysis
- Designing the design Programme
- Collecting and analyzing Data for various spaces
- Area Programming
- Flow diagram (relation of various spaces)
- Bubble diagram (locating various zones on site)
- Try and Re-create (Analyzing spaces in all dimensions through Block Models)
- Single line Graphics and study models (Choosing the right option)
- Students may integrate the knowledge gained from previous theory-based subjects (like building services mathematics for architecture, building materials and construction, structures etc.) and apply in their design during design development/ detail stage.
- It is preferable if the students communicate the application of all services in their design.
- Students must make enlarged drawings showing all working details for any part of the building.

- Formative assessment in the studio could be done through individual critique, group discussion formal and informal feedback etc.
- Summative assessment of the studio work could be achieved through Panel discussion, presentation, peer review, public review, criteria-based evaluation etc.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To apply various advanced structural systems and latest building materials.	Apply
2	To analyze new technology, structural system and materials.	Analyze
3	To analyze & Formulate through drawings or models methods developed to meet various requirements.	Analyze
4	Apply new techniques and systems in their design.	Apply
5	Apply services (studied in previous and present semester) at building level in their design.	Apply
6	To create study models with precision (or Graphics) of chosen structure for designed space.	Create

B. Arch. Semester-V**BR 321 Building Materials & Construction-V**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus:

Understanding of materials with respect to the construction type and its function.

Objectives

- To familiarize students with doors and windows in steel and aluminum sections. Also integration of openings with partitions in steel and aluminum used in interior of buildings.
- Learning of various ferrous and non ferrous metal sections used in manufacturing of metal doors and windows along with various fixtures involved.
- To familiarize students with the types of metal shutters and partitions, doors and windows, their application and construction details in steel and aluminum sections.

Contents:**A. Building Construction:****Unit-1: Metal Doors, Windows and Partition**

- Types of doors and windows in Aluminum and steel
- Types and varieties of available sections in steel and aluminum in market and their application in providing doors, windows and partitions.
- Design considerations and construction details in congruence to IS codes and manuals provided by CPWD and other organizations.

Unit-2: Special Doors and Shutters

- Different types of doors; sliding, sliding and folding, revolving doors, collapsible shutters, rolling shutters, types of rolling shutters in conventional and contemporary materials. The installation, working and mechanism of such doors and shutters.

Unit-3: Partitions, water proofing

- Types of partitions, typical details, fixtures of various partitions in partitions and its specifications.
- Waterproofing – Typical details of terrace water proofing, treatment of parapet wall cost between parapet walls on roof, damp proof course at plinth level.

B. Building Materials:**Unit-4: Ferrous & Non-ferrous metals:**

- Ferrous Metals: Pig iron, cast iron, wrought iron – types, properties, steel – properties, types and uses of steel in construction, properties of mild steel and hard steel, defects in steel.
- Nonferrous Metals and alloys: Aluminium, copper, lead Nickel Important alloys like - brass, bronze, etc.
- Corrosion of both ferrous and non ferrous metals – types and preventive measures.
- Roofing Material: Study of contemporary roofing materials

Unit-5: Damp Proofing & Water Proofing Materials

- Waterproofing details in different levels: details in simple foundations, walls, roofs, sills, lintels and roofs in RCC, RB and steel, damp proof details of plinth, sill, lintel, and roof level.
- Waterproofing materials and systems for basement.
- Market Survey on various types of waterproofing materials & their applications.
- Damp Proof Materials – Its uses, Properties, application

Unit-6: PLASTIC

Classification of plastic, moulding and fabrication, properties of plastic, use of plastic, PVC. Fiberglass.

Course Outcome:

S.No	Outcome	Taxonomy
1	Students will learn about doors and windows in steel and aluminum sections. Also integration of openings with partitions in steel and aluminum used in interior of buildings.	Understand
2	Students will understand the variety of available metal sections for varied uses.	Understand
3	Students will be able to evaluate the best suitable material and type of Door, Window and Partitions.	Evaluate
4	Students will gain knowledge of properties & specifications of ferrous & non-ferrous metals.	Remember
5	Students will apply Damp/ waterproofing techniques.	Apply
6	Students will create drawings and designs based on the acquired knowledge.	Create

References:

- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- IS Codes and CPWD Manuals
- Jindal, Hidarco and other similar manuals

B. Arch. Semester-V**BR 331 – Architectural Structure-V**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus:

Concrete as a building material and its structural qualities and design of basic structural elements of RCC frame building.

Objectives

To impart knowledge in the area of concrete technology and the design concepts of RCC framed buildings structural elements.

Content:**Unit-1: Mix Design**

- Concrete: Composition
- Basics of mix design
- Water cement ratio
- Strength, durability, workability requirements.

Unit-2: IS 456:2000 code Provisions

- Relevance of RCC in architectural practice.
- Advantages of RCC over other conventional structural practices.
- Steel for RCC Plain & Twisted bars, IS 456 code provisions.

Unit-3: Design of Basic Structural Elements

- One-way slabs
- Rectangular and T beams,
- Two-way slabs
- Columns
- Footing for isolated columns
- Detailing of reinforcement.

Unit-4: Design of Stair Case

- Design of Dog legged
- Open well stairs (waist slab type)

Course Outcome:

S.No .	Outcome	Taxonomy
1	To design concrete mix as per IS10269:2012	Evaluate
2	To design RCC elements such as beams, slab, columns, footings	Create
3	To Design RCC stair-case.	Create
4	To describe the role of ingredients of concrete	Create

Text books:

- Dayaratnam, P., “Reinforced Concrete Structures”, Oxford & IBH Publishing Co."Design of Steel Structures" by Kazimi and Jindal
- Jain, A.K., “Reinforced Concrete – Limit State Design”, Nem Chand Bros
- N. Subermanian., “Design of Reinforced Concrete Structures”, Oxford university press

References:

- IS 456 – 2000 “code of practice for plane and reinforced concrete” Bureau of Indian standard.
- S Unnikrishna Pillai, D. Menon., “ Reinforced Concrete Design” McGraw-Hill Education (India) Pvt Limited, 2009
- SP34-1987, detailing of RCC structural elements.

B. Arch. Semester - V**BR 341 – Landscape Architecture**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	1	50	50	3	100

Focus:

The course is designed to make the students understand the natural and man-made components that generate the decisions in the planning of any site, and the role of landscape architecture for the judicious co-existence of man with nature and its patterns and systems. This course shall have a direct application in the design studio of the same semester as well as subsequent semesters for site planning and landscape design of the respective design assignments.

Objectives

- To understand land and its forms through drawings and models
- To learn about the occurrence of various landforms
- To develop an understanding of the natural and man-made landscape elements & principles, their inter-relationships and co-existence (Visual and physical elements)
- To learn to read the land through the imprints left by history
- To understand landscape ecology and process
- To understand the need for urban bio-diversity for better environments.
- To learn how to generate and sustain urban biodiversity.
- To learn to develop and plan large sites with minimum or no negative impacts on the environment
- To understand plant ecology, Identification of plants & Ability to design with plant

Contents:**Unit-1: Introduction to Landscape architecture & Land Forms**

- Role of landscape architecture
- Types of landforms

Unit-2: Elements & Principles of Landscape Architecture

- Elements of landscape architecture
- Principles of landscape architecture
- Natural systems
- Man-made elements
- Modifications in natural systems with man-made elements
- A co-existence of natural and man-made elements (visual and physical elements only)

Unit-3: THE HISTORIC LANDSCAPE PATTERNS

- A comparative study of the major traditions of landscape design in the east and the west; Historical landscape garden styles of India and the world; Chinese, Buddhist, Islamic, European etc.
- Reading the historic landscape patterns
- Self-organizational landscape patterns
- Complex landscape patterns/ human induced
- The fragmented landscapes
- Developing an understanding with Examples, Historic and archaeological assessments
- Landscape heritage and conservation
- Historical Landscape assessment techniques

Unit-4: Landscape Ecology and Processes

- Landscape ecology, concept of ecosystem, eco regions, biogeographic zones, landscape structure, Patch, corridors and matrix
- Ecological urbanism; Recent research and the historical overview
- Ecological planning and design
- Urban biodiversity, Examples of urban biodiversity and its role in arriving at better urban environments.
- Landscape analysis as a tool for the scientific management of urban biodiversity

Unit-5: INFRASTRUCTURE ENHANCEMENTS AND THE GREEN LANDSCAPE RATING SYSTEMS

- Infrastructure enhancements, environmental regulations, environmental site assessments
- Stormwater management, floodplain studies, grading and earthwork, wastewater collection, treatment, erosion and sediment control
- An overview of the landscape rating systems, green landscape rating system

Unit-6: DESIGNING WITH PLANTS

- Plant ecology and processes: aquatic plants, terrestrial plants
- Climatic adaptation in plants
- Classifications in plant kingdom
- Ecological sensitive plantation
- Spatial principles of planting design
- Planting techniques and maintenance

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Remember	To recognize the various land forms, natural patterns and systems
2	Remember	To identify the elements & principles of landscape architecture
3	Remember	Identify the historic landscape patterns
4	Remember	Identify the development processes and cycles in the urban landscapes
5	Remember	Recognizes how it has been done in the past along with present state of art
6	Apply	Understand the role of urban biodiversity
7	Apply	Conduct a Landscape analysis and evaluate it with required functions
8	Apply	A knowledge base to deal with complex urban and human induced landscape design issues.
9	Apply	Develop a site plan with landscape design and relate with environment and ecology

Learning Resources / References & Learning Strategy

The learning strategy used shall be live site studies through observation and measured documentation, recording of observations through drawings; the students shall be exposed to real site conditions for understand the scale, vehicular/ machinery movements, vegetation, microclimate, MEP incorporation, etc; along with class lecture cum demonstrations and reading relevant literature.

Books & References

- Landscape architecture in India A reader by Prof Shaheer, Geeta Wahi Dua
- Time saver standards for landscape architects
- Trees of Delhi/ Central India by Pradip Kishen
- Ornamental Plants and Garden Design in Tropics and Subtropics (2 vols) by T.K. Bose

Web links

<https://www.slideshare.net/shaikhjalam/landscaping-architecture>
<https://www.slideshare.net/catherinепatterson/landscape-design-and-principles-presentation>
https://www.slideshare.net/pramod1392/gardens-of-the-world?qid=7c20a1dc-e27f-4c3c-8aa7-693f6148d4c8&v=&b=&from_search=4

B. Arch. Semester-V**BR 351 – Building Services -III (Acoustics & Lighting)**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus:

This course will give a basic understanding about the science behind Lighting, ventilation and building acoustics. It will help students to apply prediction methods to assess the functional requirements of buildings.

Objectives

By learning this course students can provide optimum lighting, ventilation and acoustical solutions through simulations and design models. Further this course will expose students to perform basic room acoustics, wind and lighting measurements.

Contents:**Unit-1: Day lighting**

Introduction: Physics of light, Photometry, Transmission of light, recommended illuminances, Glare, Daylight illuminance, Luminance distribution, Design methods, Total flux method, Daylight factor method, BIS method, Pepper-pot diagram, Models and computer tools. Planning for daylight, day light utilization factor.

- Lab: Introduction to Lux meter. Simple experiments to measure Lux levels under different sky conditions, Class room lux measurements, etc.

Unit-2: Electric Lighting

Lamps, Power factor, Luminaries, reflector, type of lens, cove lighting, valance lighting, cornice lighting, track lighting, light strip, troffer, wall washer, flood light, down light, spot light, spill, point, line and area source. Design methods: Point method, lumen method, IES glare Index system.

- Lab: Introduction to brightness meter, experiments on colour & light, brightness & colour etc.

Unit-3: Ventilation

The wind, The effects of topography on wind patterns, Air currents around the building, Air movement through the buildings, air changes, quality of air, use of fans, thermally induced air currents, pressure losses: Buoyancy-driven (Stack effect, Venturi effect) – Use of courtyard.

- Lab: Types of anemometer and its use. Wind tunnel experiment for wind movement around the buildings, Simple experiments to measure outdoor and indoor wind velocity.

Unit-4: Introduction to Basics of Acoustics

- Basic laws and terminologies related to Acoustics.
- Sound Intensity and Sound Intensity Level. (Classroom exercise)
- Sound Absorption, Transmission, Reflection, Diffusion and Diffraction.
- Free field conditions and Inverse Square Law for noise reduction with distance.
- Sound Absorbing Materials – descriptions and characteristics.

Unit-5: Acoustics for an Enclosure / Building Design

- Reverberation Time and its importance for acoustical performance of an enclosure.
- Sabine's Equation and its application for designing new auditoriums and correcting RT of existing ones. (Classroom exercise)
- Acoustical defects in an auditorium and their remedies.
- Acoustical design of auditorium and other acoustically sensitive enclosures meant for speech, music, lecture, etc.
- Properties of materials and their application for acoustical treatment, shape analysis for different enclosures.
- Designing enclosures for variable RT's.

- Sound Amplification Systems.

Unit-6: Noise Isolation and Control

- Noise and its effects.
- Types of noise and its transmission.
- Sound Insulation and Transmission Loss.
- Speech privacy and noise control in specific situations.
- Methods of Sound Insulation - control of mechanical noise and vibrations.
- Codal Provisions

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Understanding	Develop understanding of daylighting
2	Applying	Develop understanding of lighting and their application in design.
3	Applying	Comprehends ventilation and lighting as important element in design and its application while planning spaces
4	Understanding	Develop understanding of fundamentals of architectural acoustics.
5	Understanding	Explain different phenomenon and principles related to sound propagation and their implications on building design.
6	Analyse	Summarize the common acoustical defects in an auditorium and the ways to avoid / correct them.
7	Understanding Knowledge	Describe the different types of noise, their transmission and the measures to isolate / control them.

Text books

- Barron. M. (2009). Auditorium acoustics and architectural design. 2nd Ed. Taylor & Francis. Conceptnine, R. (2008). The Architecture of Light: Architectural Lighting Design Concepts and Techniques. Sage Publications.
- Cox, T. J. and D'Antonio, P. (2009). Acoustic Absorbers and Diffusers. 2nd Ed. Taylor & Francis
- Cuttle, C. Lighting by Design. 2nd Ed. Architectural Press.
- Eagan, D. M. (2002). Architectural Lighting, 2nd Ed. McGraw-Hill.
- Eagan, D. M. (2002). Concepts in Architectural Acoustics.
- Guzowski, M. (1999). Daylighting for Sustainable Design. McGraw Hill.

References:

- Harold, B. M. and Goodfriend, L. Acoustics for Architects. Reinhold.
- Heschong, L. (1976). Thermal Delight in Architecture. Cambridge : MIT Press.
- Hopkins. C. (2008). Sound Insulation: Theory into Practice. 1st Ed. Butterworth Heinemann. Randall, W. (2008). Residential Lighting: A Practical Guide to Beautiful and Sustainable Design. 2nd Ed. Wiley.
- Rea, M. (2000). The Lighting Handbook. 9th Ed. Illuminating Engineering Society of North America.
- Reinhart, C. (2014). Day lighting Handbook.
- Smith, B. J., Peters, R. J. and Owen, S. (1982). Acoustics and Noise Control. New York : Longman.
- Steffy, G. (2000). Time-Saver Standards for Architectural Lighting. McGraw-Hill.
- Szokolay, S. V. (2008). Introduction to architectural science. Taylor & Francis.
- Vigran, T. E. (2008). Building Acoustics. 1st Ed. Taylor & Francis.

Web links

- <https://www.slideshare.net/iamshivee/daylighting-77134452>
- https://www.slideshare.net/KameshMorukurthi/electrical-lighting-calculation?qid=409483a3-6719-44b5-a61c-531217bb363b&v=&b=&from_search=10
- https://www.slideshare.net/shouryagoswami969/building-bye-laws-lighting-ans-ventilation?qid=728b27c2-702c-4508-9987-866491ee16d8&v=&b=&from_search=1
- https://www.slideshare.net/sarthakaura/acoustic-materials-84289787?qid=4228636d-764f-4c42-916d-e843232f54b6&v=&b=&from_search=7

B. Arch. Semester-V**BR 361 Computer Application in Architecture-III**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
0	2	0	50	50	1	100

Course Overview:

- The purpose of the course is to prepare students to use BIM for model building to flesh out ideas and present their ideas in a timely manner.
- Students are expected to take notes, review the videos, and practice the instructions given in class. It is the student's responsibility to further look into subjects that will be touched upon in class.

Objectives

- The course should enable the student to bring ideas from concept to construction with a coordinated and consistent model-based approach. The program will enhance the visualization for creating building design view, capturing of design ideas in a photo realistic state.

Contents:**UNIT 1: Introduction to BIM**

- Introduction to BIM and Revit Architecture, Special Features of Revit Architecture.
- Understanding Revit Elements, Working in one model with many views,
- Understanding Recent files and Application Menu, Using Ribbon & Quick Access Toolbar (QAT), Using Properties Palette, Modifying Properties & Professional Palette, Using Project Browser, Salutation and Modifying Basics, Understanding Selection toggles, Accessing Revit Operation,.
- Understanding view extends and cropping regions Navigation Views (Zoom, Pan, and Rotate).

UNIT 2: Working with Project and Modeling

- Creating a new project from file, Accessing Multi-user Projects using work share, Configure Project Settings, Adding Levels, Adding Grids, Referring Layout with temporary dimensions, Adding Columns
- Adding Walls - Using snaps, Wall Properties and Types, Locating Walls, Using Modifying Tools, Adding Doors and Windows, Using Constraints, Adding Plumbing Fixtures and other components, Wall Joints
- Linking AutoCAD Drawing Files
- - Creating Topography Link, Understanding CAD Inserts, Import Tips, Create a Group, Minor Groups to Create a Layout, Creating Revit Links, Rotating and Aligning a Revit Link, Establishing Shared Co-ordinates, Managing the links, Understanding File Formats.

UNIT 3: Modeling Roof, Ceiling & Floor and Stairways

- Making Working with Footprint Roofs, Working with Ceilings, Working with Floors, Working with Extrusion Roofs, Attaching Walls to Roofs, Using Slope Editing tools, Create a Flat Roof.
- Working with Stairs, Railings to Stairs, Working with Component based Stairs, Adding Extensions to Railings, Working with Slope Arrows, Adding Openings.

UNIT 4: Working With Complex Walls, Views, Visibility & Graphic Controls

- Creating Custom Basic Wall Type, Understanding Stacked Walls, Adding Curtain Walls, Adding Curtain Grids, Mullions and Panels, Creating Wall Sweeps and Reveals, Model Lines.
- Using Object tiles, Working with Visibility & Graphics, Using View Templates, Hiding and Isolating objects in a model, Understanding View Range, Displaying Objects Above and Below in Plan Views, Using Line Work Tool, Using Cutaway Views, Using Sketchy Lines..

UNIT 5: Documentation, Annotations, Detailing & Plotting

- Understanding the Tags, Adding Schedule Views, Modifying Schedule Views, Creating Key Schedule, Using Images in the Schedule, Adding Sheets, Working with Place Order Sheets, Aligning Views with Guide Grid, Outputting Sheets to DWF file, Exporting to AutoCAD
- Adding Text, Adding Dimensions, Adding Symbols, Adding Legend Views.
- Creating Detail Callout, Adding Detail Component, Using Arrays to Duplicate Parametrically, Adding Filled and Masking Regions
- Plotting Sheets, Creating PDF.

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Understanding	Develop understanding of 3d modelling with BIM & Revit
2	Applying	Comprehends BIM and its parameter as tools and its application in architecture
3	Applying	Demonstrate the tools & concepts of BIM methods and techniques in 3D through various architectural projects of progressive complexity
4	Applying	Comprehends BIM with structural parts of the building.
5	Applying	Demonstrate the detailing & specifications in 3D models, preparing for the drawings and models.
6	Applying	Comprehends BIM model for rendering & presentation using various plug ins.

References & Web links

1. <https://www.youtube.com/watch?v=FO374T7pGrA>
2. <https://www.youtube.com/watch?v=fiUr9B2yKiI>
3. <https://www.youtube.com/watch?v=5YDbi1Zn2RE>
4. <https://www.youtube.com/watch?v=lc0u10qB0j8>
5. <https://www.youtube.com/watch?v=wsnjAjZUImw>
6. <https://www.youtube.com/watch?v=2SNsYOoVXyc>

Text & reference Books

1. Jeff Hanson, Revit 2018 Architectural Command Reference, SDC Publications
2. Lance Kriby, Mastering Autodesk Revit, Sybex, 2018
3. Eddy Krygiel, Mastering Autodesk Revit, Sybex, 2018

B. Arch. Semester-V**BR 371 Sustainable Architecture**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Understanding the concept of sustainability in architecture.

Objectives:

- To make aware the students about concept & principles of sustainable architecture.
- To make understood students about the concept of Recycling and Reuse
- To learn students about green buildings rating systems of India.

Contents:**Unit-1: Concepts of sustainability**

- Energy and Global environment, Energy use and Climate change – Its Impact, Types of Energy systems,
- Concept of Sustainability - Principles of conservation -synergy with nature
- Bioregionalism - community basis shelter technology within bioregional patterns and scales
- Ethical- environmental degradation
- Summary & conclusion of unit

Unit-2: Sustainable planning & Design

- Introduction to Sustainable Development
- Sustainable approach to site planning and design - site inventories- relationships between site factors Development impacts from one area of the site on the other areas
- Model ecosystem of the site, phasing of development - limits of change
- Design facility within social and environmental thresholds
- Solar passive/ Active techniques.
- Summary & conclusion of unit

Unit-3: Sustainable Building Materials and Construction

- Properties, Uses and Examples of -Primary, secondary and Tertiary Sustainable Materials,
- Principles to improve energy efficiency - siting and vernacular design, shade, ventilation, earth shelter, thermal inertia and air lock entrances.
- Techniques of sustainable construction - technologies, methods of effectiveness, and design synthesis
- Alternative materials and construction methods:
- Use of local materials and on site growth of food, fuel and building materials

Unit-4: Recycling and Reuse

- Pre building, Building, Post building stages - Architectural Reuse, Waste prevention,
- Construction and Demolition recycling- Conservation of natural and building resources. Energy and material savings
- Types of wastes
- Elimination of waste and minimize pollution- various Decomposition methods
- Innovative reuse of various wastes

Unit-5: Smart cities

- Concept of smart cities.
- Sustainable Development Case Studies: illustrated examples of the planning, development, and construction.

Unit-6: Rating systems

- Green architecture and various national rating systems for sustainability.
- Indian systems – TERI GRIHA rating, LEED India rating, IGBC
- Summary & conclusion of unit

Course Outcome:

S.No	Outcome	Taxonomy
1	Student will learn about the concept of sustainability.	Understand
2	Students will be able to apply the aspects of sustainable planning.	Apply
3	Students will be able to analyze the building materials on the basis of sustainable aspects.	Analyze
4	Students will apply the building materials which can be reused or recycled.	Apply
5	Students will learn about green building rating systems of India.	Remember
6	Students will be able to design sustainable architectural designs.	Create

References:

- Integrated approach to sustainable Development by B.C.Bose
- Environmental control systems Heating, Cooling, Lighting By Fuller Moore
- Sustainable practices in built Environment by Caring A.Langston, Grace K.C.Ding
- Sustainable Building Design Manual Vol I & II
- GRIHA Manual (Vol 1-5)
- The Environment – Principles & Applications *by Charis Park*
- "Housing, Climate and Comfort" by Martin Evans
- "Buildings in the tropics" by Maxwell Fry
- Climate Responsive Architecture "by Arvind Kishan, Baker & Szokolay".
- Man, Climate and Architecture by Givoni, B.,
- An Introduction To Building Physics by Narashimhan
- Manual Of Tropical Housing And Building – Part I – Climatic Design by O.H. Koenigsberger
- Housing Climate & Comfort by M.Evans
- Climatic Design by Donald Watson

B. Arch. Semester-VI**BR 312 – Architectural Design - VI**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	8	150	150	13	300

Objectives

- The studio emphasis shall be on creative and rational skills for problem solving, preferably on a contoured site. Design-problem may focus but not limited to a multi-functional, service (advanced services) oriented building like Small scale housing, convention hall, shopping complex, resort, habitat centre, office building, mixed use occupancy buildings etc. in an urban setting including application of urban development, controls, codes and bye-laws.
- Emphasis may also be laid on site planning as well as on advanced services at building and at site level. The focus would be on understanding how to design for an urban setting.
- There would be minimum one major and one minor exercise/project based on the module contents. The modules may be taken up by the faculty in order of preference. The order should be common in both sections of same year. The faculty may achieve stated minimum outcomes using various strategies and approaches.
- There may be integration of design with structural and construction details, for this, the project should be integrated with the structures and building construction classes. One set of detailed working drawings must also be generated at the end of the design process.
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Contents:

- This module can be started with a warm-up exercise/ literature review (group or individual). Students could be sensitized (social-cultural sensitization) through documentary/ movies/ photos etc.
- Students may visit site for collecting context specific data for getting better understanding of real- life project details. The collected data may be analyzed and presented for evaluation.
- The above-mentioned module teaching methods are suggestive. Faculty may choose other pedagogical approaches for design thinking process.
- Design Problem may be introduced by the faculty using linear design approach or hidden-curriculum or other design teaching models can be adopted for defining the design problem.
- Readings/ short movies/ Discussion on designers' philosophies could be initiated for idea generation. Further approaches for design iterations may involve more common techniques like Flow diagram to explore the relation of various spaces, bubble diagram for locating various zones on site, try and recreate for analysing spaces in all dimensions through Block Models and single line graphics and study models for choosing the right option.
- Students may integrate the knowledge gained from previous theory-based subjects (like building services mathematics for architecture, building materials and construction, structures etc.) and apply in their design during design development/ detail stage.
- It is preferable if the students communicate the application of all services in their design.
- Students must make enlarged drawings showing all working details for superstructure.
- Formative assessment in the studio could be done through individual critique, group discussion formal and informal feedback etc.
- Summative assessment of the studio work could be achieved through panel discussion, presentation, peer review, public review, criteria-based evaluation etc.

Course Outcome:

S.No .	Outcome	Taxonomy
1	To apply various indigenous and latest building materials	Apply
2	To understand architectural and structural vocabulary through verbal and written communication	Understand
3	To understand sensitivity towards building bye-laws.	Understand
4	To create & Build with precision block models, study models, site models	Create
5	To apply & Forms correlation between design and other subjects studied in previous semesters and till present	Apply
6	To apply & Communicate through drawings or models methods developed to meet various requirements	Apply

B. Arch. Semester-VI**BR 322 Building Materials & Construction-VI**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus:

Understanding of materials with respect to the construction style and its function.

Objectives

- To make students aware of the construction fundamentals of temporary structures.
- To familiarize students with special concreting methods.
- Learning the cost effective in building construction through study of various low cost building materials.

Contents:**A. Building Construction:****Unit-1: False Ceiling & Wall Finishes:**

- Typical details, various types of false ceiling, application of various types of materials in false ceiling.
- Details of application of wall finishes – plaster, putty, veneer, laminates, aluminum etc

Unit-2: Special concrete and concreting method

High density, fiber Reinforced, polymer concrete, properties & uses. Ready mixed concrete, grouting, cold weather & underwater concreting, Lightweight concrete construction, Composition of lightweight concrete & its advantages, its application in building walls, roof, foundations & ornamental works.

Unit-3: Temporary Structure

Temporary structures, materials and techniques used, earthquake resistant structures.

B. Building Materials:**Unit-4: Decorative Finishes**

wooden flooring, wooden staircase, wooden paneling, glazed wall finish, ceramic tile finish.

Unit-5: Cost Effective Building Material

- Introduction to unit
- Concept of Alternate Building Materials, Fly Ash, Stabilized Earth Blocks
- Need for search of Cost Effective material
- Characteristic requirements of a cost effective material

Unit-6: Structural Glazing & Aluminum Composite Panels

- Introduction to glazing materials and ACP's
- Composition of glazing materials, types and available market forms
- Composition of Aluminum Composite panels, types and available market forms
- Manufacturing process of ACP's
- Merits, demerits and Application in construction industry

Course Outcome:

S.No	Outcome	Taxonomy
1	Students will learn about wall & decorative finishes.	Remember
2	Students will be able to draw construction details of fall ceilings.	Create
3	Students will evaluate the suitable type of fall ceiling for respective type of space requirement.	Evaluate
4	Students will analyze the special concreting methods for best suitable construction.	Analyze
5	Students will learn about low cost building materials & temporary structures.	Understand
6	Students will be able to draw construction details of Structural glazing & ACP cladding.	Apply

References:

- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- Building Materials: Materials of Construction, Gurcharan Singh
- Building Construction Handbook, R. Chudel

B. Arch. Semester-VI**BR 332 – Architectural Structure-VI**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Steel as the advance structural building material and Design of structural steel members.

Objectives: To impart knowledge of simple steel structures, structural steel properties, structural steel members and design of structural steel members and their connections.

Content:**Unit-1 Design of Connections**

- Introduction
- Types of steel sections used in steel structures.
- Bolted and Welded Connections
- Simple connections
- Connections subjected to moments (simple cases only).

Unit-2 Design of Tension Members

- Introduction
- Failure criteria for tension members
- Design of members Subjected to Axial Tension

Unit-3: Compression members

- Introduction
- Laced column design
- Battened column design
- Columns including built-up columns.

Unit-4: Slab Base Design

- Design of slab base (no gusseted base) and simple column and footing connection details

Unit-5: Flexural Member Design

- Introduction to flexural steel members
- Moment of resistance of flexural members
- Web buckling and web crippling in flexural members
- Design of flexural members.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To design connection for steel structures	Create
2	To design structural steel members like struts, columns	Create
3	To design slab base for columns	Create
4	To design flexural members	Create
5	To explain various steel sections used in steel structures.	Understand

Text books:

- Duggal, S.K., “Design of Steel Structures”, 2nd Ed., Tata McGraw Hill.
- Arya, A.S. and Ajmani, J.L., “Design of Steel Structures”, Nem Chand Bros.
- S. S Bhavikatti., “Design of steel structures by limit state method”, I. K International Pvt. Ltd

References:

- IS 800 – 2007 “code of practice for Steel Structures” Bureau of Indian standard.
- Ramchandra, V. Gehlot “Limit state design of Steel Structures”, scientific Publishers.
- Steel Table with IS steel section.

Web links:

- <https://nptel.ac.in/courses/105105162/>

B. Arch. Semester-VI**BR-342 Estimation, costing and specification writing**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Understanding of basic methods of estimation and methodology used in specification writing for materials and works.

Objectives

This course is intended to impart students with the necessary technical knowledge for preparation of Specifications and calculating estimates and detailed costing for small to medium scale projects.

Contents:**Unit-I: Introduction to Estimation**

- Definition of estimating and costing, Purpose of estimation and costing,
- data required to prepare an estimate (Drawings/specification/ rates), complete estimate structure.
- Procedure or method of estimating,

Unit-II. Measurement of materials and works

- Introduction to measurement of various construction work items, importance and significance
- in construction projects i.e. Units of measurement, rules for measurement, Methods of taking
- out quantities- Long wall and short wall method, centre line method, partly centre line, cross
- wall method. Standard modes of measurement as per Indian Standards for various work items.

Unit-III. Types of estimates

- Preliminary/Approximate Quantity Estimates: Importance & purpose of Preliminary /Approximate estimates, Plinth area method, Cubical contents method and centre line method and their preparation.
- Types of approximate estimates, basic differences and advantages. Detailed Quantity Estimation: Types of detailed estimates and their application, Methods of deriving detailed quantities for various construction work items.
- Preparation of Detailed estimate, Work items as per construction stages: Foundations, Superstructure, Finishing works in a simple building. Description & significance of Items in Bill-of-Quantities (BOQ).

Unit-IV. Costing

- Introduction, meaning, purpose, methods of estimating cost of construction for various work items,
- Cost indices, rates of labour and material, analysis of rates,
- preparation of abstract of estimated cost, use of CPWD schedule of rates. Deriving construction cost as per BOQ.

Unit-V: Introduction to Specification.

- Introduction, Definition, importance and purpose of specifications, impact on costing.
- Types of specifications. Knowledge of manufacturers' specifications for construction materials/products
- Specification of common building materials including carriage & stacking of materials

. Unit-VI: Specification writing

- Methods of material/resource estimation and management,
- Specifications for a simple building. Standard specifications of BIS. For load bearing and framed structures
- General abbreviations used in specifications. Specification of new building materials

Course Outcome:

S.No.	Outcome	Taxonomy
1	Evaluate the estimate of small or medium size projects	Evaluate
2	Apply the techniques, skills, and modern engineering tools necessary for construction practice.	Apply
3	Analyze, & assess the quantity of materials required for civil engineering works as per specifications	Analyze
4	Create detailed report on estimation and specification process	Create
5	Evaluate & estimate the cost of expenditure and prepare a detailed rate analysis report	Evaluate
6	Describe the importance of preliminary estimate for administrative approval & technical sanction for a civil engineering project	Understand

Text book : ESTIMATION AND COSTING IN CIVIL ENGINEERING BY BN DATTA

References:

- Estimating, Costing, Specification and Valuation In Civil Engineering” by M Chakraborti
- Estimating Costing and Valuation by Rangwala

Web link:

https://bis.gov.in/?page_id=117159

<https://archive.org/details/nationalbuilding01/page/n111>

B. Arch. Semester-VI**BR 352 – Building Services -IV (HVAC & Building Automation)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus:

Building Services are what makes a building alive. These vital components vary in scale and complexity depending upon building profile and usage. Accordingly, an architect's role may range from designing services for a less complex structure to incorporating engineering solutions / designs provided by respective consultants in their design programme and to deliberate with them in order to provide the best possible solution. Having already dealt with water supply & sanitation, lifts & escalators, electrical, acoustics, illumination and firefighting services in previous semesters, this semester deals with HVAC and Building Automation.

Objectives

- By learning this course students can provide HVAC & building automation solutions through simulations and design models. Further this course will expose students to perform basic building automation & HVAC services.
- To understand the application of building automation for energy reduction in buildings

Contents:**Unit-1: Fundamentals of Heating, Ventilation and Air Conditioning**

- Basic principles, laws and terminologies related to HVAC.
- Psychrometric chart and comfort zone.
- Evaporative cooling systems of air conditioning.
- Refrigerant Cycle (Vapour Compression System) and its reversal.
- Components of Mechanical Vapour Compression Refrigeration Systems.
- Natural and artificial ventilation.

Unit-2: Types of Air Conditioning Systems

- Window Air Conditioners.
- Split Air Conditioners.
- Packaged Air Conditioners.
- Direct Expansion Air Conditioning Systems.
- Central or All-water Air Conditioning Systems.
- Selection criteria, design / structural considerations and energy requirements for above mentioned air conditioning systems.

Unit-3: Emerging Trends in HVAC and other Miscellaneous Topics

- Passive Heating and Cooling Systems.
- Energy Saving through Design, Operation and Maintenance.
- Emerging Technologies – VRV, VRF, Heat Recovery Systems, etc.
- Developing Air Conditioning layouts for their current design exercise.
- Coordination with other services, architectural and structural designs.
- Case Studies and their critical appraisal.

Unit-4: Building Automation

- Fundamentals of control systems
- Types of control systems
- The impact of automation
- Application and components of building automation systems
- Methods to reduce energy consumption of buildings
- Case studies from various climatic zones of energy efficient architecture.

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Understand	Discuss the active and passive components of HVAC and their underlying principles.
2	Understand	Explain different types of air conditioning systems. Also, identify the design / execution time considerations specific to each of them.
3	Understand	Identify the various interventions / innovations to make these systems energy- efficient.
4	Analyse	Analyse critically the air conditioning systems used in their case study buildings.
5	Apply	Apply the knowledge of air conditioning systems in their current design exercise.
6	Apply	Discuss the elements of building automation & application in buildings

Text books

- National Building Code 2005
- Mechanical and Electrical Equipment for Buildings by Walter T. Grondzik, Alison G. Kwok, Benjamin Stein.
- Basic Refrigeration and Air Conditioning by A. Ananthanarayana.
- Mitchell's Building Construction: Environment & Services, Peter Burberry, 8th Edition, 1997, Longman
- Mechanical and Electrical Equipment for Buildings, B. Stein and J. Reynolds, 10th Edition, 2005, Wiley & Sons Inc
- The Building Systems Integration Handbook, R Rush, 1991, American Institute of Architects
- Building Services: A Guide to Integrated Design: Engineering for Architect, RP Parlour, 2008, Integral Publishing
- Understanding Buildings: A Multi-disciplinary Approach, E Reid, MIT
- William H. Severns and Julian R. Fellows, "Air-conditioning and Refrigeration", John Wiley and Sons, London, 1988.
- A.F.C. Sherratt, "Air-conditioning and Energy Conservation", The Architectural Press, London, 1980.

References:

- Understanding Building Automation Systems (Direct Digital Control, Energy Management, Life Safety, Security, Access Control, Lighting, Building Management Programs) by Reinhold A. Carlson, Robert A. Di Giandomenico
- Building Automation: Control Devices and Applications by In Partnership with NJATC (2008)
- Building Control Systems, Applications Guide (CIBSE Guide) by The CIBSE (2000)

B. Arch. Semester-VI**BR 362 – Computer Application in Architecture-IV**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
0	2	0	50	50	1	100

Course Overview:

- The purpose of the course is to prepare students to use 3DS Max Basics for modeling and rendering to flesh out ideas and present their ideas in a timely manner.
- Students are expected to take notes, review the videos, and practice the instructions given in class. It is the student's responsibility to further look into subjects that will be touched upon in class.

Objectives

- The course will enhance the visualization for creating building design view, capturing of design ideas in a photo realistic state.

Contents:**UNIT 1: TOOLS**

- Introduction to 3ds Max, Interface and use in Architecture.
- Understanding 3ds Max Elements, Working in one model with many views,
- Understanding Basic tools, Objects, Objects primitives, Modifiers, sub-object level,

UNIT 2: 3D MODELING

- Poly modeling,
- Extruding, Lathing
- Compound objects, Boolean, lofting
- Cameras
- Lighting basics & presentation

UNIT 3: MATERIALS

- Materials – Color
- Materials – Bump maps
- Materials – Jpeg maps

UNIT 4: LIGHTING

- Lighting : basics
- Lighting : presentation

UNIT 5: ANIMATING

- Everything in 3D Max is animatable. Learn to animate models, lights and cameras.
- Animate the texture/color on an object: animate the color of the lighting in a scene.

UNIT 6: RENDERING SKILLS

- Understanding the Render - To turn a 3D scene into a JPEG, QuickTime Movie or other end product.
- Active Time Segment - The number of frames to be rendered.
- Output Size - The proportions and pixel settings of the rendering.
- Scanline - The default renderer for 3D Max.
- Mental Ray - An optional, higher quality renderer.

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Understanding	Develop understanding of 3d modelling & rendering with 3ds Max
2	Applying	Comprehends 3ds Max and its parameter as tools and its application in architecture
3	Applying	Demonstrate the tools & concepts of 3ds Max methods and techniques in 3D through various architectural projects or animation.
4	Applying	Comprehends 3ds max with indoor & outdoor quality renders.
5	Applying	Demonstrate the 3D models through animation/walk throughs.
6	Applying	Comprehends 3ds Max model for rendering & presentation using various plug ins.

References & Web links

1. <https://www.youtube.com/watch?v=9i8xbaIcU9w>
2. <https://www.youtube.com/watch?v=57wNALKKkBk>
3. <https://www.youtube.com/watch?v=xGZdnuYQLyc>
4. <https://www.youtube.com/watch?v=yvcO72PSut4>
5. https://www.youtube.com/watch?v=S7aoF_TfFRg
6. <https://www.youtube.com/watch?v=yCM-likGd60>
7. <https://www.youtube.com/watch?v=3YjQ5KrYWOE>

Text & reference Books

1. Architectural Rendering with 3ds Max and V-Ray: Photorealistic Visualization
2. 3D Photorealistic Rendering: Interiors & Exteriors with V-Ray and 3ds Max
3. 3ds Max Design Architectural Visualization: For Intermediate Users

B. Arch. Semester-VI**BR 372 – Town Planning & Building Bye Laws**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: To provide an understanding of Building bye-laws pertaining in various parts of the country and to introduce the discipline of Town Planning.

Objectives

- To generate an understanding about the development control regulations and the bye-laws abiding in the country.
- To introduce the discipline of town planning and its various related aspects.
- To familiarize planning theories with suitable examples of different cities in the world.

Contents:**Unit-1: Introduction to Building Byelaws**

Need of having benchmarks and standards. Definition. Terminologies.

Unit-2: Building Byelaws and Codes

Study of National Building Code. Study of Building byelaws in accordance to different cities in the country. Procedures for development and implementation of acts and bye laws for land development and building design and execution process.

Unit-3: Introduction to Town Planning

Introduction to town planning, need and definition. Industrial Revolution era planning. Origins, evolution and growth of settlements.

Unit-4: Town Planning in Ancient Period

Characteristics and planning of towns and cities. Historical background with special emphasis on basic concepts of planning and urban spaces. Egyptian, Greek, Roman, Medieval, Early Indian town planning.

Unit-5: Modern Theories and concepts in Town Planning

Philosophies of eminent planners and study of their theoretical and executed works. Planning Theories enunciated by Ebenezer Howard, Patrick Geddes, Soria Y Mata, Doxiadis, Le Corbusier, Clarence Stein, Clarence Arthur Perry, Harris & Ullman and others. Planning concept related to Garden city, Satellite town, Radburn development and neighbourhood planning.

Unit-6: Planning Survey and Techniques

Introduction to survey of planning, planning acts and bye laws, planning process, zoning and documentation. Different Survey Techniques, methodology of conducting surveys and analysis of survey data.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire the Building bye-laws pertaining in various parts of the country.	Understand
2	Explore the discipline of Town Planning in ancient and modern context.	Understand
3	Evaluate the bye laws of different cities in India through presentations.	Analyze
4	Make presentation sheets on theories of town planning.	Create
5	Make conceptual models on prominent theories of town planning.	Create
6	Make detailed model on the planning of Chandigarh city.	Create

Text book:

- The Urban Pattern: City Planning and Design by Gallion and Eisner
- Urban Planning by Chapin
- Town planning by G.K.Hiraskar
- City planning by Bandopadhyaya.
- Handbook on the National Building Code 2016.

References:

- Alexander, E.R. (1992) Approaches to Planning: Introducing Current Planning Theories, Concepts and Issues, 2nd edn. Amsterdam: Gordon & Breach.
- Campbell, H. and Marshall, R. (2002) 'Utilitarianism's Bad Breath? A Re-evaluation of the Public Interest Justification for Planning', Planning Theory 1(2): 165–89.
- Campbell, S. and Faintstein, S. (2003) 'Readings in Planning Theory. Oxford. Blackwell.
- Alexander, E.R. (2001) 'The Planner-prince: Interdependence, Rationalities and Post-communicative Practice', Planning Theory & Practice 2(3): 313–26.

Web link:

- https://www.academia.edu/28716657/TOWN_PLANNING_IN_INDIA_-ANCIENT_AGE_-MEDIEVAL_AGE_-MODERN_AGE
- <http://spa.ac.in/writereaddata/tcpo.pdf>

B. Arch. Semester-VII**BR 411 –Architectural Design - VII**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
2	0	8	150	150	14	300

Objectives

- The studio emphasis shall be on creative and rational skills for problem solving in architectural buildings on real site. Design-problem may focus on multifunctional, multi storied structure and services with application at site and building level like multi star hotels, multi specialist hospitals, high rise mall, institutes etc. in an urban setting including application of urban development controls, codes and bye-laws. The design proposal will be taken up with byelaws, master plan or any other restriction on large site.
- There should be integration of design proposal, structural system, energy efficient approaches and construction detail. One set of detailed working drawings of any one of services must also be generated at the end of the design process. Emphasis may also be laid on site planning as is learnt in previous semester. The focus would be on understanding of designing a complex building with all aspect of site planning and services in urban setting.
- There would be minimum one major and one minor exercise/project based on the module contents. The modules may be taken up by the faculty in order of preference. The order should be common in both sections of same year. The faculty may achieve stated minimum outcomes using various strategies and approaches
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Contents:**Unit-1: Introduction**

- This module can be started with a warm-up Exercise/ Literature review (Group or Individual). Students could be sensitized (complex users, high rise issues and services) through Documentary/ movies/ Photos/Presentation etc.
- Design Problem may be introduced by the faculty using linear design approach or hidden-curriculum or other design teaching models can be adopted for defining the design problem.
- Students may visit site for collecting context specific data for getting better understanding of real- life project details. The collected data may be analyzed and presented for evaluation.
- The above-mentioned module teaching methods are suggestive. Faculty may choose other pedagogical approaches for design thinking process.

Unit-2: Development of Concept

- Readings/ short movies/ Discussion on designers' philosophies could be initiated for idea generation.
- Further approaches for design iterations may involve more common techniques like Flow diagram to explore relation of various spaces, bubble diagram for locating various zones on site, try and re-create for analyzing spaces in all dimensions through Block Models and single line graphics and study models for choosing the right option.

Unit-3: Design Development

- Students may integrate the knowledge gained from previous theory based subjects (like building services, building materials and construction, structures etc.) and apply to detail out their design proposal.
- The theories of urban design may be applied for co relating the urban setting during the design development stage.

Unit-4: Final Design Proposal

- The final design proposal is prepared after conducting various informal and formal reviews at individual and at group level. The drawings and detail physical model explaining the approach and consideration of urban setting to achieve the requirements with various other restrictions may be the submittals. It is preferable if the students communicate the application of all services in their design and must prepare a set of working drawings of one of the services showing all details for execution.
- Formative assessment in the studio could be done through individual critique, group discussion formal and informal feedback etc.
- Summative assessment of the studio work could be achieved through Panel discussion, presentation, peer review, public review, Criteria based evaluation etc.

Course Outcome:

S.No	Outcome	Taxonomy
1	To analyze architectural and composite structural system and services through their design	Analyze
2	To understand sensitivity towards non-conventional technologies, energy efficiency and interior design.	Understand
3	To create with precision block models, study models, site models	Creating
4	To apply Forms correlation between design and other subjects studied in previous semesters and till present.	Apply
5	To analyze Communicate through drawings or models, methods developed to meet various stages.	Analyze

References:

- Time saver standards for building types by DeChiara and Callender- Mc Graw hill company
 - Neufert Architect's data by Bousmaha Baiche & Nicholas Walliman,-Blackwell science ltd.
 - National Building Code – ISI
 - Time saver standards for landscape architecture by Charles W Harris – Mc Graw Hill
- New Metric Handbook by Patricia Tutt and David Adler – The Architectural Press

B. Arch. Semester-VII**BR 421 Advance Building Materials & Construction**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus:

Understanding of materials with respect to the construction style and its function

Objectives

- To familiarize students with precast & pre-stressed construction techniques.
- To familiarize students with the different types of deep foundations & their construction details.
- To give complete knowledge about the earthquake zone and Reconstruction.
- To have an understanding of insulation materials.
- Learning of alternative building materials like ferro cement.

Contents:**C. Building Construction:****Unit-1: Design for Earthquake zone and Reconstruction**

Earthquakes and its effects on buildings, earthquake zones in India, Architectural design considerations and construction detailing for earthquake resistance. Design and detailing of additions and alterations in existing buildings put to new use Process of modification and precautions to be taken. Arches: Basic concepts, Disaster resistant construction system.

Unit-2: Advanced Foundations

- Types of deep foundation.
- Need & uses of deep foundation.
- Construction details of pile & raft foundation.

Unit-3: Space frame & Geodesic domes:

- Space frames, unconventional buildings like TV towers, foot over bridges etc.
- Geodesic domes – principles and construction.

D. Building Materials:**Unit-4: Ferro Cement**

- Introduction to Ferro cement
- Properties of Ferro cement
- Comparison between RCC and Ferro cement
- Casting and manufacturing of ferro cement sections
- Ferro cement products
- Merits, demerits and Application in construction industry
- Conclusion of unit

Unit-5: Precast & Pre-stressed Construction

- Precast, pre stressed, Pre Tensioning and Post Tensioning of concrete members.
- Market forms of Precast products and their Properties
- Comparative analysis between RCC Precast and Cast in situ construction system
- Casting and manufacturing of Precast RCC sections
- Concept of prestressing, types-post and pre tensioning
- Comparative analysis between RCC Pres-stressed and regular construction system

- Casting and manufacturing of Precast pre-tensioned RCC sections
- Merits, demerits and Application in construction industry

Unit-6: Insulation materials, Fire proof finishes:

- Thermal Insulation – Need, application, properties of material, uses, advantages & disadvantages
- Sound Insulation – Need, application, properties of material, uses, advantages & disadvantages
- Fire Proof Finish – Need, application, properties of material, uses, advantages & disadvantages

Course Outcome:

S.No	Outcome	Taxonomy
1	Students will learn about earthquake resistant construction techniques.	Understand
2	Students will be able to make construction details of pile & raft foundation.	Create
3	Students will create structures like geodesic domes & space frame structure.	Create
4	Students will be able to apply precast & pre-stressed construction techniques.	Apply
5	Students will analyze various fire proof finishes & insulation materials.	Analyze
6	Students will learn about alternative materials like ferro cement.	Remember

References:

- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- Building Materials: Materials of Construction, Gurcharan Singh
- Building Construction Handbook, R. Chudel

B. Arch. Semester-VII**BR-431 Professional Practice**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	3	100

Focus: Understanding of architectural profession, methods of execution and Architect act 1972

Objectives

1. To give an introduction to the students about the architectural profession and the role of professional bodies and statutory bodies.
2. To teach the students about the importance of code of conduct and ethics in professional practice and the mandatory provisions as per Architects Act 1972.
3. To expose the students some of the important legal aspects and legislations which have a bearing on the practice of architectural profession.
4. To enable the students to grasp the advanced issues concerning professional practice such as tendering, contracting including alternative practices in project execution and project management.
5. To expose the students to the implications of globalization on professional practice with particular reference to WTO and GATS and equip them for international practice

Contents:**Unit-1: Introduction to profession and Architect office**

- Meaning of term profession and its difference from trade and business. Options and higher studies.
- Types of Architect Office, its organization, routine work, ways of securing clientages, office administration and management.
- Different taxes associated with architect profession.

Unit-2: Architects Act 1972, Act, Rules & Regulations

- Introduction of Architects Act 1972 and its role to manage the profession, salient features, scope and objectives
- Architects Professional Guidelines, Architects (Professional Conduct) Regulations 1989
- Architectural Education

Unit-3: Architects Act 1972

- Conditions of Engagement and scale of charges
- Institutional Consultancy Practice
- Architectural Design Competition Guidelines

Unit-4: Tender

- Types of invitation to tender (NIT), Definition and types of tender with advantages and disadvantages of each type,
- Terminologies related to tender EMD, Security deposit, retention deposit,
- Opening and scrutiny of tenders, work order, Labor Law

Unit-5: Contract

- Definition and types of contract with their advantages and disadvantages, Indian Contract Act 1872.
- , Technical terms like, clerk of works, breach, prime cost
- Contract documents, conditions of contract, Duties, powers and liabilities of owner, architect and contractor

Unit-6: Arbitration, Easement and Valuation

- Arbitration, objectives, Types of Arbitrator, arbitral proceedings and award, powers and duties of arbitrators, termination of proceedings.
- Easement right. Indian easement act 1882, types of easement
- Valuation and its purpose, technical terms like gross income, net income, outgoings, annuity, sinking fund, etc. , methods of valuation, valuation report.

Course Outcome:

S.No	Outcome	Taxonomy
1	Create Architectural entrepreneurship	Create
2	Analyze Architectural competition.	Analyze
3	Explain legal aspects of execution process .	Understand
4	Evaluate Valuation of properties and its rent.	Evaluation
5	Apply outsourcing in Architectural profession.	Apply
6	Describe special laws rules and regulations related to profession	Remember

Text book

- Handbook of professional documents by council of architecture (2011)

References:

- Professional practice of Architecture by Prof, S C Garg, Dr. Yogesh K Garg, Satya publication New Delhi.
- Professional Practice by K. G. Krishnamurthy, S. V. Ravindra, ISBN 9788120348745 Published by PHI Learning private ltd. Rimzim House 111, patparganj industrial estate, Delhi, 110092
- Professional Practice by Dr Roshan Namavati.
- Estimating Costing And Valuation, by S. C. Rangwala
- The Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 with Rules and Regulations

Web link:

https://www.coa.gov.in/pub_show.php?det=1&pub_id=11&lang=1

[https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/doc/stan_pah/PAH%202016%20Chapter%207%20Rev%2000%20\(clean\)-161229.pdf](https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/doc/stan_pah/PAH%202016%20Chapter%207%20Rev%2000%20(clean)-161229.pdf)

https://indiacode.nic.in/handle/123456789/2187?view_type=browse&sam_handle=123456789/1362

https://www.designingbuildings.co.uk/wiki/Tender_documentation_for_construction_projects

B. Arch. Semester-VII**BR 441 – Research Methodology**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTUR E	LAB	PRACTICA L	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an understanding to the students how to conduct research.

Objectives

- To understand the importance of research in architecture.
- To understand the theoretical and practical significance of research, types of research process of formulating a research plan.
- To understand various methods of research, their applications, data and simple statistical analysis, interpret the data.
- To understand methods of technical writing and presenting a research report.

Contents:**Unit-1: Introduction to Research Methodology**

Introduction to Research: Meaning, Characteristics, Need, Objective and importance in architecture, Types of Research and Stages in Research Process.

Unit-2: Identification of topic and hypothesis formulation

Identification of areas of interest for the study, Need of the study, Formulation of research questions, research gap and hypothesis formulation.

Unit-3: Data Collection Techniques

Techniques and Methods of Data Collection. Quantitative and Qualitative Methods in Research. Primary and Secondary data collection: literature reviews, case studies, reports and research papers from reputed journal and Government agencies.

Unit-4: Research Survey and Techniques

Introduction to survey in research, Different Survey Techniques, methodology of conducting surveys in research work. Methods of survey: Literature, Visual, sampling, interviewing, Design program/ranking scale/ priority chart, questionnaire.

Unit-5: Analysis of Data Interpretation

Methods of analysis, Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations. Data sampling Meaning and types of Sampling: Probability sampling methods and Non-Probability Sampling Methods, Need of sampling. Random Sampling, Simple and stratified Random Sampling. Other type of sampling, Requisites of a good sample method, sampling distribution, Sampling Error.

Unit-6: Research Writing and Documentation

Synopsis formulation, Research Proposal, Abstract, Content, Literature review, Summary, Bibliography and referencing. Report making: Dissertation/Thesis. Minor Research Project on the topic selected in the beginning of the semester in line with all the steps of Research process starting from Identification of Research topic to Findings & Conclusion.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire the importance of research in architecture.	Understand
2	Develop to conduct field surveys for research projects.	Understand
3	Analyze the data through various research techniques.	Analyze
4	Prepare research papers and articles.	Create
5	Make report on a particular topic related to architecture.	Create
6	Make questionnaire for the conductance of survey.	Create

Text book

- Research Methodology: Methods and Techniques by CR Kothari.
- Research Methods: The Basics by Nicholas Walliman.

References:

- Architectural research methods; Linda Groat & David Wang, John Wiley and sons, New York.
- Visual research methods in Design; Henry Sanoff, Van Nostrnad Reinhold, New York.
- Architectural research; Snyder James C; Van Nostrnad Reinhold RECOMMENDED BOOKS:
- Creswell, J.W. Research Design: Qualitative & Quantitative Approaches. Thousand Oaks: Sage.1994.
- Groat, L. & Wang, D. Architectural Research Methods, NY: John Wiley and Sons Inc. 2002.
- Kothari, C.R. Research Methodology: Methods and Techniques, New Delhi: Wishwa Prakashan. 2005.
- Norman K Denzin and Yvonna S Lincoln (Eds.) Handbook of Qualitative Research,

Web link:

- http://www.sociology.kpi.ua/wp-content/uploads/2014/06/Ranjit_Kumar-Research_Methodology_A_Step-by-Step_G.pdf
- https://www.researchgate.net/publication/303381524_Fundamentals_of_research_methodology_and_data_collecti
on
- https://www.researchgate.net/publication/319207471_HANDBOOK_OF_RESEARCH_METHODODOLOGY
- <http://www.modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf>

B. Arch. Semester- VII**BR 451 – Working Drawing (Computer)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
1	2	0	50	50	2	100

Course Overview:

- The Design of a building prepared needs to be executed and constructed on the site. The building drawings so prepared become part of the contract documents with proper labelling and dimensioning, specifications, detailing.
- The drawings shall be based on building design prepared as design studio assignment in the previous semester. The learning of building material and construction will be implemented for preparing various drawings through the semester.
- The building drawings so prepared become part of the contract documents with proper labelling and dimensioning, specifications, detailing.
- It will be helpful in detailing out the drawings and understand the various stages of construction for estimation and costing.

Objectives

- Enable the students to illustrate and prepare the structural layout drawings good for construction of the designed building.
- Enable the student to identify and determine the type of structural system to be used.
- Enable the students to illustrate and prepare the drawings good for construction explaining the overall building design.
- Enable the students to illustrate and prepare the detail drawings of openings, their material and detail specification required for the construction
- Enable the students to illustrate and prepare the drawing drawings of connection between the two floors as staircase/ lift etc.
- Enable the students to illustrate and prepare the drawings good for construction explaining the building services scheme outside the building envelop but within the site.
- Enable the students to illustrate and prepare the drawings good for construction explaining the building services scheme within the building envelope.
- Enable the student to illustrate and describe the specifications for the various internal and external finishes.

Contents:**Unit-1: Structural Layout Drawings**

- Preparing detail drawing for layout of the building with respect to the site.
- Illustrate and prepare drawings for layout of the foundations.
- Preparation of detail layout of the beam and columns, or structural member as per the design.

Unit-2: Architectural Drawings at Building Level

- Preparation of detail floor level plan/s and roof level plan required for the execution of work on the site.
- Preparation of drawing giving detail of Section/s and Elevation/s to depict building heights, projections and floor levels.

Unit-3: Architectural Drawings of Openings

- Design and prepare detail drawings of doors, windows, openings with specifications of materials.
- Detail drawing for the grill, jail work etc. as required for the building.

Unit-4: Architectural Drawings of Vertical Circulation as Staircase/ Lift etc.

- Preparation of drawing for the layout of staircase, its detail and specification for the execution on the site as per the design.
- Illustration drawing of the handrail, baluster, rail fitting etc. as per the design.

Unit-5: Building Services Drawings (External & Internal)

- Water supply source and connections
- Electric supply source and connections
- Sewage disposal and storm water disposal system
- Rain water harvesting system
- Landscaping details if required
- Layouts of kitchen, toilets and other utility spaces along with the specifications of fixtures.
- Plumbing layouts of kitchen, toilets etc.

Unit-6: Specifications of Finishes

Internal Finishes

- Flooring Pattern and its specifications
- White washing/ Wall finishes etc. and its specifications
- Wood Finishes and Fixtures
- Fabrication and its specifications
- Electrical fitting and fixtures and their specifications

External Finishes

- Site development which will include the Paving, Roads, Driveways, Pathways etc and their specifications
- Fabrication like Gate, railings, fencing etc. and their specifications
- White washing/ Wall finishes etc. and its specifications
- Electrical fitting and fixtures and their specifications
- Boundary wall design, fixtures and their specifications.

Course Outcomes:

S.No.	Outcomes	Taxonomy
1	Recalls the various drawing techniques, building construction techniques and structural systems.	Remember
2	Interpretation and translation of drawings based on the structural and other practical considerations	Understand
3	Re-create the drawings based on the various construction details and structural considerations.	create
4	Demonstrate the preparation of execution drawings in the process of realization of a designed building.	Apply
5	Integrate all the drawings prepare for the execution purpose	create
6	Select the appropriate construction details as per the various services	Remember
7	Illustrate drawings based on the traditional and new materials	Understand
8	Prepare various details	Apply

Learning Resources / References & Learning Strategy

- Preparation of drawings with illustrations
- Site visit and case studies to know the various details
- Data collection from the market survey regarding construction material and detailing

Books & References

- Architectural Graphics by Francis D. K. Ching
- Architectural Graphics Standard by Charles George Ramsey
- Architectural Graphics Standard for Residential Construction by Dennis J. Hall
- Drafting & Design: Basics for Interior Design by Travis Kelly Wilson

B. Arch. Semester-VII**BR 461 – Urban Design (Elective-I)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To expose the students about the role of urban design in architecture.

Objectives

- To understand the scope and nature of urban design as a discipline.
- To introduce the components of a city and their interdependent roles.
- To understand the evolution of historic urban form.
- To learn to interpret the city in different ways and layers.
- To create awareness of contemporary urban issues as well as learn about possible ways to address them.

Contents:**Unit-1: Introduction to Urban Design**

Components of urban space and their interdependencies- outline of issues/ aspects of urban space and articulation of need for urban design- scope and objectives of urban design as a discipline.

Unit-2: Historic Urban Form

Morphology of early cities in western world- Greek agora, Roman forum, Medieval towns and Renaissance ideal cities. Industrialization and city growth, the eighteenth century city builders, Garnier's industrial city, the American grid planning, anti-urbanism, the picturesque cite industrielle and radiant city.

Unit-3: Evolution of urbanism in India

Temple towns in India, Mughal city form, medieval cities, colonial urbanism, urban spaces in modernist cities. Case studies of Chandigarh, Bhubaneshwar, Amritsar and Gandhi Nagar.

Unit-4: Theories of Urban Space

Ideas of Imageability and townscape: Cullen, Lynch, collective memory, historic reading of the city and its artefacts. Rossi- social aspects of urban space: life on street and between buildings, gender and class, Jane Jacobs, William Whyte.

Unit-5: Issues of Urban Space

Understanding and interpreting the urban problems/ issues, place-making and identity, morphology: sprawl, generic form, incoherence, privatized public realm, roles of real estate, transportation, zoning, globalization, ideas of sustainability, heritage conservation and renewal, contemporary approaches: idea of urban catalyst, transit metropolis, community participation.

Unit-6: Best Practice in Urban Design

Contemporary case studies from developing and developed economies that offer design guidelines and solutions to address various issues/ aspects of urban space.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Exposure to the role of Urban Design as a discipline.	Understand
2	Acquire the knowledge to interpret a city.	Analyze
3	Analyze the urban form of historical as well as present cities.	Analyze
4	Analyze and address urban design issues in Indian context	Analyze
5	Make presentations on the best urban design practices.	Create
6	Make model of a selected stretch to address the related issues.	Create

Text book

- By The City/For The City: Anne Guiney
- Combinatory Urbanism: Thom Mayne
- A Country of Cities: Vishaan Chakrabarti
- The Death and Life of Great American Cities: Jane Jacobs
- The Nature Of Urban Design alexandros Washburn
- A New Theory Of Urban Design: Christopher Alexander

References:

- A.E.J. Morris, "History of Urban Form before the Industrial Revolution", Prentice Hall, 1996.
- Edmund Bacon, "Design of Cities", Penguin, 1976.
- Gordon Cullen, "The Concise Townscape", The Architectural Press, 1978.
- Michelle Provoost et al., Dutchtown, NAI Publishers, Rotterdam, 1999.
- "Time Saver Standards for Urban Design", Donald natson, McGraw Hill, 2003.
- Kevin Lynch, "The Image of the City", MIT Press, 1960.
- Rithchie. A, "Sustainable Urban Design: An Environmental Approach", Taylor & Francis, 2000.
- Jonathan Barnett, "An Introduction to Urban Design", Harper Row, 1982.
- Lawrence Halprin, "Cities", Reinhold Publishing Corporation, New York, 1964.
- Gosling and Maitland, "Urban Design", St. Martin's Press, 1984
- Molcolm Moor, "Urban Design Futures", Routledge, 2006
- Geoffrey Broadbent, "Emerging Concepts in Urban Space Design", Taylor & Francis, 2003.

Web link

- https://www.mfe.govt.nz/sites/default/files/media/Extra%20downloads/Other%20documents/urban-design-case-studies-bw_0.pdf
- https://issuu.com/sminusudhakaran/docs/kolkata_ud
- <https://www.ijser.org/researchpaper/Urban-streets-and-nodes-A-case-of-Bangalore.pdf>
- <https://archnet.org/sites/6398/publications/6714>

B. Arch. Semester-VII**BR-471 Green Building & Rating System (Elective- 1)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
2	0	0	50	50	2	100

Focus: Understanding of energy efficient techniques in built environment.

Objectives:

The objectives include creating awareness and understanding of the concept of energy efficiency in buildings that respond to the climate, material and natural resources. Developing analytical skills to understand the energy consumption and hence cater to reduction. To create awareness about tools and practices to calculate energy consumption

Contents:**Unit-1: Overview of Green Rating**

- Green Rating agencies in India and their Approach – BEE (ECBC), IGBC, TERI, EDGE etc.
- Process of rating and Certification.

Unit-2: LEED Rating system

- Brief background of the rating system, Need and purpose of rating
- Various criteria for site development and building design
- Provisions for green certification

Unit-3: GRIHA rating system

- Brief background of the rating system, Need and purpose of rating
- Various criteria for site development and building design.
- Building typologies and the necessitated GRIHA rating.

Unit-4: Case studies & Green building Design project

- Case studies of GRIHA/ LEED certified buildings.
- Design & documentation of a small scale project under the aspects of green building certification criteria's of LEED/ GRIHA.

Course Outcome:

S.No	Outcome	Taxonomy
1	Student will learn about the concept of Green architecture	Understand
2	Students will be able to apply the aspects of green buildings	Apply
3	Students will be able to analyze the various criterias for green building certifications.	Analyze
4	Students will learn about various guidelines of ASHRE/ISHRE & BOE.	Remember
5	Students will learn about green building rating systems of India.	Remember
6	Students will be able to design green buildings.	Create

References:

- Environmental control systems Heating, Cooling, Lighting By Fuller Moore
- GRIHA Manual (Vol 1-5)
- Climate Responsive Architecture "by Arvind Kishan, Baker & Szokolay".
- Man, Climate and Architecture by Givoni, B.,
- An Introduction To Building Physics by Narashimhan
- Manual Of Tropical Housing And Building – Part I – Climatic Design by O.H. Koenigsberger
- Housing Climate & Comfort by M.Evans
- Climatic Design by Donald Watson

B. Arch. Semester- VII**BR 481 – Interior Design (Elective II)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	1	100	100	2	200

Focus: To study Interior design principles and their applications. To build a comfortable living using various elements of Interior design.

Objectives

- To have an understanding of an enclosed space and the importance of Space planning for any user.
- To acquire the students with a proper knowledge of any space and designing it with the help of furniture, various other fixtures and colour choices.
- To help the students to understand the importance of designing a space according to the requirements with a proper knowledge of principles and elements of design.

Contents:**Unit-1: Introduction to Interior design**

- Introduction to basic principles of designing a space.
- Introduction to elements of design for an interior space.
- Introduction to design a space according to function, color and theme.

Unit-2: History of Interior designing

- Introduction to the various interior styles through ages.
- Brief discussion of different types of Interior design styles.
- Introduction to the elements of various interior styles.

Unit-3: Elements of Interior Design

- Introduction to various elements of an Interior space; Ceiling, False ceiling, Walls, Floors, Staircases, Openings, and other Interior Services.
- Treatments on the various elements of Interior design; Finishing and fixtures.
- Introduction to Various materials for Interior design; Choosing a right material, Construction and method of application, Finishing of the material.

Unit-4: Furnishings for Interior Space

- Introduction to Furnishings in Interior design.
- Importance of furnishings for a required space according to the functionality and aesthetics.
- Types of furnishings for different types of Interiors; surface furnishings.
- Study on relation between the choice of furnishing and the theme of a space.

Unit-5: Elements of Interior designing- Lighting

- Types of lighting for an Interior space; Natural and Artificial lighting.
- Importance of Lighting in Interior spaces.
- Natural Lighting; Source, Finishes.
- Artificial Lighting; Sources, Types, Installation, Designs.
- Application of lighting according to need and aesthetics.

Unit-6: Space planning – Furniture design

- Introduction to Furniture Design.
- Importance of furniture for an Interior space to achieve an ideal Interior design.
- History of Furniture design through ages; Types of Furniture for an Interior space, Different types of design styles through ages, Evolution of furniture design through ages.
- Study of the relation between Furniture and space; Human movement; design according to the human comfort.
- Methods of construction different types of Furniture.
- Various materials for Furniture design; Types of materials for different parts of a furniture, Importance of materials, Advantages and disadvantages of these materials, Choosing an ideal material to achieve a good furniture design, Application technique, Finishing, Caring of the material.

Course Outcome:

S.No	Outcome	Taxonomy
1	To define the importance of designing a space according to the comfort of a Human being.	Remember
2	To determine affordable and yet creative interior space.	Apply
3	To explain sustainable design and methods to achieve sustainability.	Understand
4	To inculcate craft and art in Interior space.	Create
5	To learn new and innovative technologies in designing a space.	Understand
6	To learn about modern age elements of Interior design.	Understand

References:

- The Interior Design by Linda O'Shea, Chris Grimley, Mimi Love.
- Elements of Style by Erin Gates
- Furniture Design by Stuart Lawson

B. Arch. Semester- VII**BR 491 – Art & Installation in Design (Elective II)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
1	0	1	100	100	2	200

Focus: To inculcate art and craft in space design to enhance the function and aesthetics. To understand the importance of Art in Architectural Design.

Objectives

- To study art and craft of different regions; material and availability, method of construction, installation of the craft.
- To understand the importance of art for a space.
- To study the relation between Art and design.
- To study the relation between Art and Human.
- To inculcate art and craft into designing.

Unit-1: Introduction to Art

- Introduction to various types of Art
- Concept of art and beauty.
- Types of Art

Unit-2: History of Art

- History of Art.
- Evolution of Art through ages.
- Importance of visual perception for aesthetics.
- Design elements of Art.

Unit-3: Art theories

- Art as an Expression.
- Art as Representation.
- Art as Creation.

Unit-4: Art in Design

- Relation between Art and Space; Designing with a concept, need of the craft.
- Art in Interiors.
- Importance of Art as an Element of Interior designing.
- Applications of Art in an Interior space.
- Process of Designing.

Unit-5: Art and Architecture

- Introduction to Art in Architecture.
- Forms and function.
- Importance and relativity.
- Principles and elements of Art and Architecture.

Unit-6: Art form and structure

- Introduction to design an Art form as a structure.
- Study of scale and proportion.
- Introduction to Art Installation; Types of installations, Scale and Proportion; Area of specification; Material specification; Process of designing.
- Art as a Product; Importance of a Product design; Process of designing.

Course Outcome:

S.No .	Outcome	Taxonomy
1	To learn about the importance of Art in Designing.	Remember
2	To learn about Art of various forms and origins through ages.	Apply
3	To learn about designing a space using Art.	Understand
4	To inculcate various Art forms in Architecture.	Create
5	To use Art to design Installations.	Understand
6	To learn various aspects of Installation design.	Understand

References:

- Art through the ages by Fred, S.K.
- Art and Architecture by Christian Bjone.
- Le Corbusier- The Art and Architecture by Alexander von Vegesack, Arthur Ruegg, Mateo Kries and Stanislaus von Moos.

B. Arch. Semester- VIII**BR 412 – Practical Training**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
0	0	0	500	500	30	1000

Course Overview:

- The aim of the 'Professional Training' is to enable the students to gain the kind and range of practical experience which will prepare them for their likely responsibilities, immediately after qualifying B. Arch. Course.
- A Training Manual/Guidelines shall provide the details of the expected outline of work and other procedures.
- Mandatory Requirements: Student shall have to undergo Professional Training for a period of at least 6 months/140 working days in an establishment approved by the Training Coordinator / Dean to become eligible to appear for final viva-voce.

Objectives

The trainee student has the responsibility to use his/her own initiative in making the best use of the opportunities which he gets during training period and prepare himself/herself for profession. The core of the professional training is architectural one. Student is expected to get well versed with the realm of architectural discipline ranging from generation of idea, preparation of drawings to the final execution of design on site.

Contents:**Unit-1: Nature of works expected to be done during training**

- The architect may expose the trainee to different aspects of professional practice. The task may include the following but not necessarily containing all-
- Preparation of:
 - Sketch designs, presentation drawings etc.
 - Municipal drawings according to the byelaws.
 - Working drawings and details.
 - Estimates, bill of quantities & specifications.
- Discussions with:
 - Clients
 - Structural Consultants
 - Services Consultants
- Inspection and management of site:
 - Preparation of Models, perspectives and photographs
 - Preparation of Reports, progress charts etc.
- Other administrative works

Unit-2: Content of the training report

Following contents will be followed for both intermediate and final submissions:

After completion of practical training, the trainee is required to submit the following in a hard copy. Training report should contain:

- Office profile
- Listing of current project being undertaken
- Project wise details of work undertaken by student
- Trainee's own assessment and experience about office, working, projects etc.

All projects listed in the report should compulsorily correspond with the list of projects mentioned in the monthly log. Copies of drawing shall be attached as annex to support the content of the report. The drawing prints shall be obtained with the permission of the office and stamped/sealed by the 'Supervisor'/Head of the firm/office.

Unit-3: Critical Appraisal of a building of national/International importance -1

The trainee is required to write a report choosing any building that has been designed/ executed by the company/ firm, she / he is working for internship. This can be done through secondary research/data collection.

The report should contain:

- Explanation/ Justification for the choice of the project.
- Fact file of the project- discussion on location, client profile, context (physical, cultural) and legal bindings.
- Remarkable features that make the building / complex noteworthy.
- Trainee's own assessment and experience about the same.
- References used in preparation of the appraisal.

Unit-4: Critical Appraisal of a building of national/International importance-2

- Detailed study and finalization of research parameters.
- Conduction of research- comparative study/ field study/qualitative data collection/ questionnaire survey.
- Live case study/survey/ direct observation etc; and documentation, review of case study, usefulness of case study to the selected topic; conclusion from case study
- Discussion on the raw data and final chapterization
- Exercise on report writing based on the same research area.

Unit-5: DATA PROCESSING AND OUTCOME OF RESEARCH

The trainee is required to write a report choosing any building that is present in the city/ town where she / he is working for an internship. This needs to be done with primary study and user experience study. This allows the student to choose structure of heritage values.

The report should contain:

- Explanation/ Justification for the choice of the project/ built structure
- Fact file of the project- discussion on location, client profile, context (physical, cultural) and legal bindings.
- Remarkable features that make the building / complex noteworthy/ award winning/ popular.
- User experience and the design comparison.
- Trainee's own assessment and experience about the same.
- References used in preparation of the appraisal

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Apply	To understand and apply the professional aspects of an architecture office/company and the multiple issues in conception, preparation and execution of project on a site.
2	Remember	To be aware of or sensitive to the existence of certain ideas, material, or phenomena and being willing to tolerate them.
3	Understand	To be able to formulate and theorize the principles into practice.
4	Apply	To be able to set practices to act consistently in accordance with the values he or she has internalized.
5	Understand	To develop skills that helps to adapt to fit special requirements.
6	Create	To be able to design for situation specific problems.

Learning Resources / References & Learning Strategy

- Training manual/report

B. Arch. Semester-IX**BR 511 – Architectural Design - VIII**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	10	200	200	17	400

Focus: Urban Built Form & infrastructure development in urban context

Objectives:

- The objective of the design studio is to expose the students to Urban scale problems and to enable them to visualize the contextual part of a built form. They need to understand, as to what goes beyond the premise of a single building or an area and where its boundaries merge into surrounding built form with different land uses and activities.
- The studio problem therefore will focus on study and intervention within areas that have the context of design issues like, pedestrian and traffic movement, mixed activities etc. and have the scope of redevelopment.
- The design problem of Urban design scale is to be introduced, example; Redesigning of existing Urban area by studying and identifying the problems associated with it. The project would be a medium sized urban design intervention.
- The design solution would address issues like demography, market value, land use patterns etc. Other design issues are the detailing of open and built areas after studying human and movement patterns.
- The project should be substantiated by detailed site surveys and reading about urban design principles.
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work

Contents/ Design Pedagogy**Identify an Area with the Given Objectives**

- Pilot survey of an area to identify the project.
- Survey the existing urban environment.
- Visualize with objectives

Carving the study area

- Delineate the study area.
- Collect initial data.
- Prepare brief questions for responses.
- Reading the area for commonalities.
- Take response from the users.

Presenting the collected data

- Mapping of collected data using techniques and methods.
- Explain images relevant to the objectives.
- Use of both qualitative and quantitative data.
- Filter data for relevance and use.

Analysing the collected information

- Co-relating the various data for interrelationship.
- Analysing interrelationships of various identified factors.
- Examining the data for overall understanding of the information.
- Using different methods for analyses.
- Micro-level assessment of the study areas.
- Prepare activity wise layers.

Drawing inferences for interventions

- Picking up issues for addressing.
- Thinking about developing sensitive responses to the identified issues.
- Take case examples for better understanding (Readings through books or studying similar projects undertaken elsewhere)
- Prepare models for spatial analysis.
- Prepare quantitative data for existing and future proposals.

Formulation of the design programme and strategies for intervention

- Prepare the vision statement.
- Phasing of the project.
- Before and after images.
- Public private participation.
- Implementation of the design solutions.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Apply the experience gained during the training semester in current design projects	Apply
2	To Analyze the built and un-built environment around.	Analyze
3	To understand & Organize to work in a team.	Understand
4	To create an appropriate program for a project.	Create
5	To analyze and Highlight the issues.	Analyze
6	To understand the environment for sensitivity.	Understand

References:

- Graphics in Urban design by Ballly Meeda, Neil Parkyn and David Stuart Walton.
- Responsive Environments by Ian Bentley. Local Master Plans or Development Plans.
- Development Control Regulations- as per requirements.
- Relevant case examples of Designed or executed projects.

B. Arch. Semester-IX**BR 521 – Dissertation**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTUR E	LA B	PRACTICA L	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
0	0	6	200	200	5	400

Focus:

The studio emphasizes on the integrated approach. The students are required to integrate the learning of the previous research methodology to establish the research component that leads to their dissertation.

Objectives:

Emphasis of the studio is to enable students to;-

- Raise clear and precise questions, Use abstract ideas to interpret information gathered. Able to conclude with good justification. Test the conclusions against relevant criteria and standards.
- Gather, assess, record and apply relevant information and incorporate relevant study in to document form as a report.
- Make precise power point presentation of the study and conclusions and gain the ability to criticize and analyze the case studies to reach conclusion.
- Students will apply the learning from the previous semesters to research a subject area through readings; learn description, analysis and synthesis of readings; citation of authors in their writing; and plan a study and write a paper based on literature review.
- Through the course, the students will be capable of identifying the research area that will enable them to write a research paper on the subject.

Contents/ Pedagogy:**Introduction to the course and discussion on the objectives.**

- Recapitulation and discussion of methods of research :Discussion of research methods, understanding the applicability of various techniques of architectural research
- Learning from examples and group Presentation.

IDENTIFICATION OF RESEARCH AREA AND GAP

- Identify the broad study area for thesis based on literature review and case study, and its oral and visual presentation.
- Interpretation drawings, visual presentation techniques with info-graphics.
- Literature review and identification of research area and stating the research question.
- Time-work schedule
- Presentation on-Selection of topic, reason for selection, justification, synopsis.

DEVELOPING A STRUCTURAL FRAMEWORK FOR THE SEMINAR

- Discussion on the methodology-The types of data collection- primary and secondary
- Site/ case studies to be conducted
- Literature Case study and documentation, review of case study; usefulness of case study to the selected topic; conclusion from case study.
- Probable study/ research outcome
- Draft chapterization

CONTENT DEVELOPMENT

- Detailed study and finalization of research parameters.
- Conduction of research- comparative study/ field study/qualitative data collection/ questionnaire survey.
- Live case study/survey/ direct observation etc; and documentation, review of case study, usefulness of case study to the selected topic; conclusion from case study
- Discussion on the raw data and final chapterization
- Exercise on report writing based on the same research area.

DATA PROCESSING AND OUTCOME OF RESEARCH

- Results and discussion – completion of the report writing with proper citation and referencing.
- Power point presentation on the actual topic based on conclusions from case studies and research; preparation of report based on research conducted under various heads
- Preparation and presentation of final dissertation

Outcomes:

S. no.	Outcomes	Taxonomy
1	Identify research papers published in Journals for a study	Remember
2	Organize a study based on literature survey	Remember
3	Identify research methods for study	Remember
4	Identify area of research for thesis	Remember
5	Apply research methods in case study	Apply
6	Present paper in a seminar	Create
7	Practice Citation	Understand
8	Develop ethics of publication	Create
9	Identify research papers published in Journals for a study	Remember

Learning Resources / References & Learning Strategy

- Warm-up exercise/ literature review (group or individual)
- Discussion on reading material- hardcopy/ online materials, articles, papers, journals and writing individual review.
- Group discussion and debates
- Visual and oral presentation.

B. Arch. Semester-IX**BR-531 Project Management (Elective- III)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
2	0	0	50	50	2	100

Focus: Understanding of basic building execution process having a quality construction project from start to completion while maintaining budget, schedule, and safety requirements.

Objectives:

1. To equip students with a practical approach to implement building projects,
2. Basic knowledge about construction industry, project management techniques needed for managing and coordinating building projects in a professional manner.

Contents:**Unit-1: Introduction to Project Management**

- Introduction to project management, construction industry, stakeholders, roles, responsibilities and functional relationships,
- Construction projects – objectives and lifecycle, existing construction practices & project management systems,
- Project Team, organization, roles, responsibilities.

Unit-2: Introduction to Project Planning

- Concepts of project planning, scheduling & controlling.
- Project scale and construction technology,
- Human aspects in managing projects.

Unit-3: Project Planning and Scheduling.

- Inputs for project planning, defining activities and their interdependency,
- Time and resource estimation. Work breakdown structures.
- Linear scheduling methods - bar charts, LOB, their limitations. Principles,
- Definitions of network based scheduling methods: CPM, PERT. Network representation, Network analysis – forward and backward passes.

Unit-4: Project Monitoring

- Site layout and organization, Site investigations.
- Quality tests for construction material and processes.
- Project direct and indirect costs. Safety in Construction Projects.

Unit-5: Project Control

- Quality tests for construction material and processes.
- Quality control inspections.
- Project progress tracking. Crashing Project Schedules, its impact on time, cost and quality.

Unit-6: Resources Management and Value Engineering

- Methods of material/resource estimation and management,
- Resources scheduling and levelling.
- Construction equipment types, characteristics & applications.
- Value engineering, its application in building design and construction.
- Labor welfare, applicable labor Legislations.

Outcome:

S.No.	Outcome	Taxonomy
1	Apply the tools and techniques used by the construction industry and learn the most up-to-date procurement routes to gain the skills to be able to deal with risks arising from liabilities of contracting parties	Apply
2	Ensures projects are designed and built on time and to budget while protecting the integrity of the design and ensuring full compliance with regulations and sustainability standards and benchmarks	Understand
3	Apply the necessary skills to rethink design processes using value management principles	Apply
4	Apply appropriate legal and ethical standards.	Apply
5	Analyze with team and stakeholders in a professional manner, respecting differences, to ensure a collaborative project environment.	Analyze
6	Identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders.	Remember

Text book : Project Management by K. Nagarajan

References:

- Chitkara, K. K. (2004). Construction Project Management: Planning, Scheduling and Controlling. Tata McGraw–Hill Education.
- Punmia, B. C., and Khandelwal, K. K. (2006). Project planning and control with PERT and CPM. New Delhi : Laxmi Publications.

Web link:

https://www.coa.gov.in/pub_show.php?det=1&pub_id=11&lang=1

[https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/doc/stan_pah/PAH%202016%20Chapter%207%20Rev%2000%20\(clean\)-161229.pdf](https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/doc/stan_pah/PAH%202016%20Chapter%207%20Rev%2000%20(clean)-161229.pdf)

https://indiacode.nic.in/handle/123456789/2187?view_type=browse&sam_handle=123456789/1362

https://www.designingbuildings.co.uk/wiki/Tender_documentation_for_construction_projects

B. Arch. Semester- VIII**BR 541 – Barrier Free Architecture (Elective III)**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	100	100	2	200

Focus: To study about designing a space for Specially-abled population that will be user-friendly, comfortable and functional.

Objectives

- To have an understanding of Specially-abled population.
- To acquire the students with a proper knowledge of the needs, requirements and special treatments for the specially-abled population.
- To help the students to understand the importance of designing a space that will serve as a comfortable, functional and a Barrier free architecture for the Specially-abled population.

Unit-1: Introduction to Specially-abled Population

- Introduction to the population; Types of disorders.
- Needs and requirements of the population.
- Special treatments to the Specially-abled.

Unit-2: Guidelines and Space standards

- Principles of designing a space for specially-abled population.
- Rules and regulations.
- Design parameters and requirements.
- Scale, Proportion and dimensions.
- Ergonomic and Anthropometric study for a comfortable space design.

Unit-3: Building codes

- Introduction to using NBC for designing a structure for Specially-abled population.
- Importance of the implementation of NBC for the special design.
- Introduction to various Rules and Regulations; Ways to implement the codes.

Unit-4: Special architecture

- Introduction to the various structures with special design.
- End user of the design and architecture.
- Design according to the NBC.
- Elements of the design; Special corners and unique spots; Furniture and Fixtures; Specifications.
- Material use; Importance of the material quality and finish; Availability; Application.

Unit-5: School for Specially-abled children

- Designing a school with differently abled children.
- Provision for ramps, corridors and other basic requirements.
- Providing a user-friendly interior space; Choice of material; Proportion and dimensions; Lighting and other fixtures; Furniture specification; Circulation space.

Unit-6: Community center

- Designing a Community center with basic needs and requirements.
- Provision for Specially-abled population.
- User-friendly space; Material choices; Dimensions; Circulation space; Furniture specification; Fixtures and Lighting.

Course Outcome:

S.No	Outcome	Taxonomy
1	To learn about the Specially-abled population.	Remember
2	To learn about the need for the special treatment for the specially-abled population.	Remember
3	To learn about the basics of creating a space that is specially-abled friendly.	Remember
4	To learn about the design parameters for special architecture.	Remember
5	To learn about new technology and material to help the specially-abled.	Remember
6	To create an awareness about the need of Special designs.	Apply

Textbooks:

- Neufert- Architect's Data by Ernst Neufert
- National Building Codes of India

References:

- Designing for the disabled by Selwyn Goldsmith
- Building access: Universal Design and the Politics of Disability by Aimi Hamraie

Web link

- https://www.ted.com/playlists/372/designing_for_disability

B. Arch. Semester-IX**BR 551 – Human settlement & Planning (Elective-III)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an insight to the human settlement development and their planning.

Objectives

- The subject is designed to have an overview on the vocabulary of Human settlements. To understand the various elements, classifications and typology of Human Settlements.
- To familiarize the students with Planning concepts and process in Urban and Regional Planning.
- To familiarize the students with the process of evolution of cities, concepts related to humanitarian planning processes and skill development to identify planning issues in existing areas and develop solutions at basic levels.
- The subject will be taught in congruence with the Design studio and assignments for the subject will be linked to the design exercises to achieve higher level of learning and understanding the practical application of the same

Contents:**Unit-1: Introduction to Settlement Planning**

Evolution of human settlements- man, environment and built structure. Community and settlement patterns. Characteristics of settlements. Growth patterns • Ancient rural and urban settlements • Settlement patterns and birth of early and medieval cities. • Renaissance and High Baroque cities • Factory and Company towns.

Unit-2: Settlement Planning and Design of Cities in Ancient and Medieval India

Town planning as per Vastu-shashtra. • Landscaping and measurement practises as per Manasara. • India during Medieval period.

Unit-3: Introduction to Town Planning and Design of Cities

• Definitions related to Planning, levels of planning, scope and components. • Types of planning, elements and scope. • Characters of a town, census definition of urban area, densities of town. • Constituents of town/city.

Unit-4: Town and Urban Planning Concepts

Evolution of Planning concepts : City beautiful movement, Garden cities, Radburn city and neighbourhood concept • Theories related to growth and decay of settlements- Luis Mumford, Geddesian triad, Ekistics. • Utopian Planning theories-Linear city- Tony Garnier, Soriya Y Mata. Planning concepts by Le Corbusier and FLW.

Unit-5: Planning Framework and Process for Various Development PlansDesign brief - its importance and interpretation

Planning process, components and techniques- survey techniques and data collection methods • Concept of master plan, its elements, preparation and implementation • Perspective plans, structure plans, advocacy plans, zonal plans • Participatory and inclusive planning

Unit-6: Problems and Issues of Towns and Settlements

Identification of planning problems of land use distribution and change, communication system, overcrowding. • Informal growth- slums, blighted areas. • Sporadic growth and conurbation, primacy, traffic. • UDPFRI Guidelines, MoUD laws, Zoning and developmental controls.

Unit -7: Case Study of Existing Settlement

Case studies of planned cities of the world-New Delhi, Chandigarh, Jaipur, Bhubaneshwar, Bhilai, Bokaro, port town, Brasilia, Islamabad • Hands-on Exercise on local area planning. (Survey, Documentation , Interpretation, Proposal development)

Course Outcome:

Serial no.	Outcomes	Taxonomy
1	Define types of settlements based on different criteria	Analyze
2	Identify the elements of a settlement	Understand
3	Describe the principle of a settlement pattern.	Analyze
4	Distinguish between different settlements, concepts of planning and techniques of survey	Apply
5	Review the condition of development/status of urbanization	Understand
6	Develop local area plans	Create

References:

• An Introduction to the Science of Human Settlements by C.L.Doxiadis; Ekistics Hutchinson, London, 1968. • Housing and Urban Renewal by Andrew D.Thomas, George Allen and Unwin; Sydney, 1986. • Ministry of Urban Affairs and Employment; Government of India, New Delhi,1999 • Urban Development Plans: Formulation & Implementation; Guidelines, 1996. • Master Plan for Madras Metropolitan Area; Madras Metropolitan Development Authority, Second Master Plan, 2007. • Report of the National Commission on Urbanisation; Government of India 1988. • Regional Policy and Regional Integration by N. Hansen; Edward Elgar, UK, 1996. • Sustainable Human Settlements by R. S. Sandhu; Asian Experience, Rawat publications, 2001. • Living Plans: New concepts for advanced housing by P. Gastek; Brikhauser publications, 2005 • URDPFI Guidelines Vol I-2014 (<http://moud.gov.in/URDPFI>) • URDPFI Guidelines II A-II B-2014(<http://moud.gov.in/URDPFI>)

B. Arch. Semester-IX**BR 561 – Heritage & Conservation (Elective-IV)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To develop an understanding about the importance of Heritage and the need of architectural conservation.

Objectives

- To introduce the various issues and practices of Conservation.
- To familiarize the students with the status of conservation practice in India and the various agencies involved in the field of conservation.
- To inform the students about the character and issues in our heritage towns through case studies
- To outline the various guidelines for the preservation, conservation and restoration of buildings.

Contents:**Unit-1: Introduction to Heritage and Conservation**

Understanding Heritage, Types of Heritage. Heritage conservation- Need and purpose. Defining Conservation, Preservation and Adaptive reuse. Distinction between Architectural and Urban Conservation. International agencies like ICCROM, UNESCO and their role in Conservation.

Unit-2: Conservation in India

Meaning of Architectural Conservation, need and degrees of conservation. History of conservation in India and West, conservation charters, role of Archaeological survey of India in conservation of India's cultural heritage. Museum conservation – monument conservation- inventories and projects- select case studies of sites such as Hampi, Golconda, Mahabalipuram - craft Issues of conservation.

Unit-3: Conservation practice and methods

Listing of monuments, documentation of historic structures and assessing architectural character, historic structure report, guidelines for preservation, rehabilitation and adaptive re-use of historic structures. Case studies of Forts and Palaces in Rajasthan, Chettinad houses and Swamimalai dwellings. Seismic retrofit and service additions to historic buildings and heritage site management.

Unit-4: Urban Conservation

Urban conservation, methodologies to be adopted for conservation management. Case studies in conservation related to Adaptive reuse, building in context and preservation. Overview of urban history in India: understanding the character and issues of historic cities. Case studies of towns with heritage precincts like Srirangaram, Kumbakonam and Kanchipuram.

Unit-5: Conservation Planning

Conservation as a planning tool, financial incentives and planning tools such as Transferable Development Right(TDR). Heritage tourism; case studies like Pondicherry French town, etc.

Unit-6: Role and schemes of Government Agencies

Role of Archeological Survey of India, Role of INTACH, Central and state government policies and legislations, HRIDAY Scheme.

Outcome:

S.No.	Outcome	Taxonomy
1	Acquire knowledge about diverse heritage across the country.	Understand
2	Acquire the importance of heritage, issues and practices of conservation.	Understand
3	Develop the various approaches and concepts in Architectural Conservation.	Understand
4	Analyze the historic materials, traditional and modern repair methods.	Analyze
5	Exposure to the various case studies in Architectural Conservation .	Understand
6	Make presentations on the various conservation studies.	Create

Text book

- Handbook on Architectural Conservation by Sir Bernard Fielden. INTACH, New Delhi.
- Living Heritage of Mewar: Sikha Jain & Vanicka Arora.
- Humayun's Tomb Conservation: RETHINKING CONSERVATION: Aga Khan Trust for Culture.
- Architectural Conservation: Principles and Practice: Aylin Orbasli.
- Conservation of Historic Buildings: Bernard Feilden.

References:

- Robert E. Stipe, A Richer Heritage: Historic Preservation in the Twenty-First Century".
- University of North Carolina press, 2003.
- Conservation Manual, Bernard Fielden; INTACH Publication, 1989.
- B.K. Singh, "State and Culture", Oxford, New Delhi.
- A.G. K. Menon ed. "Conservation of Immovable Sites", INTACH Publication, N.Delhi., 1988.
- Seminar Issue on Urban Conservation.

Web link

- <https://cpwd.gov.in/Publication/ConservationHertBuildings.pdf>
- <http://www.intach.org/publications.php>
- https://www.indiaculture.nic.in/sites/default/files/E-Book/MinofCulture_eBook_17-02-2015.pdf
- https://www.researchgate.net/publication/316643759_HERITAGE_CONSERVATION_IN_INDIA_CHALLENGES_AND_NEW_PARADIGMS
- https://pearl.niua.org/sites/default/files/books/GP-IN4_HERITAGE.pdf

B. Arch. Semester-X**BR 512 – Architectural Design Thesis**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	11	400	400	18	800

Focus:

- Bachelor of Architecture Thesis is the final stage of learning Architectural Design. With the help of a thesis project, students are expected to demonstrate the understanding of a systematic design process which includes identification of project requirements, site study and analysis, case studies, programming, schematic design and Design Development.
- It provides the students with an opportunity to culminate the nine semesters of architectural education by demonstrating the body of knowledge and skills gained during their education and the professional training.

Objectives:

The main objective of this exercise is to provide an opportunity to the students to handle a complete design project of their own choice in a practicable manner using their creative ability. This will prepare them for the challenges of the practical world once they graduate.

Contents/ Pedagogy:**Synopsis**

- The synopsis will be a brief introduction of the proposed thesis / project and has to be submitted by the student at the end of the previous semester.

CASE STUDY, SITE ANALYSIS AND AREA PROGRAMMING**Case Study**

- The students have to conduct literature study and case studies – live & literature, to form a basis for their own design.
- Literature Review: It includes gathering the relevant standards and other information from all the available sources related to their thesis topics that will help them during the later stages of their thesis programme.
- Case Studies: The students have to conduct live and literature studies of similar projects. Instead of mere documentation of these projects, information must be collected about the requirements; salient design features clearly stating the positive and negative aspects of the design. Idea of the case study is to form a base for candidates own design.

Site Analysis

The purpose of the site analysis is to record and evaluate information on the site and its surroundings, and to use this evaluation in the design response. The site analysis should identify issues that will influence the design of a development in order to make a considered response to both site opportunities and constraints, to provide a good quality living environment, and respect, acknowledge and improve the character of the area.

Area Analysis and Programme

The students are required to prepare a comparative statement of the various available design standards, areas provided in the various case studies and the area requirements stated in the project brief, so that the area requirements for the various functions / spaces for the proposed building can be finalized. This area programme should be an exhaustive list and will form the basis of the design process to be undertaken in upcoming stages.

SCHEMATIC DESIGN

- The students have to express their ideas generated on the basis of the studies (case studies / literature studies / area analysis) conducted so far in the form of conceptual drawings, sketches and models.
- The emphasis during this stage should be on the basic concept explaining the principal ideas / thought process / dream of the student for the project in terms of planning / built form / massing of different components, leading to the design, through sketches / 3D images / block models etc.

DESIGN FINALIZATION

- The schematic drawings presented in the previous module needs to be detailed out as per the comments/ suggestions received from the guides and the reviewers.
- The detailed drawings as per the final area programme with due consideration to structural and service requirements of the building needs to be presented at this stage.

PRE-FINAL DESIGN

- The students are required to submit the final drawings, views, models, etc. incorporating the comments received in the previous reviews, to be presented before a panel of internal / external reviewers.
- All the submittals should be complete in all respects except their final renderings.

FINAL THESIS SUBMISSION

- The students are supposed to present all the submittals (drawings, model, report, etc.) complete in all respects as per the comments and suggestions received from thesis guide and various review members before the final review panel for B. Arch. Thesis.

Outcomes:

S.No.	Outcomes	Taxonomy
1	Designs a Thesis project responsive to the contextual and program requirements.	Remember
2	Combines the systematic/methodological learning from various stages of study and analysis in design process towards culmination of an informed design.	Apply
3	Communicates the ideas clearly using writing, verbal and visual presentation.	Create
4	Demonstrates self-reliance when working independently	Apply
5	Integrates ideas with design requirements	Creating
6	Compares data and information gathered from Pre-design research	Analyze
7	Evaluates data and information gathered from Pre-design research and summarizes the information to used for design	Evaluating
8	Applies various codes, standards and regulations governing the project.	Apply
9	Demonstrates synthesis of creativity and technical knowledge	Apply
10	Demonstrate the ability for decision making required to progress the understanding already developed.	Apply
11	Demonstrate the ideas clearly using detailed physical Model.	Apply

Learning Resources / References & Learning Strategy

- Bachelor of Architecture Thesis Manual
- Lectures on various related topics such as Site study and Analysis, Case Studies, Building bylaws and standards, Area Programming, structure design, Building services, Drafting conventions and Drawing Coordination.
- Tutorial on one-to-one basis
- Supervision by assigned Guide
- Supervision by assigned Guide
- Presentation to External and Internal Examiners
- Supervision by assigned Guide

B. Arch. Semester-X**BR 522 – Housing (Elective – V)**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
4	0	0	50	50	4	100

Focus:

- To create awareness about the causes and consequences of housing problems and to impart knowledge about the possible solutions.
- Understanding of the various issues involved in urban and rural housing and knowledge about the planning and design solutions for low income groups

Objectives

- Historically, human settlement has been the manifestation of socio-cultural, economic and environmental understanding.
- Designs of Adobe and habitat has been characterised and practiced by people presents huge variety mainly responding to the contextual setting that strive to achieve comfort conditions within a prevailing challenges.
- Growing urbanization, scarcity of land and housing shortage for poor, has imposing challenges whereas, new technology, concepts and capacity of real estate sector for mass housing production providing opportunities. This is quite important that, budding architects should understand challenges and opportunities of housing development.
- The course Housing acts as bridge between architecture and urban planning thus will require inter-linkages with planning aspects, housing policies, development regulations, site planning, urban design and infrastructural service designs at neighbourhood levels.

Contents:**Unit-1: Introduction**

- Definition, terminologies and importance.
- Ecological and environmental aspects of human habitat.
- Concept of Neighbourhood and community.
- Hierarchy of human needs and Housing typologies.

Unit-2: Housing Scenario

- Urbanization and housing statistics
- Housing policies and programmes
- Factors of housing demand and supply
- Housing delivery mechanism

Unit-3: Slum and Housing for Poor

- Definition , causes and characteristics OF SLUMS
- Slum statistics and initiatives for housing for poor
- Affordable housing design case studies
- Design of affordable housing for poor

Unit-4: Development Norms and Standards

- Housing and its relationship with neighbourhood and city plan
- Zoning regulation, its impact on quality of life of neighbourhood
- Density; definitions, types of density, factors, FAR, FSI, etc.
- Development norms and standards for services, amenities and facilities
- Sub- division techniques.

Unit-5: Land Economics and Real Estate Development

- Introduction to real estate market; potential and challenges
- Land economics; Concept of economics, Types of land holding and tenure systems
- Factor affecting demand and supply of housing

- Relationship between land use, location and land value (Theory of location and growth pole theory)
- Land use constraints, reservations and Land acquisition act, 2013
- Land economics and feasibility analysis for housing projects
- Models of land development in real estate market (Land pooling and sharing)

Unit-6: Site Planning and Neighbourhood Design

- Factors and principles of site planning
- Analysis for physical, climatic, legal, financial, socio-cultural aspects
- Principles of Neighbourhood design
- Housing case studies (Successful real estate projects)
- Design of Neighbourhood (concept and calculations)

Course Outcome:

S.No	Outcome	Taxonomy
1	To define basic elements of housing, neighbourhood, community, slums and real estate market and outline various housing policies and programmes	Remember
2	To explain inter-relationships between hierarchy of human needs and housing typologies or differentiate settlement design in terms of local context (Physical, economical, socio-cultural, ecological, environmental aspects) and interpret cause and effects housing demand and supply	Understand
3	To Apply zoning regulations and sub-division techniques and computation for density, FAR, built-up area, MOS, as per development norms.	Apply
4	Site planning through analysis of physical, legal and environmental conditions and feasibility analysis of housing project through pre design calculations	Analysis
5	Critical appraisal of existing housing scheme in terms of quality of life through case study	Analysis
6	To prepare suitable design of a neighbourhood under given context includes specific physical, legal, socio-economic, cultural and environmental conditions.	Understand

References:

- Beyond Gated Community by Sameer Bagaeen
- China housing reforms and outcomes Ed. By Joyce Yanyun Man
- Cities and Housing by C.S. Yadav
- City slums by J.A. Ingham
- Cost effective rural housing technology by Reddy
- Design quality in Housing- Leanings from Netherlands by Matthew Cousins
- Gated community by Sameer Bagaeen
- High density housing for mixed income group by Ranjana Ashish Mittal
- Neighbourhood planning and community based development by W. Peterman
- Planning and design for future informal settlements by David Gouverneur
- Row Housing by Gunter
- Shadow cities by Robert Neuwirth
- The economics of urban property market by Paschalis A. Arvanitidis
- The modern economics of Housing by Randall Johnston
- Town Planning by A. Bandhopadhyay
- Town Planning by Rangawala
- Urban development and Housing in India (1974-2007) Ed. By Rishimuni Dwivedi
- Urban economics and real estate market by Denise DiPasqualle
- Urban Housing and Slums by A.K. Jain
- Urban land economics by Jack Harvey and Ernie Jowsey
- Urban Planning Theory and Practice by M. Pratap Rao
- Urbanization and urban systems in India by R. Ramchandran
- Urbanization in India Ed. by R.S. Sandhu
- Journal of Housing and built environment
- Journals of Housing studies
- Planning sustainable cities- UNHabitat

B. Arch. Semester-X**BR532 – Sustainable cities and communities**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTUR E	LA B	PRACTICA L	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
4	0	0	50	50	4	100

Focus: Understand the concept of smart city: how to attain sustainability, Concepts of sustainable systems relating to energy, water, food and urban living; system modeling and simulation

Objectives:

- To appreciate the concept of sustainable development
- To know do's & don't for sustainable development
- To contribute as a designer towards sustainable development

Contents:**Unit-1: Introduction to Smart City concepts and Intelligent buildings**

- Explores the challenges facing urban environments
- The system of systems that comprise a city
- Sustainable Frames the attributes of a smart city
- Explores converged physical/digital structures that respond to & anticipate the needs/actions of occupants and are aware of the environment around them.

Unit-2: Sustainable Sites, Area Planning

- Site identification, evaluation and selection
- Site inventories of physical, biological, and cultural attributes

Unit-3: Green building Rating systems:

- Green Building Codes and standards, Structure of rating system
- Assessment criteria, assessment agencies like World Green Building Council, The Energy Resource Institute (TERI), Certifications like BREEAM, LEED, Green Globes, LEED INDIA, GRIHA etc. METHODOLOGY

Unit-4: Smart Villages:

Explores how the enabling technologies behind smart cities can be applied to villages remote rural areas, particularly in emerging economies.

Outcome:

S.No.	Outcome	Taxonomy
1	Nature and aspects of Smart cities	Remember
2	Determine eco friendly planning approach	Analyze
3	Awareness on the green building rating system and how it works	Analyze
4	Solution for the environmental hazards both at rural and urban level	Remember
5	Smart village: development and concepts	Remember
6	Application of the same in Design Studio Project	Create

Text book:

References:

**Sustainable Cities and Communities
Design Handbook**

Green Engineering, Architecture, and Technology

Book • 2nd Edition • 2018 • 2018

Web link

<https://www.researchgate.net/publication/308802350> Sustainable Urban Development Textbook

B. Arch. Semester-X**BR 542 - Disaster Mitigation Management (Elective -VI)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
4	0	0	50	50	4	100

FOCUS

In the face of climate change, occurrence of natural disaster has become more frequent, influencing livelihoods and existence of human civilization. In this context, this course is designed to provide an overview of the occurrence, causes and consequences of disaster and understanding of fundamental concepts and application of disaster resilient design.

OBJECTIVES:

- To understand the role of Seismic-resistant Architecture
- To identify the suitable methods of all for Seismic-resistant Architecture
- To understand Advantages and Disadvantages for the method adopted while constructing architecture.
- To understand behavior of building materials during earthquake
- To understand torsion and moments in the members

COURSE CONTENTS**Unit 1.****Introduction to Disaster Management**

- Define and describe disaster, hazard, emergency, vulnerability, risk and disaster management
- Identify and describe the types of natural and non-natural disasters. Important phases of Disaster Management Cycle.

Unit 2.**Disaster Mitigation and Preparedness**

- Natural Hazards: causes, distribution pattern, consequences and mitigation measures for earth quake, tsunami, cyclone, flood, landslide drought etc.
- Man-made hazards: causes, consequences mitigation measures for various industrial hazards/disasters, Preparedness for natural disasters in urban areas.

Unit 3.**Hazard and Risk Assessment:**

- Assessment of capacity, vulnerability and risk, vulnerability and risk mapping, stages in disaster recovery and associated problems.

Unit 4.**Emergency Management Systems (EMS):**

- Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

Unit 5.**Capacity Building:**

- Gender sensitive disaster management approach and inculcate new skills and sharpen existing skills of government officials, voluntary activists, development of professional and elected representative for effective disaster management, role of media in effective disaster management, overview of disaster management in

India, role of agencies like NDMA, SDMA and other International agencies, organizational structure, role of insurance sector, DM act and NDMA guidelines.

Unit 6.

Application of Geo-informatics and Advanced Techniques:

- Use of Remote Sensing Systems (RSS) and GIS in disaster Management, role of knowledge based expert systems in hazard scenario, using risks-time charts to plan for the future, early warning systems
- Integration of public policy
- Planning and design of infrastructure for disaster management, Community based approach in disaster management, methods for effective dissemination of information, ecological and sustainable development models for disaster management.

Outcome

S.No.	Outcome	Taxonomy
1	Differentiate the types of disasters, causes and their impact on environment and society	Remember
2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.	Remember
3	Draw the hazard and vulnerability profile of India, Scenarios in the Indian context.	Understand
4	Differentiate the types of disasters, causes and their impact on environment and society	Understand
5	Disaster damage assessment and management keeping a sustainable approach.	Remember
6	Asses and create ecological and sustainable development models for disaster management	Analyze

References

- “Natural Hazards and Disaster Management: Vulnerability and Mitigation” by R B Singh
- “Disaster Management and Mitigation approaches in india” by Paritosh Srivastava,
- “Management and Mitigation of Natural Disasters” by Rajan Kumar Sahoo,
- “Disaster Mitigation and Management: Post-Tsunami Perspectives” by Jegadish P Gandhi,
- “Disasters: Strengthening Community Mitigation and Preparedness” by Khanna B K
- “Strengthening Resilience in Post – Disaster Situations: Stories, Experience and Lessons from South Asia” by IDRC
- “Disaster Management at Health Care Settings Comprehensive Assessment and Effective Mitigation” by Shreen Gaber

Web Link

https://www.researchgate.net/publication/292655874_Disaster_Mitigation

https://www.researchgate.net/publication/292655874_Disaster_Mitigation

B. Arch. Semester-X**BR 552 - Earthquake Resistant Architecture(Elective-VI)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
4	0	0	50	50	4	100

FOCUS

Students would be able to understand the formation and causes of earthquakes and factors to be considered in the design of buildings and services to resist earthquakes.

OBJECTIVES

- To share the knowledge regarding the earthquake resistant buildings.
- To impart knowledge of Origin of Earthquakes, magnitude, intensity, ground motions, sensors.
- To impart knowledge about Concepts of Earthquake Resistant Design of Reinforced Concrete Buildings.
- Identify the role of engineers in Earthquake Resistant Design of Buildings.

COURSE CONTENTS**Unit 1: Fundamentals of earthquake.**

- Earth structure, seismic waves, plate tectonic theories, origin of continents, seismic zones in India.
- Predictability, intensity and measurement of earthquake.
- Basic terms like faultline, focus, epicentre, focal depth etc.

Unit 2 : Site planning, performance of ground and buildings.

- Historical experience, site selection and development.
- Affects of earthquake on ground, soil rupture, liquefaction, landslides.
- Behaviour of various types of building structures, equipments, lifelines, collapse patterns.
- Behaviour of non structural elements like services, fixtures in earthquake prone zones.

Unit 3 : Seismic design codes and building configuration.

- Seismic design code provisions- Introduction to Indian codes.
- Building configuration – scale of building, size, horizontal and vertical plane, building proportions, symmetry of building- torsion, irregularities in buildings like shortened floor heights and short columns etc.

Unit 4 : Various types of construction details used in urban planning and design.

- Seismic design and detailing of non-engineered construction- masonry structures, wood structures, earthen (mud) structures.
- Seismic design and detailing of RCC and steel structures.
- Design of non-structural elements – Architectural elements, water supply, drainage, electrical and mechanical components.
- Vulnerability of existing buildings, planning of facilities, fires after earthquake, socio-economic impact after earthquakes.

Outcome

S.No.	Outcome	Taxonomy
1	Differentiate the types of seismic waves, causes and their impact on environment and society	Remember
2	Develop a familiarity with design codes and building configuration.	Remember
3	To understand the fundamentals of earthquake and basic terminology related to earthquake resistant design concepts	Understand
4	Understand the various types of construction details to be adopted in a seismic prone area.	Understand
5	To apply the knowledge in Seismic design and detailing of RCC and steel structures.	Remember
6	To apply the knowledge gained in the architectural design assignment.	Analyze

TEXT BOOKS:

1. Guidelines for earthquake resistant non engineered construction, National information centre for earthquake engineering (NICEE).IIT Kanpur, 2006.
2. C.V.R Murthy Andrew Charlson, 'Earthquake Design Concepts', (NICEE).IIT Kanpur, 2006.
3. Agarwal. P, 'Earthquake resistant Design', Prentice Hall of India,2006.

REFERENCE BOOKS:

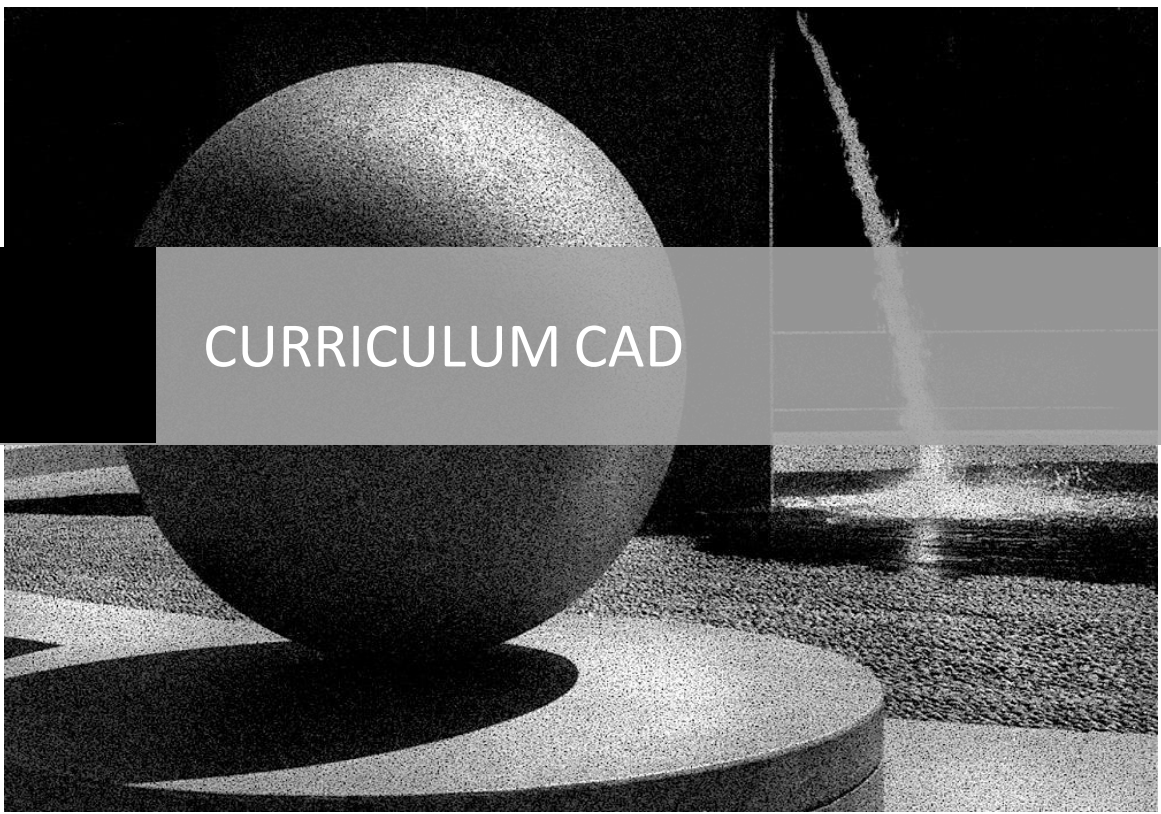
1. "Disaster Management in the Hills", Dr. Satendra, Concept Publishing Company, 2003.
2. "Disaster Management", Harsh K. Gupta, Universities Press, 2003.
3. "Natural Hazards and Disaster Management: Vulnerability and Mitigation",R. B. Singh, Rawat; Reprint edition, 2006.
4. "Proceedings of the National Conference on Disaster & Technology, 1998, Manipal, India", Nirmita Mehrotra, 1998.
5. "Disaster Risk Reduction in South Asia", Sahni, Pardeep, Ariyabandu and Madhavi Malalgoda, PHI Learning, 2003.
6. Ian Davis, 'Safe shelter within unsafe cities: Disaster vulnerability and rapid urbanization', Open House International. UK, 1987.
7. Socio-economic development record – Vol.12, No.1, 2005.
8. Mary c. Camrio, Lugia Binda, 'Learning from practice-A review of Architectural Design and construction experience after recent earthquakes' – Joint USA-Italy Workshop, October 18-23, 1992, Orvieto, Italy.
9. Improving Earthquake & Cyclone Resistance of Structures by Shekhar Chandra Dutta & Parth Sarthi Mukhopadhyay

Web Link

<https://www.youtube.com/watch?v=fd7DzoZM5sM>
https://www.youtube.com/watch?v=Fw94a_qKRuU

SESSION

2020-21



CURRICULUM CAD



A LEADING WOMEN'S UNIVERSITY

Undergraduate Program
Bachelor of Architecture

College of Architecture & Design

Mody University of Science & Technology

N.H. 11, Lakshmangarh, Sikar, Rajasthan - 332311

Academic Curriculum (2015 - 16 Onwards)
Undergraduate Program - Bachelor of Architecture
College of Architecture & Design, MODY University
Mody University of Science & Technology, Lakshmangarh, Rajasthan

B. Arch.

5 Years

(300 credits)

Background

A curriculum for Design Education evolves from the vision of the institution, its aspirations and its capability to deliver the knowledge. It defines the relationships between the teacher and the student and the institution. Curriculum for Architecture also connects creativity and physical reality.

Five-year Architecture undergraduate program is designed to provide an exceptional university education as well as comprehensive preparation for entry in the competitive and challenging career in architecture. Studies in architecture and other associated disciplines are undertaken in parallel throughout the five-year program. This five-year undergraduate professional program is a professional degree accredited by the **Council of Architecture, India**. The program is for a limited number of qualified students committed to the study of architecture. These students are admitted directly to the professional degree program and begin studies in architecture in the first year.

The **B. Arch** curriculum has two stages of study. The stage-1 (years 1, 2, 3) provides a foundation of understanding on which to build a second level of advanced study. Continuously through the course of the program runs the Design Studio, in which projects are selected as a means for developing the professional skills, knowledge, understanding and a platform to create exemplary architectural designs. At the end of the third year, the program culminates with a studio project helping students to summarize what they have learned with an introduction to prepare themselves for more independent studies in the advanced professional program.

The stage-2 (years 4 & 5) concludes with a **semester** (one or two) of Professional Training (forth year) and Final Year Dissertation program. The first semester of the final Year integrates an introduction to independent Research Methods. An integrated design research phase continues throughout the final two semesters. The final year project is selected by the students' themselves to provide them an opportunity to develop their individual point of view about the profession and create their own place in the building industry. Thesis or Dissertation is part of the course to investigate issues the student sees as significant to herself and to the profession.

The Objective

- Develop direct personal experience of social, environmental and technological contexts.
- Encourage exploration of the diversity of thoughts, techniques, working methods and material palettes.
- Develop capacities to think from simple first principles, using observation, common sense and intuition to build more elaborate conceptual frameworks.
- Develop ability to “learning how to question, absorb and analyze” rather than following “conventional” practices and solutions.
- Understand and connect to local realities as vehicles for solutions.
- Encourage sharing and collaboration and as well as individual achievement.
- Creativity, skills and initiative should be developed and encouraged to assist the involvement of the body, mind and therefore confidence.
- General awareness towards architectural heritage introduced from the beginning of the degree program through courses / electives by experts on conservation, restoration and re – adaptation of buildings.

The Curriculum (B. Arch)

The curriculum allows students to choose their own area of interest and allow for independent exploration in the later years (3+2-year model) by having option of choice based Studio and Theory subjects. This is important to have a more mature and self-driven Architect. The curriculum shall also encourage students to select subjects of their choice from allied disciplines at other Colleges of this University.

The curriculum is to allow for Inter-disciplinary teaching in areas of Technology, Humanities and Environment by conducting joint sessions and assignments. The course content is synchronized to facilitate the same. Moreover, each semester has a thematic emphasis to allow many different subject to address the same. This is done to facilitate further synthesis.

Curriculum structure allows for other means of learning such as travelling studios, joint studios or studios in other socio-cultural environment apart from exchange program. This can provide the necessary confidence to deal with the outside world.

The courses dealing with design studio, technology, humanities shall be taught in an inter-disciplinary manner and not as compartmentalized specializations.

History, theory & technology based courses are those, which let us understand and appreciate, social, cultural, technological and historical knowledge and skills for its application in design projects.

Course Structure

The course structure and relative emphasis between sub-disciplines vary depending on their position within the course.

First year, being a Foundation year, the emphasis shall be on the development of background knowledge such as sensibility, analytical skills, technical and general communication skills and associated disciplines.

During Second and Third, Advanced years the emphasis is on understanding and appreciation of in-depth relationships between various disciplines and use of their resolutions, complexity, techniques and methods of application. The Fourth and Fifth Years, termed as final years, emphasize the development of the individual’s maturity and establishment of direction. During last two years of the course student develops her theoretical and practical understandings and decide on personal choice of directions.

Credit Loads

The course is of 5 years / 10 semester's duration. Each year consists of 2 semesters of approximately 16 weeks each. Each semester carries a contact load of 30 - 32 credits, where 1 credit is equivalent to 1.0 lecture hour/week in theoretical subjects and studio, workshop, laboratory based courses.

Each semester normally consists of (including design studio) not more than 6 subjects and each subject is normally of at least 2 credits.

In addition to subjects that form the core of the curriculum, the course offers 10 credits out of a total of 300, as electives. These electives are offered within the disciplines of humanities, arts and crafts: history and theory, and technology, so that a student can develop her interest in these areas.

- 1 Credit = 1 Contact hour for Theory and Studio
- 1 Credit = 2 Contact hour for Workshop
- 1 Contact hour = 100 Marks

Assessment

Student's performance is continually evaluated through Time Problems, projects, Tests, Quizzes and periodic assessments of sessions work. Generally, **50 %** of the assessment is through this system, and **50 %** weight is assigned to end of semester examinations (Internal). All core subjects are examined at the end of the semester through project review (Juries), crits, viva-voce or examination papers. Electives are normally assessed through final results, assignments or papers.

In order to clear a subject a student must obtain at least **50 %** marks in all the assessments of the subject. While the teaching faculty in all subject areas does grading, the subjects at the end of the Third and Fifth Year are examined additionally by an external examiner.

First Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

First Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 111	Design Studio –I & Architectural Graphics Skills- Manual & Computers I	10 (5 + 5)	10	0	1000 500 + 500 (250 + 250) (250 +250)	50% 50%	0	3
	AR 121	Building Materials & Construction Technology I	6	6	100	500 250 + 250	50% 50%	3	3
	AR 131	Structure Design & Systems I	3	3	50	250 125 + 125	50% 50%	2	0
	AR 141	History & Humanities I	3	3	50	250 125 + 125	50% 50%	2	3
	AR 151	Basic Design & Workshops I	6	6	0	600 300 +300	50% 50%	0	0
	AR 161	Introduction To Building Industry	2	2	0	200 100 + 100	50% 50%	0	3
	TOTAL		30	30					12

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 112	Design Studio –II & Architectural Graphics Skills- Manual & Computers II	10 (5 + 5)	10	0	1000 500 + 500 (250 + 250) (250 +250)	50% 50%	0	3
	AR 122	Building Materials & Construction Technology II	6	6	100	500 250 + 250	50% 50%	3	3
	AR 132	Structure Design & Systems II	3	3	50	250 125 + 125	50% 50%	2	3
	AR 142	History & Humanities II	3	3	50	250 125 + 125	50% 50%	2	3
	AR 152	Basic Design & Workshops II	6	6	0	600 300 + 300	50% 50%	0	0
	MDC 003	Environmental Studies	4	4	400	0	50% 50%	0	0
	TOTAL		32	32					12

Second Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

Second Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 211	Design Studio – III, Computer Application I, Fundamentals of Design & Communication skills	15 (9 +6)	15	0	1500 900 + 600 (450 + 450) (300+300)	50% 50%	0	6
	AR 221	Building Materials & Construction Technology III	4	4	100	300 150 + 150	50% 50%	3	0
	AR 231	Structure Design & Systems III	3	3	50	250 125 + 125	50% 50%	2	3
	AR 241	History of Architecture	2	2	50	150 75 + 75	50% 50%	2	3
	AR 251	Building Services I	3	3	100	200 100 + 100	50% 50%	3	0
	AR 261	Elective/Workshop	3	6	0	300 150 + 150	50% 50%	0	0
TOTAL			30	33					12

AR 271 Related Study Programme

2 Credit

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 212	Design Studio – IV, Computer Application II & Theory of Design	16 (12+4)	16	0	1600 1200 + 400 (600 + 600) (200+200)	50% 50%	0	6
	AR 222	Building Materials & Construction Technology IV	4	4	100	300 150 + 150	50% 50%	3	0
	AR 232	Structure Design & Systems IV	3	3	100	200 100 + 100	50% 50%	3	0
	AR 242	Surveying & Levelling	2	2	50	150 75 + 75	50% 50%	2	3
	AR 252	Building Services II	3	3	100	200 100 + 100	50% 50%	0	3
	AR 262	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	0
TOTAL			30	32					12

Third Year B. ARCH STAGE-1
Academic Curriculum (2015 - 16 Onwards)

Third Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 311	Design Studio V	16	16	0	1600 800 + 800	50% 50%	0	6
	AR 321	Building Materials & Construction Technology V	4	4	100	300 150 + 150	50% 50%	3	0
	AR 331	Structure Design & Systems V	3	3	50	250 125 + 125	50% 50%	2	0
	AR 341	Landscape Architecture	3	3	0	300 150 + 150	50% 50%	0	0
	AR 351	Climatology	2	2	50	150 75 + 75	50% 50%	2	0
	AR 361	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	6
	TOTAL		30	32					12

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Theory	Exam Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 312	Design Studio VI	16	16	0	1600 800 + 800	50% 50%	0	6
	AR 322	Quantity Estimation and Specification writing	3	3	100 50 + 50	200 100 + 100	50% 50%	3	0
	AR 332	Structure Design & Systems VI	3	3	50	250 125 + 125	50% 50%	2	0
	AR 342	Professional Practice	3	3	100	200 100 + 100	50% 50%	3	0
	AR 352	Town Planning & Building Bylaws	3	3	100	200 100 + 100	50% 50%	3	3
	AR 362	Elective/Workshop	2	4	0	200 100 + 100	50% 50%	0	3
	TOTAL		30	32					12

Forth Year B. ARCH STAGE-2
Academic Curriculum (2015 - 16 Onwards)

Forth Year

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory Sessional Internal External Viva	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 411	Practical Training	28	0	0 2800 1400 + 700+700	0 100%	0	0
	TOTAL		28					0

Subject To Approval

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory Sessional Internal External	Weightage Internal ETE	Exam Duration	Field Trips / Semester
	AR 412	Design Studio VIII	14	14	0 1400 700 + 700	50% 50%	0	9
	AR 422	Building Materials & Construction Technology VIII	5	5	100 400 200 + 200	50% 50%	3	0
Spring Semester	AR 432	Structure Design & Systems VIII	4	4	100 300 150 + 150	50% 50%	3	0
	AR 442	Intelligent Buildings	3	3	100 200 100 + 100	50% 50%	3	0
	AR 452	Thesis Orientation	2	2	0 200 100 + 100	50% 50%	0	0
	AR 462	Elective/Workshop	2	4	0 200 100 + 100	50% 50%	0	3
	TOTAL		30	32				12

Fifth Year B. ARCH STAGE-2
Academic Curriculum (2015 - 16 Onwards)

Fifth Year Subject To Approval

Autumn Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal	External	Weightage Internal	ETE	Exam Duration	Field Trips / Semester
	AR 511	Advance Design Studio IX	14	14	0	1400	700 + 700	50%	50%	0	9
	AR 521	Professional Practice (Advance)	6	6	100	500	250 + 250	50%	50%	3	0
	AR 531	Advance Construction & Structures	6	6	100	500	250 + 250	50%	50%	3	0
	AR 541	Research Methodology	2	2	100	100	50 + 50	50%	50%	3	0
	AR 551	Advance Services	2	2	0	200	100 + 100	50%	50%	0	3
	TOTAL		30	30				50%	50%		12

Subject To Approval

Spring Semester	Course Code	Course Title	Credit	Contact Hours/Week	Exam Theory	Sessional Internal	External Viva	Weightage Internal	ETE	Exam Duration	Field Trips / Semester
	AR 512	Dissertation/Thesis	24	24	0	2400	1200 + 600 + 600	50%	50%	0	12
	AR 522	Advance Elective I	3	3	0	300	150 + 150	50%	50%	0	0
	AR 532	Advance Elective II	3	3	0	300	150 + 150	50%	50%	0	0
	TOTAL		30	30							12

First Year B. ARCH STAGE-1

AR 111 Design Studio I	10 - 10

- Focus:**
- A.** Exploring principles of space making, introduction to the built environment and its creative exploration.
 - B.** Learning techniques and skills to represent different objects through 2D & 3D geometry.

Objectives

- To deliver an introduction to architecture through analysis of building elements, such as floors, walls, doors, stairs, rooms, etc.
- To have an understanding of relationship between the human body, scale and the built environment, context, creative and exploratory responses, scale and proportion, basic organizational principles, abstraction, order, constants and variations and design as a response.
- Understanding importance of technical drawing as medium of communication as basic vocabulary in design.

Contents

- Introduction to subject. Getting acquainted with necessary instruments of drawing. Learning to draw straight and curved lines with different qualities.
- Learning good lettering to improve and maintain quality of presentation.
- Learning meaning of terms 'Plan' & 'Elevations' and using them for drawing simple objects through 'Orthographic Projections'.
- Learning theory of 'Orthographic Projections' and drawing projections of points, lines, geometric solids.
- Dealing with sections of simple geometric solids and their combinations.
- Learning principles of development of lateral surfaces of solids, applying them to work out and drawing developed surfaces of simple geometric solids and using them to make models of some of them.
- Auxiliary orthographic projection of solids and its application to sections of solids by inclined plans.
- Principles of space - making.
- Abstract sketches, model making, pencil and ink drawing, idea of human scale: methods of measurement.
- Site visits, experiential exploration of built environment, Case Studies.
- Measure drawings, analytical studies to understand building order, anthropometric content in design inputs lectures on factors affecting design and design disciplines.
- Mental and visual 3D perception

Outcome

- Students will learn about observation and logical skills to involve understanding of a space creation.
- Students will learn desired written and presentations skills to express their designs.
- Students will be able to visualize the idea and concept with expression of thoughts via appropriate communication method.
- Students should learn all aspects of **technical representation of drawings** to express and document their design projects through graphical communication.
- Students will be able to express all drawing contents through all taught mediums of communication.

Examination Pattern:

- Sessional: 100 % {(25 % Internal continuous assessment + 25% External: Architectural Graphic and Techniques I) + (25% Internal continuous assessment + 25% External: Design Studio I) }

References:

- John Hanock, **Time Saver Standards for Architectural Design Data**, McGraw-Hill Professional Publishing
- Ramsay and Sleeper, **Architectural Graphic Standards**, Wiley
- ND Bhat, **Engineering Drawing**, Charotar
- IH Morris, **Geometrical Drawing for Arts Students**, Universities Press
- KR Gopalakrishna, **Engineering drawing Vol I and II**, Subhas

AR 122 Building Materials & Construction Technology I	6 - 6

Focus: Understanding of basic building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as mud, brick, stone, bamboo, timber, etc. and methods of preservation, treatment and types of uses.
- To help students understand the basic building elements, their function and behavior under various conditions with specific reference to 'load bearing construction' and simple non RCC frame structure.
- To develop strong sense of perception, understanding the basic principles of construction and materials.
- The emphasis should be on teaching the fundamental principles and constructional details suitable for Indian conditions.
- Students will be encouraged to study both in classroom and also outside at work sites in order to get the practical exposure.

Contents:

Construction

- Structural and nonstructural building elements and Terminologies.
- Basic wall section of load bearing and framed structures.
- Introduction to various tools and equipment's commonly used in construction
- Types of Masonry construction in brick and stone.
- Bamboo construction Methods.
- Stone construction joinery details.

Materials

Mud: Fundamentals of soil science, types of soils, principles of soil stabilization, types of stabilizers, requirements and types of mud wall building and surface protection, advantage and disadvantage of mud construction.

Stones: Formation in nature, geological classification, quarrying of stones, dressing, characteristics of stones, testing of stones, uses of stone. preservation of stones, deterioration of stones, behavior of stone, fabrication, physical and chemical properties, selection of stones, types of stones,

Bricks: Manufacturing process, Types of bricks, Classification of bricks, Characteristics, Ingredients of bricks, Forms of bricks, Testing of bricks, Types of bonding in bricks, Storage of bricks,

CAD, MUST

Bamboo: Bamboo as plant classification, species, geographical distribution, anatomy of bamboo, properties, strength, processing, harvesting, working of bamboo tools, treatment and preservation of bamboo, uses of bamboo.

Timber: Classification of trees, structure of trees, characteristics, seasoning of timber, defects and diseases, decay of timber, preservation, fire resistance, conservation of timber, storage of timber, uses of timber, manufacturing process of timber, hard wood, soft wood, advantages of timber construction.

Outcome

- Students learn about construction of the building using intelligence, bamboo, brick, stone through drawing case study.
- Students will learn basic understanding of materials with respect to building components and their construction methods.
- Students will get practical experience of making small shelter structures.
- Students will learn making of plan, elevation and section along with sketches and details showing methods of construction.
- Students will also get to know some analysis fundamentals skills required for selection of materials as per design requirements.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, Construction **Technology**, Prentice Hall
- Barry, **Construction of Buildings**

AR 131 Structure Design & Systems I	3 - 3

Focus: Behavior of building elements and basic structural systems.

Objectives

- Understanding importance of structure and its contents with respect to behavior and language of building elements and components.
- To understand and link knowledge of architecture, civil engineering, statics and material in a natural way.

Contents

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with manmade structures.
- Functions of structures. Primary and secondary forces acting on structures – gravitational force, live load, wind, temperature variation. Types of supports & their characteristics.
- Analysis & design – Design criteria.
- Primary elements of structure and their behavior.
- Factor of safety & factors affecting it. Characteristics of structural design – strength, stiffness and stability. Discussion on factors affecting them and ways of satisfying these requirements.
- Study of behavior of structures through models and testing them for given load.

Outcome

- Enable students to understand the concepts of building Structures.
- Students shall understand about the structural action of various elements.
- Students will have sufficient knowledge about various long span structures.
- Students should understand freedom of creativity, and encourages exploration, cooperation and discussion in the multi-genre science in which architecture is located.
- Student should learn that, the architecture and structure create a homogeneous unit, if the structure is not an obstacle to perceive the work and the architectonic shape creates a logical structural solution.
- Students will able to handle basic structure problems with Perception of structure, which is connected with a typological kind of a building, its size and function.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- RK Bansal and Sanjay Bansal, **Engineering Mechanics** Third edition, Laxmi Publications, New Delhi.
- Ferdinand L Singer, **Engineering Mechanics** Third Edition, Harper Collins Publications.

AR 141 History & Humanities I	3 - 3

Focus: To develop appropriate skills of reading, discussion and writing as well as understanding of the physical experience of buildings in order to appreciate the complexity of the influences bearing on architecture, as reflected in the major historical periods.

Objectives

- To inform about the development of architecture in the Ancient Western World and the cultural and contextual determinants that produced that architecture.
- To understand architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to technology, style and character in the prehistoric world and in Ancient Egypt, West Asia, Greece and Rome.

Contents

- Introducing concepts of culture and civilization – Paleolithic and Neolithic culture – art forms and evolution of shelter – megaliths – agricultural revolution and its impact on culture and civilization.
- Landscape and culture of Ancient Egypt – history – religious and funerary beliefs and practices – monumentality – tomb architecture: evolution of the pyramid from the mastaba – temple architecture: mortuary temples and cult temples Great Pyramid of Cheops, Gizeh – temple of Ammon Ra, Karnak – temple of Abu Simbel (Rock Cut)
- Urbanization in the Fertile Crescent– evolution of city-states and their character – law and writing – theocracy and architecture – evolution of the Ziggurat – palaces.
- Landscape and culture of Greece – Minoan and Mycenaean cultures – Hellenic and Hellenistic cultures – Greek character – Greek polis and democracy – Greek city planning – architecture in the archaic and classic periods - orders in architecture: Doric, Ionic, Corinthian – optical illusions in architecture.
- Roman history: Republic and Empire – Roman religion and the Roman temple – Roman character – lifestyle – Roman urban planning – art and architecture as imperial propaganda: forums and basilicas – domestic architecture – structural forms, materials and techniques of construction – orders in architecture: Tuscan and Composite.

Outcome

- An understanding about the spatial and stylistic qualities.
- An understanding of the architecture as an outcome of various social, political and economic upheavals, and as a response to the cultural and climate conditions.
- Students will gain knowledge about the art & architecture of the European, Egyptian & Middle Eastern cultures, which have served as the cradle of human civilization, which will help them in building concepts for their design.
- The will be made aware, about the planning, construction, function and aesthetics of historical buildings and an appreciation of architectural style as a product of the time, place and culture in the western world.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Tadgell Christopher, **History of Architecture in India**, Phaidon Press.
- Brown Percy, **Indian Architecture, Buddhist and Hindu period**, Read Books
- Grover Satish, **Architecture of India, Buddhist and Hindu**

AR 151 Basic Design & Workshop I	6 - 6

Focus: Development of three dimensional visualizations, graphical abstraction and preliminary form exploration.

Objectives

- To create understanding and hands on skill based modes & methods of workshop art and its recording & analysis.
- To have knowledge of anthropometric content in Design, method of measurement. Human scale and proportion.
- To develop analytical thinking through exercises in fundamentals of composition, graphics, research and design process.

Contents

- Comprehensive understanding of the design field: relationship of basic design to architectural design and design field in general. Performance requirements and criteria for judgement of design.
- Observation and its expression: Field, mode and methods of observation, recording and analyzing observations: its expression.
- Visual perception, Ideas as abstraction. Graphic tools to express abstraction (geometric content); and abstraction of environmental and architectural observation.
- Human dimension: Anthropometric content in design, methods of measurement, idea of human scale and proportion.
- Basic shelter: Understanding of basic shelter and its related factors through chosen examples, methods of learning.
- WORKSHOP: - Hands on practical training and creation of 3D structures to express innovation and supernatural ideas.

Outcome

- Enable students to learn the various tools used in carpentry, metal work, masonry, painting etc. and get a reasonable skill in handling the materials and tools there off.
- Students will get an opportunity to see directly the craftsmen's work, and interact with them face to face.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

References:

- Wucius Wong, **Principles of three Dimensional Design**, Van Nostrand Reinhold Company
- Wucius Wong, **Principles of two Dimensional Design**, Wiley
- Wucius Wong, **Principles of color composition**
- Robert Gill, **Rendering with Pen and Ink**, Van Nostrand Reinhold Company

AR 161 Introduction to Building Industry	2 - 2

Focus: General introduction to building industry.

Objectives

- To familiarize students to all stakeholders and participants in building & construction industry.
- To understand role and responsibilities of various team members of building industry.
- To introduce students to local, national and global structure of building construction, product manufacturing infrastructure, production and delivery systems.

Contents

- Series of lectures, site visits (trade show), case studies, research, market survey, introduction to sales industry and manufacturing industries.
- General information re following team members and or stake holders, i.e. surveyors, contractors, developers, financiers, bankers, architects, landscape architects, artists, interior designers, project managers, construction managers, quantity surveyors, building economist, hydraulic engineer, civil engineer, structure engineer, mechanical engineer, electrical engineer, financial controller, acoustic designers, product designers, industrial designers, real estate personals, property managers etc.

Outcome

- Students will have knowledge of various stakeholder and team members of building involved in the industry, their roles and responsibilities and their professional contribution.
- Students shall have understanding of the structure of the building industry from pre-construction to delivery stage.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 112 Design Studio II	10 - 10

Focus: To shape spaces through an understanding of elements that builds a design language and continuing from previous semester, reinforcing the understanding & importance of representing different objects through 2D & 3D geometry and learning more complex skills in the same direction.

Objectives

- To have emphasis on relationship between the human body, scale and the built environment, context, creative and exploratory responses, scale and proportion, basic organizational principles, abstraction, order, constants and variations and design as a response.
- To teach design parameters with respect to site and environment.
- To design space through program, site analysis, area volume diagrams.
- To understand documentation of site, site analysis and basic report writing.
- Understanding importance of technical drawing as medium of communication as basic vocabulary in architecture and learning techniques & skills to represent different objects through 2D & 3D geometry thus developing visualization of geometric forms to use it in designing.

Contents

- Principles of abstraction, spatial ordering, kinds of form and their principles of combination light and perception of space and form.
- Elements of architecture, spatial order, modulation of space, space structure form co-relation, program interpretation, choice of theme, abstraction, spatial scales, ordering mechanisms, evolution of form.
- Different ways of presentation of solids in 3D projections, like Axonometric & Isometric.
- Studying sciography and methods of representing it in 2D projections.
- Applying sciography to 3D geometrical projections especially Isometric projections.
- Understanding basic principles of perspective drawings – relatively realistic way for presentation. Introduction of basic elements such as station point, picture plane, eye level, center of vision, cone of vision, vanishing points etc.
- Drawing one point and two point perspectives through
 - Plan and Elevation method
 - Plan and vanishing points method
 - Measuring point method.

Outcome

- Enable students to emphasis on analytical skill to develop design and its management.
- Student shall gain depth knowledge of visualization and enhanced conception of ideas.
- Enable students to understand shades and shadow, solar path and its relation to build masses.
- Students shall learn perspective drawing in 2D & 3D projection to accumulate space drawings with measurements.

Examination Pattern:

- Sessional: 100 % {(25 % Internal continuous assessment + 25% External: Architectural Graphic and Techniques I) + (25% Internal continuous assessment + 25% External: Design Studio I) }

References:

- ND Bhat, **Engineering Drawing**, Charotar
- IH Morris, **Geometrical Drawing for Arts Students**, Universities Press
- KR Gopalakrishna, **Engineering drawing Vol I and II**, Subhas
- SH Mullik, **Perspective**, Jyotsna Prakashan
- Chen John SM, **Architecture in Pen and Ink**, McGraw-Hill C
- Kemmerich, Carl, **Graphic Details for Architects**, Pall Mall P
- Kemmerich Carl, **Manual of Graphic Techniques for Architects**, Graphic Designers and Architects, Scribner Book Company
- **New Metric Handbook**; Planning and Design Data, Architectural Press
- Shankar Mulik, **A textbook of Perspective and Sciography**
- Alibert O. Halse, **Architectural Rendering**, Literary Licensing, LLC.
- Russel, James E, **Graphics for Architects and Planners**, McGraw-Hill C

AR 122 Building Materials & Construction Technology II	6 - 6

Focus: Understanding of advanced building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as paint, glass, tiles, lime and timber boards, etc. and methods of preservation, treatment and types of uses.
- To understand both in general and in detail the methods of construction by using Timber products such as ply wood.
- To understand in detail, the methods of construction by using basic materials such as clay products and natural timber for structural and non- structural components.
- To understand building industry through various market surveys.
- To gain basic knowledge of hardware, plumbing and sanitary products through case studies.

Contents

- Brick masonry (continued) – acute / obtuse angled joints, cavity wall construction.
- Types of foundation.
- Lintel & arches – types and their construction.
- Simple wooden joinery
- Construction details in door, window and staircase.
- Ferrous & nonferrous materials iron, steel, market forms of steel, aluminum and copper.

Outcome

- Student will learn Introduction to concrete technology and its materials i.e. composite buildings, complex buildings and steel buildings.
- Student also learns construction of Basic building elements such as door, window, staircase, floor, roof, dome and vault etc.
- An understanding of basic services and hardware and sanitary equipment's for construction methods.

CAD, MUST

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, Construction **Technology**, Prentice Hall
- Barry, **Construction of Buildings**

AR 132 Structures Design and Systems II	3 - 3

Focus: Behavior of building elements and basic structural systems.

Objectives

- Understanding importance of structure and its contents with respect to behavior and language of building elements and components.
- To understand and Join knowledge of architecture, civil engineering, statics and material in a natural way.

Contents

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with manmade structures.
- Functions of structures. Primary and secondary forces acting on structures – gravitational force, live load, wind, temperature variation. Types of supports & their characteristics.
- Analysis & design – Design criteria.
- Primary elements of structure and their behavior.
- Factor of safety & factors affecting it. Characteristics of structural design – strength, stiffness and stability. Discussion on factors affecting them and ways of satisfying these requirements.
- Study of behavior of structures through models and testing them for given load.

Outcome

- Enable students to understand the concepts of structures in architecture.
- Apply the concepts of action of forces on a body and should be able to apply the equilibrium concepts.
- Analyze any type of determinate trusses with different end conditions.
- Enable students to solve the sectional properties for any geometrical shapes.
- The concepts of elastic constants and its applications for various types of problems with a
- Thorough understanding of stresses and strain.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- IB Prasad **Applied Mechanics and Strength of Materials**
 - RK Bansal, **Strength of Materials** Third Edition, Laxmi Publications, New Delhi
- 1.

AR 142 History & Humanities II	3 - 3

Focus: Continuing from previous semester, to emphasis on Indian, Islamic and Mughal architecture and style in India.

Objectives

- To understand Indian architecture as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in the Indus valley civilization, Vedic period and manifestation of Buddhist and Hindu architecture in various parts of the country.

Contents

Harappa - Cultural Civilization

Buddhist era architecture in India

Indian temple architecture

Islamic architecture in India

Mughal architecture

The topics will be containing:

- Introduction to Unit, History, excavation, background, planning of town and cities, lifestyle, art and culture etc.
- Conclusion
- Summary of Unit

Outcome

- The students understand Indian architecture as a response to the political and socio cultural conditions present in India at different points of time.
- The architectural responses will be understood with respect to technology style and character.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Sir Bannister Fletcher, **History of Architecture**, Athlone Press
- Brown Percy, **Indian Architecture, Buddhist and Hindu period**, Read Books
- Grover Satish, **Architecture of India, Buddhist and Hindu**
- Tadmor Christopher, **History of Architecture in India**, Phaidon Press.
- Brown Percy, **Indian Architecture, Islamic period**, Palmer Press
- Volwahsen, **Living Architecture Vol 1 &2/A**

AR 152 Basic Design & Workshop II	6 - 6

Focus: Introduction to architectural design through basic design – elements of design

Objective

- To understand the elements and principles of Basic design as the building blocks of creative process.
Design through exercises that will develop the originality, expression, skill and creative thinking.
- To involve students in a number of exercises to understand the grammar of design and visual composition.
- To enable the understanding of 3D Composition by involving students in a number of exercises. This will help generation of a form from a two dimensional/abstract idea.
- To enable the understanding of the relationship between the grammar of design and architecture by involving the students in seminars/ workshops and simple exercises which will look at building form analytically.

Contents

- Elements and principles of visual composition using point, line, shape.
- Exploring color schemes and their application in a visual composition and in architectural forms and spaces.
- Study of texture and schemes of texture both applied and stimulated and their application.
- Study of linear and planar forms using simple material like mount board, metal foil, box boards, wire string, polystyrene etc.
- Study of solids and voids to evolve sculptural forms and spaces and explore the play of light and shade and application of color.
- Study of fluid and plastic forms using easily moldable materials like clay, plaster of paris etc.
- Analytical appraisal of building form in terms of visual character, play of light and shade, solids and voids etc.
- Application of basic design in architectural design through the manipulation of line, plane, solid and voids and application of texture color, proportion etc.

Outcome

- An understanding of the qualities of different elements as well as their composite fusions.
- An ability to engage and combine the elements of design in spontaneous as well as intentional ways in order to create desired qualities and effects

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

Reference:

- F. David Martin and Lee A Jacobus, **Humanities through the Arts**, McGraw-Hill

MDC 003 Environment Science and Studies	4 - 4

Focus: Architecture as a system of environmental control

Objective

- To study human heat balance and comfort.
- To familiarize students with the design and settings for buildings for daylight and factors That influence temperature
- To inform about the air pattern around buildings and the effect of wind on design and siting of buildings
- To expose the students to the various design strategies for building in different types of climatic zones.

Contents

- Climate- factors affecting, classification, modes of measurement, assessment tools
- Comfort- factors affecting, theories and proposed modes of measurement, assessment tools
- Introduction to building physics

Outcome

- Understanding of thermal balance in human beings
- Designing climate responsive structure
- Conceptual understanding of air flow in buildings

Examination Pattern:

- Continuous Evaluation Mid Term 1: I hour duration 25 marks Weightage: 12.5%
- Mid Term 2: I hour duration 25 marks Weightage: 12.5%
- End Term: 3-hour duration 100 marks Weightage: 50%
- Field work and Report writing: ----- Weightage: 25%

Second Year

AR 211	Design Studio III	15 - 15

Focus:

- B.** Basic Computer knowledge related to Architectural software
- C.** Understanding of context and implementation of principles in design
- D.** Understanding importance of spoken, written and visual communication.

Objectives

- Understanding fundamentals of theory of architecture
- Understanding importance of spoken, written and visual communication. basic vocabulary of design
- Studio design project
- Reinforcing spoken, written and presentation skills in English.

Content

Studio projects shall be structured to deal with two (or more) distinctly different contexts with program being identical. Studio could be divided into two groups with different sites and resulting solutions shall be discussed in the class to highlight the various differences, which can be attributed to the contextual reasons. In the second project, context with a number of constraints shall be chosen and the process of enhancing the context, in other words, place making shall be investigated. Studio shall attempt to define the nature of relation between built and un built spaces and the need of using un built spaces for programmatic needs shall be highlighted.

- Advanced English reading and writing exercises through book reviews, business letter writing, and presentation of design projects, group discussions and project reports.

Outcome

- Enable students to learn and understand theory of architecture in depth with practical approach in design.
- Enable students to gain confidence in spoken and written English language
- Understanding of context and relationship of functions

Examination Pattern:

- Sessional: 100% {(60 %: 30% Internal continuous assessment + 30 External) + (40 %: 20% Internal continuous assessment + 20% External)}

Reference:

- Francis DK Ching **Form, Space and Order**
- Prammar VS **Design Fundamentals in Architecture**

- Gideon Space Time and Architecture
- von Meiss, Pierre **Elements of Architecture from Form to place**
- Frank Lloyd Wright on **Architecture**
Wright
- Papadakis **Free Spirit in Architecture**
- Crouch June **Traditions in Architecture/Data Planning**. Johnson
- Snyder, James **Introduction to Architecture**
- Porter, Tom **Colour for Architecture**
- Chen John S M. **Architecture in Pen and Ink**
- Kemmerich Carl. **Graphic Details for Architects**
- Kemmerich Carl. **Manual of Graphic Techniques for Architects, Graphic Designers and Architects**
- **New Metric Handbook; Planning and Design Data**. Recent Edition
- Shankar Mulik. **A Textbook of Perspective and Sciography**
- Alibert O. Halse. **Architectural Rendering**
- N.D. Bhatt. **Engineering Graphics**
- Russel, James E. **Graphics for Architects and Planners**
- Robertson Howard. **The principles of Architectural Composition**. Architectural press, UK, qsasa

AR 221	Building Materials & Construction Technology III	4 - 4

Focus: Knowledge of various structural systems and methods of construction and detailing of buildings of medium complexity using natural and manmade materials.

Objective

- To acquaint the students with construction practices pertaining to RCC, floors, roofs and flooring with different materials. Load bearing and frame structures.

Content

- Construction** - Study of principles and methods of construction of RCC, one way, two way slabs-cantilever slabs, sloping RCC roof, vaults, domes including form-work techniques and reinforcement details. Construction with materials alternative to RCC.
- Flooring in mud, murrum, stones marble, granite, tandur/kota stone, mosaic, terrazzo, ceramic tiles and wooden flooring
- Paving Cast in situ concrete, concrete tiles, interlocking blocks, clay tiles, brick and stone
- Plaster Method of plastering a) Internal (use of various finishes viz., lime, cement, plaster of paris, puffing etc., b) External smooth, rough, textured, grit plaster.
- Materials** – Paints, varnishes and distempers, emulsions, cement base paints. Constituents of oil paints, characteristics of good paints, types of paints and process of painting different surfaces. Types of varnish, methods of applying varnish and French polish and melamine finish.

Outcome

- An Understanding of advanced materials, products and methods of construction and in detailing.

Examination Pattern:

- Theory: 20 %
- Sessional: 80% (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Duggal SK. **Building Materials**

AR 231	Structure Design & Systems III	3 - 3

Focus: Understanding the structural concepts and behavior of structural elements relating the knowledge acquired to architectural design

Objective

- To give an insight into the structural behavior of columns and beams

Content

- Introduction to Torsion theory with simple problems.
- Columns and struts effective length, critical load, slenderness ratio, Euler's equation for different end conditions.
- Formula for slope and deflections of cantilever, simply supported and overhang beam using double integration and Macaulay's method of different load conditions.
- Moment area method for simple case of loading. Expound the structural concepts introduced in non- mathematical terms with examples and application in architectural design.

Outcome

Students will have an insight into the structural behavior of columns and beams

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- SS Bhavikatti. **Strength of Materials**
- Basavarajaiah BS and Mahadevappa. **Strength of Materials**

AR 241	History of Architecture	2 - 2

Focus: Western architecture and its development

Objective

- To provide an understanding of Western architecture during Renaissance, Baroque, Neo classical and modern periods.

Content

- Background and influences on Renaissance architecture. Characteristics of Renaissance Architecture in general.
- General characteristics of Baroque.
- Transitional Period A brief account of the situation before the change over to Modern architecture in Europe. Palladian Revival in Britain, Greek Revival and Gothic Revival
- Impact of Industrial Revolution in Europe the social, economic and political changes effected, new requirements of the society, new materials and technological developments.
- The Chicago school works of Louis Sullivan, early industrial buildings, contributions of Bauhaus, De Stijl Movement, Italian Futurism, Art Nouveavau Movement and Arts and Crafts Movement to Modern Architecture
- Ideas and works of great masters Le Corbusier, FL Wright, MV Rohe, Walter Gropius contributions of Brazilian architect Oscar Niemeyer

Objective

- To understand architecture of different parts of world as evolving within specific cultural contexts including aspects of society, religion, politics and climate
- To gain knowledge of the development of architectural form with reference to technology, style and character in architecture in various parts of the world.

Outcome

- The students will understand architecture as a response to the political and socio cultural conditions present in specific region at different points of time.
- The architectural responses will be understood with respect to technology style and character.

CAD, MUST

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Sir Bannister Fletcher. **History of Architecture**
- Henri Stierlin. **Architecture of the world – Greece**
- Henri Stierlin. **Architecture of the world - The Roman Empire**
- Henri Stierlin. **Architecture of the world – Romanesque**

AR 251	Building Services I	3 - 3

Focus: Understand building services as essential part of design

Objective

- To impart the knowledge and skills required for understanding the building services of water supply and sanitation and their integration with architectural design.
- Understanding rain water harvesting.

Content

- **Water supply** introduction, sources of water supply, qualitative and quantitative aspects, impurities, purification sedimentation, coagulants, filtration, disinfection, water softening and miscellaneous treatment of water. Sources of water pollution and preventive measures. Public water distribution system, methods of layout of distribution pipes.
- Pipe sizes, fittings, valves, types of taps, wash basins, sink, bath tubs, flushing cistern. Domestic water supply systems mains, ferrules, service pipe, water meter, sump, pumps, overhead tank, distribution pipes, cold water and hot water supply for single and multistoried buildings.
- Provision for fire fighting fire hydrants. Study of solar heating systems, gas and electric geysers.
- **Sanitation:** Introduction, importance and purpose of sanitation, definitions bacteria, invert, sewer, sewerage, types of refuse, collection and disposal of refuse, systems of drainage separate, combined and partially separate system, advantages and disadvantages of each system.
- Sanitary requirements for various types of buildings, types of pipes.
- Man holes drop manholes, manhole with intercepting trap, inspection chambers, self cleansing velocity, drains on sloping sites, sub soil drainage, storm water disposal catch basins, inlets, storm water regulators.
- Importance of pumps and sewage pumping stations, septic tanks soak pit, soak well, design aspects, disposal of effluent.
- House drainage principles, traps-floor trap, multi-trap, gully trap, grease and oil trap, urinals, Indian, European, Anglo Indian type of water closet, squatting urinal, bidet

CAD, MUST

- Definitions Siphonage, anti-siphonage pipe, cowl, fresh air inlet, soil and waste pipes, vent pipe
- Systems of plumbing single stack, one pipe, one pipe partially ventilated, two pipe disposal of waste water from buildings typical plan of residence with garage showing all the traps, inspection chambers, pipes connected to public sewer line alternatively connecting the same layout of pipes to septic tank. Testing of drains and drain pipes.
- Brief study - natural methods of sewage disposal by dilution and land treatment, self purification of natural waters, oxidation, sewage treatment, oxidation ponds, aqua privy, garage drainage and layout of simple drainage systems, sewers, materials, laying and testing of sewers, ventilation of sewers, surface drains, sewer, cleaning of sewers, recycling of sewage water. Rain water harvesting.
- Rural sanitation, biogas, different methods of collection and disposal of dry refuse and night soil
- Site visits Water treatment plant, sewage treatment plant, multistoried apartments for studying water supply and sanitary arrangements.

Outcome:

- Students will understand the importance of building services and their use in building
- Students will learn Rain Water Harvesting in buildings

Examination Pattern:

- Theory: 30 %
- Sessional: 70 % (35 % Internal continuous assessment + 35 % External)

References:

- RS Deshpande. **Sanitary Engineering** - (Vol I and II)
- S Birdii. **Water supply and Sanitary Engineering**
- Relevant **IS Codes of India**

AR 261	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 212	Design Studio IV	16 - 16

Focus: A. Urban context and architecture design

B. Basic Computer knowledge related to Architectural software

C. Basic vocabulary of design.

Objective

- To understand the issue of building and context, building bylaws, urban design.

Content

- The design of building will look into aspects of context, surrounding and building program. architectural dimension with issues of services.
- Designing in specific context. Detailed layouts and site planning for building program.

Outcome

Students will learn urban scale and handling of architectural design

Examination Pattern:

- Sessional: 100% {(60 %: 30% Internal continuous assessment + 30 External) + (40%: 20 % Internal continuous assessment + 20% External)}

Reference:

- Broadbent Geoffrey. **Design in Architecture**
- Lang Jon. **Creating Architectural Theory**

AR 222	Building Materials & Construction Technology IV	4 - 4

Focus: Understanding of materials with respect to the construction style and its function

Objective

To study construction systems with focus on roofing and techniques of pile foundation and metal doors, windows and partitions.

Content

Part A.

Construction – Mild steel and Aluminum doors and windows and partitions. Details of RC framed structures with reinforcements, beams including cantilever beams, columns, flat slab, ribbed filler slabs, waffle roof.

Pile foundation Precast piles, cast-in-situ piles, types of piles, method of driving piles, pile caps etc.

Part B.

Materials – Anti-termite treatment to foundation, masonry walls and wood work (pre construction) water proofing materials and weather proofing materials like chemical admixtures and surface applications. Lime and brick bats etc., Pest control treatment.

Outcome:

Students will get exposure of different materials and their practical usage on site.

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Duggal SK. **Building Materials**

AR 232	Structure Design & Systems IV	3 - 3

Focus: Structural systems and implications in design

Objective

- To give an insight into the structural behavior of portal frames.

Content

- Analysis of propped cantilever, fixed beams, shear force diagrams and bending moment diagrams. Analysis of continuous beam (maximum three spans)
- Clapeyron's Three Moments Theorem b) Moment Distribution Method
- Analysis of portal frame (single bay, single story with sway and non-sway) by moment distribution method
- To explain the structural concepts introduced in non- mathematical terms with examples and application in architectural design.

Outcome:

Students will learn the applications of structural mathematical terms in design, through site visits and class lectures.

Examination Pattern:

- Theory: 30 to 35%
- Sessional: 65 to 70% (35 % Internal continuous assessment + 35 % External)

References:

- SS Bhavikatti. **Structural Analysis**
- Vazirani and Ratwani. **Theory of Structures**

AR 242	Surveying & Levelling	2 - 2

Focus: To develop the knowledge and skills related to surveying and levelling principles and practice.

Objective

- Understanding principles of surveying and leveling, use of various survey and leveling instruments, carrying out surveys of land of medium complexity and preparation of survey plans.

Content

- Surveying Definition, classification, principles of surveying, character of work, shrunk scale.
- Chain Survey Instruments used, types of chain, instruments for ranging. Setting out angles, erecting perpendiculars.
- Field work chain triangulation, recording and plotting, errors in survey.
- Plane table survey plane table and accessories. Methods of plane table survey, radiation, intersection, traversing and resection, field problems.
- Levelling definition, classification, booking and reduction of levels, longer levelling, errors
- Theodolite study of instruments, definition of different terms, temporary adjustments, uses, measuring horizontal and vertical angles, method of repetition, extension lines.
- Contouring Characteristics of contours, direct and indirect methods of contouring, interpolation, uses of contours, setting out works such as center lines of a building, grade for sewer, center line of a bridge.

Outcome

Students will learn different methods of understanding complex sites: contours, terrain, cliffs, valley and so on.

Examination Pattern:

- Theory: 20 to 25%
- Sessional: 75 to 80% (40 % Internal continuous assessment + 40 % External)

AR 252	Building Services II	3 - 3

Focus: Advance services in building industry

Objective

- To introduce students to electrical services and illumination and to sensitize them with respect to their integration into Architectural Design.

Content

Part A

- Importance of electrical services in buildings, introduction to commonly used terminology
- Supply and distribution of electricity to buildings substations (including high tension panels, transformers, low tension panels, generators) and overhead versus underground distribution systems, panel boards etc.
- Internal supply and distribution brief description of various cabling types, conduit, PVC casing and capping wiring systems;
- Earthing and brief description of protective devices fuses, MCBs, ELCB, etc., Electrical load estimation.
- Introduction to power and lighting circuits. Indian Electricity Rules-Relevant codes of Practice.

Part-B

- Quality and quantity of light;
- Methods of lighting: ambient, task and accent lighting
- Systems of luminaries: direct, indirect etc.
- Various types of electrical lamps incandescent, fluorescent/CFL, HID s, neon lamps and their lighting characteristics
- Design considerations for different types of occupancies and tasks Preparation of a lighting and electrical scheme

CAD, MUST

Outcome:

Students will learn to incorporate the element light with understanding of its impact in design

Examination Pattern:

- Theory: 30 %
- Sessional: 70 % (35 % Internal continuous assessment + 35 % External)

References:

- H Cotton. **Electrical Technology**
- L.Uppal. **Electrical Wiring, Estimating & Costing**
- Anwari. **Basic Electrical Engg**

CAD, MUST

AR 262	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

Third Year

AR 311	Design Studio V	16 - 16

Focus: Institutional building design and its fundamentals

Objectives

- To understand the differences and similarities between institutional goals and architectural goals.
- To understand creating of spaces for learning. Formal, informal and interactive processes of learning and role of the built environment.
- To understand the role of built environments in therapeutic and nurturing institutions
- Working drawings

Content

- Institutional projects like facilities of higher learning, vocational training or a small-scale campus may be given. Case studies of contemporary campus architecture (built since 1980s) shall be carried out.
- There are two distinct typologies of campuses, one that has integrated into the urban fabric at the edges of its boundary and the other that has ignored the urban fabric. Campus planning may be attempted as a two-stage project, with site planning, as one and other stage could be a detailed design of one of the identified buildings.
- The design has to respond to climatic, environmental and ecological factors.
- Detailing of architectural features of the major project like entrance lobby, skylights and staircases has to be attempted.

Outcome

- Students will learn the goals of the institutions regarding the role of built environment in its functioning.
- They will learn to sensitively design to the needs of disabled, aged people and children.
- One major project and one minor/ time problem to be tackled in semester

CAD, MUST

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 321	Building Materials & Construction Technology V	4 - 4

Focus: Detailing of building elements

Objective:

- To study constructional systems and detailing of special doors, windows, structural glazing and cladding

Content:

Part A

- **Construction** – PVC & FRP, frameless glass doors and windows and partitions. Wooden/Steel/Aluminum sliding and folding doors and partitions.
- Steel doors for garages and workshops. Collapsible gate and rolling shutters, remote control systems of doors and gates. Structural glazing, aluminum composite panel cladding.

Part B.

- **Materials** – Insulation materials Thermal and sound insulation materials. Glass its manufacture in its various types like plate, tinted, decorative, reinforced, laminated glass block, fiber glass, glass murals, partially colored glass, etching of glass and its applications in building industry for both exteriors and interiors.
- Glass fabrication techniques, fiber reinforced composite materials and products.

Outcome:

Students will learn to represent drawings with specific details which will bring clarity to the design as well as understanding

Examination Pattern:

- Theory: 20 to 25%
- Sessional: 75 to 80% (40 % Internal continuous assessment + 40 % External)

References:

- Chudley. **Construction Technology**
- Barry. **Construction of Buildings**

AR 331	Structure Design & Systems V	3 - 3

Focus: Concreate as a building material and its structural qualities

Objective

- To provide an introduction to design of reinforced concrete structures.

Content

- Concrete: Composition, basics of mix design, water cement ratio, strength, durability, workability requirements.
- Relevance of RCC in architectural practice. Advantages of RCC over other conventional structural practices. Steel for RCC Plain & Twisted bars, IS 456 code provisions.
- Working stress method of design basic concept, types of loads, assumptions. Calculation of MR for singly RC beam.
- Limit state method of design. Necessity and philosophy of limit state design. Limit state design of simply supported slabs, beams, T-beams, columns (axial and uniaxial bending) and footings (axially loaded square footing).
- Design of Dog legged and open well stairs (waist slab type)

Outcome:

Students will learn to demonstration models and experiments with materials and structural systems related to the above topics

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- Ramachandra. **Design of steel Structures**
- Kazimi and Jindal. **Design of Steel Structures.**
- IS 800 - 1984, IS 883-1970
- IS special publication for the design of steel structures [SP-6 (1)]

AR 341	Landscape Architecture	3 - 3

Focus: Landscaping as a medium of design in architecture. Understanding of Landscape elements like trees, shrubs, plants, water, rocks and development of landscape planning and application in architectural design.

Objective

- To introduce students to the discipline of landscape architecture and to develop basic skills required in handling simple landscape design projects.

Content

- Introduction to landscape architecture, definitions.
- Noted landscape architects and their concepts and definitions
- Natural and manmade landscape, urban and rural landscape
- Elements of landscape architecture like vegetation, land forms and water bodies and their application in design
- Introduction to Site planning and site analysis
- Landscape materials and plant materials study, introduction to taxonomy
- Study and analysis of contemporary landscape designs
- Study of existing landscaped areas like courtyards, gardens, urban spaces etc.
- Street and site furniture Application of landscape design for site plans, small gardens, residential areas, urban spaces, courtyards etc.

Outcome:

- Students develop skills required in handling landscaping project.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

References:

- JO Simmonds. **Landscape Architecture**
- Michel Laurie. **Introduction to landscape architecture**

AR 351	Climatology	2 - 2

Focus: Climate responsive architectural design requires understanding of climatology

Objective:

- Understanding of Climate and its impact on architectural design, fundamentals of climatology and environmental studies, Passive climatic control.
- To apply the principles of Solar Passive Architecture to design of buildings.

Content:

- Introduction to passive techniques of cooling such as evaporative cooling, earth tubing, wind scoops, roof ponds, shaded courtyards etc.,
- Two design exercises (in hot dry and warm humid climate) with an objective to integrate passive cooling systems in the design.

Outcome:

Students will learn the impacts of climate on architectural design and dealing with them

Examination Pattern:

- Theory: 20 %
- Sessional: 80% (40 % Internal continuous assessment + 40 % External)

References:

- Koenigsberger. **Manual of Tropical Housing & Buildings (Part-II)**
- Martin Evans. **Housing, Climate and Comfort**
- Maxwell Fry. **Buildings in the tropics**
- Arvind Kishan, Baker & Szokolay. **Climate Responsive Architecture**

CAD, MUST

AR 361	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 312	Design Studio VI	16 - 16

Focus: A large scale housing project / Working Drawing

Objectives

- To understand the difference in housing as a process and a product, the role of an architect in creating the product and facilitating the process
- To understand the needs of privacy, communal spaces, efficiency of open spaces and ideas of extended living areas
- To differentiate and understand the nature of organic and planned communities.

Content

- Scale of the project shall be limited to allow for intensive study rather than repetition of typical configuration.
- Housing projects can be attempted with added complexities for example, dense context, occupation based, traditional urban fabric, social status and prevalent social strata.
- Details from the dwelling cell to immediate shared space to communal space shall be emphasized and worked out.
- Socio cultural layer of the occupants shall form a strong fabric in the ultimate weave of the design.
- Projects shall aim at developing a very sensitive attitude towards micro level human habitation and role of architecture in enhancing or curbing the quality of living.

One major project and one minor/ time problem to be tackled in the semester.

Outcome

Students will learn to handle projects with considering disabled, aged people and children. Students will learn to work in socio cultural harmony as well as towards all levels of requirement of housing.

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

AR 322	Quantity & Estimation	3 - 3

Focus: Systems of taking out quantities and estimating for all trades involved in construction of medium complexity, writing specifications for materials and various items of work.

Objective

- To develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

Content

- Introduction, importance of estimation, types of estimates, mode of measurement etc.,
- Study of local SR rates, market rates, measurement book (MB), RA bill, interim and final certificate
- Detailed rate analysis of building items as per current schedule of rates (CSR) of local PWD for information only
- Percentage of various materials used in building items like cement, steel, rubble, metal, sand, brick, tiles etc.,
- Abstract and detailed specifications for various materials and items of work used in building

Estimate of:

- Load bearing and RCC framed structure with one example for each
- Typical interior items of a residence and an office
- Various types of roofs like steel and wood including roofing materials like
- Mangalore tiles, AC, GI sheet etc.,
- Water supply and sanitary works
- A typical layout plan with roads, culverts etc.

Outcome:

- Students will develop the necessary skills for estimation and writing specifications for various types of buildings and developmental work.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

References:

- SK Dutta. **Estimating and Costing**
- SC Rangawala. **Estimating**

AR 332	Structure Design & Systems VI	3 - 3

Focus: Steel as the advance structural building material and its techniques.

Objective

- To give an introduction to the design of steel structures.

Content

- Design of simple and eccentric riveted and welded connections.
- Design of tension and compression members in trusses.
- Design of built-up columns (lacing only)
- Design of slab base (no gusseted base) and simple column and footing connection details
- Design of laterally restrained beams (simple and compound)
- Provision for fire protection for steel structures relevant code provision

Outcome

- Students will learn details and calculations of steel structure and its impact on design

Examination Pattern:

- Theory: 20 %
- Sessional: 80 % (40 % Internal continuous assessment + 40 % External)

References:

- N Krishna Raju. **Pre-stressed Concepts**
- DL Schodek. **Structures**
- Alexander Zamen. **Form and Structure in Architecture**
- N Krishna Raju and RN Pranesh. **RCC - design and practice**

AR 342	Professional Practice	3 - 3

Focus: Introduction to the profession of architecture, its division and sub divisions

Objective

- To understand the responsibilities & liabilities of the profession. To understand the process of contract management.

Content

Profession: Idea of profession and essential difference among profession, trade and business.

- Profession of architecture, its essential tenets, duties and liabilities.
- Types and extent of services offered by architects, scale of fees, stages of payment, and contract between client and architect.
- Code of Professional Conduct, Architects Act of 1972. Role of Council of Architecture and the Indian Institute of Architects in the functioning of the Profession.

Practice: Types of Architectural firms, proprietorship, partnership, associate ship, and private limited concerns. Advantages and disadvantages of each type of firm, various means of building client base and gaining projects, Architectural competitions.

- Guidelines of COA, procedure of conduct of such competitions.
- Administration and basic accounting procedures. Taxes and implications of service tax. Implication of GATS on the profession in India.

Building Industry: General overview of the industry. Various participants and dimensions of building industry. Finance, statutory controls, construction procedures, enforcement issues related to building industry and the role of architect, employer, and contractor.

Contract Management: Overview of procedures in contract management with a focus on Architect's role.

Tender: Procedure of calling for tender, documents necessary for tendering process. Tender document and its content. Types of tenders, suitability of different types to various categories of projects. Advantages and disadvantages of each type of tender. Tender notices, opening, scrutiny, process of selection and award. Architect's role in tender process. Essential characteristics of Tender Notice, Earnest Money Deposit, Security Deposit, Retention Amount, Mobilization Amount

CAD, MUST

and Bonus & Penalty Clauses.

- Various issues arising out of tendering process and the role of an architect in maintaining objectivity in the process.

Contract: General Principles, types of contract, definitions of various terms used in the contract document. Contract document, contents and sections dealing with various aspects of contract management. Conditions and Scope of Contract and the role of an architect in ensuring a positive completion of a contract. Architect's role in the contract and vested authority.

Issues of Contract: i) Termination of contract, ii) Certificates of value and quality, iii) Virtual completion and final completion, iv) Defects liability period, v) Latent and patent defects, vi) Liquidated and un-liquidated damages, vii) Extension of time, delays and penalty, viii) Non tendered items, extras, extra work, additional works, variations, rate analysis and architect's role in certification of variations, ix) Prime cost, provisional sum, x) Types of insurance necessary during contract including fire insurance for safeguarding client's interest.

Outcome

Students will learn the responsibilities & liabilities of the Profession and understand the process of Contract and project management.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

References:

- Roshan Namavathi. **Professional Practice for Architects & Engineers**
- Bob Greenstreet. **Legal and Contractual Procedures for Architects**
- AJ Legal Handbook
- KG Krishnamurthy and SV Ravindra. **Professional Practice**

AR 352	Town Planning & Building Bylaws	3 - 3

Focus: Urban and regional planning and the factors of planning

Objective

- To give an introduction to the discipline of urban and regional planning

Content

- Human settlements Urban settlements and Rural settlements, differences, origins, evolution and growth of settlements. Major functions of a city, city forming and city serving functions. Problems faced by a typical city. Relation between urban and rural settlements, characteristics and planning efforts of cities and towns of various historical periods like Egyptian, Greek, Roman, Medieval, Renaissance, Neo-classical. Industrial Revolution and its impact on cities, the contemporary city. Cities of Indus valley and Vedic period, cities of Moghul period and British period, typical Indo-Aryan cities, typical Dravidian temple city.
- Planning Theories enunciated by Ebenezer Howard, Patrick Geddes, Soria Y Mata, Doxiadis, Le-Corbusier, Clarence Stein, Clarence Arthur perry, Hilberseimer their relevance to Indian conditions.
- Land use planning, land use classification for cities and rural settlements, analysis of land uses in Indian cities.
- Urbanization, Industrialization and urban growth, definitions and inter relationship. Trends in urbanization in India since Independence. Growth of metropolitan cities, their growth and management problems, world urbanization trends.
- Components of a settlement activity pattern and land use, traffic and road network, density of population and population distribution. Central business district of a city, other business districts, urban nodes, rest of the city, fringe area and suburbs. Growth and aging of various parts of the city particularly the CBD, the problems caused due to this including slums, internal spatial structure of cities concentric zone theory, sector theory, multiple nuclei concept and work-home concept.
- Planning Techniques study and analysis of existing settlements, methodology of conducting diagnostic surveys and studies, land use survey, density survey, FSI survey, traffic surveys, presentation of data
- Regional Planning relation among various settlements of a region, pattern of settlements in a

region. Definition of a region, various types of regions, basic principles of regional planning

- Urban Renewal causes and consequences of urban blight and obsolescence slums and shanties methods of conducting surveys, analysis and presentation of data, prevention of formation of slums and squatter settlements. Environmental and management issues.

Outcome

Students will have an introduction to the discipline of urban and regional planning.

Examination Pattern:

- Theory: 30 %
- Sessional: 70% (35 % Internal continuous assessment + 35 % External)

Reference:

- Gallion and Eisner. **The Urban Pattern: City Planning and Design**
- Chapin. **Urban Planning**

AR 362	Elective/Workshop	2 - 2

Examination Pattern:

- Sessional: 100% (50 % Internal continuous assessment + 50 % External)

REVISED B.ARCH. CURRICULUM CAD
[BATCH 2015-2020]



A LEADING WOMEN'S UNIVERSITY

Undergraduate Program
Bachelor of Architecture

School of Architecture & Town Planning

Mody University of Science & Technology

N.H. 11, Lakshmangarh, Sikar, Rajasthan - 332311

Course Outline**School of Architecture & Town Planning, Mody University:**

- B. Arch.

5 Years

(300 credits)

Background

A curriculum for Design Education evolves from the vision of the institution, its aspirations and its capability to deliver the knowledge. It defines the relationships between the teacher and the student and the institution. Curriculum for Architecture also connects creativity and physical reality.

Five-year Architecture undergraduate program is designed to provide an exceptional university education as well as comprehensive preparation for entry in the competitive and challenging career in architecture. Studies in architecture and other associated disciplines are undertaken in parallel throughout the five-year program. This five-year undergraduate professional program is a professional degree accredited by the **Council of Architecture, India**. The program is for a limited number of qualified students committed to the study of architecture. These students are admitted directly to the professional degree program and begin studies in architecture in the first year.

The **B. Arch** curriculum has two stages of study. The stage-1 (years 1, 2, 3) provides a foundation of understanding on which to build a second level of advanced study. Continuously through the course of the program runs the Design Studio, in which projects are selected as a means for developing the professional skills, knowledge, understanding and a platform to create exemplary architectural designs. At the end of the third year, the program culminates with a studio project helping students to summarize what they have learned with an introduction to prepare themselves for more independent studies in the advanced professional program.

The stage-2 (years 4 & 5) concludes with a **semester** (one or two) of Professional Training (forth year) and Final Year Thesis program. The first semester of the final Year integrates an introduction to independent Research Methods. An integrated design research phase continues throughout the final two semesters. The final year project is selected by the students' themselves to provide them an opportunity to develop their individual point of view about the profession and create their own place in the building industry. Thesis or Dissertation is part of the course to investigate issues the student sees as significant to herself and to the profession.

The Objective

- Develop direct personal experience of social, environmental and technological contexts.
- Encourage exploration of the diversity of thoughts, techniques, working methods and material palettes.
- Develop capacities to think from simple first principles, using observation, common sense and intuition to build more elaborate conceptual frameworks.
- Develop ability to “learning how to question, absorb and analyze” rather than following “conventional” practices and solutions.
- Understand and connect to local realities as vehicles for solutions.
- Encourage sharing and collaboration and as well as individual achievement.
- Creativity, skills and initiative should be developed and encouraged to assist the involvement of the body, mind and therefore confidence.
- General awareness towards architectural heritage introduced from the beginning of the degree program through courses / electives by experts on conservation, restoration and re –adaptation of buildings.

The Curriculum (B. Arch)

The curriculum allows students to choose their own area of interest and allow for independent exploration in the later years (3+2-year model) by having option of choice based Studio and Theory subjects. This is important to have a more mature and self-driven Architect. The curriculum shall also encourage students to select subjects of their choice from allied disciplines at other Colleges of this University.

The curriculum is to allow for Inter-disciplinary teaching in areas of Technology, Humanities and Environment by conducting joint sessions and assignments. The course content is synchronized to facilitate the same. Moreover, each semester has a thematic emphasis to allow many different subject to address the same. This is done to facilitate further synthesis.

Curriculum structure allows for other means of learning such as travelling studios, joint studios or studios in other socio-cultural environment apart from exchange program. This can provide the necessary confidence to deal with the outside world.

The courses dealing with design studio, technology, humanities shall be taught in an inter-disciplinary manner and not as compartmentalized specializations.

History, theory & technology based courses are those, which let us understand and appreciate, social, cultural, technological and historical knowledge and skills for its application in design projects.

Course Structure

The course structure and relative emphasis between sub-disciplines vary depending on their position within the course.

First year, being a Foundation year, the emphasis shall be on the development of background knowledge such as sensibility, analytical skills, technical and general communication skills and associated disciplines.

During Second and Third, Advanced years the emphasis is on understanding and appreciation of in-depth relationships between various disciplines and use of their resolutions, complexity, techniques and methods of application. The Fourth and Fifth Years, termed as final years, emphasize the development of the individual's maturity and establishment of direction. During last two years of the course student develops her theoretical and practical understandings and decide on personal choice of directions.

Credit Loads

The course is of 5 years / 10 semester's duration. Each year consists of 2 semesters of approximately 16 weeks each. Each semester carries a contact load of 30 credits, where 1 credit is equivalent to 1.0 lecture hour/week in theoretical subjects and studio, workshop, laboratory based courses.

Each semester normally consists of (including design studio) not more than 6 subjects and each subject is normally of at least 2 credits.

In addition to subjects that form the core of the curriculum, the course offers 10 credits out of a total of 300, as electives. These electives are offered within the disciplines of humanities, arts and crafts: history and theory, and technology, so that a student can develop her interest in these areas.

- 1 Credit = 1 Contact hour for Theory/ Studio/ Workshop

Assessment

Student's performance is continually evaluated through Time Problems, projects, Tests, Quizzes and periodic assessments of sessions work. Generally, **50 %** of the assessment is through this system, and **50 %** weight is assigned to end of semester examinations (Internal). All core subjects are examined at the end of the semester through project review (Juries), crits, viva-voce or examination papers. Electives are normally assessed through final results, assignments or papers.

In order to clear a subject a student must obtain at least **50 %** marks in all the assessments of the subject. While the teaching faculty in all subject areas does grading, the subjects at the end of the Third and Fifth Year are examined additionally by an external examiner.

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 412 – Architectural Design VII

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	12	200	200	14	400

Objective: To learn about reading and documenting urban housing contexts and to understand the idea of urban housing development. To understand the role of architecture in shaping urban housing fabric. To create architecture which fits into a specific urban context.

Contents:
Unit 1: Introduction

Review of different forms of housing globally, Housing need & Demand, Housing resources and options available in housing

Unit 2: Research and data collection through case study

Finding details of housing in Indian context, collecting data and analyse case study

Unit 3: Design

Design project on given site; there may be a minor design project and a major design project.

Unit 4: Design development

Design development in stages using all the data collected through case studies.

Outcome: Students will have understanding about the housing fundamentals and design methods will get explored.

References:

- Babur Mumtaz and Patweikly, **Urban Housing Strategies**, Pitman Publishing, London, 1976.
- Geoffrey K.Payne, **Low Income Housing in the Development World**, John Wiley and Sons, Chichester, 1984.
- John F.C.Turner, **Housing by people**, Marison Boyars, London, 1976.
- Martin Evans, **Housing, Climate and Ocmfort**, Architectural Press, London, 1980.
- Forbes Davidson and Geoff Payne, **Urban Projects Manual**, Liverpool University Press, Liverpool, 1983.
- DL Schodek, **Structures**
- Alexander Zamen, **Form and Structure in Architecture**
- N Krishna Raju and RN Pranesh, **RCC - design and practice**

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 422 – Advance building Construction I

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	3	100	100	4	200

Objectives:

Study of the advanced and more complex aspects of construction. It also aims at making students aware of systems and techniques of construction systems of roofing for large span and complex buildings.

Contents:

Unit 1: Special concrete and concreting method

High density, fiber Reinforced, polymer concrete, properties & uses. Ready mixed concrete, grouting, cold weather & underwater concreting, Lightweight concrete construction, Composition of lightweight concrete & its advantages, its application in building walls, roof, foundations & ornamental works.

Unit 2: Roofs and Water Proofing

Expansion Joints, Water-Proofing, false Ceiling, Suspended ceilings, roofs.

Unit 3: Space Structure

Introduction to space structures, possibilities in different materials, types of space structures and possibilities in different materials to cover large spans.

Unit 4: Steel Truss and Temporary Structure

General study of Grid structures and skeletal structures, space frames, domes etc. in steel, various types, constructional aspects, merits and demerits, etc. Steel trusses for various spans, ridged truss, saw tooth truss with lattice girders, roof lighting, a/c sheet and profiled MS sheet cladding and roof fixing details. Temporary structures, materials and techniques used, earthquake resistant structures.

Materials - Plastics - types, properties and uses of plastics such as polycarbonates, acrylics, PVC polymer films, fiber reinforced plastic. Rubber and Asbestos cement products. Water Proofing elements, construction chemicals and additives, adhesives, plaster of Paris, gypsum, Polystyrenes, sealants, Ferro-cement

Outcome:

Students will have understanding of material properties and construction techniques of Ferro cement, RCC and special concreting methods and appropriate material and technology.

References:

EVANS, M. (1980). **Housing, climate and comfort**. London [etc.], The Architectural Press.

PAYNE, G. (1985). **Low-income housing in the developing world: the role of sites and services and settlement upgrading**. Chichester, W.Sussex, Wiley.

PAYNE, G. K., & DAVIDSON, F. (2000). **Urban projects manual**. [Liverpool], Liverpool University Press in association with Fairstead Press.

TURNER, J. F. C. (1991). **Housing by people: towards autonomy in building environments**. London, Boyars.

WAKELY, P. I., SCHMETZER, H., & MUMTAZ, B. (1976). **Urban housing strategies: education and realization**. London, Pitman.

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 432 – Structure Design & Systems VII

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
3	0	0	50	50	3	100

Objectives:

Conceptual study of Advance Frame construction structures with reference to high rise buildings and surface structure.

Content:**Unit – I: TIMBER STRUCTURES – BEAMS, COLUMNS AND ROOF TRUSSES**

Properties, strength and types of timber used as structural components in timber construction – Permissible stresses in timber – Design of Columns and beams as per BIS codes. Types of Timber Roof Trusses used for different spans.

Unit – II: Foundation and Pre - Stressing

Raft foundations, **Pre-stressing** – Method and losses in pre-stressing, comparison of RCC and pre-stressing, Pre-stressing systems. Pre-tensioning and post-tensioning.

Unit – III: Cantilever and Truss

Types of **roof trusses** – Selection of trusses according to the span – Estimation of gravity loads and wind loads, Use of BIS and book SP-38 in analyzing and design of trusses, gusseted plate connections (Theory Only). Cylindrical, parabolic and flat arches, advantages and limitations. Beams and columns and various types of supporting systems cantilever and propped cantilever. Continuous and fixed beams and their behavior under load.

Unit – IV: Shell Structure

Simple framed structures and trusses-advantages and limitations. Conceptualizing and understanding of surface structures – shells, domes and folded plates.

Outcome:

Students will have understanding of advance frame construction, high rise building structure design, timber structures and shell structure.

References:

- V.S.Prasad, **Structural Mechanics & Analysis**,
- B.C.Punmia , **Strength of Material & Mechanics of Structure (Vol. II)**, M/s. Lax Publications, New Delhi - 2010
- C.S.Reddy, **Basic Structural Analysis**,
- Ramachandra .S, **Design of steel structures Vol. I**, Standard publication, New Delhi, 1992
- Vazirani .V.N, and Ratwani .M.M, **Steel structures**, Khanna Publications, New Delhi, 1995

B. ARCH. (STAGE II) - SEMESTER - VIII**AC 442 – Professional Practice-II (Valuation & Contract documents)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	1	0	50	50	2	100

Focus: Introduction to the profession of architecture, its division and sub divisions

Objective: To understand the responsibilities & liabilities of the profession. To understand the process of contract management.

Content:

Unit 1: Practice: Types of Architectural firms, proprietorship, partnership, associate ship, and private limited concerns. Advantages and disadvantages of each type of firm. Various means of building client base and gaining projects. Architectural competitions,

- Guidelines of COA, procedure of conduct of such competitions.
- Administration and basic accounting procedures. Taxes and implications of service tax. Implication of GATS on the profession in India.

Unit 2: Contract: General Principles, types of contract, definitions of various terms used in the contract document. Contract document, contents and sections dealing with various aspects of contract management. Conditions and Scope of Contract and the role of an architect in ensuring a positive completion of a contract. Architect's role in the contract and vested authority.

Unit 3: Valuation and Rent

Valuation – purpose of valuation, types of valuation- book value – salvage value- scrap value- depreciation obsolescence- sinking fund- land valuation- mortgage and lease- problems on valuation- Annuity- definition, Fixation of rent- out going- gross and net income – year's purchase- capital cost- standard rent- market rent economical rent

Unit 4: Outsourcing and Architectural competition

Basic introduction, Regulations governing the **conduct of competitions**, open & closed competitions, appointment & duties of Assessors, instructions to participants, award of premium. Role of development authorities & urban arts commissions, salient features of the DCR for CMA, **important regulations** in Rajasthan govt.,- Environmental acts & laws, special rules governing hill & desert area development, heritage act of India etc.

Outcome:

Students will understand complex technicality of the profession

References:

- Roshan Namavati, **Professional Practice**,
- **COA Handbook of Professional Documents.**
- **Hand book on Professional Practice**, I. I. A, Image systems, Mumbai, 1998.

B. ARCH. (STAGE II) - SEMESTER - VIII
AC 451 – Dissertation

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
1	0	2	100	100	3	200

OBJECTIVES

- The primary objective of this subject is to enable students to establish a strong theoretical foundation, clarity of thought and also to orient the students to structured research in a focused manner.
- The process of study shall enable students to conduct in depth analysis and objective research on a topic of their interest.
- Students may be encouraged to select the topic which may eventually culminate in the further studies and research work.

COURSE CONTENTS

Students may choose a topic related to Architecture and allied subjects. The topics must be vetted by the faculty. Emphasis must be on critical understanding, logical reasoning and structured writing.

Students can thus utilize this as an opportunity for writing research papers, amounting to literature review and relevant case studies which are otherwise required for Thesis. The study shall be conducted under the guidance of teacher or external expert in the department.

OUTCOMES –

- By the end of the semester, students will be submitting a written paper of approximately 3500 words.

SUGGESTED REFERENCES

1. Mukhi, H.R. Technical Report Writing: Specially prepared for Technical and Competitive Examinations, New Delhi: Satya Prakashan, 2000.
2. Barrass, Robert. Writing at Work \b a guide to better writing in administration, business and management, London: Routledge, 2003.
3. Seely, John. The Oxford guide to effective writing and speaking, 2nd ed., Oxford; New York : Oxford University Press, 2005.
4. Jo Ray McCuen, Anthony Winkler. Readings for writers, 9th ed., Fort Worth: Harcourt Brace College Publishers, 1998.
5. Treece, Malra. Effective reports, 2nd ed., Boston: Allyn and Bacon, 1985.
6. Anderson, J. and Poole, M. (1998). Thesis and assignment writing. Brisbane: John Wiley.
7. Borden, I. and Ray, K. R. (2006). The dissertation: an architecture student's handbook. 2nd Ed. Oxford: Architectural Press.
8. Fink, A. (1998). Conducting research literature reviews: from paper to the Internet. Thousand Oaks: Sage.
9. Murray, R. (2005). Writing for academic journals. Berkshire: Maidenhead, Open University Press.

B. ARCH. (STAGE II) - SEMESTER - IX
AD 511 – Architectural Design VIII

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	14	300	300	16	600

Objectives: To create an opportunity for the coordinated group work in conducting physical, socio-economic and traffic analysis: data collection, analysis and presentation as a prerequisite to the main design issues, including intervention into specialized aspects of landscaping, town planning and urban design through architectural design exercises.

Contents:
Unit 1: Building Project & the vicinity around

Correlation of design issues to land and surrounding areas, influences of neighbouring areas on the design development; Consideration of issues such as socio-economics, environment, technology in relation to urban design. (Prerequisites: Earlier design studios)

Unit 2: Urban Context

The basic aim of the studio is to relate the building/buildings, complexes, streets, public places and spaces, etc., to the urban or regional context for which the change in the scale would imply change in the complexity of design, change in the user profiles, change in the issues addressed and involvement of public in design. The large scale design would require variation in all stages of design; understanding Urban Sprawl.

Unit 3: Aspects of Urban Design

Aspects in Design: Introduction to historical development of urban design, various theories in modern times, aspects of planning, and cultural contribution in definition of spaces. Studies in urban design like behavioral studies and physical expression of socio-cultural aspects, morphology and typology in city structure, townscape and image ability of public spaces, communication systems, infrastructure development and network of open spaces, etc., are understood through examples or book reviews. Interpretive techniques and analyzing methods like visual analysis, questionnaire techniques, recording devices, mapping and vantage points, are reviewed and chosen.

Unit 4: Survey Methods

Observation, Methods of public participation in design are to be studied. Design proposal should consider all possibilities to achieve the aims and objectives of design. The class should provide a master-plan which would have design in the form of guidelines, bye-laws, phasing of design, prototype, design, or detailed design

Outcome:

Developing skill of higher design level of contextual-planning, neighborhood thinking

References

- Gallion Arthur B ; Eisner Simon, (1963) **Urban pattern city planning and design**, Van nostrand
- Cullen Gordon, (1968), **Townscape**, Architectural Press
- Spreiregen P D(1965), **Architecture of towns and cities**, McGraw Hill
- Chiara, J.D. (1984), **“Time Saver Standard for Site Planning”**, McGraw Hill Book Co., N.Y.
- Krier Rob, (1984) **Urban Space**, Academy editions
- Christopher Alexander,(1977), **Pattern Language**, Oxford University Press
- Sanoff Henry, (1991), **Visual research methods in Design**, Van Nostrand Reinhold
- Banargee Tridib Southworth Michael, (1990), **City Sense and City Design**, M I T Press
- Broadbent Geoffrey, (1990), **Emerging concepts in urban space design**, Van Nostrand Reinhold, London.

AD 521 – Professional Practice-III (Legal implications & business management)

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
4	0	0	50	50	4	100

Objectives:

The study of this subject is to enable the student to acquaint with the various responsibilities of an architect and understand the technicality of the profession. To understand complex issues and their solutions related to professional practice.

Content:**Unit 1: Business management of professional practice**

Office management practice, dealing with client, contractor specialist suppliers & services consultants, record keeping, methods of filing, business communication. Handling business management software. HR practices, feedback, planning & decision making, manpower management.

Unit 2: Financial & office management of professional practice

Budgeting of the project, office budgeting, profit & loss, receipts & payments, income & expenditures, taxation- professional tax, income tax, service tax etc. trial balance, inventory records, basics of internal & external auditing.

Unit 3: Legal implications of professional practice.

Definition, types of Easements, acquisition, protection and extinction of easements – Need for Arbitration: arbitration agreement, role of arbitrators, umpire etc, excepted matters, arbitral award, terms of contract between architect & client, client & contractor etc., Sale deed procedure.

Issues of Contract: i) Termination of contract, ii) Certificates of value and quality, iii) Virtual completion and final completion, iv) Defects liability period, v) Latent and patent defects, vi) Liquidated and un-liquidated damages, vii) Extension of time, delays and penalty, viii) Non tendered items, extras, extra work, additional works, variations, rate analysis and architect's role in certification of variations, ix) Prime cost, provisional sum, x) Types of insurance necessary during contract including fire insurance for safeguarding client's interest.

Unit 4: Special Architecture issues.

Local Rules and regulations, its effects on profession and education. General information and introduction to various acts and laws such as land acquisition Act, urban land ceiling Act. Building bye-laws, owner ship documents, Dilapidation and Demolition. Latest methods of assessing building age & ways of dismantling of buildings.

Outcome:

Students will understand complex technicality of the profession

References:

- Roshan Namavati, **Professional Practice**,
- **COA Handbook of Professional Documents.**
- **Hand book on Professional Practice**, I. I. A, Image systems, Mumbai, 1998.

AD 531 – Advance Building Construction - II

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
2	0	4	100	100	6	200

Objectives:

To inculcate the basic concepts related to the tall buildings structure and behavior and various types of shells. To introduce the basic concepts of Space Frames, Shells and folded plates and tensile structures, parametricism and biomimicry.

Content:**Unit 1: Special Structures**

Definitions, Types – single, double & multilayered grids – two way & three way space grids, connectors, Grids, Domes, various forms, Geodesic domes. Advanced Foundations: Pile and raft foundations, Lift slab construction, slip form construction etc. Analysis of three hinged arches. Diaphragm tension, Structure for pavilions.

Unit 2: Tall Buildings

High rise buildings, foundations structural systems and architectural design considerations, Brief outline of their Behavior and their applicability for various heights of buildings, advanced methods of multistory building construction, Sky Scrapers. General study of various external cladding materials and systems, curtain walling in various materials, construction details of glass curtain walling.

Unit 3: Design for Earthquake zone and Reconstruction

Earthquakes and its effects on buildings, earthquake zones in India, Architectural design considerations and construction detailing for earthquake resistance. Design and detailing of additions and alterations in existing buildings put to new use Process of modification and precautions to be taken. Arches: Basic concepts, Disaster resistant construction system.

Unit 4: Tensile Structures

Suspended cable structures, types of cable network systems, shapes of cable suspended systems, examples of tensile membrane structures, types of pneumatic structures. Space frames, unconventional buildings like TV towers, Geodesic domes – principles and construction, basics of parametricism and biomimicry.

Outcome:

The student shall have conceptual understanding of designing Shells and Space Frames, appropriate knowledge to tall structural systems, shells and folded plates and tensile structure for the space coverage and other advanced design concepts.

References:

- Gurucharan Singh, **Building Construction and Material**, Standard Book House, Delhi - 2010
- Stephen Emmittand, Christopher George, **R. Barry's Advanced Construction of Buildings**, Black Well Publishing Oxford – 2006
- R. Barry – Affiliated East West Press, **The Construction of Building, Vol-1, IV**, New Delhi – 2004
- M.J.Tomilson, **Foundation Design and Construction**, Educational Low Priced Books Scheme with Longman London - 1995
- Francis D.K.Ching, **Building Construction Illustrated**, VAN Nostrand Reinhold, New York – 2010
- L.S.Beedle, **Advances in Tall Buildings**

AD 541 – Thesis Orientation

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
1	0	1	50	50	2	100

Objectives:

To develop faculty of critical thinking in student in orienting toward thesis design/research statement, leading to creation of comprehensive base of information relevant to the thesis project in the subsequent semester.

Content:**Unit 1: Reviewing**

Review of a book and a research paper; basics of a book review, selection of reading material for review; techniques of reviewing.

Unit 2: Case Study

Selection of a nagging problem for case study, basics of undertaking case study.

Unit 3: Basics of writing a Concept Paper

Selection of a topic of interest, finding out niche area in which to work, enumerating risks and advantages in the area selected, literature search, processing of pictures and data.

Unit 4: Preparation of a Research Paper

Preparation of points from the data processed, understanding the framework of technical writing, actual writing and reviewing, support text with illustrations, referencing and cross-referencing, writing bibliography and completing the paper.

Note: Each student shall select a topic related to Architecture/allied fields with the guidance of the faculty coordinator of Thesis Orientation course; who will check on the progress of the students work. It is important that the student should start thinking about the dissertation/thesis topic much earlier during the practical training. This will give the student an opportunity to interact with the professional architects and colleagues in the firm, where she undergoes professional training.

Outcome:

Students get equipped with the skill in the basics of dissertation writing and critical thinking.

References:

- DWIVEDI R.S. (2001), **Research Methods in behavioral science**. Mcmillan New Delhi
- SANOFF, H. (1991), **Visual research methods in design**. New York, Van Nostrand Reinhold.
- WANG, D. ET AL. (2013), **Architectural research methods**. Groat, Hoboken, N. J., Wiley
- ZEISEL, J., & EBERHARD, J. P. (2006), **Inquiry by design: environment, behaviour, neuroscience in architecture, interiors, landscape and planning**. New York, W. W. Norton & Company.

B. ARCH. (STAGE II) - SEMESTER - X
AD 512 – Architectural Design Thesis

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
0	0	8	400	400	24	800

Objectives:

- To develop assimilation, synthesis and application of research in Architecture
- To prepare a student to independently handle and present all aspects of an architectural design: from its evolution to final solution in totality;
- To understand the importance of the evolutionary stages of a design process and various techniques required for a successful presentation of an architectural design;
- To develop in students the ability to handle specific aspects of design relevant to the topic.

Course contents

Each student is required to conduct an intensive study and present a design thesis on any of the design topics. The students should submit synopsis for the least three different, designs or research oriented topics in the department, of which one will be approved to carry on the research and design. Each student shall be attached with a faculty member who will guide his work. The arrangement of the assessment of the progress through the semester for all the students and a Program Schedule 'will be declared separately for each session by the department.

The work of the student should result into a 'Design Proposal' based on the complete and detailed study of site including its selection, topography, climate, spatial requirements of the project, special functional and physical needs of the project, and the standard data, construction and services and all other factors that the involved with a particular thesis topic.

At least two of the following items, for complete design or an approved part thereof, should be covered in full detail and included in the design and presentation, along with the final design proposal-

1. Structural calculations and design.
2. Detailed estimate and specification.
3. Working drawing and construction details.
4. Proposal for Mechanical services to cover 'Air-conditioning & Mechanical conveying system'.
5. Proposal for Electrical Services and Illumination.
6. Proposal for Water supply and waste disposal services.
7. Proposal for Acoustical design & specification.
8. Proposal for Interior design – including furniture, fittings and finishes.
9. Landscape design proposals in detail.

The design proposal should be prepared and presented with the help of charts, Drawings, perspective views, models and other audio-visual aids. A thesis report must also be prepared and submitted in one soft copy (on CD) and three hard copies (one to be returned to the student) type written and bound together with prints and photographs of all the drawings & models. The thesis report should explain the objectives, scope, case studies, literature study – research and data, design concept/approach, design proposals, construction programming & financing etc.

The original drawings, models and one copy of the thesis report will be returned to the students in due course of time as decided by the department.

Outcomes:

- **Designs** a Thesis project responsive to the contextual and program requirements.
- **Combines** the systematic/methodological learning from various stages of study and analysis in design process towards culmination of an informed design.
- **Communicates** the ideas clearly using writing, verbal and visual presentation.
- **Demonstrates** self-reliance when working independently
- Integrates ideas with design requirements
- **Compares** data and information gathered from Pre-design research
- **Evaluates** data and information gathered from Pre-design research and summarizes the information to be used for design
- **Applies** various codes, standards and regulations governing the project.
- **Demonstrates** synthesis of creativity and technical knowledge
- **Demonstrate** the ability for decision making required to progress the understanding already developed.
- **Demonstrate** the ideas clearly using detailed physical Model.

References

1. Mukhi, H.R. Technical Report Writing: Specially prepared for Technical and Competitive Examinations, New Delhi: Satya Prakashan, 2000.
2. Barrass, Robert. Writing At Work \b a guide to better writing in administration, business and management, London: Routledge, 2003.
3. Seely, John. The Oxford guide to effective writing and speaking, 2nd ed., Oxford ; New York : Oxford University Press, 2005.
4. Jo Ray McCuen, Anthony Winkler. Readings for writers, 9th ed., Fort Worth : Harcourt Brace College Publishers, 1998.
5. Treece, Malra. Effective reports, 2nd ed., Boston: Allyn and Bacon, 1985.
6. Time Saver Standards
7. Neuferts Architects Data
8. A.J.Metric Handbook

B. ARCH. (STAGE II) - SEMESTER - X**AD 522 – Advance Elective I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	1	50	50	2	100

AD 522 INTERIOR DESIGN

Objectives: To study the Interior Design principles and their applications in interiors.

Detailed study of History, principles and elements that go into making of an interior space more aesthetic, pleasing and functional with a few projects as practical.

ContentS:**Unit 1: Introduction to interior design**

Definition of interior design - **Interior design process** - Vocabulary of design in terms of principles and elements - Introduction to the design of interior spaces as related to typologies and functions, themes and concepts - Study and design.

Unit 2: History of interior design

Brief study of the **history of interior design** through the ages relating to historical context, design movements and ideas etc. - Brief study of folk arts and crafts. (vernacular design in India) with reference to interior design and decoration.

Unit 3: Elements of interior design - enclosing elements and furniture design & space planning

To understand passive architecture. Introduction to various **elements of interiors** like floors, ceilings, walls, staircases, openings, interior service elements, incidental elements etc. and various methods of their treatment involving use of materials and methods of construction in order to obtain certain specific functional, aesthetic and psychological effects.

Study of the relationship between furniture and spaces - human movements & **furniture design** as related to human comfort. Function, materials and methods of construction - changing trends and lifestyles – innovations and design ideas - Study on furniture for specific types of interiors like office furniture, children's furniture, residential furniture, display systems, etc. – Design Projects on Residential, Commercial and Office Interiors.

Unit 4: Elements of interior design– lighting accessories & interior landscaping

Study of **interior lighting** - Different types of lighting their effects types of lighting fixtures. Other elements of interiors like accessories used for enhancement of interiors – Paintings, objects de art, etc. Interior landscaping - Elements like rocks, plants, water, flowers, fountains, paving, artifacts, etc. their physical properties, effects on spaces and design values.

Outcome:

Expertize ad better understanding of subject interior design and its application.

References:

- Francis .D.K. Ching, **Interior Design Illustrated**, V.N.R. Pub., NY 1987.
- Julius Pendero and Martin Zelnik, **Human Dimensions and Interior space**, Whitney Library of Design, NY 1979.
- Steport - De Van Kness, Logan and Szebely, **Introduction to Interior Design** Macmillan Publishing Co., NY 1980.
- Inca / **Interior Design Register**, Inca Publications, Chennai, 1989.
- Kathryn .B. Hiesinger and George H.Marcus, **Landmarks of twentieth Century Design**; Abbey Ville Press, 1993.
- Syanne Slesin and Stafford Ceiff - **Indian Style**, Clarkson N. Potter, Newyork, 1990.
- The Impulse to adorn - **Studies in traditional Indian Architecture** - Editor Dr.Saranya Doshi, Marg Publications, 1982.

AD 532 SUSTAINABLE PASSIVE DESIGN

Objectives: To learn basics of passive architecture techniques and its impact on architectural design, fundamentals of passive architecture. To study passive design principles in old & new buildings of India.

Content:**Unit I: Concept of passive building design.**

Introduction. Need of passive architecture. Energy and Global environment, Energy use and Climate change – Its impact, Types of Energy. Introduction to passive and sustainable building designs. Summary & conclusion

Unit II: Passive techniques

Introduction. Global warming & heat Island effect. Heating cycle, Solar gains, Solar Geometry & Shading. Various passive heating techniques & passive cooling techniques. Day lighting & ventilation passive techniques. Summary & conclusion

Unit III: Sustainable building materials & construction.

Introduction. Impact of Construction on environment. Techniques of sustainable construction - technologies, methods of effectiveness. Alternative materials and construction methods. Summary & conclusion

Unit IV: Green Building Rating systems

Introduction. Green architecture and various international rating systems for sustainability. Indian systems – TERI GRIHA rating, LEED India rating, IGBC. Case studies. Summary & conclusion

Outcome:

Increased understanding of the concept of passive architecture & its impact on built environment.

References:

- N.K. Bansal; **Passive Building Design**
- D.K. Ching; **Green Building illustrated**
- SPIEGEL 3rd edition ; **Green Building Materials**
- Keith Robertson and Andreas Athienitis; **Solar Energy for Building**
- K. Athienitis and Mat Santamouris; **Thermal Analysis and Design of Passive Solar Buildings**
- Martin Evans ; **Housing, Climate and Comfort**
- Maxwell Fry ; **Buildings in the tropics**
- Arvind Kishan, Baker & Szokolay ; **Climate Responsive Architecture;**
- P. Kukreja ; **Tropical architecture**

AD 542 HERITAGE CONSERVATION**COURSE OBJECTIVES:**

- Moving from basic theories, the course touches upon the technical aspects and ethics of conservation.
- The course culminates with a module on sensitizing the students of architecture towards designing in historic environments.
- Explore the history, philosophy and science of architectural conservation through lectures and seminar discussions.
- Encourage appropriate methodologies and tools for recording, documentation and inventorying of heritage structures.
- Develop sensitivity to design in heritage environment.

COURSE CONTENTS

- **Unit - 1. Introduction to Conservation**

- Definitions for the heritage components of built heritage;
- An overview of national and international approaches from UNESCO, ICOMOS, ICCROM, A.S.I., GETTY foundation, INTACH, WMF, international charters, Civic bodies etc.
- Search for an Indian approach; Legal Status of Heritage in India.
- National Conservations Policy of ASI.

- **Unit - 2. Documentation & Mapping**

- Listing of monuments and recording techniques,
- Documentation techniques for buildings and other intangible heritage components; Understanding assessment and mapping the factors of deterioration;

- **Unit - 3. Conservation Concepts:**

- Prevailing practices in conservation,
- Concepts of restoration, retrofitting, rehabilitation, consolidation, preservation, revitalization etc.
- Adaptive reuse;

- **Unit - 4. Conservation Techniques:**

- Conservation of Built Heritage using traditional materials and techniques;
- Approach and methodology for appropriate repairs

- **Unit - 5. Design Approach in Historic Context:**

- Approaches in designing in the historic context,
- Interpretation with examples in India and abroad;
- Concepts of heritage zones,
- Identification and delineation criteria for historic urban fabrics;

COURSE OUTCOMES:

- To understand the philosophy and science of architectural conservation.
- To learn the appropriate methodologies and tools for recording, documentation and inventorying of heritage structures.
- To acquire skills for documentation photography, surveys, research etc.
- To apply suitable methodology with reference to given context
- To critically evaluate and make assessment of heritage components
- To design in a heritage context
- To demonstrate respect for built and cultural heritage

SUGGESTED REFERENCES

1. Guidelines for Conservation: A technical Manual Bernard Feilden 1989 INTACH, New Delhi
2. ICOMOS Charters, (Venice Charter, Burra Charter, Nara Declaration) ICOMOS

3. Management Guidelines for World Cultural heritage Sites. Bernanrd Feilden & Jukka Jokilehto, 1998
ICCROM, Rome
4. Conservation Manual Sir John, Marshall 1923 Archaeological Survey of India.
5. National Conservation Policy 2013 Archaeological Survey of India

B. ARCH. (STAGE II) - SEMESTER - X**AD 532 – Advance Elective II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	TUTORIAL	PRACTICAL/ STUDIO	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	1	50	50	2	100

AD 552 HOUSING

Objectives: To develop independent critical thinking in the sector of housing design.

Contents:**Unit 1: Basics of Housing**

- The definitions of housing, housing concepts, housing needs, supply and demand, socio-economic aspects, affordability, etc.

Unit 2: Housing typologies and standards

- Single unit housing; row housing; high density housing; low density housing; medium density housing; detached housing, housing standards and their relevance to development, new trends.

Unit 3: Housing approaches, dynamics and possibilities

- Density studies, massing studies, Built unit development; actors in housing; land allocation/plot provision; owner built housing; commercially developed housing; cooperative housing; social housing; public housing; mass housing; self help housing; dynamics of squatter settlements; community development issues; incremental housing development.

Unit 4: Planning and Design inputs and case studies

Upgrading; low cost approaches; consolidating; appropriate design options of building components; layout design including infrastructure and services, housing design as a result of environmental aspects, development of technology and community interests, case studies in Public sector housing, Industrial Housing, Government housing, private and cooperative housing, their advantages and disadvantages.

Outcome:

Students will understand the concept of Housing & its impact on built environment.

References:

- EVANS, M. (1980). **Housing, climate and comfort**. London [etc.], The Architectural Press.
- PAYNE, G. (1985). **Low-income housing in the developing world: the role of sites and services and settlement upgrading**. Chichester, W.Sussex, Wiley.
- PAYNE, G. K., & DAVIDSON, F. (2000). **Urban projects manual**. [Liverpool], Liverpool University Press in association with Fairstead Press.
- TURNER, J. F. C. (1991). **Housing by people: towards autonomy in building environments**. London, Boyars.
- WAKELY, P. I., SCHMETZER, H., & MUMTAZ, B. (1976). **Urban housing strategies: education and realization**. London, Pitman.

AD 562 REGIONAL & URBAN PLANNING**OBJECTIVES**

- To develop skills for a comprehensive design in areas of urban design, hospitality for making a complete design portfolio from the brief to tender drawings.
- Understanding design as a process of problem identification, space standards, formulation of requirements, evolution of design criteria and development of design of buildings in urban context, phasing and development.

COURSE CONTENTS**Unit 1:-**

Issues of urban structure, urban space and form: Issues of conservation: Issues in zoning, land use, density, development control: Issues of building in context, urban infill: Density, mixed land use, ground coverage, development controls: Urban systems, services and their integration with the project: User requirements (derived from surveys): Issues in appropriate technology and costs: Issues of hierarchy, identity of space, public and private scales of space: Integration of community institutions etc: Detailing for the disabled and the elderly;

Unit 2:-

Issue in preparation of Master Plan for academic: administrative, hospitality etc. environmental considerations: phases of development: scope for expansion for future developments: safe and comfortable vehicular and pedestrian movement: issues of character and landscaping.

EXPECTED OUTCOMES

The students looked at various components and aspects associated with the urban environment in terms of physical infrastructure, socio cultural aspects, gender issues etc. and looked at ways to address them through their designs. Mapping and diagramming techniques were explored in the design process to help explore the design process better.

The final submission shall necessarily include a model of one of the design outcome.

REFERENCES

1. Alexander, Christopher. Pattern language: Towns, Buildings, Construction. Oxford University Press, New York.
2. Richard. D. Dober. Campus Architecture: Building in the Groves of Academy. McGraw Hill, New York, 1996.
3. Chiara, De Joseph and Others. Timesaver's standard for Housing and Residential development, 2nd ed. McGraw Hill, Inc, New York.
4. Newman, Oscar and Others. Defensible space: People and Design in the Violent City. Architectural Press, London, 1972.
5. Neuferts Architects Data

AD 572 DISASTER MANAGEMENT**OBJECTIVES**

To understand the basic principles of disasters and its happening, management during the disasters and capacity building to cope with disasters.

COURSE CONTENTS**Unit 1. Introduction to Disaster Management:**

Define and describe disaster, hazard, emergency, vulnerability, risk and disaster management; Identify and describe the types of natural and non-natural disasters. Important phases of Disaster Management Cycle.

Unit 2. Disaster Mitigation and Preparedness:

Natural Hazards: causes, distribution pattern, consequences and mitigation measures for earth quake, tsunami, cyclone, flood, landslide drought etc. Man-made hazards: causes, consequences mitigation measures for various industrial hazards/disasters, Preparedness for natural disasters in urban areas.

Unit 3. Hazard and Risk Assessment:

Assessment of capacity, vulnerability and risk, vulnerability and risk mapping, stages in disaster recovery and associated problems.

Unit 4. Emergency Management Systems (EMS):

Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

Unit 5. Capacity Building:

Gender sensitive disaster management approach and inculcate new skills and sharpen existing skills of government officials, voluntary activists, development of professional and elected representative for effective disaster management, role of media in effective disaster management, overview of disaster management in India, role of agencies like NDMA, SDMA and other International agencies, organizational structure, role of insurance sector, DM act and NDMA guidelines.

Unit 6. Application of Geo-informatics and Advanced Techniques:

Use of Remote Sensing Systems (RSS) and GIS in disaster Management, role of knowledge based expert systems in hazard scenario, using risks-time charts to plan for the future, early warning systems.

Unit 7. Integration of public policy:

Planning and design of infrastructure for disaster management, Community based approach in disaster management, methods for effective dissemination of information, ecological and sustainable development models for disaster management.

CASE STUDIES

Lessons and experiences from various important disasters with specific reference to Civil Engineering.

OUTCOMES:

The students will be able to –

- Differentiate the types of disasters, causes and their impact on environment and society
- Assess vulnerability and various methods of risk reduction measures as well as mitigation.
- Draw the hazard and vulnerability profile of India, Scenarios in the Indian context, Disaster damage assessment and management.

REFERENCES

1. Introduction to International Disaster Management ,
 2. Disaster Management in Archives, Libraries and Museums,
 3. Disaster Management Handbook
 4. NIDM Guidelines
- NDMA Catalogues

B. Arch. Semester-I**BR 111 - Basic Design & workshop- I**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	Lab	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	4	100	100	8	200

Objectives

- The aim of this subject is to familiarize students with visual grammar, elements of design and methods of visual composition with various mediums and colour.
- In addition to the earlier, the intention of space design activity will be limited to the level of visual composition of architectural spaces considering human activity and anthropometry. There would be several studio/ design thinking exercises based on the module contents as is described below. The module may be taken up by the faculty in order of preference. The order should be common in both the sections of the same year. The faculty may achieve stated minimum outcome using various strategies and approaches.
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Contents:**Unit-1: Colour theory and its application, Study and Application of elements of design, visual grammar and Gestalt principles in basic composition**

- Lecture on Elements of Design, Visual Grammar & Gestalt principles
- Creation of Color wheel and relationships among various color
- Application of colors in built form and objects
- Elements of Design in basic composition
- Application of visual grammar and gestalt principles
- Evaluation of two-dimensional composition with the help of above aspects

Unit-2: Application of colour theory and visual grammar in composition.

- Design of two-dimensional composition in black and white medium
- Design of two-dimensional composition in color medium
- Evaluate the composition with Visual Grammar

Unit-3: Transformation from two-dimensional shape to three-dimensional form

- Form generation techniques – from 2D to 3D, Additive and Subtractive form
- Construction of 3D form with various material and colors
- Evaluation and Analysis of 3D form with visual grammar

Unit-4: Anthropological study of human activity space

- Study of relationship between human body movement and human activity
- Relationship between human activity and built space
- Measured drawing of human activity space – a case study

Unit-5: Architectural design process and product

- Design brief - its importance and interpretation
- Preparation of circulation/flow diagrams
- Design parameters- physical, socio-cultural, economic, climatic etc.
- Study and design of small spaces like drawing room, dining room, bed room, kitchen, toilets, study room, class room, offices etc. And making their measured drawings.

Unit-6: Design problem-II

- Design of simple structure like Bus Shelter, Milk Bar, Small Ice Cream Parlor, Gift Shop, Florist Kiosk, Enquiry, Snack Bar, Suvidha Kendra etc.

Course Outcome:

S. N o.	Outcome	Taxonomy
1	To understand the analytical skill to develop design and its management.	Understand
2	To understand the depth knowledge of visualization and enhanced conception of ideas.	Understand
3	To apply the observation and logical skills to involve understanding of a space creation.	Apply
4	To analyze the desired written and presentations skills to express their designs.	Analyze
5	To understand the idea and concept with expression of thoughts via appropriate communication method.	Understand
6	To understand about the design minor architectural projects as mentioned above.	Understand

References:

- John Hancock, Time Saver Standards for Architectural Design Data, McGraw-Hill Professional Publishing
- Smithies, K.W; “Principles of Design in Architecture”, Chapman & Hall, London, 1983
- Ching, Francis D.K; “Architectural Form, Space and Order”, Van Nostrand Reinhold International Thomson Publishing, Inc.: New York, 1996.
- Rompilla, Ethel; “Color for Interior Design”, Harry N. Abrams ,New York, First Edition, 2005
- Chiara, Joseph De; “Time Saver Standards for Building Types” McGraw–Hill Professional- Publishing, 2001
- Wucius Wong, Principles of three Dimensional Design, Van Nostrand Reinhold Company
- Wucius Wong, Principles of two Dimensional Design, Wiley
- Wucius Wong, Principles of color composition
- Rendering with Pen and Ink by Robert W. Gill

B. Arch. Semester-I**BR 121 Building Materials & Construction- I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus: Understanding of basic building elements, building materials, & construction process.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as mud, stone, bamboo, timber, etc. and methods of preservation, treatment and types of uses.
- To help students understand the basic building elements, their function and behavior under various conditions with specific reference to 'load bearing construction' and simple non RCC frame structure.
- To develop a strong sense of perception, understanding the basic principles of construction and materials.
- The emphasis on teaching the fundamental principles and constructional details suitable for Indian conditions.
- Students will be encouraged to study both in the classroom and also outside at work sites in order to get the practical exposure.

Contents:**A. Building Construction:****Unit-1: Introduction to Super and Sub- Structures**

- Introduction to basic elements of buildings and their importance.
- General introduction to types of foundation.
- Cross-section of a wall showing elements of building.
- Various construction tools, used on construction sites.

Unit-2: Mud Construction

- The nature of material, visual and textural properties.
- Construction details of COB, Adobe, Wattle & Daub, Compressed Stabilized Earth Blocks & Rammed Earth Construction
- Properties and characteristics of mud used for binding material in masonry.
- Identification and selection processes

Unit-3: Introduction to Stone Masonry

- Types of stone masonry
- Random rubble masonry – Coursed & un-coursed,
- Square rubble brought to course, Square rubble course
- Ashlar Masonry

B. Building Materials:**Unit-4: STONE**

- Rocks - Classification and basic nature of each classified rock.
- Processing of stones and forms of stone available in market
- Structural, Visual and textural properties of stones
- Identification and selection for application purposes
- Application in construction of buildings
- Artificial Stones

Unit-5: TIMBER & BAMBOO

- Trees - Classification and basic nature of each classified tree.
- Processing and storage of timber and forms of timber available in market.
- Structural, Visual and textural properties of timber.
- Identification and selection for application purposes.
- Application in construction of buildings
- Seasoning, storage and preservation of timber, properties and strength of manufactured products, veneer, plywood, block boards, fiberboard, etc.
- Bamboo as plant classification, species, geographical distribution, anatomy of bamboo, properties, strength, processing, harvesting, working of bamboo tools, treatment and preservation of bamboo, uses of bamboo.
- Construction details of Bamboo frame and joinery

Unit-6: LIME

- General introduction of lime,
- Classification and types of lime- Quick & Fat lime,
- Properties of Quick and Fat lime; application of lime based on its properties.
- Sources of lime and constituents of limestone, slacking of quicklime.
- Tests for lime, storing lime,
- Process of making lime mortar for masonry.
- Curing requirements and shrinkage properties of lime.

Course Outcome:

S.No	Outcome	Taxonomy
1	To define basic building elements	understand
2	To explain the types and necessity of stone masonry	Analyze
3	To define mud as a building material & types of mud construction technology.	understand
4	To able to make construction details of stone, timber & bamboo construction.	Create
5	To be aware of the properties and applications of Timber, bamboo & lime as a building material.	understand
6	To apply construction techniques in design projects.	Apply

References:

- W.B. Mackay, **Building Construction**, Orient Blackswan
- Chudley, **Construction Technology**, Prentice Hall
- Barry, **Construction of Buildings**,
- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W B Mackay (Volume 1 and Volume 2)
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B C Punmia, Ashok K. Jain and Arun K. Jain
- Building Materials by Gurcharan Singh
- Building Construction Handbook by R. Chudely

B. Arch. Semester-I**BR 131 –Architectural Structure-I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: Behavior of building elements and basic structural systems.

Objectives

- The course covers mechanical properties of common engineering materials and introduces simple types of structural elements followed by determination of forces and stresses in the elements.

Contents:**Unit-1: Simple Stresses and Strains**

- Introduction to structures
- Types of engineering materials, their mechanical properties and the tests for their mechanical properties.
- Stress and strain

Unit-2 Structural Elements

- Introduction to structural elements
- Function of each structural element
- Primary & secondary loading on structure
- Working stresses and factors of safety, partial safety factors for load and stresses at limit state of collapse.

Unit-3 Elastic Constants

- Elastic constants and their mutual relationships
- Lateral strain, longitudinal strain, poisson's ratio,
- Relation between modulus of elasticity and modulus of rigidity.

Unit-4 Centre of gravity & moment of inertia

- Centre of gravity
- Moment of Inertia of sectional elements
- C.G of simple plan figures
- Theorem of parallel axis theorem of perpendicular axis.

Unit-5 Shear Force and Bending Moment

- Introduction
- Types of loads and beams
- Types of support conditions
- Bending moment and shear force diagrams for determinate beams under simple types of loads
- Methods of superposition.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To describe mechanical properties of materials.	Understand
2	To Draw stress strain curves for structural materials.	Apply
3	To analyze simply supported and cantilever structural elements	Evaluate
4	Describe the various structural elements and their function.	Understand
5	Explain the loads acting on structures.	Understand

Text books

- Kumar. A., “Stability Theory of Structures”, Tata McGraw Hill Co. Ltd.
- R.K Bansal and Sanjay Bansal, Engineering Mechanics Third edition, Laxmi Publications, New Delhi.
- Jain, A.K., “Strength of Materials and Structural Analysis”, 2nd Ed., Nem Chand & Bros.

References:

- C.S Reddy “Basic Structural Analysis”, McGraw Hill Education, 3 edition (1 July 2017).
- S S Bhavikatti “Structural Analysis Vol-2”, Vikas Publishing House, Fourth edition (2013).

Web link

- <https://nptel.ac.in/courses/105105108/>

B. Arch. Semester-I**BR 141 – Introduction to History of Architecture**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an insight to the architecture of prehistoric period and early civilizations.

Objectives

- To inform about the development of architecture in the Ancient Western World.
- To understand the architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to style and character in the prehistoric world and in Ancient Egypt and West Asia.

Contents:**Unit-1: Introduction to Prehistoric / Primitive**

Introduction to the concept of culture and civilization: Paleolithic and Neolithic culture, art forms and evolution of shelter, primitive people, shelters, settlements, megaliths and memorials. Examples of Oval huts, Dolmen tomb, Tumulus, Houses at Catal Huyuk, Stonehenge etc. Agricultural revolution and its impact on culture and civilization.

Unit-2: Ancient Egyptian Civilization

Study of socio-cultural, religious and political systems, people's beliefs, climate and other factors influencing Architecture, character of human settlements, typology of Shelters and buildings, Religious burial systems and Cult temples of Egypt, construction methods and materials used. Tomb architecture: evolution of the pyramid from the Mastaba, mortuary temples and cult temples Great Pyramid of Cheops, Gizeh, temple of Ammon Ra, Karnak, temple of Abu Simbel (Rock Cut).

Unit-3: Ancient Mesopotamian Civilization

Architectural character as a reflection of climate and geology, planning of Palaces of Assyria and Persia, Ziggurats and corbelled drains of Assyria, Staircases of Persepolis, physical planning of Babylonia, Ur-Sumar.

Unit-4: Indus Valley Civilization

Contributions of Archaeologists, Timeline, socio-cultural, religious and political systems, settlement planning pattern, typology of Shelters and civic buildings, Citadel- Granary-Great baths, civic utility systems.

Unit-5: Aryan / Vedic Civilization

Timeline with reference to Indus Valley Civilisation, settlement planning pattern and Town forms by planning pattern namely; Dandaka, Nandyavarta etc., typical Vedic village, shelter types by shape and material used, Torana and Sacred railings.

Unit-6: Chinese Civilization

Architectural character, building typologies, settlement pattern, Settlement layout and planning principles adopted.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire the development and architecture of ancient civilizations.	Understand
2	Acquire the various architectural form and character in the historical period.	Understand
3	Evaluate various civilizations in ancient era	Analyze
4	Make sheets with free hand sketching on all the civilizations.	Create
5	Exposure to the various architectural styles through presentations.	Understand
6	Make sketchbook and models on the architectural styles with respect to the timeline.	Create

Text book

- History of Architecture in India by Tadgell Christopher.
- The Great Ages of World Architecture by G.K Hiraskar.
- A History of Architecture by Sir Banister Fletcher's.

References:

- Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai: D.B. Taraporevala Sons and Co.
- Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London: Verona Printed.
- Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London: McGraw-Hill.
- Dutt, B. B. (2009). Town Planning in Ancient India. Delhi: Isha Books.
- Kimball, F. and Edgell, G. H. (2012). A History of Architecture. Amazon: Ulan Press.
- Faulkner, H. T. (1953). Architecture through the Ages. New York: Putnam Adult.
- Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.
- Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers.
- Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York: M. Courier Dover Publications.
- Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford: Oxford University Press.
- Prammar, V. S. (2005). A social history of Indian architecture. New Delhi: Oxford University Press India.
- SenGupta, B. K. (2006). Reading material on the History of Human Settlements. New Delhi: ITPI.
- Singh, U. (2009). A history of ancient and early medieval India: from the Stone age to the 12th century. Delhi: Pearson India.
- Watkin, D. (2005). A History of Western Architecture. 4th Ed. London: Laurence King Publishing.

Web link

- https://www.pssurvival.com/PS/Rebuilding_Infrastructure/History_of_Architecture-2016.pdf
- <https://www.amazon.in/Banister-Fletchers-History-Architecture-Cruickshank/dp/0750622679>
- <http://www.archinomy.com>

B. Arch. Semester-I**BR 151 – Art and Graphics - I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	2	0	100	100	2	200

Focus: Development of three dimensional visualizations, graphical abstraction and preliminary form exploration and Rendering.

Objectives

- Understanding the importance of technical drawing as medium of communication as basic vocabulary in design.
- To learn the utility and art of using the potential of Pencil as a powerful tool of Graphic Communication.
- To understand representation of forms using basic semiotics.
- To understand the fundamentals, use, role and importance of Colours and proportion in Graphics.

Contents:**A. Art and Graphics I:****Unit-1: Pencil as an effective presentation tool**

- Free hand line work with different strokes/grades in pencil.
- Effect of light and shade on simple geometrical solids.
- Textures of different building materials in pencil through shading
- Outdoor sketching of simple building forms
- Sketches of scenes and activities from memory involving public spaces, markets, festivals, recreational spaces etc...

Unit-2: Visual perception and Color Theory

- Ideas as abstraction: composition with points, lines, 2D shapes,
- Graphic tools to express abstraction (geometric content)
- Color Theory and basic technique using Pencil color
- Abstraction of environmental and architectural observation: Dichotomy of seasonal changes
- Graphics to represent communication: visually interactive designs using colors

Unit-3: Perspective Drawings:

- Free hand perspective (one point and two point) drawing of an enclosed space, open space
- Concept of light and Shadow in a space

Unit-4: Scale and Proportion

- methods of measurement (unconventional)
- Idea of human/tree scale and proportion

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will be able to coagulate concept of a space creation.	Understand
2	Students will deduce learn desired written and presentations skills to express their designs	Understand
3	Students will able to visualize the idea and concept with expression of thoughts via appropriate communication method.	analyze
4	Students express all aspects of visually interactive design	analyze
5	Students will be able to express all drawing contents through all taught mediums of communication.	Apply

Text book

- Robert Gill, **Rendering with Pen and Ink**, Van Nostrand Reinhold Company

References:

- Wucius Wong, **Principles of three Dimensional Design**, Van Nostrand Reinhold Company
- Wucius Wong, **Principles of two Dimensional Design**, Wiley
- Wucius Wong, **Principles of color composition**,
- Robert Gill, **Rendering with Pen and Ink**, Van Nostrand Reinhold Company

B. Arch. Semester-I**BR 161 – Architectural Drawing – I (Manual)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	2	0	50	50	3	100

Objectives

- Introducing and familiarizing students with drafting tools and accessories and provide basic knowledge and skill to draft a drawing manually.
- Developing drafting skills through different types of lines, their intensity and interpretation. Also understanding the scale of drawing, dimensioning, lettering techniques and layout of sheets.
- Visualizing and drawing geometric forms in different positions using orthographic projections and sciography will help the student to understand and develop drawings for various design proposals.
- Familiarizing students to three dimensional drawings/objects and its application used to enhance and communicating design ideas.
- Development of surfaces to develop understanding of 2-dimensional drawings and 3-dimensional models.
- Introducing the importance of rendering and exploring different methods/ techniques of rendering in various exercises. The subject will be taught in congruence with the current Design studio and other subjects like Mathematics for Architecture and Workshop. The assignments for the subject may be linked to design exercises to achieve a higher level of learning and understanding the practical application of the same.

Contents:**Unit-1: Introduction**

- Drawing instruments and its uses
- Sheet layout and sketches
- Lines, lettering , scales and dimensioning

Unit-2: Orthographic Projections

- Introduction to Projections
- Concept, Principle and Methods of Projections
- Orthographic Projections of Point, Line and Plane
- Projections of Solids in different positions
- Application of Projection for preparing architectural drawings
- Application of Sciography in 2 dimensional drawings with rendering techniques

Unit-3: Application of Sections in Architectural Drawings

- Introduction of section of solids with simple forms
- Concept and methods of drawing section of solids
- Application of sections for simple building drawings
- Section of complex form or structures

Unit-4: Metric Drawing - Architectural Drawing Techniques

- Types used & advantage
- Isometric, Axonometric & Oblique view
- Metric drawings, projections and their dimensions
- Difference between perspective and metric projections

Unit-5: Development of Surfaces

- Introduction to development of surfaces and its uses.
- Methods of development of surfaces

Unit-6: Development of complex Surfaces

- Development of lateral surfaces of simple solids as cube, cone, pyramids and prisms.
- Development of complex solids, when two or more simple solids are joined together.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To understand and select drawing tools and techniques for drafting basic drawing	understand
2	To analyze a type of line, intensity, thickness, text to draw a shape.	analyze
3	To apply a scale, dimension for a layout of sheet or drawing	apply
4	To create a line, plane or solid into drawing using orthographic projections	create
5	To create the drawings of complex compositions	create
6	To evaluate the 2 dimensional drawings and 3 dimension form using development of surfaces and metric projection	evaluate

References:

- Elementary Engineering Drawing: Plane and Solid Geometry by N. D. Bhatt
- Rendering with Pen and Ink by Robert W. Gill
- Architectural Graphics by Francis D. K. Ching
- Engineering Drawing by B.V.R. Gupta
- Engineering Drawing: With Creative Design, Volume 2, by Hiram. E. Grant
- Architectural Drawing: Perspective, Light and Shadow, Rendering by Sherley W.Morgan
- Rendering in Pen and Ink by Arthur L. Gupatil

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

FOCUS:

- Behavior of Design and creativity of thinking.
- The course introduces the different tools and techniques of creativity as applicable to various Projects in Design (it may be termed as problem solving for a design project)

OBJECTIVES:

- Understanding the importance of Creative thinking in Design, its contents with respect to behavior and language of building elements and components.
- To understand and Join knowledge of architecture, civil engineering, statics and material in a natural way.
- To introduce lateral(adjacent/ horizontal/ sideways) thinking and facilitate innovative design solutions.

Course Methodology/ Content
BEFORE MID TERM TEST (MTT)

UNIT-1:

- Glossary of technical words, natural structures and intuitive understanding of their behavior, their relationship with man made structures.

UNIT-2:

- Thinking techniques - Principles in generative, convergent, lateral, interactive, graphical thinking, check lists, analysis and synthesis simulation, action ability and implementations of intentions. Blocks in creative thinking. Simple exercises based on thinking techniques

UNIT-3:

- Tools and techniques of creativity - mind mapping, brainstorming with related stimuli and unrelated stimuli, positive techniques for creativity, creative pause, Focus, Challenge,

AFTER MID TERM TEST (MTT)

UNIT-4:

- Alternatives, concepts, provocation, movement, setting up provocations, sensitizing techniques, group or individual techniques. Simple design exercises.

UNIT-5:

- Problem statements - Brain writing with unrelated stimuli, idea mapping, random input, storyboarding exercises, problem solving techniques - Divide and conquer, hill climbing strategy, means -ends analysis, trial and error, brainstorming, morphological analysis, method of focal objects, lateral thinking, steps developed by Polya, Dekker, De Bono and others, research, analogy, reduction (complexity), TRIZ, Halpern's techniques etc. Simple Design exercises

UNIT-6:

- Functional Design,
- Creative solutions applicable to designs - Design, Invention, opportunity, problems, improvement, planning, projects, conflicts. Simple Design exercises. Creative Design process - conceptual design, embodiment design, detail design, Iterations

OUTCOME:

S.No .	Outcome	Taxonomy
1	Enable students to understand the concepts of design in architecture.	understand
2	Apply the concepts of action of forces on a body and design.	Apply
3	Enable students to think in creative ways.	Create
4	Enable students to think in creative ways. The concepts of elastic/ flexible/ variable constants and its applications for various types of problems with thorough understanding of creative thinking.	Create

REFERENCE BOOKS:

1. Geoffrey Broadbent. **Design in Architecture**, London:D.Fulton
2. Christopher Alexander. **Pattern Language**. New York: Oxford University Press
3. Thomas Mitchell. **Redefining Designing: Form to Experience**
4. Edward De Bono, **Lateral Thinking**
5. James Snyder and Anthony Y catanse, **Introduction to Architecture**, Mc Graw-Hill Book company, New York, 1979.
6. Bryan L. Peterson, **Design Basics for Creative Results**, F&W Publications, Inc.
7. Noone, Donald.J, **Creative Problem solving**, Hauppauge, 1993.
8. De Bono, Edward, **Serious Creativity: Using the power of Lateral thinking to create new ideas**, Harper Collins publishers, 1992.

B. Arch. Semester-I
BR 181 Environmental Studies

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
4	0	0	50	50	4	100

Focus: Understanding the importance of ecology & environment with respect to architecture.

Objectives

- To provide fundamental knowledge about natural and built environment.
- To introduce the students to fundamental concepts to understand environmental processes.
- The curriculum further incorporates understanding in relation to Indian context.
- An attempt to have a detailed understanding of India's natural environment and the threats to them.

Contents:

Unit-1: Fundamental of ecosystem

- Fundamentals of ecosystem,
- Components of an Ecosystem – Abiotic and Biotic
- Relationship cycles between Abiotic and Biotic components within an ecosystem
- Types of Ecosystem

Unit-2: Our Earth's Environment

- Global Climatic factors, altitude, latitude and longitude
- Major climatic zones of world
- Climatic Zones of India
- Global warming

Unit-3: Resource and Environment

- Sources of natural resources used in construction industry
- Environmental impact on extraction of natural resources used for construction.
- Pollution caused in processing of natural construction material
- Concept of Alternate Building Material
- Concept of Generating Construction Material out of waste like stone dust, fly ash bricks

Unit-4: Human Impact on Environment

- Introduction to waste generated by human habitat at a single dwelling unit level and urban level
- Generation of waste from construction sites and its appropriate disposal
- Generation of Industrial Waste and its impact on Environment

Unit-5: Management of Environment

- Treatment of solid, liquid and gaseous waste generated by human habitat
- Treatment of waste from construction sites
- Water conservation and harvesting

Unit-6: Applications of Ecological Methods and Techniques in Architecture

- Ecological conservation methods at site planning and master planning scale.

Course Outcome:

S.No .	Outcome	Taxonomy
1	students will aware about the scientific knowledge and current debates on the environment at three nested scales, including their interlink ages – Global, Regional and Local.	Understand
2	students will understand cause-and-effect relationships between various human, natural and climatic factors that impinges upon ecological systems and their linkages.	Evaluate
3	Students will be sensitive with global & national environmental issues, the scale of impacts, important conventions, laws and policies in the field of biodiversity, and environmental protection.	Remember
4	Students will understand about global warming effects.	Understand
5	Students will be able to analyze various climatic zones of india.	Analyze
6	Students will include environmental and ecological concerns in their designs.	Apply

References:

- The Environment – Principles & Applications *by Charis Park*
- Dictionary of Ecology and Environment *by P.H.Collin*
- Ecology *by M. Begon etal*
- Theoretical Ecology *by R.May & A.McLean*

B. Arch. Semester-II**BR 112 - Basic Design & workshop- II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	4	100	100	8	200

Objectives

- The aim of this subject is to familiarize the students with architectural design process through small scale projects of human habitat.
- The design activity will be limited to the level of visual composition of architectural spaces considering human activity and anthropometry, building material exploration, colour etc. There would be several studio/ design thinking exercises based on the module contents as is described below.
- The module may be taken up by the faculty in order of preference. The order should be common in both sections of the same year. The faculty may achieve stated minimum outcome using various strategies and approaches.
- **Examples of project:** Small living space, Home stay, Small showroom, Shop, Exhibition space, Meditation hall etc.
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Contents: Parameter to understand & Study**Design process and human as user of space**

- Study and differentiate human needs, wants and desires
- Study of cases for different user's requirements
- Transform the behavioral requirements into space form
- Study of relationship among spaces with proximity chart, storytelling etc.

Human activity and context

- Study of a context and its surroundings and collect information
- Analyze the above information in favour of the usage perspective
- Understanding of human scale to the context

Planning of Spaces

- Distribution of the human activity spaces along the context considering the context as visual background
- Analyze the relationship among the spaces
- Verbal presentation on planning of built environment with different mediums

Architectural Composition

- Composition of spaces with geometric or non-geometric forms
- Visualization of Architectural composition from different positions on context
- Colour composition of exterior and interior spaces
- Application of building materials according to colour composition and texture
- Verbal presentation with technical drawings of built form

Detail design of interior spaces with a theme

- Detail planning and design of Interior spaces considering human needs and human anthropometric data with a theme
- Application of building materials with colour and texture in detail design
- Verbal presentation of Interior spaces

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will aware about the application of the architectural design process for small scale projects of human habitat	Understand
2	To evaluate the human behavioral needs into architectural program requirements	Evaluate
3	To understand about the information on context and the human-space relationship	Understand
4	Students will be able to analyze the desired written and presentations skills to express their designs.	Analyze
5	To understand the architectural spaces in a design project	Understand
6	Students will be able to understand the communication of the architectural drawings with the help of various mediums.	Understand

References:

- Audio/visual presentation, model making, sketching with different techniques, photography
- All the above modules will be evaluated in the form of verbal presentation of design work, write up material, drawing work, model making, photography etc.
- Architectural Design by Jane Anderson
- Elements of Space Making by Yatin Pandya

B. Arch. Semester-II**BR 122 Building Materials & Construction -II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus: Knowledge of various methods of construction and detailing of buildings of medium complexity using manmade materials.

Objectives

- To have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as brick, cement, sand and coarse aggregates etc.
- To understand building industry through various market surveys.
- To develop understanding about the principles, construction techniques in shallow and deep foundations.
- Study of openings will proceed to the study of Arches and its classification.

Contents:**A. Building Construction:****Unit-1: Introduction to Brick Masonry**

- Types of brick bats,
- Types of Brick bonds for wall masonry- half, single, one & half thick wall,
- Cavity wall, Jointing & pointing & bonding of bricks
- Brick walls in different ends, corners and junctions

Unit-2: Shallow Foundation

- General introduction to types of foundation
- Foundation in brick & stone masonry
- Shallow foundation: Types, Isolated, combined and raft foundations and their construction techniques.

Unit-3: Spanning of Openings

- Lintels in Stone and brick masonry, Construction of Brick & Stone arches
- Classification of Arches on the basis of geometrical shape, materials, construction techniques, viz. flat, segmental, semicircular, Tudor, circular, elliptical, semi-elliptical, venetian, florentine arches, etc. Illustration of terminology for arches, construction detailing and methods of centering

B. Building Materials:**Unit-4: BRICK**

- Nature of bricks,
- Classification and manufacturing process
- Structural, Visual and textural properties of bricks
- Identification and selection for application

Unit-5: CEMENT

- General introduction about cement,
- Composition and properties of cement,
- functions of cement ingredients,
- manufacturing of cement, tests for cement,
- storage of cement,
- varieties of cement and their application
- Process of making cement mortar for masonry
- Curing requirements

Unit-6: Fine & Coarse aggregates (Sand & Stone grit)**Sand-**

- General introduction,
- Sources of sand & impurities in sand, processing of sand
- Classification of sand- pit & river sand, and their properties
- Tests for qualities of sand
- Alternate fine aggregate: Stone dust

Stone Grit-

- General introduction,
- Storing, handling, sampling and testing of aggregates,
- Strength of aggregates and reaction with alkali
- Classification on the basis of particle size and their particular application

Course Outcome:

S.No	Outcome	Taxonomy
1	Students will have an understanding of the properties, characteristics, strength, manufacture, processing and application of materials such as brick, cement, sand and coarse aggregates etc.	Understand
2	Students will learn about types of brick bonds & methods of brick construction.	Remember
3	Students will understand the construction details & construction method of shallow foundations.	Understand
4	Students will be able to draw the details of Arches in stone & brick masonry.	Create
5	Students will learn about binding materials for walls.	Remember
6	Students will be able to incorporate building materials & construction technologies in their design projects.	Apply

References:

- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- Building Materials: Materials of Construction by Gurcharan Singh
- Building Construction Handbook, R. Chudely

B. Arch. Semester-II**BR 132 – Architectural Structure-II**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Behavior of building elements and basic structural systems.

Objectives

- The course covers analyses of trusses, bending stresses in structural elements, shear stresses in various plan figures, limit state approach for design.

Contents:**Unit-1: Limit State Approach**

- Introduction to limit states
- Types of limit states
- Limit states as per IS 456:2000
- Partial safety factors for materials
- Load combinations for design.

Unit-2: Trusses

- Types of trusses
- Stability of trusses
- Analysis of trusses
- Method of joints and methods of sections

Unit-3: Direct and Bending stresses

- Theory of simple bending
- Bending and shear stresses in symmetrical sections
- Combined direct and bending stresses.

Unit-4: Shear force and bending moment

- Introduction
- Types of beams
- Types of loads
- SFD and BMD for cantilever and overhang cases.

Unit-5: Basic rules for Preliminary Sizing of members

- Introduction to materials (Steel & Concrete)
- Thumb rules for column spacing and grid lines
- Member sizes for beam, column and slab.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To describe the limit state approach for design.	Understand
2	To analyze the simple trusses.	Analyse
3	To analyze beams with any type of loading and to draw SFD and BMD	Analyse
4	Solve for bending stresses in cross-section of member	Apply
5	Draw grid for architectural plan and preliminary sizing of members.	Create

Text books:

- Kumar. A., “Stability Theory of Structures”, Tata McGraw Hill Co. Ltd.
- R.K Bansal and Sanjay Bansal, Engineering Mechanics Third edition, Laxmi Publications, New Delhi.
- Jain, A.K., “Strength of Materials and Structural Analysis”, 2nd Ed., Nem Chand & Bros.

References:

- C.S Reddy “Basic Structural Analysis”, McGraw Hill Education, 3 edition (1 July 2017).
- S S Bhavikatti “Structural Analysis Vol-2”, Vikas Publishing House, Fourth edition (2013).

Web link

- <https://nptel.ac.in/courses/105105108/>

B. Arch. Semester-II**BR 142 – History of Architecture-I**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an insight to the architectural period of Classical antiquity in western world and to develop an understanding of Indian and Islamic Architecture.

Objectives

- To gain knowledge of the development of architectural form with reference to technology, style and character in Greece and Rome.
- To provide an understanding of rock-cut architecture in India.
- To provide an understanding of manifestation of Buddhist and Jain architecture.
- To provide an understanding of the Indian Temple Architecture and Islamic Architecture in its various stylistic modes characterized by technology, ornamentation and planning practices.

Contents:**Unit-1: Greek Architecture**

Landscape and culture of Greece, Hellenic and Hellenistic periods, study of principles of design, proportion, Optical corrections and Classical Orders in architecture: Doric, Ionic, Corinthian. Greek city planning and building types viz., Temples, Sanctuaries, Agora, etc. and their effect on settlement planning.

Unit-2: Roman Architecture

Roman history, Republic and Empire, Roman Architectural character, materials and techniques of construction, orders in architecture: Tuscan and Composite. Building types viz., Temples, Thermae, Amphi-theatres, Circus, Aqueducts, Forum, basilicas etc.

Unit-3: Buddhist and Jain Architecture in India

Study of religious philosophy, evolution of building typologies, Types of structures and elements developed eg: Stupas, Viharas, Chaityas, Stambhas, Toranas, sacred railing etc. in India. Study of form variations across various countries. Introduction and study of Jain Architecture with significant examples.

Unit-4: Indo Aryan Architecture

Development of fortification, walled towns and settlement patterns. Role of Shilpa sashtra and Artha sashtra in settlement planning. Study of worshipping places in Indo Aryan/ Nagara style, design of buttressed shikharas, rock-cut and structural examples of temples.

Unit-5: Dravidian Architecture

Development of fortification, walled towns and settlement patterns. Role of Shilpa sashtra in settlement planning. Study of worshipping places in Dravidian style (Chola, Chalukya, Pallava, Satavahana, Hoysala, Vijayanagara etc.), Design of Gopuram and Shikhara, Jain cave and rock-cut temple architecture.

Unit-6: Islamic Architecture

History of Islam: advent, development and principles, architectural character of the Islamic style, Establishment of the Delhi Sultanate: Imperial style. Development of basic dome, mosque and tomb prototypes. Evolution of Indo-Islamic architecture under the Mughal emperors. Influence of specific Emperors such as Akbar and Shah Jahan; Building of Fatehpur-Sikri and Shahjahanabad and Mughal gardens.

Course Outcome:

S.No.	Outcomes	Taxonomy
1	Acquire the development and architecture in the classical period.	Understand
2	Acquire the various architectural form, character and planning in India.	Understand
3	Evaluate and analyze the architectural form of northern and southern India.	Analyze
4	Make sheets with free hand sketching on the architectural styles.	Create
5	Exposure to the Islamic architectural style through case studies.	Understand
6	Make sketchbook and models on the architectural styles with respect to the timeline.	Create

Text book

- History of Architecture in India by Tadgell Christopher.
- The Great Ages of World Architecture by G.K Hiraskar.
- A History of Architecture by Sir Banister Fletcher's.

References:

- Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai: D.B. Taraporevala Sons and Co.
- Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London: Verona Printed.
- Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London: McGraw-Hill.
- Dutt, B. B. (2009). Town Planning in Ancient India. Delhi: Isha Books.
- Kimball, F. and Edgell, G. H. (2012). A History of Architecture. Amazon: Ulan Press.
- Faulkner, H. T. (1953). Architecture through the Ages. New York: Putnam Adult.
- Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.
- Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers.
- Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York: M. Courier Dover Publications.
- Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford: Oxford University Press.
- Pramari, V. S. (2005). A social history of Indian architecture. New Delhi: Oxford University Press India.
- SenGupta, B. K. (2006). Reading material on the History of Human Settlements. New Delhi: ITPI.
- Singh, U. (2009). A history of ancient and early medieval India: from the Stone Age to the 12th century. Delhi: Pearson India.
- Watkin, D. (2005). A History of Western Architecture. 4th Ed. London: Laurence King Publishing.

Web link

- https://www.pssurvival.com/PS/Rebuilding_Infrastructure/History_of_Architecture-2016.pdf
- <https://www.amazon.in/Banister-Fletchers-History-Architecture-Cruikshank/dp/0750622679>
- <http://www.archinomy.com>

B. Arch. Semester-I**BR 152 – Art and Graphics - II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	2	-	50	50	3	100

Focus: To familiarize students with the 3-dimensional drawings of the building and perspective views and ways of Presenting it.

Objectives

- To nurture more with the elements and principles of design as the building blocks of creative process.
- Design through exercises that will develop the originality, expression, skill and creative thinking.
- To introduce various rendering and shading techniques.
- To introduce various art forms: commercial, graffiti, Logo Design, Poster Design using various mediums: Linocut, Fabric
- Composition and Presentation of Design Sheet : Inking, Dot rendering, sciography

Contents:**Unit-1** Executing principal and elements of design for complex forms

- Isometric /Axonometric of simple forms| black and white
- Composition with Different Isometric Forms| Rendered

Unit-2 Advanced Rendering Techniques for Perspective Drawings

- Use of Water color
- Relief and Closure principle in water colour composition.
- Charcoal shading

Unit-3

- Advanced Graphics Technique
- Rendering technique on Fabric
- Printing technique using Linocut
- Poster, Book cover and Logo using shading Technique

Unit-4: Sciography and Sheet Presentation

- Understanding various technique to determine the shadow angle of an object
- To Determine the composition with direction of light on an object
- Dot Rendering and Inking Techniques
- **Presentation and Composition** using above techniques

Course Outcome:

S.No.	Outcome	Taxonomy
1	To understand about the analytical skills to develop design and its management.	Understand
2	To understand about the depth knowledge of visualization and enhanced conception of ideas.	Understand
3	Students will be able to create shades and shadows, solar path and its relation to build masses.	Create
4	Students will be able to create various rendering mediums on different materials.	Create
5	To understand about the analytical skills to develop design and its management.	Understand

Text book

Design Rendering Techniques by Dick Powell

References:

- F. David Martin and Lee A Jacobus, **Humanities through the Arts**, McGraw-Hill
- Criss. B. M. (2011). Designing with models: A Studio Guide to Architectural Process Models. 3rd Ed. Hoboken : John Wiley & Sons.
- Kieran, S. and Timberlake, J. (2008). Lobolly House : Elements of a New Architecture. New York : Princeton Architectural Press.
- Morgan, C. L. and Nouvel, J. (2002). The Elements of Architecture. London : Thames & Hudson.
- Werner, M. (2011). Model Making. New York : Princeton Architectural Press.

B. Arch. Semester-II**BR 162 – Architectural Drawing – II (Manual)**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	2	0	50	50	3	100

Objectives

- Architectural Graphics-II intends to develop essential manual skills such as proficiency in drawing, largely used as primary mode of communication of ideas in architectural design.
- Students will be introduced to a variety of tools and techniques for visual expression with emphasis on manual drawing.
- A continuation of Architectural Graphics-I, Architectural Graphics-II intends to introduce the students to various essentials of architectural drawings such as principles, tools and techniques for communicating design ideas.
- The course would help students identify suitable methods of representation and methods in different built environment scenarios.
- Architectural Graphics-II introduces advanced techniques for architectural drawing such as perspective projection, mix-media renderings etc.
- The course would help students identify suitable methods of representation and methods in different built environment scenarios.
- The subject will be taught is congruence with the Design studio, and assignments for the subject will be linked to the design exercises to achieve higher level of learning and understanding the practical application of the same.

Contents:**Unit-1: Basics of perspective drawings**

- Anatomy of perspective: Station point, Eye level, Cone of vision, Picture plane, Horizon line, Ground line, Vanishing points
- Types of perspectives : One point, Two point, Three point

Unit-2: Perspective drawings for exteriors

- 2 point perspectives of building exterior
- 3 point perspectives of simple architectural forms

Unit-3: Perspective drawings of interior spaces

- One point and two points perspectives of interiors
- Perspectives of simple household furniture items

Unit-4: Perspective drawing by innovative methods

- Preparation of Perspective by innovative methods like approximate method, Diagonal Method, Grid Method etc. Other innovative methods of perspective presentation.
- Introduction to shortcut methods in perspective drawing.
- Perspectives of Residences.
- Sciography in perspectives

Unit-5: Freehand presentations and rendering techniques

- Freehand perspective sketching, Rendering, shades and shadows.
- Introduction to represent different textures and finishes in plan and elevation of interior and exterior spaces.
- Graphical representation of furniture, automobiles, human figures, etc. in plans and elevations and 3-dimensions.

Unit-6: Manual techniques for painting/colouring of Architectural Drawings

- Techniques Colouring of architectural presentation drawings in various medium
- Monochromatic shades, Shades and shadows in multi-coloured drawings

Course Outcome:

S.No.	Outcome	Taxonomy
1	Evaluate the need to combine the use of manual drawing tools and techniques for drafting and freehand drawing for architectural design communication	Evaluate
2	Apply the projected drawing method of exterior and interior perspective	Apply
3	Create one and two point perspective drawings from floor plans and elevations	Create
4	Create by Drawing/sketching 3- Dimensional Architectural drawings using and freehand techniques.	Create
5	Analyse an understanding of furniture, people and accessories in one and two point projected perspective drawing.	Analyze
6	Create conceptual and presentation drawings as a design presentation tool for various purposes	Create

References:

- This course employs a lab strategy where instructor introduces, demonstrates the use of a tool/techniques. Students are supervised on-to-one basis. Primarily stress is given to skill development by hands-on experience with support of reference material.
- Architectural Graphics, 4th Edition by Francis D.K. Ching
- Design Drawing by Francis D.K. Ching

B. Arch. Semester-II**BR 172 - Vernacular and Traditional Architecture**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: To expose the students with the vernacular and traditional architecture in the various regions of India.

Objectives

- To introduce the study of vernacular architecture as a process and not a product.
- To provide an overview of the various approaches and concepts of vernacular architecture.
- To study the various vernacular architecture forms in the various regions of the country.
- To look at the impact of Colonial rule on the vernacular architecture of India.

Contents:**Unit-1: Introduction to Vernacular Architecture**

Overview, Definition and classification of Vernacular architecture. Survey and study of vernacular architecture. Methodology- Cultural and contextual responsiveness of vernacular architecture.

Unit-2: Approaches and Concepts

Different approaches and concepts to the study of vernacular architecture: an overview – Aesthetic, Architectural and anthropological studies in detail. Determinants of vernacular architecture: the Role of social, cultural, political, economic symbolic, climatic, technological context in creation of form with suitable examples.

Unit-3: Vernacular Architecture in the Northern Region of India

Hill Architecture of Himachal Pradesh and Uttarakhand influencing the planning aspects, materials of construction & construction details.

Unit-4: Vernacular Architecture in the Western Region of India

Forms spatial planning, cultural aspects, symbolism, color, art, materials of construction and construction technique of vernacular architecture in the Deserts of Kutch.

Planning aspects in Rajasthan; materials used, constructional details, climatic factors influencing the buildings with examples of Haveli.

Unit-5: Vernacular Architecture in Southern Region of India

Dravidian south planning aspects, materials of construction, constructional details & settlement planning in context to religious practices, beliefs, culture & climatic factors influencing the planning of buildings with examples of Kerala: Houses of the Nair & Namboothiri community; Koothambalam, Padmanabhapuram palace and Tamil Nadu: Houses and palaces of the Chettinad region; Agraharams.

Unit-6: Western Influences on Vernacular Architecture of India

Colonial influences on the Traditional Goan house - Evolution of the Bungalow from the traditional bangla, Victoria Villas – Planning principles and materials and methods of construction. Settlement pattern and house typologies in Pondicherry and Cochin.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire knowledge about the vernacular architecture of India	Understand
2	Acquire various approaches and concepts in Traditional architecture	Understand
3	Analyze the settlement pattern and housing typologies in various regions.	Analyze
4	Make sheets with free hand sketching on the various traditional techniques.	Create
5	Exposure to the various traditional material and techniques by case studies.	Understand
6	Make models of the vernacular traditional houses.	Create

Text book

- Encyclopedia of Vernacular Architecture of the World
- Invitation to Vernacular Architecture: A Guide to the Study of Ordinary Buildings and Landscapes
- Vernacular Architecture (Material Culture)
- Vernacular Architecture in the 21st Century: Theory, Education and Practice

References:

- Paul Oliver, Encyclopedia of Vernacular Architecture of the World, Cambridge University Press, 1997.
- Amos Rapoport, House, Form & Culture, Prentice Hall Inc. 1969.
- R W Brunskill: Illustrated Handbook on Vernacular Architecture, 1987.
- V.S. Pramar, Haveli – Wooden Houses and Mansions of Gujarat, Mapin Publishing Pvt. Ltd., Ahmedabad, 1989.
- Kulbhushan Jain and Minakshi Jain – Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad 1992.
- G.H.R. Tillotsum – The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.
- Carmen Kagal, VISTARA – The Architecture of India, Pub: The Festival of India, 1986.
- S. Muthiah and others: The Chettiar Heritage; Chettiar Heritage 2000

Web link

- https://www.academia.edu/26930475/An_Out_Line_of_Vernacular_Architecture_of_Himachal_Pradesh
- https://www.researchgate.net/publication/236014050_Prathaa_Kathkhuni_Architecture_of_Himachal_Pradesh
- <https://www.archdaily.com/tag/vernacular-architecture>
- https://www.academia.edu/28564645/SOUTH_INDIAN_VERNACULAR_ARCHITECTURE_-_A_EXECUTIVE_SUMMARY

B. Arch. Semester-II						
BR 182 - Theory Of Design						
PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	3	100

Focus:

Objectives

Study about theory of design is a very important aspect of design industry. This subject gives an idea about the history as well as present day life in respect of structures, materials. It provides a brief idea about the buildings, style, beauty, proportion, symmetry etc. The idea of any design comes from the study of these fundamentals. As an Architect, you should know how the tradition follows. And in future when you will design good and elegant buildings it would help you a lot. It acts as a base to number of other subjects which you will encounter in your coming semesters.

Contents:

Unit-1: Organization of forms and spaces

- Introduction to Unit
- Primary elements of architecture – point, line, plane, volume,
- Primary forms, properties of form, transformation of forms – dimensional transformation, subtractive, additive forms, organization of additive form – articulation of forms,
- Space defining elements – horizontal, vertical, opening in space defining elements, spatial relationship, spatial organization.
- Classification of Spaces based on a notion of enclosure.
- Conclusion and Summary of Unit

Unit-2: Formulation of design

- Introduction to Unit
- Formulation of design through elements and principles of architectural design.
- Applications of Ordering principle such as axis, symmetry, hierarchy, datum, rhythms, repetition, visual perception, proximity, repetition, simplest and largest figure, continuity and closure, figure and ground relationship

Unit-3: Principles and design Philosophies

- Introduction to Unit
- To appreciate the guiding principles in the words and philosophies of Master Architects
- Study of time, life, works and philosophies of Louis Sullivan, Frank Lloyd Wright, Walter Gropius, and Mies Vander Rohe, Le Corbusier.
- Chicago School

Unit-4: Concept and individual work of Architects

- Introduction of Unit
- Concepts of their individual work as entity in itself.
 - Louis Sullivan: Guaranty Building, Wainwright building, Auditorium building etc.
 - Walter Gropius: Bauhaus, Fagus Shoe Last Factory etc.
 - Mies Vander Rohe: Farnsworth Houses, Lake Shore Apartment, Seagram Building etc.
 - Frank Lloyd Wright: Prairie Houses organic Architecture etc.

Unit-5: Works of Master Architects in India

- Introduction to Unit
- Le Corbusier: Early and later works in Chandigarh & Ahmadabad as well as specific study of Chandigarh.
- Louis-I-Kahn: IIM Ahmedabad

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will be able to understand the organization of forms and spaces	Understand
2	Students will learn Formulation of design	Understand
3	Students will remember the Principles and design Philosophies of famous architects.	Remember
4	Students will learn the Concept and individual work of Architects of world	Understand
5	Students will analyze the Works of Master Architects of India	Analyze
6	Students will apply the principles of theory of design in their architectural project.	Apply

References:

- Pattern language, by christopher alexander
- Principles of sociology, by tabussum, henna
- Architecture elements, materials, form, by prina
- Form, space, and order, by francis d.k. ching

B. Arch. Semester-III**BR-211- Architectural Design- III**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	7	100	100	12	200

Focus: To develop sensitivity towards existing habitat spaces with its building elements.

Objective

The students are now well versed with visual grammar dealt in the previous semesters. The current semester will involve the formulation of design concepts and developing simple single storied load bearing structures in the immediate or observable environment. The semester focuses on the understanding of context and elements of the built form in an existing setting. The projects would connect horizontal circulation reflecting their creative approach drawn from data analysis and climatic consideration to the physical setting. They will address spatial requirements from activities and known spaces to sites without formal byelaws.

There will be at least one major and one minor design exercise. The faculty can take up the exercises as per their order of preference. The order should be common in both sections. The faculty may achieve the stated minimum outcomes using appropriate strategies. The subject will be integrated with Visual Arts, Art Appreciation, History, BMC, Climate Responsive Architecture, Water Supply and Sanitation and Structures. The design process should result in form and function.

Suggested typologies: residences, community centre, aanganwadi, primary health centre, public toilet, Visitor's centre, petrol pumps etc. Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Content: Design Pedagogy

- Students will study the context and elements of built and unbuilt spaces in an observable setting to develop an understanding of socio-cultural attributes of the physical environment, methods of construction emerging out of the way of life of the people in a given place including topographical and climatic survey. The information of visited physical setting will be gathered.
- Students will present the documentation work through visual, verbal and graphical communication skills. The students may work in groups at this stage. They may use some of the techniques like measured drawings, rendered hand drawn sheets, models, role play, etc. Students will integrate attributes in terms of facilitation, plan form, volume, orientation, climatic considerations and space organization.
- Students will integrate knowledge from other associated subjects mentioned earlier to evolve a design for simple single storied load bearing structures. Students will keep in mind the spatial requirements emerging out of activities, aesthetic appeal, functional quality and elementary structural concepts required to evolve the specific form.
- Climatic consideration for the design, orientation of building on site their application in elevations as functional/aesthetic solutions will also be a part of the design exercise.
- The assessment/ evaluation strategy to be based on review in the form of desk crits/ informal crits /interim crits/group crits.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To apply the learning of the previous semesters	Apply
2	To develop sensitivity towards existing informal settings and elements of built space.	Develop
3	To map gathered information of visited physical setting	Map
4	To critique the materials, construction techniques and structural systems used in the elements of built forms.	Critique
5	To compose the architectural spaces in a design project	Compose
6	To apply climate responsive techniques to simple single storied load bearing structures.	Apply

References:

- Encyclopaedia Of Vernacular Architecture by Paul Oliver
- Vernacular Architecture In The Twenty First Century by Macel Vellinga & Lindsay Asquith
- Architecture without Architects by Bernard Rudofsky
- Architecture For The Poor by Hassan Fathy

B. Arch. Semester-III**BR 221 Building Materials & Construction -III**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus:

Knowledge of various structural systems and methods of construction and detailing of buildings of medium complexity using natural and manmade materials.

Objectives

- To familiarize students with basic information about construction procedures and reinforcement detailing about RCC elements like Columns, Beams and Slabs. Also to make students aware of joining details of columns, beams and slabs.
- To introduce to the students with the classification and types and details of construction of roofs
- To give complete knowledge about the various types of flooring and its construction details
- To create drawings and designs based on the acquired knowledge

Contents:**A. Building Construction:****Unit-1: RCC Roofing, Flooring**

- Introduction to RCC elements like Columns, Beams and Slabs.
- Reinforcement detailing of RCC building elements like columns, beams and slabs through sketches and site visits.
- Construction details of Flat RCC roof with waterproofing details and study of different RCC roof forms and its connection with structure.
- Typical details of application of floor finishes – stones, (inlay work), vinyl floor, tile flooring, cement concrete block flooring, glass flooring etc.

Unit-2: Wooden Joints & Wooden openings.

- Types of timber / wooden joints.
- Classification of doors; (a) paneled doors. (b) ledged and battened doors, (c) ledged, braced and battened doors, (d) framed, ledged, braced, and battened doors (e) flush doors
- Windows: Timber windows; Casement window and its details

Unit-3: Timber Construction:

- Types of wooden flooring systems
- Construction details of flooring of wood plank & beam framing and wood decking
- Types of wooden roofing - flat roof and pitched roofs
- Construction details of roofing of wood plank & beam framing and wooden trusses
- various timber foundations and their construction details
- Types of wooden walls – structural and non-structural

B. Building Materials:

Unit-4: CEMENT-CONCRETE

- Mortars, concrete and RCC preparation, application technique, test concreting under special Conditions, special varieties of concrete etc, uses, properties etc.

Unit-5: Glass

- Introduction to Unit
- Classification, composition, properties, types, manufacturing process, treatment of glass, special varieties of glass etc.
- Conclusion and Summary of Unit

Unit-6: FLOOR FINISHES

- terrazzo, stone slabs, brick and terracotta tiles, Synthetic materials (PVC, Timber).
- Floors of industrial buildings & warehouses.
- Ceramic wall & floor tiles.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will learn about construction procedures and reinforcement detailing about RCC elements like Columns, Beams and Slabs.	Understand
2	Students will learn about joining details of columns, beams and slabs.	Remember
3	Students will be able to draw details of timber single and double roofs and timber floors.	Create
4	Students will be able to analyze wooden joints & their uses in wooden openings.	Analyze
5	Students will learn about glass & floor finishes used in building materials.	Remember
6	Students will create drawings and designs based on the acquired knowledge.	Create

References:

- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- Building Materials: Materials of Construction by Gurcharan Singh
- Building Construction Handbook by R. Chudel

B. Arch. Semester-III**BR 231 – Architectural Structure-III**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Understanding the structural concepts and behavior of structural elements relating the knowledge acquired to architectural design.

Objectives

- To evaluate elastic deformations in beams and to find forces and deflection in redundant structures.

Contents:**Unit-1 Slope & Deflection**

- Introduction
- Slope and deflection for beams
- Moment area method
- Conjugate beam method

Unit-2 Columns and struts

- Introduction
- Columns and struts effective length
- Critical load
- Slenderness ratio
- Euler's equation for different end conditions.

Unit-3 Slope & Deflection

- Formula for slope and deflections of cantilever, simply supported and overhang beam
- Double integration method
- Macaulay's method for different load conditions.

Unit-4 Slope deflection method

- Introduction
- Slope deflection equation
- Application of slope deflection equations for analysis of beams

Course Outcome:

S.No.	Outcome	Taxonomy
1	To develop slope deflection equations for various load cases on beams	understand
2	To find ultimate load carrying capacity of column.	Analyze
3	To describe failure theory for short and long column	Understand
4	Analyze continuous beams using slope deflection method	Evaluate

Text books:

- S. Ramamrutham r. Narayan "Theory of structures 9th edition" Dhanpat Rai.
- Kumar. A., "Stability Theory of Structures", Tata McGraw Hill Co. Ltd.
- R.K Bansal and Sanjay Bansal, Engineering Mechanics Third edition, Laxmi Publications, New Delhi.
- Jain, A.K., "Strength of Materials and Structural Analysis", 2nd Ed., Nem Chand & Bros.

References:

- C.S Reddy "Basic Structural Analysis", McGraw Hill Education, 3 edition (1 July 2017).
- S S Bhavikatti "Structural Analysis Vol-2", Vikas Publishing House, Fourth edition (2013).
- Jain, A.K., "Strength of Materials and Structural Analysis", 2nd Ed., Nem Chand & Bros.

Web link

- <https://nptel.ac.in/downloads/105101085/>
- www.pdfdrive.net

B. Arch. Semester-III**BR 241 – History of Architecture-II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an insight to the architecture of western world.

Objectives

- To inform about the development of architecture in the Western World.
- To understand the architecture as evolving within specific cultural contexts including aspects of politics, society, religion and climate.
- To gain knowledge of the development of architectural form with reference to technology, style and character in High & Late Medieval period.

Contents:**Unit-1: Early Christian Architecture**

Architectural character during the period, evolution of Church form, building typologies, and building elements, Baptisteries, Early Basilica churches and settlement planning. Examples of St. Peters Basilica of Rome, and S. Maria Maggiore Rome.

Unit-2: Byzantine Architecture

Study of structural and construction system, development of Pendentive. Representative examples of St. Sophia, Constantinople.

Unit-3: Romanesque Architecture

General study of evolution and development of early church and vaulting system. Representative examples of Pisa Cathedral, Church of the Apostles.

Unit-4: Gothic Architecture

Characteristics of Gothic Architecture, evolution and development of pointed arches, flying buttresses and ribs. Examples of Notre Dame Paris, Abbey Church at Reims.

Unit-5: Renaissance Architecture

Revival of classical period and reintroduction of anthropomorphic classical orders. Study of periods: Early Renaissance, High Renaissance, Baroque and Rococo. Study of Piazza and the development of centralized church form. Dynamism and systemization of Baroque Architecture. Representative examples of Piazza of St. Peters of Rome, Château De Chambord, St. Paul at England.

Unit-6: 18-19th Century Revival- The Industrial Revolution Era

Impact of the Industrial Revolution and its effects, Technological innovations, Development of the railways and changes in settlement systems. New and emerging building types; Building of factory towns and rapid urbanization. New building technologies and implications on architecture –use of concrete, steel and glass. Architectural periods in Britain and Europe. Art Nouveau, Arts and Crafts Movement. Representative examples of Westminster New place in London, The University Museum at Oxford.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire the development and architecture during the medieval period.	Understand
2	Acquire the various architectural form and character in the western world.	Understand
3	Evaluate and analyze various architectural styles.	Analyze
4	Make sheets with free hand sketching on all the architectural styles.	Create
5	Exposure to the various architectural styles through presentations.	Understand
6	Make sketchbook and models on the architectural styles with respect to the timeline.	Create

Text book

- History of Architecture in India by Tadgell Christopher.
- The Great Ages of World Architecture by G.K Hiraskar.
- A History of Architecture by Sir Banister Fletcher's.

References:

- Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai: D.B. Taraporevala Sons and Co.
- Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London: Verona Printed.
- Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London: McGraw-Hill.
- Dutt, B. B. (2009). Town Planning in Ancient India. Delhi: Isha Books.
- Kimball, F. and Edgell, G. H. (2012). A History of Architecture. Amazon: Ulan Press.
- Faulkner, H. T. (1953). Architecture through the Ages. New York: Putnam Adult.
- Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.
- Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers.
- Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York: M. Courier Dover Publications.
- Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford: Oxford University Press.
- Prammar, V. S. (2005). A social history of Indian architecture. New Delhi: Oxford University Press India.
- SenGupta, B. K. (2006). Reading material on the History of Human Settlements. New Delhi: ITPI.
- Singh, U. (2009). A history of ancient and early medieval India: from the Stone Age to the 12th century. Delhi: Pearson India.
- Watkin, D. (2005). A History of Western Architecture. 4th Ed. London: Laurence King Publishing.

Web link

- https://www.pssurvival.com/PS/Rebuilding_Infrastructure/History_of_Architecture-2016.pdf
- <https://www.amazon.in/Banister-Fletchers-History-Architecture-Cruickshank/dp/0750622679>
- <http://www.archinomy.com>

B. Arch. Semester-III

BR 251 - Building Services - I (Water supply & Sanitation)

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To introduce Plumbing systems and to understand its considerations in architectural design.

Objectives

- To understand the need and importance of building services.
- To understand the water supply system at urban level.
- To apply knowledge gained on water supply system in small buildings.
- To design water supply system in a residential building.
- To understand the components of various sewage systems at domestic level.
- To design sewage system for a residential building.
- To understand rainwater disposal system in small buildings.
- To design rainwater disposal system for a residential building.
- To design domestic water supply and sewage network for a small residential building.

Contents:

Unit-1: Importance of Building Services

- Importance of water supply and sewerage.
- Historical overview of development of water/ sewerage systems.

Unit-2: Water Supply for Urban Area

- Sources of water
- Quality of water, impurities in water and its treatment.
- Water demand calculations; norms and standards.
- Water storage, overhead tank, and sump.
- Water distribution system at city/ neighbourhood overview.
- Water treatment plant.
- Types of water distribution networks.
- Water pipe materials, apparatus, joints, fixtures and valves.
- Guidelines for laying of water mains, distribution.

Unit-3: Domestic Water Supply

- Principles of water supply in domestic buildings.
- Water supply in low-rise and multi-storeyed buildings.
- Hot-cold water supply network and connections.
- Pipe materials, fixtures, joints, equipment.
- Roof top water drainage.

Unit-4: Domestic Sewage System

- Principles of domestic sewer systems norms and standards.
- Types of pipe systems.
- Types of traps, use and water seal.
- Domestic sewer conveyance network.
- Components of sewer conveyance network.
- Basic terminology, Gully trap, inspection chamber, intercepting trap, man holes etc.
- Calculation for Gradient and slope in sewage disposal.
- Various sanitary fixtures and its connections.
- Sewage disposal to septic tank, cesspool, soak pit.
- Connection of house drainage to public sewer.

Unit-5: Rain Water and Storm Water Disposal System

- Techniques to divide surface area for rainwater disposal.
- Details of collection point/ Khurra.
- Conveyance network for waste / rain water.
- Apparatus for conveyance of water, catch basin, gully traps, calculation for gradient/ slopes.

Unit-6: Design of Domestic Water Supply and Sewage Network

- Applications of knowledge water supply and sewage design
- Preparation of drawings excluding hydraulic design

Course Outcomes:

S.No.	Outcomes	Taxonomy
1.	Discuss the active and passive components of plumbing.	Analyse
2.	Value the importance of building services	Understand
3.	Develop understanding of water supply system at city levels	Understand
4.	Design water supply in residential and other small buildings	Evaluate
5.	Design rain and wastewater system in domestic building	Apply
6.	Design of water-sewer system in buildings (except hydraulics design calculation parts)	Apply

Text books

- Building Construction by Sushil Kumar
- Building Construction by B.C Punmia
- Building Construction by Rangwala
- Building Construction by P.C Varghese

References:

- Plumbing Engineering by Dr. Subhash Patil
- International Plumbing Code by Indian Code Council
- Modern Plumbing by E. Keith Blumberg
- Plumbing Basics by Dr. Rick Peters
- Building Construction Illustrated by Dr. F.D.K Ching
- Mechanical And Electrical Equipment For Building by Walter T. Gondzik

Web links

- https://www.youtube.com/watch?v=WL_xM7Po15A
- https://www.youtube.com/watch?v=f2faanH0_Ww
- <https://www.youtube.com/watch?v=deugZdFIcew>
- <https://www.youtube.com/watch?v=oWhKUNCCAtk>
- <https://www.youtube.com/watch?v=QpMxEgQ1-gw>
- <https://www.youtube.com/watch?v=Zgz33tfSu8M>
- <https://www.youtube.com/watch?v=TO0IC0XlvoY>
- https://www.slideshare.net/SiddharthKhanna11/history-lecture-1?qid=81f05e4d-44b8-4432-8524-0f0d8f59c3fc&v=&b=&from_search=11

B. Arch. Semester-III**BR 261 – Computer Application in Architecture -I**

PERIODS	EVALUATION SCHEME		

LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT	CREDITS	SUBJECT TOTAL
0	2	0	50	50	1	100

Focus: To expose students to prepare presentation drawings and to generate 3D models.

Objectives

- To develop a theoretical understanding of AutoCAD and its relevance in Architecture. Students would develop skills of 2D drafting using various tools and techniques. They would be able to generate 3D from 2D drawing using the rendering skills like material, lighting, background etc.

Contents:

Unit-1: Introduction to Computer Aided Drafting

- Introduction to computer aided drafting
- To develop and understand the tools and basic set up for computer aided drafting
- Theoretical understanding of CAD

Unit-2: Computer Aided Drafting Methods and Techniques – 2D

- To comprehend tools and systems for 2d drafting
- Develops and draws various architectural plans, elevations and sections through 2 d Cad
- Manipulate and alter through various tools and techniques existing architectural drawings in 2D Cad

Unit-3: COMPUTER AIDED DRAFTING METHODS AND TECHNIQUES – 2D – DEMONSTRATION

- To apply more complex tools and methods to edit drawings in 2D Cad
- Demonstrate presentation drawings in 2D Cad
- Draw and create a complete set of architectural drawings for a dwelling unit in 2 D Cad

Unit-4: Computer Aided Drafting Methods and Techniques – 3d

- To comprehend tools and systems for 3d modelling in CAD
- Develops and draws various architectural volumes, forms and surfaces through 2 d Cad
- Convert and draw 2 d architectural drawings to 3d forms

Unit-5: Computer Aided Drafting Methods and Techniques – 3d – Demonstration

- To apply more complex tools and methods to edit drawings in 3D Cad
- Demonstrate presentation drawings , material application and lighting in 3D Cad
- Draw and create a complete set of architectural drawings for a dwelling unit in 3 D Cad

Course Outcomes:

S. No.	Outcomes	Taxonomy
1	Develop understanding of computer aided drafting	Understand
2	Comprehends computer aided drafting and its parameter as tools and its application in architecture	Apply

3	Demonstrate the concepts of CAD drafting methods and techniques in 2D and 3D through various architectural projects of progressive complexity	Create
4	Evaluates CAD techniques for quicker methods and presentation skills	Evaluate
5	Develop understanding of computer aided drafting	Understand
6	Comprehends computer aided drafting and its parameter as tools and its application in architecture	Apply

Text books

- Fundamentals Of Three-Dimensional Computer Graphics by Watt
- Computer Aided Design guide For Architecture, Engineering And Construction by Aouad

References:

- The Illustrated AutoCAD 2002 Quick Reference First Edition by Ralph Grabowski
- Autocad 2000: A Problem-Solving Approach by Tickoo Sham
- CAD For Interiors Beyond The Basics by J.A. Fiorello

Web links

- <https://www.youtube.com/watch?v=TehtsatwiiU>
- <https://www.youtube.com/watch?v=hO865EIE0p0>
- <https://www.youtube.com/watch?v=-iX-ZyvOiQA>
- <https://www.youtube.com/watch?v=2n5AikPvIjA>
- <https://www.youtube.com/watch?v=zM3TTdGNNrQ>
- <https://www.youtube.com/watch?v=swWcUxrDR1g>
- <https://www.youtube.com/watch?v=-mTh-Aj4JiA>
- <https://www.youtube.com/watch?v=4MtUWTI0YWY>

B. Arch. Semester-III**BR 271 - Climatology**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: Understanding of Climate responsive architectural design.

Objectives

- To familiarize students with the design and settings for buildings for daylight and factors that influence temperature.
- Understanding of Climate and its impact on architectural design, fundamentals of climatology and environmental studies, Passive climatic control.
- To apply the principles of Solar Passive Architecture to design of buildings.

Contents:**Unit-1: Elements of climate**

- Climate and Weather
- Elements of Climate
- Classification of climate
- Climate balanced Architecture

Unit-2: Effect of climate on man

- Human Comfort- definitions and concepts
- Relation of climatic elements to comfort
- Body heat balances, Thermal Comfort Factors..
- The Bioclimatic Chart

Unit-3: Environment and Building Forms

- Impact of External forces on Building
- Heat flow, heat transfer, heat storage and time lag of various building materials and elements.
- Day lighting, air movement and ventilation.
- Reading of Psychometric chart and its applicability.
- Building configuration and climate response.

Unit-4: Site & Building Design

- Site Selection, Site Planning
- Sun path diagram
- Building Orientation and Placement
- Solar movement and sun shading devices. Analytical and illustrative exercises, related to the above topics.
- Effect of Landscaping

Unit-5: Wind & Building Design

- Wind effect and Air Flow Pattern
- Ventilation Techniques
- Air movement around the buildings
- Stack Effect and Thermally induced air currents
- Evaporative cooling

Unit-6: Architectural Application

- Shelter for warm-humid climates
- Shelter for hot-dry climates
- Shelter for composite climate
- Shelter for moderate climate
- Shelter for cold –cloudy and cold- sunny climates.
- Application of software in climate responsive design

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will be able to classify the factors of comfort.	Understand
2	Students will infer the impact of climatic forces on built structures	Understand
3	Students will examine through mathematical formulae the thermal comfort levels of built form	Analyze
4	Students will assess the effects of site, sun and wind in building response	Analyze
5	Students will Identify the unique design requirements according to climate	Analyze
6	Students will learn the impacts of climate on architectural design and dealing with them	Remember

References:

- The Environment – Principles & Applications *by Charis Park*
- "Housing, Climate and Comfort" by Martin Evans
- "Buildings in the tropics" by Maxwell Fry
- Climate Responsive Architecture "by Arvind Kishan, Baker & Szokolay".
- Man, Climate and Architecture by Givoni, B.,
- An Introduction To Building Physics by Narashimhan
- Manual Of Tropical Housing And Building – Part I – Climatic Design by O.H. Koenigsberger
- Housing Climate & Comfort by M.Evans
- Climatic Design by Donald Watson

B. Arch. Semester-IV**BR 212 – Architectural Design - IV**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	7	100	100	12	200

Focus: To develop sensitivity towards existing habitat spaces with its building elements.

Objective

The study of design shall continue with further progress and complexity in aesthetic qualities with more emphasis on architectural and functional aspects. The semester will focus on studying functional patterns in horizontal and vertical circulation for double storied framed structures with application of services. The design project will involve complexities like site restrictions and introduction to basic byelaws. The subject will be integrated with Art Appreciation, BMC, Contemporary History, Site Planning and Landscape Architecture, Electrical and Illumination, Concrete Structures.

There will be at least two design problems, one major and one minor, arranged in sequence leading to more and more complexity. The faculty can take up the exercises as per their order of preference. The order should be common in both sections. The faculty may achieve the stated minimum outcomes using appropriate strategies.

Suggestive Typologies: school, nursing home, Childcare centre, homestead, Motel.

Content: Design Pedagogy**Pre-Design Study:**

- This stage will involve at least two projects- one major and one minor in continuation with the previous semester in an increasing order of complexity with considerations relating to horizontal and vertical circulation to a double-storey framed structure.
- Introduction to byelaws with site restrictions is also initiated at this stage. Functional aspects of building services like drainage, water supply and electricity with structural concepts in the design will be a major part of the exercise. Site Planning and Landscape intentions shall also be involved in related stages of the design process.
- The student will study and collect data using case studies through literature reviews, site visits and gathering of data/ information through literary sources. The project outcome / design solutions will be in the form of sheets, elevations- sections, perspective views, etc.

Presentation of the previous module

- Documentation of historical- socio- cultural information,
- Use of locally available materials leading to construction techniques in elements of built forms and in response to the climate of the region.
- Structural System in the built forms
- Identification of possible design intervention in the region/ settlement.

Design Intervention in the Region mentioned in the above modules

- Justification of the Design Intervention
- Conceptual Design
- Design development/ Form Development
- Presentation/ Crits

Introduction to the Design Problem, Site study and Area Programming

- Introduction to the Design Exercise/ Problem
- Site Visit and Site Analysis
- Case studies
- Collecting relevant data for the given design problem
- Synthesising and Analysing the above data
- Deriving Area Requirements for the Design Exercise

Design Development

- Relation to various functional aspects of the design problem: Use of bubble diagrams, flow diagrams, zoning of site, etc.
- Conceptual Design
- Finalization of design proposals: schematic 2D/ 3D / single line/ conceptual level site plan, floor plan, elevations and sections should be finalized

Final Design Proposals

- Final developed to- scale drawings- site plan, plans, elevations, sections, elevations
- Facilitation to the floor plan for justification of provided spatial proposals
- Detailed Site Plan with built and unbuilt spaces and landscaping features
- Development of views and construction details
- Model of the proposed design

Course Outcome:

S.No.	Outcome	Taxonomy
1	To Analyze the learning of the previous semesters	Analyze
2	To understand the given project in terms of the design process with requirements for the same	Understand
3	To Analyze data from standards, case studies and site visits for the current project.	Analyze
4	To analyze data collected with relevance to the current project.	Analyze
5	To Create design concepts required for the given project	Create
6	To Apply & integrate learning from other allied subjects to the design proposal	Apply

B. Arch. Semester-IV**BR 222 Building Materials & Construction -IV**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus:

Understanding of materials with respect to the construction type and its functions.

Objectives

- To familiarize students with the different types of vertical circulation possibilities in the form of Stairs.
- To give complete knowledge about the various types of Cladding and surface finishes.
- To have an understanding of the grillage foundation & various types of steel trusses.

Contents:**A. Building Construction:****Unit-1: Staircase**

- Technical terminology involved, Different types of staircases-Dog legged, Circular, Open Well, Spiral, Elliptical, etc. Classification also based on materials like wooden, steel and RCC.
- Staircase layout and its construction details, different elements of staircases, etc.

Unit-2: Cladding

- Various materials and fixing details of surface cladding.
- Types of Stone cladding (Dry & wet).
- ACP Cladding on external building facades.

Unit-3: Grillage foundation & Steel trusses

- Construction details of Grillage foundation
- Construction of steel structures (Factory shed/ large span)
- Details of Roof and roof trusses
- Waterproofing and rain water disposal from roofs
- Steel columns, portal frames, etc.
- North light truss, tubular monitor roof truss

B. Building Materials:**Unit-4: Wood and its derivatives**

Veneers, ply boards (advantages and disadvantages of ply boards), industrial timber, industrial form batten, baulk, board, deal, end, hog, plak, pole, quartering, scantling.

Unit-5: Paits, Distempers & Varnishes

SURFACE FINISHES: Paints and surface finishes; Composition, properties and methods of application of different types of paints: Oil, synthetic enamels, acrylic and other plastic emulsions and formulations, interior and exterior grade paints. Natural and synthetic clear varnishes, French polish. Cement based paints.

Unit-6: MISCELLANEOUS MATERIALS

Cork, rubber, Gypsum, sealants, heat and sound insulation materials.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Students will become aware of vertical circulation through staircases with all technical terms.	Understand
2	Students be able to analyze various types of staircases with reference to its placement, geometry and material used.	Analyze
3	Students will be able to compare and analyze various materials used for cladding purposes for building components along with their construction details	Evaluate
4	Students will be able to make construction details of steel trusses.	Create
5	Students will learn about wall finishes.	Remember
6	Students will create drawings and designs based on the acquired knowledge.	Create

References:

- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- Building Materials: Materials of Construction, Gurcharan Singh
- Building Construction Handbook, R. Chudel

B. Arch. Semester-IV**BR 232 – Architectural Structure-IV**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Analysis of Plane Frame Structures and continuous structures.

Objectives

- To give an insight into the behavior of propped cantilever, fixed beams and portal frames.

Contents:**Unit-1 Fixed and Continuous Beams**

- Analysis of propped cantilever
- Fixed beams
- Shear force diagrams and bending moment diagrams
- Analysis of continuous beam (maximum three spans)

Unit-2 Clapeyron's Theorem

- Clapeyron's Three Moments Theorem
- Application of clapeyron's theorem for analysis of continuous beams.
- Moment Distribution Method

Unit-3 Moment Distribution Method

- Stiffness of members
- Distribution factors
- Carry over moment
- Analysis of portal frame without sway (single bay, single story with sway and non-sway) by moment distribution method
- Analysis of portal frame without sway (single bay, single story non-sway) by moment distribution method

Unit-4 Rotation Contribution Method (Kani's Method)

- Introduction
- Application of Kani's method for frame and beam analysis.

Course Outcome:

S.No	Outcome	Taxonomy
1	To analyze propped cantilever and fixed beams	Analyse
2	To analyze continuous beams with application of clapeyron's three moment theorem	Analyse
3	To Analyze portal frame both sway and non-sway using moment distribution method.	Analyse

Text books:

- S. Ramamrutham r. Narayan "Theory of structures 9th edition" Dhanpat Rai.
- Kumar. A., "Stability Theory of Structures", Tata McGraw Hill Co. Ltd.
- R.K Bansal and Sanjay Bansal, Engineering Mechanics Third edition, Laxmi Publications, New Delhi.
- Jain, A.K., "Strength of Materials and Structural Analysis", 2nd Ed., Nem Chand & Bros.

References:

- C.S Reddy “Basic Structural Analysis”, McGraw Hill Education, 3 edition (1 July 2017).
- S S Bhavikatti “Structural Analysis Vol-I”, Vikas Publishing House, Fourth edition (2013).
- Jain, A.K., “Strength of Materials and Structural Analysis”, 2nd Ed., Nem Chand & Bros.

Web links:

- <https://nptel.ac.in/downloads/105101085/>
- www.pdfdrive.net

B. Arch. Semester-IV**BR 242 – History of Architecture-III**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an insight understanding of the architectural developments in modern era.

Objectives

- To introduce the condition of modernity and bring out its impact in the realm of architecture.
- To study modern architecture as evolving from various aspects; industrialization, urbanization, material development, modern art as well as society's reaction to them.
- To study the changing developmental trajectories in modern architecture.
- To develop an overall understanding of the architectural developments.

Contents:**Unit-1: Modern Movement**

Return to the fundamentals and origins, nature and geometry, new invention of iron and glass, horizontal and vertical expansions. Emergence of Modern Architecture; Bauhaus movement and CIAM, Post War reconstruction in Europe, and its influences on Modern Architecture, Philosophies of minimalism and Form Follows Function. Works of great modern masters; Peter Behrens, Walter Gropius, Mies Van der Rohe, Le Corbusier, later works of Frank Lloyd Wright; Louis Kahn, Alvar Alto etc.

Unit-2: The International Style

Simplification of the modern architecture into steel and glass cubes; an overview of the work of Philip Johnson.

Unit-3: Post Modern Architecture: Reaction

Architecture entrenched in place and history, sarcastic approval of expression, ornament, symbolism and context. An overview of the works of James Stirling, Michael Graves, Charles Moore.

Unit-4: Post Modern Architecture: Resistance

Disregard for historical imagery, revival of the ideals of the modern architecture of the 20's, exaggerated and sophisticated revival of the grid and Corbusier's geometry. An overview of the works of Richard Rogers, Norman Foster, Richard Meier.

Unit-5: Hi-Tech Architecture

Synthesis of the Hi-Tech and Historicism, an overview of the works of Cesar Pelli, Aldo Rossi.

Unit-6: Deconstruction

Reaction to the post-modern, non-perfection as important as perfection, narrative and representational, fragmentation of structures. An overview of the works of Zaha Hadid, Frank O. Gehry and Rem Koolhaas.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire the development and technological advancements in modern era.	Understand
2	Acquire the various architectural form and character of the modern architecture.	Understand
3	Evaluate and analyze various architectural styles	Analyze
4	Make sheets with free hand sketching on all architectural styles.	Create
5	Exposure to the various architectural styles through presentations.	Understand
6	Make sketchbook and models on the architectural styles with respect to the timeline.	Create

Text book

- History of Architecture in India by Tadgell Christopher.
- The Great Ages of World Architecture by G.K Hiraskar.
- A History of Architecture by Sir Banister Fletcher's.

References:

- Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai: D.B. Taraporevala Sons and Co.
- Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London: Verona Printed.
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- Kimball, F. and Edgell, G. H. (2012). A History of Architecture. Amazon: Ulan Press.
- Faulkner, H. T. (1953). Architecture through the Ages. New York: Putnam Adult.
- Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London: B.T. Batsford Ltd.
- Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers.
- Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York: M. Courier Dover Publications.
- Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford: Oxford University Press.
- Prammar, V. S. (2005). A social history of Indian architecture. New Delhi: Oxford University Press India.
- SenGupta, B. K. (2006). Reading material on the History of Human Settlements. New Delhi: ITPI.
- Singh, U. (2009). A history of ancient and early medieval India: from the Stone Age to the 12th century. Delhi: Pearson India.
- Watkin, D. (2005). A History of Western Architecture. 4th Ed. London: Laurence King Publishing.

Web link

- <https://www.amazon.in/Banister-Fletchers-History-Architecture-Cruickshank/dp/0750622679>
- <http://www.archinomy.com>

B. Arch. Semester-IV**BR 252 - Building Services - II (Electrical & Firefighting)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To enable students to understand various systems of Electrical services, Firefighting, Illumination and Elevators/Escalator services; and its design application for a small and large building.

Objectives

- To develop an understanding of building services involved in the built environment.
- Knowledge of electrical systems at site level and building level
- To understand the Illumination systems involved at domestic level.
- To develop skills to prepare design of illumination system for a residential and commercial building.
- Knowledge of essential component of firefighting system systems at domestic level.
- Skill to prepare design of Fire Fighting system for buildings
- Knowledge of vertical transportation system.
- Skill to prepare design of vertical transportation system for buildings
- Knowledge of building services coordination system.
- Skill to prepare coordinated building services plan for entire buildings.

Contents:**Unit-1: Importance of Building Services**

- Importance of Electrical, Firefighting, illumination and vertical transportation system
- Historical overview of the development of Electrical, Firefighting, illumination and vertical transportation system.

Unit-2: Electrical Services

- Basic principles of electricity
- Electricity demand calculations; norms and standards
- High side electrical system at site level - Transformers and switch gears – Layout of substations
- Electrical distribution system at site level overview
- Types of distribution networks at site level and building level.
- Planning electrical wiring for building – Main and distribution boards
- Types of wires, wiring systems and conduit
- Fixing of electrical fixtures and switches
- Materials, apparatus, joints, fixtures and breakers –Market survey
- Low voltage supply (data and telephone)

Unit-3: Illumination

- Visual tasks – Factors affecting visual tasks
- Modern theory of light and colour – Synthesis of light –
- Additive and subtractive synthesis of colour – Luminous flux – Candela – Solid angle illumination – Utilisation factor – Depreciation factor
- Classification of lighting – Artificial light sources – Spectral energy distribution – Luminous efficiency – Colour temperature – Colour rendering.
- Design of modern lighting – Lighting for stores, offices, schools, hospitals and house lighting. Elementary idea of special features required and minimum level of illumination required for physically handicapped and elderly in building types.

Unit-4: Fire Fighting System

- Causes and spread of fire, Combustibility of materials and safety norms.
- Passive Fire Protection Strategies.
- Active Fire Protection Systems.
 - Fire Detection Systems.
 - Alarm Systems.
 - Fire Extinguishing Systems.
 - Smoke Control.
- Designing Fire Escapes for Life Safety.
- Code Provisions

Unit-5: Vertical Transportation System

- Types of Elevators, Escalators and Auto-walks and their suppliers.
- Factors guiding their placement and layout in a building envelope.
- Designing Elevators – no. of elevators, capacity, elevator bank, etc.
- Design and construction of pit, well and machine rooms for elevators and escalators.
- Elevator, escalator and auto-walks design applications.
- Exchange of Information.
- Installation and commissioning

Unit-6: Coordination of Building Services

- Coordination of building services with other service layouts, architectural layouts and structural layouts.
- Preparation of Coordination drawings.

Course Outcomes:

S. No.	Outcomes	Taxonomy
1	To discuss the active and passive components of Electrical system and various principles.	Understand
2	To develop understanding for Electrical, Firefighting, illumination and vertical transportation system for Small building	Understand
3	To develop skills to design Electrical, Firefighting, illumination and vertical transportation system for domestic building	Apply
4	To develop skills to design water supply in domestic building	Apply
5	To apply of learning to design of Electrical, Firefighting, illumination and vertical transportation systems in buildings (except detail design calculations)	Analyze

Text books

- Basic electrical engineering by D.P Kothari, I.J Nagrath
- Handbook of electrical design details by Neil Sclater Building construction illustrated by Dr. D.K. Ching

References:

- Introduction to the design and analysis of building electrical system by John Mathew Electrical design guide for commercial buildings by William H. Clark
- Mechanical and electrical equipment for building by Walter T. Gondzik

Web links

- <https://www.youtube.com/watch?v=mc979OhitAg>
 - https://www.youtube.com/watch?v=TTh8eT_g9yI
 - <https://www.youtube.com/watch?v=YLe5XTmm64A>
 - <https://www.youtube.com/watch?v=X27QTSDZle8>
 - <https://www.youtube.com/watch?v=Eh6-Fy9Yr6k>
 - <https://www.youtube.com/watch?v=F-jRMFz6pEE>
 - <https://www.youtube.com/watch?v=Ujg05YWNYt4>
 - https://www.youtube.com/watch?v=3-4mvq_Ixx8
 - <https://www.slideshare.net/ghghfgd/liftescalator-moving-walk>
 - <https://www.slideshare.net/ihudhaif/topic-lift-escalator-walkway-1130-anlev>
 - <https://www.youtube.com/watch?v=-tqYeFJgex8>
 - <https://www.youtube.com/watch?v=WHt3wvRnJHQ>
- https://www.slideshare.net/E185/bs-2-lift-presentation-1?qid=38e659dd-2a6e-441a-9a8b-28dca6c830e0&v=&b=&from_search=1

B. Arch. Semester-IV**BR 262 – Computer Application in Architecture -II**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
0	2	0	50	50	1	100

Focus: To expose students to use SketchUP for model building to flesh out ideas and present their ideas and to use v-ray for SketchUP to create renderings with proper lighting and photo realism.

Objectives

- To develop practical understanding of SketchUP and its relevance in Architecture. Students would develop skills of 3D modelling using various tools and techniques. They would be able to generate 3D from 2D drawing using the rendering skills like material, lighting, background etc.
- To learn SketchUP layouts to create presentations including the renders, floor plans, sections and elevations in an organized manner.

Contents:**Unit-1: Introduction to SketchUP**

Toolbars, Camera controls, Pan, Zoom, orbit, Basic tools, Rectangle, Circle, Select, pencil, push /pull, Groups, Components, Move, Rotate, copy, offset, Paint bucket etc.

Modelling

- Walls + floor, Windows, Doors, Frames, tables, Roof, etc.
- Openings

Materials

- Creating materials - Search online for materials, Create new material
- Edit materials – Scale, Rotate, Edit
- Modeling practice – Chair, Shelves, Accessories
- Warehouse - Download models, Edit models, Groups vs components, Scale

Unit-2: 3D project modeling

- Interior Space – Residence
- Object placement
 - Locking to axis
 - Reference points

Unit-3: Section & Layouts

- Sections – Elevations, Floor plans, Layouts, Preparing views, Sending to layouts, Positioning, Sizing, Moving, copy, Using scenes, Scale, Dimensions, Updating model reference, Styles in layout, Title block

Unit-4: Structures

- Floor, Walls / store front, Doorways, Window frames, Stairs, Columns, Rails etc.

Unit-5: Detailing & Lighting

- Tables, Counters, Rugs, Picture frames / posters, Light fixtures, Doors, Windows, Planters, Accessories
- Lights and settings, Lighting with shades, Directional lights, Ambient lights, General lights, Accent lights, Test renders 2.1.

Unit-6: Render & Presentation

- Fixing the lighting, Editing materials, V-Ray material effects, Camera positioning, Render settings
- Views, Views in SketchUP for use in Layouts, Set up layout, Image hierarchy, scale, Inserting renderings, Dimensions and labels, Title block, Presentation Tips

Course Outcomes:

S. No.	Outcomes	Taxonomy
1	Develop understanding of 3d modelling with sketchup	Understand
2	Comprehends sketchup modelling and its parameter as tools and its application in architecture	Apply
3	Demonstrate the tools & concepts of sketchup modelling methods and techniques in 3D through various architectural projects of progressive complexity	Apply
4	Comprehends sketchup modelling with structural parts of the building.	Apply
5	Demonstrate the detailing & lighting in 3D models, preparing for the rendering	Apply
6	Comprehends Sketchup model for rendering & presentation using various plugins.	Apply

Web links

- [Getting started with Google SketchUp Part 1 - YouTube](#)
- [Google SketchUp 8 For Dummies aidanchopra.com](#)
- [Chaos Group / Chaos Software official website - home - V-Ray® - award winning, produc...chaosgroup.com](#)
- [Fine Woodworking's Google SketchUp® Guide for Woodworkers: The Basics - Woodworking - ...tauntonstore.com](#)
- [Gallery : Corona Renderer corona-renderer.com](#)
- <https://forums.sketchup.com/t/recommended-book-for-sketchup-starter/23832>
- <https://3dwarehouse.sketchup.com/?hl=en>

B. Arch. Semester-IV**BR 272 – Surveying & Levelling**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	2	0	50	50	2	100

Focus: To cultivate the knowledge and skills related to surveying and levelling principles and practice. **Objectives:**

- Understanding principles of surveying and leveling
- Use of various survey and leveling instruments
- Carrying out surveys of land of medium complexity and preparation of survey plans.

Content:**Unit-1: Introduction**

- Surveying Definition
- Classification of surveying
- Principles of surveying
- Character of work, shrunk scale.

Unit-2: Chain Surveying

- Chain Survey Instruments
- Types of chain
- Instruments for ranging
- Setting out angles
- Erecting perpendiculars
- Field work chain triangulation
- Recording and plotting, errors in survey.

Unit-3: Compass Traversing

- Introduction
- Types of compass
- Fore bearing, back bearing, adjustment of closing error.

Unit-4: Plane Table Surveying

- Plane table survey
- Plane table and accessories
- Methods of plane table survey, radiation, intersection, traversing and resection, field problems.

Unit-5: Levelling

- Levelling definition,
- Classification,
- Booking of reduced levels
- longer levelling, errors

Unit-6: Theodolite

- Study of theodolite,
- Definition of different terms,
- Measuring horizontal and vertical angles,
- Method of repetition.

Unit-7: Contouring

- Contouring
- Characteristics of contours,
- Direct and indirect methods of contouring, interpolation,
- Uses of contours
- Setting out works such as center lines of a building, grade for sewer, centerline of a bridge.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To explain basic principles of surveying.	Understand
2	To Explain the use of various surveying equipments	Understand
3	To develop L-section profile a road	Analyse
4	To draw contours map for a given area	create
5	Use theodolite for surveying	Apply

Text books:

- N.N Basak., “Surveying & Levelling”, Tata McGraw Hill Education Private Limited.
- C. L. Kochher., “Text book of Surveying”, Katson Publishing House, 1979.
- R. Subramanian., “Surveying & Levelling”, Oxford University Press, 2007.

Web links:

- <https://nptel.ac.in/courses/105107122/1>

B. Arch. Semester-V**BR 311 – Architectural Design - V**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	8	150	150	13	300

Objectives

- The studio emphasizes on site planning. Design-problem should focus (but not limited to) on a multi-functional large span public building in an urban setting. Emphasis of the problem would be on design parameters, graphical presentation of design details and architectural expression in functional and constructional elements rather than detailed structural analysis. Site restrictions (bye-laws) should be imposed in framing design problems.
- Design exercises could be sports complex, exhibition hall(s), interpretation centre, cultural centre, showrooms, auditorium, temporary canopy, Hospice or Old age home etc.
- There would be minimum one major and one minor exercise/project based on the module contents.
- The modules may be taken up by the faculty in order of preference. The order should be Common in both sections of same year. The faculty may achieve stated minimum outcomes using various strategies and approaches.
- This course shall be integrated with building construction studio and services (mechanical services & acoustics).
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Contents:

- Students are required to be well versed with all the building structural systems, so that they will be able to categorize and choose structural systems for a multistoried (2-3 storeys) building. This could be done through literature study/ lectures/ discussions/ videos, study models, presentation etc.
- Students should explore various new building materials appropriate for the building typology – An exhaustive list of materials could be prepared through market survey/ case studies/ books/ papers/ reports, presentation, display etc.
- Students must practice various written and verbal skills developed in previous semesters during this module.
- The concerned faculties may open a dialogue in the studio on latest technology/ material. Mapping of students' participation in the discussion may help in evaluating the learning progress of the student(s). (Like in focused group).

Learning outcome could be achieved after completing the initial design process steps (in any preferred order/ or using any of design teaching model) stated below: -

- Introducing Design Problem
- Site Visit
- Site Analysis
- Designing the design Programme
- Collecting and analyzing Data for various spaces
- Area Programming
- Flow diagram (relation of various spaces)
- Bubble diagram (locating various zones on site)
- Try and Re-create (Analyzing spaces in all dimensions through Block Models)
- Single line Graphics and study models (Choosing the right option)
- Students may integrate the knowledge gained from previous theory-based subjects (like building services mathematics for architecture, building materials and construction, structures etc.) and apply in their design during design development/ detail stage.
- It is preferable if the students communicate the application of all services in their design.
- Students must make enlarged drawings showing all working details for any part of the building.

- Formative assessment in the studio could be done through individual critique, group discussion formal and informal feedback etc.
- Summative assessment of the studio work could be achieved through Panel discussion, presentation, peer review, public review, criteria-based evaluation etc.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To apply various advanced structural systems and latest building materials.	Apply
2	To analyze new technology, structural system and materials.	Analyze
3	To analyze & Formulate through drawings or models methods developed to meet various requirements.	Analyze
4	Apply new techniques and systems in their design.	Apply
5	Apply services (studied in previous and present semester) at building level in their design.	Apply
6	To create study models with precision (or Graphics) of chosen structure for designed space.	Create

B. Arch. Semester-V**BR 321 Building Materials & Construction-V**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus:

Understanding of materials with respect to the construction type and its function.

Objectives

- To familiarize students with doors and windows in steel and aluminum sections. Also integration of openings with partitions in steel and aluminum used in interior of buildings.
- Learning of various ferrous and non ferrous metal sections used in manufacturing of metal doors and windows along with various fixtures involved.
- To familiarize students with the types of metal shutters and partitions, doors and windows, their application and construction details in steel and aluminum sections.

Contents:**A. Building Construction:****Unit-1: Metal Doors, Windows and Partition**

- Types of doors and windows in Aluminum and steel
- Types and varieties of available sections in steel and aluminum in market and their application in providing doors, windows and partitions.
- Design considerations and construction details in congruence to IS codes and manuals provided by CPWD and other organizations.

Unit-2: Special Doors and Shutters

- Different types of doors; sliding, sliding and folding, revolving doors, collapsible shutters, rolling shutters, types of rolling shutters in conventional and contemporary materials. The installation, working and mechanism of such doors and shutters.

Unit-3: Partitions, water proofing

- Types of partitions, typical details, fixtures of various partitions in partitions and its specifications.
- Waterproofing – Typical details of terrace water proofing, treatment of parapet wall joint between parapet walls on roof, damp proof course at plinth level.

B. Building Materials:**Unit-4: Ferrous & Non-ferrous metals:**

- Ferrous Metals: Pig iron, cast iron, wrought iron – types, properties, steel – properties, types and uses of steel in construction, properties of mild steel and hard steel, defects in steel.
- Nonferrous Metals and alloys: Aluminium, copper, lead Nickel Important alloys like - brass, bronze, etc.
- Corrosion of both ferrous and non ferrous metals – types and preventive measures.
- Roofing Material: Study of contemporary roofing materials

Unit-5: Damp Proofing & Water Proofing Materials

- Waterproofing details in different levels: details in simple foundations, walls, roofs, sills, lintels and roofs in RCC, RB and steel, damp proof details of plinth, sill, lintel, and roof level.
- Waterproofing materials and systems for basement.
- Market Survey on various types of waterproofing materials & their applications.
- Damp Proof Materials – Its uses, Properties, application

Unit-6: PLASTIC

Classification of plastic, moulding and fabrication, properties of plastic, use of plastic, PVC. Fiberglass.

Course Outcome:

S.No	Outcome	Taxonomy
1	Students will learn about doors and windows in steel and aluminum sections. Also integration of openings with partitions in steel and aluminum used in interior of buildings.	Understand
2	Students will understand the variety of available metal sections for varied uses.	Understand
3	Students will be able to evaluate the best suitable material and type of Door, Window and Partitions.	Evaluate
4	Students will gain knowledge of properties & specifications of ferrous & non-ferrous metals.	Remember
5	Students will apply Damp/ waterproofing techniques.	Apply
6	Students will create drawings and designs based on the acquired knowledge.	Create

References:

- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- IS Codes and CPWD Manuals
- Jindal, Hidalgo and other similar manuals

B. Arch. Semester-V**BR 331 – Architectural Structure-V**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus:

Concrete as a building material and its structural qualities and design of basic structural elements of RCC frame building.

Objectives

To impart knowledge in the area of concrete technology and the design concepts of RCC framed buildings structural elements.

Content:**Unit-1: Mix Design**

- Concrete: Composition
- Basics of mix design
- Water cement ratio
- Strength, durability, workability requirements.

Unit-2: IS 456:2000 code Provisions

- Relevance of RCC in architectural practice.
- Advantages of RCC over other conventional structural practices.
- Steel for RCC Plain & Twisted bars, IS 456 code provisions.

Unit-3: Design of Basic Structural Elements

- One-way slabs
- Rectangular and T beams,
- Two-way slabs
- Columns
- Footing for isolated columns
- Detailing of reinforcement.

Unit-4: Design of Stair Case

- Design of Dog legged
- Open well stairs (waist slab type)

Course Outcome:

S.No	Outcome	Taxonomy
1	To design concrete mix as per IS10269:2012	Evaluate
2	To design RCC elements such as beams, slab, columns, footings	Create
3	To Design RCC stair-case.	Create
4	To describe the role of ingredients of concrete	Create

Text books:

- Dayaratnam, P., “Reinforced Concrete Structures”, Oxford & IBH Publishing Co."Design of Steel Structures" by Kazimi and Jindal
- Jain, A.K., “Reinforced Concrete – Limit State Design”, Nem Chand Bros
- N. Subermanian., “Design of Reinforced Concrete Structures”, Oxford university press

References:

- IS 456 – 2000 “code of practice for plane and reinforced concrete” Bureau of Indian standard.
- S Unnikrishna Pillai, D. Menon., “ Reinforced Concrete Design” McGraw-Hill Education (India) Pvt Limited, 2009
- SP34-1987, detailing of RCC structural elements.

B. Arch. Semester - V**BR 341 – Landscape Architecture**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	1	50	50	3	100

Focus:

The course is designed to make the students understand the natural and man-made components that generate the decisions in the planning of any site, and the role of landscape architecture for the judicious co-existence of man with nature and its patterns and systems. This course shall have a direct application in the design studio of the same semester as well as subsequent semesters for site planning and landscape design of the respective design assignments.

Objectives

- To understand land and its forms through drawings and models
- To learn about the occurrence of various landforms
- To develop an understanding of the natural and man-made landscape elements & principles , their inter-relationships and co- existence (Visual and physical elements)
- To learn to read the land through the imprints left by history
- To understand landscape ecology and process
- To understand the need for urban bio-diversity for better environments.
- To learn how to generate and sustain urban biodiversity.
- To learn to develop and plan large sites with minimum or no negative impacts on the environment
- To understand plant ecology, Identification of plants & Ability to design with plant

Contents:**Unit-1: Introduction to Landscape architecture & Land Forms**

- Role of landscape architecture
- Types of landforms

Unit-2: Elements & Principles of Landscape Architecture

- Elements of landscape architecture
- Principles of landscape architecture
- Natural systems
- Man-made elements
- Modifications in natural systems with man-made elements
- A co-existence of natural and man-made elements (visual and physical elements only)

Unit-3: THE HISTORIC LANDSCAPE PATTERNS

- A comparative study of the major traditions of landscape design in the east and the west; Historical landscape garden styles of India and the world; Chinese, Buddhist, Islamic, European etc.
- Reading the historic landscape patterns
- Self-organizational landscape patterns
- Complex landscape patterns/ human induced
- The fragmented landscapes
- Developing an understanding with Examples, Historic and archaeological assessments
- Landscape heritage and conservation
- Historical Landscape assessment techniques

Unit-4: Landscape Ecology and Processes

- Landscape ecology, concept of ecosystem, eco regions, biogeographic zones, landscape structure, Patch, corridors and matrix
- Ecological urbanism; Recent research and the historical overview
- Ecological planning and design
- Urban biodiversity, Examples of urban biodiversity and its role in arriving at better urban environments.
- Landscape analysis as a tool for the scientific management of urban biodiversity

Unit-5: INFRASTRUCTURE ENHANCEMENTS AND THE GREEN LANDSCAPE RATING SYSTEMS

- Infrastructure enhancements, environmental regulations, environmental site assessments
- Stormwater management, floodplain studies, grading and earthwork, wastewater collection, treatment, erosion and sediment control
- An overview of the landscape rating systems, green landscape rating system

Unit-6: DESIGNING WITH PLANTS

- Plant ecology and processes: aquatic plants, terrestrial plants
- Climatic adaptation in plants
- Classifications in plant kingdom
- Ecological sensitive plantation
- Spatial principles of planting design
- Planting techniques and maintenance

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Remember	To recognize the various land forms, natural patterns and systems
2	Remember	To identify the elements & principles of landscape architecture
3	Remember	Identify the historic landscape patterns
4	Remember	Identify the development processes and cycles in the urban landscapes
5	Remember	Recognizes how it has been done in the past along with present state of art
6	Apply	Understand the role of urban biodiversity
7	Apply	Conduct a Landscape analysis and evaluate it with required functions
8	Apply	A knowledge base to deal with complex urban and human induced landscape design issues.
9	Apply	Develop a site plan with landscape design and relate with environment and ecology

Learning Resources / References & Learning Strategy

The learning strategy used shall be live site studies through observation and measured documentation, recording of observations through drawings; the students shall be exposed to real site conditions for understand the scale, vehicular/ machinery movements, vegetation, microclimate, MEP incorporation, etc; along with class lecture cum demonstrations and reading relevant literature.

Books & References

- Landscape architecture in India A reader by Prof Shaheer, Geeta Wahi Dua
- Time saver standards for landscape architects
- Trees of Delhi/ Central India by Pradip Kishen
- Ornamental Plants and Garden Design in Tropics and Subtropics (2 vols) by T.K. Bose

Web links

<https://www.slideshare.net/shaikhjalam/landscaping-architecture>
<https://www.slideshare.net/catherinepatterson/landscape-design-and-principles-presentation>
https://www.slideshare.net/pramod1392/gardens-of-the-world?qid=7c20a1dc-e27f-4c3c-8aa7-693f6148d4c8&v=&b=&from_search=4

B. Arch. Semester-V**BR 351 – Building Services -III (Acoustics & Lighting)**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus:

This course will give a basic understanding about the science behind Lighting, ventilation and building acoustics. It will help students to apply prediction methods to assess the functional requirements of buildings.

Objectives

By learning this course students can provide optimum lighting, ventilation and acoustical solutions through simulations and design models. Further this course will expose students to perform basic room acoustics, wind and lighting measurements.

Contents:**Unit-1: Day lighting**

Introduction: Physics of light, Photometry, Transmission of light, recommended illuminances, Glare, Daylight illuminance, Luminance distribution, Design methods, Total flux method, Daylight factor method, BIS method, Pepper-pot diagram, Models and computer tools. Planning for daylight, day light utilization factor.

- Lab: Introduction to Lux meter. Simple experiments to measure Lux levels under different sky conditions, Class room lux measurements, etc.

Unit-2: Electric Lighting

Lamps, Power factor, Luminaries, reflector, type of lens, cove lighting, valance lighting, cornice lighting, track lighting, light strip, troffer, wall washer, flood light, down light, spot light, spill, point, line and area source. Design methods: Point method, lumen method, IES glare Index system.

- Lab: Introduction to brightness meter, experiments on colour & light, brightness & colour etc.

Unit-3: Ventilation

The wind, The effects of topography on wind patterns, Air currents around the building, Air movement through the buildings, air changes, quality of air, use of fans, thermally induced air currents, pressure losses: Buoyancy-driven (Stack effect, Venturi effect) – Use of courtyard.

- Lab: Types of anemometer and its use. Wind tunnel experiment for wind movement around the buildings, Simple experiments to measure outdoor and indoor wind velocity.

Unit-4: Introduction to Basics of Acoustics

- Basic laws and terminologies related to Acoustics.
- Sound Intensity and Sound Intensity Level. (Classroom exercise)
- Sound Absorption, Transmission, Reflection, Diffusion and Diffraction.
- Free field conditions and Inverse Square Law for noise reduction with distance.
- Sound Absorbing Materials – descriptions and characteristics.

Unit-5: Acoustics for an Enclosure / Building Design

- Reverberation Time and its importance for acoustical performance of an enclosure.
- Sabine's Equation and its application for designing new auditoriums and correcting RT of existing ones. (Classroom exercise)
- Acoustical defects in an auditorium and their remedies.
- Acoustical design of auditorium and other acoustically sensitive enclosures meant for speech, music, lecture, etc.
- Properties of materials and their application for acoustical treatment, shape analysis for different enclosures.
- Designing enclosures for variable RT's.

- Sound Amplification Systems.

Unit-6: Noise Isolation and Control

- Noise and its effects.
- Types of noise and its transmission.
- Sound Insulation and Transmission Loss.
- Speech privacy and noise control in specific situations.
- Methods of Sound Insulation - control of mechanical noise and vibrations.
- Codal Provisions

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Understanding	Develop understanding of daylighting
2	Applying	Develop understanding of lighting and their application in design.
3	Applying	Comprehends ventilation and lighting as important element in design and its application while planning spaces
4	Understanding	Develop understanding of fundamentals of architectural acoustics.
5	Understanding	Explain different phenomenon and principles related to sound propagation and their implications on building design.
6	Analyse	Summarize the common acoustical defects in an auditorium and the ways to avoid / correct them.
7	Understanding Knowledge	Describe the different types of noise, their transmission and the measures to isolate / control them.

Text books

- Barron. M. (2009). Auditorium acoustics and architectural design. 2nd Ed. Taylor & Francis. Conceptnine, R. (2008). The Architecture of Light: Architectural Lighting Design Concepts and Techniques. Sage Publications.
- Cox, T. J. and D'Antonio, P. (2009). Acoustic Absorbers and Diffusers. 2nd Ed. Taylor & Francis
- Cuttle, C. Lighting by Design. 2nd Ed. Architectural Press.
- Eagan, D. M. (2002). Architectural Lighting, 2nd Ed. McGraw-Hill.
- Eagan, D. M. (2002). Concepts in Architectural Acoustics.
- Guzowski, M. (1999). Daylighting for Sustainable Design. McGraw Hill.

References:

- Harold, B. M. and Goodfriend, L. Acoustics for Architects. Reinhold.
- Heschong, L. (1976). Thermal Delight in Architecture. Cambridge : MIT Press.
- Hopkins. C. (2008). Sound Insulation: Theory into Practice. 1st Ed. Butterworth Heinemann. Randall, W. (2008). Residential Lighting: A Practical Guide to Beautiful and Sustainable Design. 2nd Ed. Wiley.
- Rea, M. (2000). The Lighting Handbook. 9th Ed. Illuminating Engineering Society of North America.
- Reinhart, C. (2014). Day lighting Handbook.
- Smith, B. J., Peters, R. J. and Owen, S. (1982). Acoustics and Noise Control. New York : Longman.
- Steffy, G. (2000). Time-Saver Standards for Architectural Lighting. McGraw-Hill.
- Szokolay, S. V. (2008). Introduction to architectural science. Taylor & Francis.
- Vigran, T. E. (2008). Building Acoustics. 1st Ed. Taylor & Francis.

Web links

- <https://www.slideshare.net/iamshivee/daylighting-77134452>
- https://www.slideshare.net/KameshMorukurthi/electrical-lighting-calculation?qid=409483a3-6719-44b5-a61c-531217bb363b&v=&b=&from_search=10
- https://www.slideshare.net/shouryagoswami969/building-by-laws-lighting-ans-ventilation?qid=728b27c2-702c-4508-9987-866491ee16d8&v=&b=&from_search=1
- https://www.slideshare.net/sarthakaura/acoustic-materials-84289787?qid=4228636d-764f-4c42-916d-e843232f54b6&v=&b=&from_search=7

B. Arch. Semester-V**BR 361 Computer Application in Architecture-III**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
0	2	0	50	50	1	100

Course Overview:

- The purpose of the course is to prepare students to use BIM for model building to flesh out ideas and present their ideas in a timely manner.
- Students are expected to take notes, review the videos, and practice the instructions given in class. It is the student's responsibility to further look into subjects that will be touched upon in class.

Objectives

- The course should enable the student to bring ideas from concept to construction with a coordinated and consistent model-based approach. The program will enhance the visualization for creating building design view, capturing of design ideas in a photo realistic state.

Contents:**UNIT 1: Introduction to BIM**

- Introduction to BIM and Revit Architecture, Special Features of Revit Architecture.
- Understanding Revit Elements, Working in one model with many views,
- Understanding Recent files and Application Menu, Using Ribbon & Quick Access Toolbar (QAT), Using Properties Palette, Modifying Properties & Professional Palette, Using Project Browser, Salutation and Modifying Basics, Understanding Selection toggles, Accessing Revit Operation,.
- Understanding view extends and cropping regions Navigation Views (Zoom, Pan, and Rotate).

UNIT 2: Working with Project and Modeling

- Creating a new project from file, Accessing Multi-user Projects using work share, Configure Project Settings, Adding Levels, Adding Grids, Referring Layout with temporary dimensions, Adding Columns
- Adding Walls - Using snaps, Wall Properties and Types, Locating Walls, Using Modifying Tools, Adding Doors and Windows, Using Constraints, Adding Plumbing Fixtures and other components, Wall Joints
- Linking AutoCAD Drawing Files
- - Creating Topography Link, Understanding CAD Inserts, Import Tips, Create a Group, Minor Groups to Create a Layout, Creating Revit Links, Rotating and Aligning a Revit Link, Establishing Shared Co-ordinates, Managing the links, Understanding File Formats.

UNIT 3: Modeling Roof, Ceiling & Floor and Stairways

- Making Working with Footprint Roofs, Working with Ceilings, Working with Floors, Working with Extrusion Roofs, Attaching Walls to Roofs, Using Slope Editing tools, Create a Flat Roof.
- Working with Stairs, Railings to Stairs, Working with Component based Stairs, Adding Extensions to Railings, Working with Slope Arrows, Adding Openings.

UNIT 4: Working With Complex Walls, Views, Visibility & Graphic Controls

- Creating Custom Basic Wall Type, Understanding Stacked Walls, Adding Curtain Walls, Adding Curtain Grids, Mullions and Panels, Creating Wall Sweeps and Reveals, Model Lines.
- Using Object tiles, Working with Visibility & Graphics, Using View Templates, Hiding and Isolating objects in a model, Understanding View Range, Displaying Objects Above and Below in Plan Views, Using Line Work Tool, Using Cutaway Views, Using Sketchy Lines..

UNIT 5: Documentation, Annotations, Detailing & Plotting

- Understanding the Tags, Adding Schedule Views, Modifying Schedule Views, Creating Key Schedule, Using Images in the Schedule, Adding Sheets, Working with Place Order Sheets, Aligning Views with Guide Grid, Outputting Sheets to DWF file, Exporting to AutoCAD
- Adding Text, Adding Dimensions, Adding Symbols, Adding Legend Views.
- Creating Detail Callout, Adding Detail Component, Using Arrays to Duplicate Parametrically, Adding Filled and Masking Regions
- Plotting Sheets, Creating PDF.

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Understanding	Develop understanding of 3d modelling with BIM & Revit
2	Applying	Comprehends BIM and its parameter as tools and its application in architecture
3	Applying	Demonstrate the tools & concepts of BIM methods and techniques in 3D through various architectural projects of progressive complexity
4	Applying	Comprehends BIM with structural parts of the building.
5	Applying	Demonstrate the detailing & specifications in 3D models, preparing for the drawings and models.
6	Applying	Comprehends BIM model for rendering & presentation using various plug ins.

References & Web links

1. <https://www.youtube.com/watch?v=FO374T7pGrA>
2. <https://www.youtube.com/watch?v=fiUr9B2yKiI>
3. <https://www.youtube.com/watch?v=5YDbi1Zn2RE>
4. <https://www.youtube.com/watch?v=lc0u10qB0j8>
5. <https://www.youtube.com/watch?v=wsnjAjZUImw>
6. <https://www.youtube.com/watch?v=2SNsYOoVXyc>

Text & reference Books

1. Jeff Hanson, Revit 2018 Architectural Command Reference, SDC Publications
2. Lance Kriby, Mastering Autodesk Revit, Sybex, 2018
3. Eddy Krygiel, Mastering Autodesk Revit, Sybex, 2018

B. Arch. Semester-V**BR 371 Sustainable Architecture**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Understanding the concept of sustainability in architecture.

Objectives:

- To make aware the students about concept & principles of sustainable architecture.
- To make understood students about the concept of Recycling and Reuse
- To learn students about green buildings rating systems of India.

Contents:**Unit-1: Concepts of sustainability**

- Energy and Global environment, Energy use and Climate change – Its Impact, Types of Energy systems,
- Concept of Sustainability - Principles of conservation -synergy with nature
- Bioregionalism - community basis shelter technology within bioregional patterns and scales
- Ethical- environmental degradation
- Summary & conclusion of unit

Unit-2: Sustainable planning & Design

- Introduction to Sustainable Development
- Sustainable approach to site planning and design - site inventories- relationships between site factors Development impacts from one area of the site on the other areas
- Model ecosystem of the site, phasing of development - limits of change
- Design facility within social and environmental thresholds
- Solar passive/ Active techniques.
- Summary & conclusion of unit

Unit-3: Sustainable Building Materials and Construction

- Properties, Uses and Examples of -Primary, secondary and Tertiary Sustainable Materials,
- Principles to improve energy efficiency - siting and vernacular design, shade, ventilation, earth shelter, thermal inertia and air lock entrances.
- Techniques of sustainable construction - technologies, methods of effectiveness, and design synthesis
- Alternative materials and construction methods:
- Use of local materials and on site growth of food, fuel and building materials

Unit-4: Recycling and Reuse

- Pre building, Building, Post building stages - Architectural Reuse, Waste prevention,
- Construction and Demolition recycling- Conservation of natural and building resources. Energy and material savings
- Types of wastes
- Elimination of waste and minimize pollution- various Decomposition methods
- Innovative reuse of various wastes

Unit-5: Smart cities

- Concept of smart cities.
- Sustainable Development Case Studies: illustrated examples of the planning, development, and construction.

Unit-6: Rating systems

- Green architecture and various national rating systems for sustainability.
- Indian systems – TERI GRIHA rating, LEED India rating, IGBC
- Summary & conclusion of unit

Course Outcome:

S.No	Outcome	Taxonomy
1	Student will learn about the concept of sustainability.	Understand
2	Students will be able to apply the aspects of sustainable planning.	Apply
3	Students will be able to analyze the building materials on the basis of sustainable aspects.	Analyze
4	Students will apply the building materials which can be reused or recycled.	Apply
5	Students will learn about green building rating systems of India.	Remember
6	Students will be able to design sustainable architectural designs.	Create

References:

- Integrated approach to sustainable Development by B.C.Bose
- Environmental control systems Heating, Cooling, Lighting By Fuller Moore
- Sustainable practices in built Environment by Caring A.Langston, Grace K.C.Ding
- Sustainable Building Design Manual Vol I & II
- GRIHA Manual (Vol 1-5)
- The Environment – Principles & Applications *by Charis Park*
- "Housing, Climate and Comfort" by Martin Evans
- "Buildings in the tropics" by Maxwell Fry
- Climate Responsive Architecture "by Arvind Kishan, Baker & Szokolay".
- Man, Climate and Architecture by Givoni, B.,
- An Introduction To Building Physics by Narashimhan
- Manual Of Tropical Housing And Building – Part I – Climatic Design by O.H. Koenigsberger
- Housing Climate & Comfort by M.Evans
- Climatic Design by Donald Watson

B. Arch. Semester-VI**BR 312 – Architectural Design - VI**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	8	150	150	13	300

Objectives

- The studio emphasis shall be on creative and rational skills for problem solving, preferably on a contoured site. Design-problem may focus but not limited to a multi-functional, service (advanced services) oriented building like Small scale housing, convention hall, shopping complex, resort, habitat centre, office building, mixed use occupancy buildings etc. in an urban setting including application of urban development, controls, codes and bye-laws.
- Emphasis may also be laid on site planning as well as on advanced services at building and at site level. The focus would be on understanding how to design for an urban setting.
- There would be minimum one major and one minor exercise/project based on the module contents. The modules may be taken up by the faculty in order of preference. The order should be common in both sections of same year. The faculty may achieve stated minimum outcomes using various strategies and approaches.
- There may be integration of design with structural and construction details, for this, the project should be integrated with the structures and building construction classes. One set of detailed working drawings must also be generated at the end of the design process.
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Contents:

- This module can be started with a warm-up exercise/ literature review (group or individual). Students could be sensitized (social-cultural sensitization) through documentary/ movies/ photos etc.
- Students may visit site for collecting context specific data for getting better understanding of real- life project details. The collected data may be analyzed and presented for evaluation.
- The above-mentioned module teaching methods are suggestive. Faculty may choose other pedagogical approaches for design thinking process.
- Design Problem may be introduced by the faculty using linear design approach or hidden-curriculum or other design teaching models can be adopted for defining the design problem.
- Readings/ short movies/ Discussion on designers' philosophies could be initiated for idea generation. Further approaches for design iterations may involve more common techniques like Flow diagram to explore the relation of various spaces, bubble diagram for locating various zones on site, try and recreate for analysing spaces in all dimensions through Block Models and single line graphics and study models for choosing the right option.
- Students may integrate the knowledge gained from previous theory-based subjects (like building services mathematics for architecture, building materials and construction, structures etc.) and apply in their design during design development/ detail stage.
- It is preferable if the students communicate the application of all services in their design.
- Students must make enlarged drawings showing all working details for superstructure.
- Formative assessment in the studio could be done through individual critique, group discussion formal and informal feedback etc.
- Summative assessment of the studio work could be achieved through panel discussion, presentation, peer review, public review, criteria-based evaluation etc.

Course Outcome:

S.No .	Outcome	Taxonomy
1	To apply various indigenous and latest building materials	Apply
2	To understand architectural and structural vocabulary through verbal and written communication	Understand
3	To understand sensitivity towards building bye-laws.	Understand
4	To create & Build with precision block models, study models, site models	Create
5	To apply & Forms correlation between design and other subjects studied in previous semesters and till present	Apply
6	To apply & Communicate through drawings or models methods developed to meet various requirements	Apply

B. Arch. Semester-VI**BR 322 Building Materials & Construction-VI**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus:

Understanding of materials with respect to the construction style and its function.

Objectives

- To make students aware of the construction fundamentals of temporary structures.
- To familiarize students with special concreting methods.
- Learning the cost effective in building construction through study of various low cost building materials.

Contents:**A. Building Construction:****Unit-1: False Ceiling & Wall Finishes:**

- Typical details, various types of false ceiling, application of various types of materials in false ceiling.
- Details of application of wall finishes – plaster, putty, veneer, laminates, aluminum etc

Unit-2: Special concrete and concreting method

High density, fiber Reinforced, polymer concrete, properties & uses. Ready mixed concrete, grouting, cold weather & underwater concreting, Lightweight concrete construction, Composition of lightweight concrete & its advantages, its application in building walls, roof, foundations & ornamental works.

Unit-3: Temporary Structure

Temporary structures, materials and techniques used, earthquake resistant structures.

B. Building Materials:**Unit-4: Decorative Finishes**

wooden flooring, wooden staircase, wooden paneling, glazed wall finish, ceramic tile finish.

Unit-5: Cost Effective Building Material

- Introduction to unit
- Concept of Alternate Building Materials, Fly Ash, Stabilized Earth Blocks
- Need for search of Cost Effective material
- Characteristic requirements of a cost effective material

Unit-6: Structural Glazing & Aluminum Composite Panels

- Introduction to glazing materials and ACP's
- Composition of glazing materials, types and available market forms
- Composition of Aluminum Composite panels, types and available market forms
- Manufacturing process of ACP's
- Merits, demerits and Application in construction industry

Course Outcome:

S.No	Outcome	Taxonomy
1	Students will learn about wall & decorative finishes.	Remember
2	Students will be able to draw construction details of fall ceilings.	Create
3	Students will evaluate the suitable type of fall ceiling for respective type of space requirement.	Evaluate
4	Students will analyze the special concreting methods for best suitable construction.	Analyze
5	Students will learn about low cost building materials & temporary structures.	Understand
6	Students will be able to draw construction details of Structural glazing & ACP cladding.	Apply

References:

- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- Building Materials: Materials of Construction, Gurcharan Singh
- Building Construction Handbook, R. Chudel

B. Arch. Semester-VI**BR 332 – Architectural Structure-VI**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Steel as the advance structural building material and Design of structural steel members.

Objectives: To impart knowledge of simple steel structures, structural steel properties, structural steel members and design of structural steel members and their connections.

Content:**Unit-1 Design of Connections**

- Introduction
- Types of steel sections used in steel structures.
- Bolted and Welded Connections
- Simple connections
- Connections subjected to moments (simple cases only).

Unit-2 Design of Tension Members

- Introduction
- Failure criteria for tension members
- Design of members Subjected to Axial Tension

Unit-3: Compression members

- Introduction
- Laced column design
- Battened column design
- Columns including built-up columns.

Unit-4: Slab Base Design

- Design of slab base (no gusseted base) and simple column and footing connection details

Unit-5: Flexural Member Design

- Introduction to flexural steel members
- Moment of resistance of flexural members
- Web buckling and web crippling in flexural members
- Design of flexural members.

Course Outcome:

S.No.	Outcome	Taxonomy
1	To design connection for steel structures	Create
2	To design structural steel members like struts, columns	Create
3	To design slab base for columns	Create
4	To design flexural members	Create
5	To explain various steel sections used in steel structures.	Understand

Text books:

- Duggal, S.K., “Design of Steel Structures”, 2nd Ed., Tata McGraw Hill.
- Arya, A.S. and Ajmani, J.L., “Design of Steel Structures”, Nem Chand Bros.
- S. S Bhavikatti., “Design of steel structures by limit state method”, I. K International Pvt. Ltd

References:

- IS 800 – 2007 “code of practice for Steel Structures” Bureau of Indian standard.
- Ramchandra, V. Gehlot “Limit state design of Steel Structures”, scientific Publishers.
- Steel Table with IS steel section.

Web links:

- <https://nptel.ac.in/courses/105105162/>

B. Arch. Semester-VI**BR-342 Estimation, costing and specification writing**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: Understanding of basic methods of estimation and methodology used in specification writing for materials and works.

Objectives

This course is intended to impart students with the necessary technical knowledge for preparation of Specifications and calculating estimates and detailed costing for small to medium scale projects.

Contents:**Unit-I: Introduction to Estimation**

- Definition of estimating and costing, Purpose of estimation and costing,
- data required to prepare an estimate (Drawings/specification/ rates), complete estimate structure.
- Procedure or method of estimating,

Unit-II. Measurement of materials and works

- Introduction to measurement of various construction work items, importance and significance
- in construction projects i.e. Units of measurement, rules for measurement, Methods of taking
- out quantities- Long wall and short wall method, centre line method, partly centre line, cross
- wall method. Standard modes of measurement as per Indian Standards for various work items.

Unit-III. Types of estimates

- Preliminary/Approximate Quantity Estimates: Importance & purpose of Preliminary /Approximate estimates, Plinth area method, Cubical contents method and centre line method and their preparation.
- Types of approximate estimates, basic differences and advantages. Detailed Quantity Estimation: Types of detailed estimates and their application, Methods of deriving detailed quantities for various construction work items.
- Preparation of Detailed estimate, Work items as per construction stages: Foundations, Superstructure, Finishing works in a simple building. Description & significance of Items in Bill-of-Quantities (BOQ).

Unit-IV. Costing

- Introduction, meaning, purpose, methods of estimating cost of construction for various work items,
- Cost indices, rates of labour and material, analysis of rates,
- preparation of abstract of estimated cost, use of CPWD schedule of rates. Deriving construction cost as per BOQ.

Unit-V: Introduction to Specification.

- Introduction, Definition, importance and purpose of specifications, impact on costing.
- Types of specifications. Knowledge of manufacturers' specifications for construction materials/products
- Specification of common building materials including carriage & stacking of materials

. Unit-VI: Specification writing

- Methods of material/resource estimation and management,
- Specifications for a simple building. Standard specifications of BIS. For load bearing and framed structures
- General abbreviations used in specifications. Specification of new building materials

Course Outcome:

S.No.	Outcome	Taxonomy
1	Evaluate the estimate of small or medium size projects	Evaluate
2	Apply the techniques, skills, and modern engineering tools necessary for construction practice.	Apply
3	Analyze, & assess the quantity of materials required for civil engineering works as per specifications	Analyze
4	Create detailed report on estimation and specification process	Create
5	Evaluate & estimate the cost of expenditure and prepare a detailed rate analysis report	Evaluate
6	Describe the importance of preliminary estimate for administrative approval & technical sanction for a civil engineering project	Understand

Text book : ESTIMATION AND COSTING IN CIVIL ENGINEERING BY BN DATTA

References:

- Estimating, Costing, Specification and Valuation In Civil Engineering” by M Chakraborti
- Estimating Costing and Valuation by Rangwala

Web link:

https://bis.gov.in/?page_id=117159

<https://archive.org/details/nationalbuilding01/page/n111>

B. Arch. Semester-VI**BR 352 – Building Services -IV (HVAC & Building Automation)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus:

Building Services are what makes a building alive. These vital components vary in scale and complexity depending upon building profile and usage. Accordingly, an architect's role may range from designing services for a less complex structure to incorporating engineering solutions / designs provided by respective consultants in their design programme and to deliberate with them in order to provide the best possible solution. Having already dealt with water supply & sanitation, lifts & escalators, electrical, acoustics, illumination and firefighting services in previous semesters, this semester deals with HVAC and Building Automation.

Objectives

- By learning this course students can provide HVAC & building automation solutions through simulations and design models. Further this course will expose students to perform basic building automation & HVAC services.
- To understand the application of building automation for energy reduction in buildings

Contents:**Unit-1: Fundamentals of Heating, Ventilation and Air Conditioning**

- Basic principles, laws and terminologies related to HVAC.
- Psychrometric chart and comfort zone.
- Evaporative cooling systems of air conditioning.
- Refrigerant Cycle (Vapour Compression System) and its reversal.
- Components of Mechanical Vapour Compression Refrigeration Systems.
- Natural and artificial ventilation.

Unit-2: Types of Air Conditioning Systems

- Window Air Conditioners.
- Split Air Conditioners.
- Packaged Air Conditioners.
- Direct Expansion Air Conditioning Systems.
- Central or All-water Air Conditioning Systems.
- Selection criteria, design / structural considerations and energy requirements for above mentioned air conditioning systems.

Unit-3: Emerging Trends in HVAC and other Miscellaneous Topics

- Passive Heating and Cooling Systems.
- Energy Saving through Design, Operation and Maintenance.
- Emerging Technologies – VRV, VRF, Heat Recovery Systems, etc.
- Developing Air Conditioning layouts for their current design exercise.
- Coordination with other services, architectural and structural designs.
- Case Studies and their critical appraisal.

Unit-4: Building Automation

- Fundamentals of control systems
- Types of control systems
- The impact of automation
- Application and components of building automation systems
- Methods to reduce energy consumption of buildings
- Case studies from various climatic zones of energy efficient architecture.

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Understand	Discuss the active and passive components of HVAC and their underlying principles.
2	Understand	Explain different types of air conditioning systems. Also, identify the design / execution time considerations specific to each of them.
3	Understand	Identify the various interventions / innovations to make these systems energy- efficient.
4	Analyse	Analyse critically the air conditioning systems used in their case study buildings.
5	Apply	Apply the knowledge of air conditioning systems in their current design exercise.
6	Apply	Discuss the elements of building automation & application in buildings

Text books

- National Building Code 2005
- Mechanical and Electrical Equipment for Buildings by Walter T. Grondzik, Alison G. Kwok, Benjamin Stein.
- Basic Refrigeration and Air Conditioning by A. Ananthanarayana.
- Mitchell's Building Construction: Environment & Services, Peter Burberry, 8th Edition, 1997, Longman
- Mechanical and Electrical Equipment for Buildings, B. Stein and J. Reynolds, 10th Edition, 2005, Wiley & Sons Inc
- The Building Systems Integration Handbook, R Rush, 1991, American Institute of Architects
- Building Services: A Guide to Integrated Design: Engineering for Architect, RP Parlour, 2008, Integral Publishing
- Understanding Buildings: A Multi-disciplinary Approach, E Reid, MIT
- William H. Severns and Julian R. Fellows, "Air-conditioning and Refrigeration", John Wiley and Sons, London, 1988.
- A.F.C. Sherratt, "Air-conditioning and Energy Conservation", The Architectural Press, London, 1980.

References:

- Understanding Building Automation Systems (Direct Digital Control, Energy Management, Life Safety, Security, Access Control, Lighting, Building Management Programs) by Reinhold A. Carlson, Robert A. Di Giandomenico
- Building Automation: Control Devices and Applications by In Partnership with NJATC (2008)
- Building Control Systems, Applications Guide (CIBSE Guide) by The CIBSE (2000)

B. Arch. Semester-VI**BR 362 – Computer Application in Architecture-IV**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
0	2	0	50	50	1	100

Course Overview:

- The purpose of the course is to prepare students to use 3DS Max Basics for modeling and rendering to flesh out ideas and present their ideas in a timely manner.
- Students are expected to take notes, review the videos, and practice the instructions given in class. It is the student's responsibility to further look into subjects that will be touched upon in class.

Objectives

- The course will enhance the visualization for creating building design view, capturing of design ideas in a photo realistic state.

Contents:**UNIT 1: TOOLS**

- Introduction to 3ds Max, Interface and use in Architecture.
- Understanding 3ds Max Elements, Working in one model with many views,
- Understanding Basic tools, Objects, Objects primitives, Modifiers, sub-object level,

UNIT 2: 3D MODELING

- Poly modeling,
- Extruding, Lathing
- Compound objects, Boolean, lofting
- Cameras
- Lighting basics & presentation

UNIT 3: MATERIALS

- Materials – Color
- Materials – Bump maps
- Materials – Jpeg maps

UNIT 4: LIGHTING

- Lighting : basics
- Lighting : presentation

UNIT 5: ANIMATING

- Everything in 3D Max is animatable. Learn to animate models, lights and cameras.
- Animate the texture/color on an object: animate the color of the lighting in a scene.

UNIT 6: RENDERING SKILLS

- Understanding the Render - To turn a 3D scene into a JPEG, QuickTime Movie or other end product.
- Active Time Segment - The number of frames to be rendered.
- Output Size - The proportions and pixel settings of the rendering.
- Scanline - The default renderer for 3D Max.
- Mental Ray - An optional, higher quality renderer.

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Understanding	Develop understanding of 3d modelling & rendering with 3ds Max
2	Applying	Comprehends 3ds Max and its parameter as tools and its application in architecture
3	Applying	Demonstrate the tools & concepts of 3ds Max methods and techniques in 3D through various architectural projects or animation.
4	Applying	Comprehends 3ds max with indoor & outdoor quality renders.
5	Applying	Demonstrate the 3D models through animation/walk throughs.
6	Applying	Comprehends 3ds Max model for rendering & presentation using various plug ins.

References & Web links

1. <https://www.youtube.com/watch?v=9i8xbaIcU9w>
2. <https://www.youtube.com/watch?v=57wNALKKkBk>
3. <https://www.youtube.com/watch?v=xGZdnuYQLyc>
4. <https://www.youtube.com/watch?v=yvcO72PSut4>
5. https://www.youtube.com/watch?v=S7aoF_TfFRg
6. <https://www.youtube.com/watch?v=yCM-likGd60>
7. <https://www.youtube.com/watch?v=3YjQ5KrYWOE>

Text & reference Books

1. Architectural Rendering with 3ds Max and V-Ray: Photorealistic Visualization
2. 3D Photorealistic Rendering: Interiors & Exteriors with V-Ray and 3ds Max
3. 3ds Max Design Architectural Visualization: For Intermediate Users

B. Arch. Semester-VI**BR 372 – Town Planning & Building Bye Laws**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
3	0	0	50	50	3	100

Focus: To provide an understanding of Building bye-laws pertaining in various parts of the country and to introduce the discipline of Town Planning.

Objectives

- To generate an understanding about the development control regulations and the bye-laws abiding in the country.
- To introduce the discipline of town planning and its various related aspects.
- To familiarize planning theories with suitable examples of different cities in the world.

Contents:**Unit-1: Introduction to Building Byelaws**

Need of having benchmarks and standards. Definition. Terminologies.

Unit-2: Building Byelaws and Codes

Study of National Building Code. Study of Building byelaws in accordance to different cities in the country. Procedures for development and implementation of acts and bye laws for land development and building design and execution process.

Unit-3: Introduction to Town Planning

Introduction to town planning, need and definition. Industrial Revolution era planning. Origins, evolution and growth of settlements.

Unit-4: Town Planning in Ancient Period

Characteristics and planning of towns and cities. Historical background with special emphasis on basic concepts of planning and urban spaces. Egyptian, Greek, Roman, Medieval, Early Indian town planning.

Unit-5: Modern Theories and concepts in Town Planning

Philosophies of eminent planners and study of their theoretical and executed works. Planning Theories enunciated by Ebenezer Howard, Patrick Geddes, Soria Y Mata, Doxiadis, Le Corbusier, Clarence Stein, Clarence Arthur Perry, Harris & Ullman and others. Planning concept related to Garden city, Satellite town, Radburn development and neighbourhood planning.

Unit-6: Planning Survey and Techniques

Introduction to survey of planning, planning acts and bye laws, planning process, zoning and documentation. Different Survey Techniques, methodology of conducting surveys and analysis of survey data.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire the Building bye-laws pertaining in various parts of the country.	Understand
2	Explore the discipline of Town Planning in ancient and modern context.	Understand
3	Evaluate the bye laws of different cities in India through presentations.	Analyze
4	Make presentation sheets on theories of town planning.	Create
5	Make conceptual models on prominent theories of town planning.	Create
6	Make detailed model on the planning of Chandigarh city.	Create

Text book:

- The Urban Pattern: City Planning and Design by Gallion and Eisner
- Urban Planning by Chapin
- Town planning by G.K.Hiraskar
- City planning by Bandopadhyia.
- Handbook on the National Building Code 2016.

References:

- Alexander, E.R. (1992) Approaches to Planning: Introducing Current Planning Theories, Concepts and Issues, 2nd edn. Amsterdam: Gordon & Breach.
- Campbell, H. and Marshall, R. (2002) 'Utilitarianism's Bad Breath? A Re-evaluation of the Public Interest Justification for Planning', Planning Theory 1(2): 165–89.
- Campbell, S. and Faintstein, S. (2003) 'Readings in Planning Theory. Oxford. Blackwell.
- Alexander, E.R. (2001) 'The Planner-prince: Interdependence, Rationalities and Post-communicative Practice', Planning Theory & Practice 2(3): 313–26.

Web link:

- https://www.academia.edu/28716657/TOWN_PLANNING_IN_INDIA_-ANCIENT_AGE_-MEDIEVAL_AGE_-MODERN_AGE
- <http://spa.ac.in/writereaddata/tcpo.pdf>

B. Arch. Semester-VII**BR 411 –Architectural Design - VII**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
2	0	8	150	150	14	300

Objectives

- The studio emphasis shall be on creative and rational skills for problem solving in architectural buildings on real site. Design-problem may focus on multifunctional, multi storied structure and services with application at site and building level like multi star hotels, multi specialist hospitals, high rise mall, institutes etc. in an urban setting including application of urban development controls, codes and bye-laws. The design proposal will be taken up with byelaws, master plan or any other restriction on large site.
- There should be integration of design proposal, structural system, energy efficient approaches and construction detail. One set of detailed working drawings of any one of services must also be generated at the end of the design process. Emphasis may also be laid on site planning as is learnt in previous semester. The focus would be on understanding of designing a complex building with all aspect of site planning and services in urban setting.
- There would be minimum one major and one minor exercise/project based on the module contents. The modules may be taken up by the faculty in order of preference. The order should be common in both sections of same year. The faculty may achieve stated minimum outcomes using various strategies and approaches
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work.

Contents:**Unit-1: Introduction**

- This module can be started with a warm-up Exercise/ Literature review (Group or Individual). Students could be sensitized (complex users, high rise issues and services) through Documentary/ movies/ Photos/Presentation etc.
- Design Problem may be introduced by the faculty using linear design approach or hidden-curriculum or other design teaching models can be adopted for defining the design problem.
- Students may visit site for collecting context specific data for getting better understanding of real- life project details. The collected data may be analyzed and presented for evaluation.
- The above-mentioned module teaching methods are suggestive. Faculty may choose other pedagogical approaches for design thinking process.

Unit-2: Development of Concept

- Readings/ short movies/ Discussion on designers' philosophies could be initiated for idea generation.
- Further approaches for design iterations may involve more common techniques like Flow diagram to explore relation of various spaces, bubble diagram for locating various zones on site, try and re-create for analyzing spaces in all dimensions through Block Models and single line graphics and study models for choosing the right option.

Unit-3: Design Development

- Students may integrate the knowledge gained from previous theory based subjects (like building services, building materials and construction, structures etc.) and apply to detail out their design proposal.
- The theories of urban design may be applied for co relating the urban setting during the design development stage.

Unit-4: Final Design Proposal

- The final design proposal is prepared after conducting various informal and formal reviews at individual and at group level. The drawings and detail physical model explaining the approach and consideration of urban setting to achieve the requirements with various other restrictions may be the submittals. It is preferable if the students communicate the application of all services in their design and must prepare a set of working drawings of one of the services showing all details for execution.
- Formative assessment in the studio could be done through individual critique, group discussion formal and informal feedback etc.
- Summative assessment of the studio work could be achieved through Panel discussion, presentation, peer review, public review, Criteria based evaluation etc.

Course Outcome:

S.No	Outcome	Taxonomy
1	To analyze architectural and composite structural system and services through their design	Analyze
2	To understand sensitivity towards non-conventional technologies, energy efficiency and interior design.	Understand
3	To create with precision block models, study models, site models	Creating
4	To apply Forms correlation between design and other subjects studied in previous semesters and till present.	Apply
5	To analyze Communicate through drawings or models, methods developed to meet various stages.	Analyze

References:

- Time saver standards for building types by DeChiara and Callender- Mc Graw hill company
 - Neufert Architect's data by Bousmaha Baiche & Nicholas Walliman,-Blackwell science ltd.
 - National Building Code – ISI
 - Time saver standards for landscape architecture by Charles W Harris – Mc Graw Hill
- New Metric Handbook by Patricia Tutt and David Adler – The Architectural Press

B. Arch. Semester-VII**BR 421 Advance Building Materials & Construction**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	2	100	100	5	200

Focus:

Understanding of materials with respect to the construction style and its function

Objectives

- To familiarize students with precast & pre-stressed construction techniques.
- To familiarize students with the different types of deep foundations & their construction details.
- To give complete knowledge about the earthquake zone and Reconstruction.
- To have an understanding of insulation materials.
- Learning of alternative building materials like ferro cement.

Contents:**C. Building Construction:****Unit-1: Design for Earthquake zone and Reconstruction**

Earthquakes and its effects on buildings, earthquake zones in India, Architectural design considerations and construction detailing for earthquake resistance. Design and detailing of additions and alterations in existing buildings put to new use Process of modification and precautions to be taken. Arches: Basic concepts, Disaster resistant construction system.

Unit-2: Advanced Foundations

- Types of deep foundation.
- Need & uses of deep foundation.
- Construction details of pile & raft foundation.

Unit-3: Space frame & Geodesic domes:

- Space frames, unconventional buildings like TV towers, foot over bridges etc.
- Geodesic domes – principles and construction.

D. Building Materials:**Unit-4: Ferro Cement**

- Introduction to Ferro cement
- Properties of Ferro cement
- Comparison between RCC and Ferro cement
- Casting and manufacturing of ferro cement sections
- Ferro cement products
- Merits, demerits and Application in construction industry
- Conclusion of unit

Unit-5: Precast & Pre-stressed Construction

- Precast, pre stressed, Pre Tensioning and Post Tensioning of concrete members.
- Market forms of Precast products and their Properties
- Comparative analysis between RCC Precast and Cast in situ construction system
- Casting and manufacturing of Precast RCC sections
- Concept of prestressing, types-post and pre tensioning
- Comparative analysis between RCC Pres-stressed and regular construction system

- Casting and manufacturing of Precast pre-tensioned RCC sections
- Merits, demerits and Application in construction industry

Unit-6: Insulation materials, Fire proof finishes:

- Thermal Insulation – Need, application, properties of material, uses, advantages & disadvantages
- Sound Insulation – Need, application, properties of material, uses, advantages & disadvantages
- Fire Proof Finish – Need, application, properties of material, uses, advantages & disadvantages

Course Outcome:

S.No	Outcome	Taxonomy
1	Students will learn about earthquake resistant construction techniques.	Understand
2	Students will be able to make construction details of pile & raft foundation.	Create
3	Students will create structures like geodesic domes & space frame structure.	Create
4	Students will be able to apply precast & pre-stressed construction techniques.	Apply
5	Students will analyze various fire proof finishes & insulation materials.	Analyze
6	Students will learn about alternative materials like ferro cement.	Remember

References:

- Building Construction Illustrated by Francis D. K. Ching
- Building Construction by W. B. McKay
- Building Construction by Sushil Kumar
- Building Construction by Rangwala
- Engineering Materials by Rangwala
- Building Construction by B. C. Punmia
- Building Materials: Materials of Construction, Gurcharan Singh
- Building Construction Handbook, R. Chudel

B. Arch. Semester-VII**BR-431 Professional Practice**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	3	100

Focus: Understanding of architectural profession, methods of execution and Architect act 1972

Objectives

1. To give an introduction to the students about the architectural profession and the role of professional bodies and statutory bodies.
2. To teach the students about the importance of code of conduct and ethics in professional practice and the mandatory provisions as per Architects Act 1972.
3. To expose the students some of the important legal aspects and legislations which have a bearing on the practice of architectural profession.
4. To enable the students to grasp the advanced issues concerning professional practice such as tendering, contracting including alternative practices in project execution and project management.
5. To expose the students to the implications of globalization on professional practice with particular reference to WTO and GATS and equip them for international practice

Contents:**Unit-1: Introduction to profession and Architect office**

- Meaning of term profession and its difference from trade and business. Options and higher studies.
- Types of Architect Office, its organization, routine work, ways of securing clientages, office administration and management.
- Different taxes associated with architect profession.

Unit-2: Architects Act 1972, Act, Rules & Regulations

- Introduction of Architects Act 1972 and its role to manage the profession, salient features, scope and objectives
- Architects Professional Guidelines, Architects (Professional Conduct) Regulations 1989
- Architectural Education

Unit-3: Architects Act 1972

- Conditions of Engagement and scale of charges
- Institutional Consultancy Practice
- Architectural Design Competition Guidelines

Unit-4: Tender

- Types of invitation to tender (NIT), Definition and types of tender with advantages and disadvantages of each type,
- Terminologies related to tender EMD, Security deposit, retention deposit,
- Opening and scrutiny of tenders, work order, Labor Law

Unit-5: Contract

- Definition and types of contract with their advantages and disadvantages, Indian Contract Act 1872.
- , Technical terms like, clerk of works, breach, prime cost
- Contract documents, conditions of contract, Duties, powers and liabilities of owner, architect and contractor

Unit-6: Arbitration, Easement and Valuation

- Arbitration, objectives, Types of Arbitrator, arbitral proceedings and award, powers and duties of arbitrators, termination of proceedings.
- Easement right. Indian easement act 1882, types of easement
- Valuation and its purpose, technical terms like gross income, net income, outgoings, annuity, sinking fund, etc. , methods of valuation, valuation report.

Course Outcome:

S.No	Outcome	Taxonomy
1	Create Architectural entrepreneurship	Create
2	Analyze Architectural competition.	Analyze
3	Explain legal aspects of execution process .	Understand
4	Evaluate Valuation of properties and its rent.	Evaluation
5	Apply outsourcing in Architectural profession.	Apply
6	Describe special laws rules and regulations related to profession	Remember

Text book

- Handbook of professional documents by council of architecture (2011)

References:

- Professional practice of Architecture by Prof, S C Garg, Dr. Yogesh K Garg, Satya publication New Delhi.
- Professional Practice by K. G. Krishnamurthy, S. V. Ravindra, ISBN 9788120348745 Published by PHI Learning private ltd. Rimzim House 111, patparganj industrial estate, Delhi, 110092
- Professional Practice by Dr Roshan Namavati.
- Estimating Costing And Valuation, by S. C. Rangwala
- The Building and other Construction Workers' (Regulation of Employment and Conditions of Service) Act, 1996 with Rules and Regulations

Web link:

https://www.coa.gov.in/pub_show.php?det=1&pub_id=11&lang=1

[https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/doc/stan_pah/PAH%202016%20Chapter%207%20Rev%2000%20\(clean\)-161229.pdf](https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/doc/stan_pah/PAH%202016%20Chapter%207%20Rev%2000%20(clean)-161229.pdf)

https://indiacode.nic.in/handle/123456789/2187?view_type=browse&sam_handle=123456789/1362

https://www.designingbuildings.co.uk/wiki/Tender_documentation_for_construction_projects

B. Arch. Semester-VII**BR 441 – Research Methodology**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTUR E	LAB	PRACTICA L	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an understanding to the students how to conduct research.

Objectives

- To understand the importance of research in architecture.
- To understand the theoretical and practical significance of research, types of research process of formulating a research plan.
- To understand various methods of research, their applications, data and simple statistical analysis, interpret the data.
- To understand methods of technical writing and presenting a research report.

Contents:**Unit-1: Introduction to Research Methodology**

Introduction to Research: Meaning, Characteristics, Need, Objective and importance in architecture, Types of Research and Stages in Research Process.

Unit-2: Identification of topic and hypothesis formulation

Identification of areas of interest for the study, Need of the study, Formulation of research questions, research gap and hypothesis formulation.

Unit-3: Data Collection Techniques

Techniques and Methods of Data Collection. Quantitative and Qualitative Methods in Research. Primary and Secondary data collection: literature reviews, case studies, reports and research papers from reputed journal and Government agencies.

Unit-4: Research Survey and Techniques

Introduction to survey in research, Different Survey Techniques, methodology of conducting surveys in research work. Methods of survey: Literature, Visual, sampling, interviewing, Design program/ranking scale/ priority chart, questionnaire.

Unit-5: Analysis of Data Interpretation

Methods of analysis, Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations. Data sampling Meaning and types of Sampling: Probability sampling methods and Non-Probability Sampling Methods, Need of sampling. Random Sampling, Simple and stratified Random Sampling. Other type of sampling, Requisites of a good sample method, sampling distribution, Sampling Error.

Unit-6: Research Writing and Documentation

Synopsis formulation, Research Proposal, Abstract, Content, Literature review, Summary, Bibliography and referencing. Report making: Dissertation/Thesis. Minor Research Project on the topic selected in the beginning of the semester in line with all the steps of Research process starting from Identification of Research topic to Findings & Conclusion.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Acquire the importance of research in architecture.	Understand
2	Develop to conduct field surveys for research projects.	Understand
3	Analyze the data through various research techniques.	Analyze
4	Prepare research papers and articles.	Create
5	Make report on a particular topic related to architecture.	Create
6	Make questionnaire for the conductance of survey.	Create

Text book

- Research Methodology: Methods and Techniques by CR Kothari.
- Research Methods: The Basics by Nicholas Walliman.

References:

- Architectural research methods; Linda Groat & David Wang, John Wiley and sons, New York.
- Visual research methods in Design; Henry Sanoff, Van Nostrnad Reinhold, New York.
- Architectural research; Snyder James C; Van Nostrnad Reinhold RECOMMENDED BOOKS:
- Creswell, J.W. Research Design: Qualitative & Quantitative Approaches. Thousand Oaks: Sage.1994.
- Groat, L. & Wang, D. Architectural Research Methods, NY: John Wiley and Sons Inc. 2002.
- Kothari, C.R. Research Methodology: Methods and Techniques, New Delhi: Wishwa Prakashan. 2005.
- Norman K Denzin and Yvonna S Lincoln (Eds.) Handbook of Qualitative Research,

Web link:

- http://www.sociology.kpi.ua/wp-content/uploads/2014/06/Ranjit_Kumar-Research_Methodology_A_Step-by-Step_G.pdf
- https://www.researchgate.net/publication/303381524_Fundamentals_of_research_methodology_and_data_collecti
on
- https://www.researchgate.net/publication/319207471_HANDBOOK_OF_RESEARCH_METHODODOLOGY
- <http://www.modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf>

B. Arch. Semester- VII**BR 451 – Working Drawing (Computer)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
1	2	0	50	50	2	100

Course Overview:

- The Design of a building prepared needs to be executed and constructed on the site. The building drawings so prepared become part of the contract documents with proper labelling and dimensioning, specifications, detailing.
- The drawings shall be based on building design prepared as design studio assignment in the previous semester. The learning of building material and construction will be implemented for preparing various drawings through the semester.
- The building drawings so prepared become part of the contract documents with proper labelling and dimensioning, specifications, detailing.
- It will be helpful in detailing out the drawings and understand the various stages of construction for estimation and costing.

Objectives

- Enable the students to illustrate and prepare the structural layout drawings good for construction of the designed building.
- Enable the student to identify and determine the type of structural system to be used.
- Enable the students to illustrate and prepare the drawings good for construction explaining the overall building design.
- Enable the students to illustrate and prepare the detail drawings of openings, their material and detail specification required for the construction
- Enable the students to illustrate and prepare the drawing drawings of connection between the two floors as staircase/ lift etc.
- Enable the students to illustrate and prepare the drawings good for construction explaining the building services scheme outside the building envelop but within the site.
- Enable the students to illustrate and prepare the drawings good for construction explaining the building services scheme within the building envelope.
- Enable the student to illustrate and describe the specifications for the various internal and external finishes.

Contents:**Unit-1: Structural Layout Drawings**

- Preparing detail drawing for layout of the building with respect to the site.
- Illustrate and prepare drawings for layout of the foundations.
- Preparation of detail layout of the beam and columns, or structural member as per the design.

Unit-2: Architectural Drawings at Building Level

- Preparation of detail floor level plan/s and roof level plan required for the execution of work on the site.
- Preparation of drawing giving detail of Section/s and Elevation/s to depict building heights, projections and floor levels.

Unit-3: Architectural Drawings of Openings

- Design and prepare detail drawings of doors, windows, openings with specifications of materials.
- Detail drawing for the grill, jail work etc. as required for the building.

Unit-4: Architectural Drawings of Vertical Circulation as Staircase/ Lift etc.

- Preparation of drawing for the layout of staircase, its detail and specification for the execution on the site as per the design.
- Illustration drawing of the handrail, baluster, rail fitting etc. as per the design.

Unit-5: Building Services Drawings (External & Internal)

- Water supply source and connections
- Electric supply source and connections
- Sewage disposal and storm water disposal system
- Rain water harvesting system
- Landscaping details if required
- Layouts of kitchen, toilets and other utility spaces along with the specifications of fixtures.
- Plumbing layouts of kitchen, toilets etc.

Unit-6: Specifications of Finishes

Internal Finishes

- Flooring Pattern and its specifications
- White washing/ Wall finishes etc. and its specifications
- Wood Finishes and Fixtures
- Fabrication and its specifications
- Electrical fitting and fixtures and their specifications

External Finishes

- Site development which will include the Paving, Roads, Driveways, Pathways etc and their specifications
- Fabrication like Gate, railings, fencing etc. and their specifications
- White washing/ Wall finishes etc. and its specifications
- Electrical fitting and fixtures and their specifications
- Boundary wall design, fixtures and their specifications.

Course Outcomes:

S.No.	Outcomes	Taxonomy
1	Recalls the various drawing techniques, building construction techniques and structural systems.	Remember
2	Interpretation and translation of drawings based on the structural and other practical considerations	Understand
3	Re-create the drawings based on the various construction details and structural considerations.	create
4	Demonstrate the preparation of execution drawings in the process of realization of a designed building.	Apply
5	Integrate all the drawings prepare for the execution purpose	create
6	Select the appropriate construction details as per the various services	Remember
7	Illustrate drawings based on the traditional and new materials	Understand
8	Prepare various details	Apply

Learning Resources / References & Learning Strategy

- Preparation of drawings with illustrations
- Site visit and case studies to know the various details
- Data collection from the market survey regarding construction material and detailing

Books & References

- Architectural Graphics by Francis D. K. Ching
- Architectural Graphics Standard by Charles George Ramsey
- Architectural Graphics Standard for Residential Construction by Dennis J. Hall
- Drafting & Design: Basics for Interior Design by Travis Kelly Wilson

B. Arch. Semester-VII**BR 461 – Urban Design (Elective-I)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To expose the students about the role of urban design in architecture.

Objectives

- To understand the scope and nature of urban design as a discipline.
- To introduce the components of a city and their interdependent roles.
- To understand the evolution of historic urban form.
- To learn to interpret the city in different ways and layers.
- To create awareness of contemporary urban issues as well as learn about possible ways to address them.

Contents:**Unit-1: Introduction to Urban Design**

Components of urban space and their interdependencies- outline of issues/ aspects of urban space and articulation of need for urban design- scope and objectives of urban design as a discipline.

Unit-2: Historic Urban Form

Morphology of early cities in western world- Greek agora, Roman forum, Medieval towns and Renaissance ideal cities. Industrialization and city growth, the eighteenth century city builders, Garnier's industrial city, the American grid planning, anti-urbanism, the picturesque cite industrielle and radiant city.

Unit-3: Evolution of urbanism in India

Temple towns in India, Mughal city form, medieval cities, colonial urbanism, urban spaces in modernist cities. Case studies of Chandigarh, Bhubaneshwar, Amritsar and Gandhi Nagar.

Unit-4: Theories of Urban Space

Ideas of Imageability and townscape: Cullen, Lynch, collective memory, historic reading of the city and its artefacts. Rossi- social aspects of urban space: life on street and between buildings, gender and class, Jane Jacobs, William Whyte.

Unit-5: Issues of Urban Space

Understanding and interpreting the urban problems/ issues, place-making and identity, morphology: sprawl, generic form, incoherence, privatized public realm, roles of real estate, transportation, zoning, globalization, ideas of sustainability, heritage conservation and renewal, contemporary approaches: idea of urban catalyst, transit metropolis, community participation.

Unit-6: Best Practice in Urban Design

Contemporary case studies from developing and developed economies that offer design guidelines and solutions to address various issues/ aspects of urban space.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Exposure to the role of Urban Design as a discipline.	Understand
2	Acquire the knowledge to interpret a city.	Analyze
3	Analyze the urban form of historical as well as present cities.	Analyze
4	Analyze and address urban design issues in Indian context	Analyze
5	Make presentations on the best urban design practices.	Create
6	Make model of a selected stretch to address the related issues.	Create

Text book

- By The City/For The City: Anne Guiney
- Combinatory Urbanism: Thom Mayne
- A Country of Cities: Vishaan Chakrabarti
- The Death and Life of Great American Cities: Jane Jacobs
- The Nature Of Urban Design alexandros Washburn
- A New Theory Of Urban Design: Christopher Alexander

References:

- A.E.J. Morris, "History of Urban Form before the Industrial Revolution", Prentice Hall, 1996.
- Edmund Bacon, "Design of Cities", Penguin, 1976.
- Gordon Cullen, "The Concise Townscape", The Architectural Press, 1978.
- Michelle Provoost et al., Dutchtown, NAI Publishers, Rotterdam, 1999.
- "Time Saver Standards for Urban Design", Donald natson, McGraw Hill, 2003.
- Kevin Lynch, "The Image of the City", MIT Press, 1960.
- Rithchie. A, "Sustainable Urban Design: An Environmental Approach", Taylor & Francis, 2000.
- Jonathan Barnett, "An Introduction to Urban Design", Harper Row, 1982.
- Lawrence Halprin, "Cities", Reinhold Publishing Corporation, New York, 1964.
- Gosling and Maitland, "Urban Design", St. Martin's Press, 1984
- Molcolm Moor, "Urban Design Futures", Routledge, 2006
- Geoffrey Broadbent, "Emerging Concepts in Urban Space Design", Taylor & Francis, 2003.

Web link

- https://www.mfe.govt.nz/sites/default/files/media/Extra%20downloads/Other%20documents/urban-design-case-studies-bw_0.pdf
- https://issuu.com/sminusudhakaran/docs/kolkata_ud
- <https://www.ijser.org/researchpaper/Urban-streets-and-nodes-A-case-of-Bangalore.pdf>
- <https://archnet.org/sites/6398/publications/6714>

B. Arch. Semester-VII**BR-471 Green Building & Rating System (Elective- 1)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
2	0	0	50	50	2	100

Focus: Understanding of energy efficient techniques in built environment.

Objectives:

The objectives include creating awareness and understanding of the concept of energy efficiency in buildings that respond to the climate, material and natural resources. Developing analytical skills to understand the energy consumption and hence cater to reduction. To create awareness about tools and practices to calculate energy consumption

Contents:**Unit-1: Overview of Green Rating**

- Green Rating agencies in India and their Approach – BEE (ECBC), IGBC, TERI, EDGE etc.
- Process of rating and Certification.

Unit-2: LEED Rating system

- Brief background of the rating system, Need and purpose of rating
- Various criteria for site development and building design
- Provisions for green certification

Unit-3: GRIHA rating system

- Brief background of the rating system, Need and purpose of rating
- Various criteria for site development and building design.
- Building typologies and the necessitated GRIHA rating.

Unit-4: Case studies & Green building Design project

- Case studies of GRIHA/ LEED certified buildings.
- Design & documentation of a small scale project under the aspects of green building certification criteria's of LEED/ GRIHA.

Course Outcome:

S.No	Outcome	Taxonomy
1	Student will learn about the concept of Green architecture	Understand
2	Students will be able to apply the aspects of green buildings	Apply
3	Students will be able to analyze the various criterias for green building certifications.	Analyze
4	Students will learn about various guidelines of ASHRE/ISHRE & BOE.	Remember
5	Students will learn about green building rating systems of India.	Remember
6	Students will be able to design green buildings.	Create

References:

- Environmental control systems Heating, Cooling, Lighting By Fuller Moore
- GRIHA Manual (Vol 1-5)
- Climate Responsive Architecture "by Arvind Kishan, Baker & Szokolay".
- Man, Climate and Architecture by Givoni, B.,
- An Introduction To Building Physics by Narashimhan
- Manual Of Tropical Housing And Building – Part I – Climatic Design by O.H. Koenigsberger
- Housing Climate & Comfort by M.Evans
- Climatic Design by Donald Watson

B. Arch. Semester- VII**BR 481 – Interior Design (Elective II)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	1	100	100	2	200

Focus: To study Interior design principles and their applications. To build a comfortable living using various elements of Interior design.

Objectives

- To have an understanding of an enclosed space and the importance of Space planning for any user.
- To acquire the students with a proper knowledge of any space and designing it with the help of furniture, various other fixtures and colour choices.
- To help the students to understand the importance of designing a space according to the requirements with a proper knowledge of principles and elements of design.

Contents:**Unit-1: Introduction to Interior design**

- Introduction to basic principles of designing a space.
- Introduction to elements of design for an interior space.
- Introduction to design a space according to function, color and theme.

Unit-2: History of Interior designing

- Introduction to the various interior styles through ages.
- Brief discussion of different types of Interior design styles.
- Introduction to the elements of various interior styles.

Unit-3: Elements of Interior Design

- Introduction to various elements of an Interior space; Ceiling, False ceiling, Walls, Floors, Staircases, Openings, and other Interior Services.
- Treatments on the various elements of Interior design; Finishing and fixtures.
- Introduction to Various materials for Interior design; Choosing a right material, Construction and method of application, Finishing of the material.

Unit-4: Furnishings for Interior Space

- Introduction to Furnishings in Interior design.
- Importance of furnishings for a required space according to the functionality and aesthetics.
- Types of furnishings for different types of Interiors; surface furnishings.
- Study on relation between the choice of furnishing and the theme of a space.

Unit-5: Elements of Interior designing- Lighting

- Types of lighting for an Interior space; Natural and Artificial lighting.
- Importance of Lighting in Interior spaces.
- Natural Lighting; Source, Finishes.
- Artificial Lighting; Sources, Types, Installation, Designs.
- Application of lighting according to need and aesthetics.

Unit-6: Space planning – Furniture design

- Introduction to Furniture Design.
- Importance of furniture for an Interior space to achieve an ideal Interior design.
- History of Furniture design through ages; Types of Furniture for an Interior space, Different types of design styles through ages, Evolution of furniture design through ages.
- Study of the relation between Furniture and space; Human movement; design according to the human comfort.
- Methods of construction different types of Furniture.
- Various materials for Furniture design; Types of materials for different parts of a furniture, Importance of materials, Advantages and disadvantages of these materials, Choosing an ideal material to achieve a good furniture design, Application technique, Finishing, Caring of the material.

Course Outcome:

S.No	Outcome	Taxonomy
1	To define the importance of designing a space according to the comfort of a Human being.	Remember
2	To determine affordable and yet creative interior space.	Apply
3	To explain sustainable design and methods to achieve sustainability.	Understand
4	To inculcate craft and art in Interior space.	Create
5	To learn new and innovative technologies in designing a space.	Understand
6	To learn about modern age elements of Interior design.	Understand

References:

- The Interior Design by Linda O'Shea, Chris Grimley, Mimi Love.
- Elements of Style by Erin Gates
- Furniture Design by Stuart Lawson

B. Arch. Semester- VII**BR 491 – Art & Installation in Design (Elective II)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
1	0	1	100	100	2	200

Focus: To inculcate art and craft in space design to enhance the function and aesthetics. To understand the importance of Art in Architectural Design.

Objectives

- To study art and craft of different regions; material and availability, method of construction, installation of the craft.
- To understand the importance of art for a space.
- To study the relation between Art and design.
- To study the relation between Art and Human.
- To inculcate art and craft into designing.

Unit-1: Introduction to Art

- Introduction to various types of Art
- Concept of art and beauty.
- Types of Art

Unit-2: History of Art

- History of Art.
- Evolution of Art through ages.
- Importance of visual perception for aesthetics.
- Design elements of Art.

Unit-3: Art theories

- Art as an Expression.
- Art as Representation.
- Art as Creation.

Unit-4: Art in Design

- Relation between Art and Space; Designing with a concept, need of the craft.
- Art in Interiors.
- Importance of Art as an Element of Interior designing.
- Applications of Art in an Interior space.
- Process of Designing.

Unit-5: Art and Architecture

- Introduction to Art in Architecture.
- Forms and function.
- Importance and relativity.
- Principles and elements of Art and Architecture.

Unit-6: Art form and structure

- Introduction to design an Art form as a structure.
- Study of scale and proportion.
- Introduction to Art Installation; Types of installations, Scale and Proportion; Area of specification; Material specification; Process of designing.
- Art as a Product; Importance of a Product design; Process of designing.

Course Outcome:

S.No .	Outcome	Taxonomy
1	To learn about the importance of Art in Designing.	Remember
2	To learn about Art of various forms and origins through ages.	Apply
3	To learn about designing a space using Art.	Understand
4	To inculcate various Art forms in Architecture.	Create
5	To use Art to design Installations.	Understand
6	To learn various aspects of Installation design.	Understand

References:

- Art through the ages by Fred, S.K.
- Art and Architecture by Christian Bjone.
- Le Corbusier- The Art and Architecture by Alexander von Vegesack, Arthur Ruegg, Mateo Kries and Stanislaus von Moos.

B. Arch. Semester- VIII**BR 412 – Practical Training**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
0	0	0	500	500	30	1000

Course Overview:

- The aim of the 'Professional Training' is to enable the students to gain the kind and range of practical experience which will prepare them for their likely responsibilities, immediately after qualifying B. Arch. Course.
- A Training Manual/Guidelines shall provide the details of the expected outline of work and other procedures.
- Mandatory Requirements: Student shall have to undergo Professional Training for a period of at least 6 months/140 working days in an establishment approved by the Training Coordinator / Dean to become eligible to appear for final viva-voce.

Objectives

The trainee student has the responsibility to use his/her own initiative in making the best use of the opportunities which he gets during training period and prepare himself/herself for profession. The core of the professional training is architectural one. Student is expected to get well versed with the realm of architectural discipline ranging from generation of idea, preparation of drawings to the final execution of design on site.

Contents:**Unit-1: Nature of works expected to be done during training**

- The architect may expose the trainee to different aspects of professional practice. The task may include the following but not necessarily containing all-
 - Preparation of:
 - Sketch designs, presentation drawings etc.
 - Municipal drawings according to the byelaws.
 - Working drawings and details.
 - Estimates, bill of quantities & specifications.
 - Discussions with:
 - Clients
 - Structural Consultants
 - Services Consultants
 - Inspection and management of site:
 - Preparation of Models, perspectives and photographs
 - Preparation of Reports, progress charts etc.
 - Other administrative works

Unit-2: Content of the training report

Following contents will be followed for both intermediate and final submissions:

After completion of practical training, the trainee is required to submit the following in a hard copy. Training report should contain:

- Office profile
- Listing of current project being undertaken
- Project wise details of work undertaken by student
- Trainee's own assessment and experience about office, working, projects etc.

All projects listed in the report should compulsorily correspond with the list of projects mentioned in the monthly log. Copies of drawing shall be attached as annex to support the content of the report. The drawing prints shall be obtained with the permission of the office and stamped/sealed by the 'Supervisor'/Head of the firm/office.

Unit-3: Critical Appraisal of a building of national/International importance -1

The trainee is required to write a report choosing any building that has been designed/ executed by the company/ firm, she / he is working for internship. This can be done through secondary research/data collection.

The report should contain:

- Explanation/ Justification for the choice of the project.
- Fact file of the project- discussion on location, client profile, context (physical, cultural) and legal bindings.
- Remarkable features that make the building / complex noteworthy.
- Trainee's own assessment and experience about the same.
- References used in preparation of the appraisal.

Unit-4: Critical Appraisal of a building of national/International importance-2

- Detailed study and finalization of research parameters.
- Conduction of research- comparative study/ field study/qualitative data collection/ questionnaire survey.
- Live case study/survey/ direct observation etc; and documentation, review of case study, usefulness of case study to the selected topic; conclusion from case study
- Discussion on the raw data and final chapterization
- Exercise on report writing based on the same research area.

Unit-5: DATA PROCESSING AND OUTCOME OF RESEARCH

The trainee is required to write a report choosing any building that is present in the city/ town where she / he is working for an internship. This needs to be done with primary study and user experience study. This allows the student to choose structure of heritage values.

The report should contain:

- Explanation/ Justification for the choice of the project/ built structure
- Fact file of the project- discussion on location, client profile, context (physical, cultural) and legal bindings.
- Remarkable features that make the building / complex noteworthy/ award winning/ popular.
- User experience and the design comparison.
- Trainee's own assessment and experience about the same.
- References used in preparation of the appraisal

Course Outcomes:

S. No.	Taxonomy	Outcomes
1	Apply	To understand and apply the professional aspects of an architecture office/company and the multiple issues in conception, preparation and execution of project on a site.
2	Remember	To be aware of or sensitive to the existence of certain ideas, material, or phenomena and being willing to tolerate them.
3	Understand	To be able to formulate and theorize the principles into practice.
4	Apply	To be able to set practices to act consistently in accordance with the values he or she has internalized.
5	Understand	To develop skills that helps to adapt to fit special requirements.
6	Create	To be able to design for situation specific problems.

Learning Resources / References & Learning Strategy

- Training manual/report

B. Arch. Semester-IX**BR 511 – Architectural Design - VIII**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	10	200	200	17	400

Focus: Urban Built Form & infrastructure development in urban context

Objectives:

- The objective of the design studio is to expose the students to Urban scale problems and to enable them to visualize the contextual part of a built form. They need to understand, as to what goes beyond the premise of a single building or an area and where its boundaries merge into surrounding built form with different land uses and activities.
- The studio problem therefore will focus on study and intervention within areas that have the context of design issues like, pedestrian and traffic movement, mixed activities etc. and have the scope of redevelopment.
- The design problem of Urban design scale is to be introduced, example; Redesigning of existing Urban area by studying and identifying the problems associated with it. The project would be a medium sized urban design intervention.
- The design solution would address issues like demography, market value, land use patterns etc. Other design issues are the detailing of open and built areas after studying human and movement patterns.
- The project should be substantiated by detailed site surveys and reading about urban design principles.
- Parallel subjects would give assignments connected with the current design exercise(s) as part of their course work

Contents/ Design Pedagogy**Identify an Area with the Given Objectives**

- Pilot survey of an area to identify the project.
- Survey the existing urban environment.
- Visualize with objectives

Carving the study area

- Delineate the study area.
- Collect initial data.
- Prepare brief questions for responses.
- Reading the area for commonalities.
- Take response from the users.

Presenting the collected data

- Mapping of collected data using techniques and methods.
- Explain images relevant to the objectives.
- Use of both qualitative and quantitative data.
- Filter data for relevance and use.

Analysing the collected information

- Co-relating the various data for interrelationship.
- Analysing interrelationships of various identified factors.
- Examining the data for overall understanding of the information.
- Using different methods for analyses.
- Micro-level assessment of the study areas.
- Prepare activity wise layers.

Drawing inferences for interventions

- Picking up issues for addressing.
- Thinking about developing sensitive responses to the identified issues.
- Take case examples for better understanding (Readings through books or studying similar projects undertaken elsewhere)
- Prepare models for spatial analysis.
- Prepare quantitative data for existing and future proposals.

Formulation of the design programme and strategies for intervention

- Prepare the vision statement.
- Phasing of the project.
- Before and after images.
- Public private participation.
- Implementation of the design solutions.

Course Outcome:

S.No.	Outcome	Taxonomy
1	Apply the experience gained during the training semester in current design projects	Apply
2	To Analyze the built and un-built environment around.	Analyze
3	To understand & Organize to work in a team.	Understand
4	To create an appropriate program for a project.	Create
5	To analyze and Highlight the issues.	Analyze
6	To understand the environment for sensitivity.	Understand

References:

- Graphics in Urban design by Ballly Meeda, Neil Parkyn and David Stuart Walton.
- Responsive Environments by Ian Bentley. Local Master Plans or Development Plans.
- Development Control Regulations- as per requirements.
- Relevant case examples of Designed or executed projects.

B. Arch. Semester-IX**BR 521 – Dissertation**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTUR E	LA B	PRACTICA L	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
0	0	6	200	200	5	400

Focus:

The studio emphasizes on the integrated approach. The students are required to integrate the learning of the previous research methodology to establish the research component that leads to their dissertation.

Objectives:

Emphasis of the studio is to enable students to;-

- Raise clear and precise questions, Use abstract ideas to interpret information gathered. Able to conclude with good justification. Test the conclusions against relevant criteria and standards.
- Gather, assess, record and apply relevant information and incorporate relevant study in to document form as a report.
- Make precise power point presentation of the study and conclusions and gain the ability to criticize and analyze the case studies to reach conclusion.
- Students will apply the learning from the previous semesters to research a subject area through readings; learn description, analysis and synthesis of readings; citation of authors in their writing; and plan a study and write a paper based on literature review.
- Through the course, the students will be capable of identifying the research area that will enable them to write a research paper on the subject.

Contents/ Pedagogy:**Introduction to the course and discussion on the objectives.**

- Recapitulation and discussion of methods of research :Discussion of research methods, understanding the applicability of various techniques of architectural research
- Learning from examples and group Presentation.

IDENTIFICATION OF RESEARCH AREA AND GAP

- Identify the broad study area for thesis based on literature review and case study, and its oral and visual presentation.
- Interpretation drawings, visual presentation techniques with info-graphics.
- Literature review and identification of research area and stating the research question.
- Time-work schedule
- Presentation on-Selection of topic, reason for selection, justification, synopsis.

DEVELOPING A STRUCTURAL FRAMEWORK FOR THE SEMINAR

- Discussion on the methodology-The types of data collection- primary and secondary
- Site/ case studies to be conducted
- Literature Case study and documentation, review of case study; usefulness of case study to the selected topic; conclusion from case study.
- Probable study/ research outcome
- Draft chapterization

CONTENT DEVELOPMENT

- Detailed study and finalization of research parameters.
- Conduction of research- comparative study/ field study/qualitative data collection/ questionnaire survey.
- Live case study/survey/ direct observation etc; and documentation, review of case study, usefulness of case study to the selected topic; conclusion from case study
- Discussion on the raw data and final chapterization
- Exercise on report writing based on the same research area.

DATA PROCESSING AND OUTCOME OF RESEARCH

- Results and discussion – completion of the report writing with proper citation and referencing.
- Power point presentation on the actual topic based on conclusions from case studies and research; preparation of report based on research conducted under various heads
- Preparation and presentation of final dissertation

Outcomes:

S. no.	Outcomes	Taxonomy
1	Identify research papers published in Journals for a study	Remember
2	Organize a study based on literature survey	Remember
3	Identify research methods for study	Remember
4	Identify area of research for thesis	Remember
5	Apply research methods in case study	Apply
6	Present paper in a seminar	Create
7	Practice Citation	Understand
8	Develop ethics of publication	Create
9	Identify research papers published in Journals for a study	Remember

Learning Resources / References & Learning Strategy

- Warm-up exercise/ literature review (group or individual)
- Discussion on reading material- hardcopy/ online materials, articles, papers, journals and writing individual review.
- Group discussion and debates
- Visual and oral presentation.

B. Arch. Semester-IX**BR-531 Project Management (Elective- III)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
2	0	0	50	50	2	100

Focus: Understanding of basic building execution process having a quality construction project from start to completion while maintaining budget, schedule, and safety requirements.

Objectives:

1. To equip students with a practical approach to implement building projects,
2. Basic knowledge about construction industry, project management techniques needed for managing and coordinating building projects in a professional manner.

Contents:**Unit-1: Introduction to Project Management**

- Introduction to project management, construction industry, stakeholders, roles, responsibilities and functional relationships,
- Construction projects – objectives and lifecycle, existing construction practices & project management systems,
- Project Team, organization, roles, responsibilities.

Unit-2: Introduction to Project Planning

- Concepts of project planning, scheduling & controlling.
- Project scale and construction technology,
- Human aspects in managing projects.

Unit-3: Project Planning and Scheduling.

- Inputs for project planning, defining activities and their interdependency,
- Time and resource estimation. Work breakdown structures.
- Linear scheduling methods - bar charts, LOB, their limitations. Principles,
- Definitions of network based scheduling methods: CPM, PERT. Network representation, Network analysis – forward and backward passes.

Unit-4: Project Monitoring

- Site layout and organization, Site investigations.
- Quality tests for construction material and processes.
- Project direct and indirect costs. Safety in Construction Projects.

Unit-5: Project Control

- Quality tests for construction material and processes.
- Quality control inspections.
- Project progress tracking. Crashing Project Schedules, its impact on time, cost and quality.

Unit-6: Resources Management and Value Engineering

- Methods of material/resource estimation and management,
- Resources scheduling and levelling.
- Construction equipment types, characteristics & applications.
- Value engineering, its application in building design and construction.
- Labor welfare, applicable labor Legislations.

Outcome:

S.No.	Outcome	Taxonomy
1	Apply the tools and techniques used by the construction industry and learn the most up-to-date procurement routes to gain the skills to be able to deal with risks arising from liabilities of contracting parties	Apply
2	Ensures projects are designed and built on time and to budget while protecting the integrity of the design and ensuring full compliance with regulations and sustainability standards and benchmarks	Understand
3	Apply the necessary skills to rethink design processes using value management principles	Apply
4	Apply appropriate legal and ethical standards.	Apply
5	Analyze with team and stakeholders in a professional manner, respecting differences, to ensure a collaborative project environment.	Analyze
6	Identify project goals, constraints, deliverables, performance criteria, control needs, and resource requirements in consultation with stakeholders.	Remember

Text book : Project Management by K. Nagarajan

References:

- Chitkara, K. K. (2004). Construction Project Management: Planning, Scheduling and Controlling. Tata McGraw–Hill Education.
- Punmia, B. C., and Khandelwal, K. K. (2006). Project planning and control with PERT and CPM. New Delhi : Laxmi Publications.

Web link:

https://www.coa.gov.in/pub_show.php?det=1&pub_id=11&lang=1

[https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/doc/stan_pah/PAH%202016%20Chapter%207%20Rev%2000%20\(clean\)-161229.pdf](https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/doc/stan_pah/PAH%202016%20Chapter%207%20Rev%2000%20(clean)-161229.pdf)

https://indiacode.nic.in/handle/123456789/2187?view_type=browse&sam_handle=123456789/1362

https://www.designingbuildings.co.uk/wiki/Tender_documentation_for_construction_projects

B. Arch. Semester- VIII**BR 541 – Barrier Free Architecture (Elective III)**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	100	100	2	200

Focus: To study about designing a space for Specially-abled population that will be user-friendly, comfortable and functional.

Objectives

- To have an understanding of Specially-abled population.
- To acquire the students with a proper knowledge of the needs, requirements and special treatments for the specially-abled population.
- To help the students to understand the importance of designing a space that will serve as a comfortable, functional and a Barrier free architecture for the Specially-abled population.

Unit-1: Introduction to Specially-abled Population

- Introduction to the population; Types of disorders.
- Needs and requirements of the population.
- Special treatments to the Specially-abled.

Unit-2: Guidelines and Space standards

- Principles of designing a space for specially-abled population.
- Rules and regulations.
- Design parameters and requirements.
- Scale, Proportion and dimensions.
- Ergonomic and Anthropometric study for a comfortable space design.

Unit-3: Building codes

- Introduction to using NBC for designing a structure for Specially-abled population.
- Importance of the implementation of NBC for the special design.
- Introduction to various Rules and Regulations; Ways to implement the codes.

Unit-4: Special architecture

- Introduction to the various structures with special design.
- End user of the design and architecture.
- Design according to the NBC.
- Elements of the design; Special corners and unique spots; Furniture and Fixtures; Specifications.
- Material use; Importance of the material quality and finish; Availability; Application.

Unit-5: School for Specially-abled children

- Designing a school with differently abled children.
- Provision for ramps, corridors and other basic requirements.
- Providing a user-friendly interior space; Choice of material; Proportion and dimensions; Lighting and other fixtures; Furniture specification; Circulation space.

Unit-6: Community center

- Designing a Community center with basic needs and requirements.
- Provision for Specially-abled population.
- User-friendly space; Material choices; Dimensions; Circulation space; Furniture specification; Fixtures and Lighting.

Course Outcome:

S.No	Outcome	Taxonomy
1	To learn about the Specially-abled population.	Remember
2	To learn about the need for the special treatment for the specially-abled population.	Remember
3	To learn about the basics of creating a space that is specially-abled friendly.	Remember
4	To learn about the design parameters for special architecture.	Remember
5	To learn about new technology and material to help the specially-abled.	Remember
6	To create an awareness about the need of Special designs.	Apply

Textbooks:

- Neufert- Architect's Data by Ernst Neufert
- National Building Codes of India

References:

- Designing for the disabled by Selwyn Goldsmith
- Building access: Universal Design and the Politics of Disability by Aimi Hamraie

Web link

- https://www.ted.com/playlists/372/designing_for_disability

B. Arch. Semester-IX**BR 551 – Human settlement & Planning (Elective-III)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To provide an insight to the human settlement development and their planning.

Objectives

- The subject is designed to have an overview on the vocabulary of Human settlements. To understand the various elements, classifications and typology of Human Settlements.
- To familiarize the students with Planning concepts and process in Urban and Regional Planning.
- To familiarize the students with the process of evolution of cities, concepts related to humanitarian planning processes and skill development to identify planning issues in existing areas and develop solutions at basic levels.
- The subject will be taught in congruence with the Design studio and assignments for the subject will be linked to the design exercises to achieve higher level of learning and understanding the practical application of the same

Contents:**Unit-1: Introduction to Settlement Planning**

Evolution of human settlements- man, environment and built structure. Community and settlement patterns. Characteristics of settlements. Growth patterns • Ancient rural and urban settlements • Settlement patterns and birth of early and medieval cities. • Renaissance and High Baroque cities • Factory and Company towns.

Unit-2: Settlement Planning and Design of Cities in Ancient and Medieval India

Town planning as per Vastu-shashtra. • Landscaping and measurement practises as per Manasara. • India during Medieval period.

Unit-3: Introduction to Town Planning and Design of Cities

• Definitions related to Planning, levels of planning, scope and components. • Types of planning, elements and scope. • Characters of a town, census definition of urban area, densities of town. • Constituents of town/city.

Unit-4: Town and Urban Planning Concepts

Evolution of Planning concepts : City beautiful movement, Garden cities, Radburn city and neighbourhood concept • Theories related to growth and decay of settlements- Luis Mumford, Geddesian triad, Ekistics. • Utopian Planning theories-Linear city- Tony Garnier, Soriya Y Mata. Planning concepts by Le Corbusier and FLW.

Unit-5: Planning Framework and Process for Various Development PlansDesign brief - its importance and interpretation

Planning process, components and techniques- survey techniques and data collection methods • Concept of master plan, its elements, preparation and implementation • Perspective plans, structure plans, advocacy plans, zonal plans • Participatory and inclusive planning

Unit-6: Problems and Issues of Towns and Settlements

Identification of planning problems of land use distribution and change, communication system, overcrowding. • Informal growth- slums, blighted areas. • Sporadic growth and conurbation, primacy, traffic. • UDPFRI Guidelines, MoUD laws, Zoning and developmental controls.

Unit -7: Case Study of Existing Settlement

Case studies of planned cities of the world-New Delhi, Chandigarh, Jaipur, Bhubaneshwar, Bhilai, Bokaro, port town, Brasilia, Islamabad • Hands-on Exercise on local area planning. (Survey, Documentation , Interpretation, Proposal development)

Course Outcome:

Serial no.	Outcomes	Taxonomy
1	Define types of settlements based on different criteria	Analyze
2	Identify the elements of a settlement	Understand
3	Describe the principle of a settlement pattern.	Analyze
4	Distinguish between different settlements, concepts of planning and techniques of survey	Apply
5	Review the condition of development/status of urbanization	Understand
6	Develop local area plans	Create

References:

• An Introduction to the Science of Human Settlements by C.L.Doxiadis; Ekistics Hutchinson, London, 1968. • Housing and Urban Renewal by Andrew D.Thomas, George Allen and Unwin; Sydney, 1986. • Ministry of Urban Affairs and Employment; Government of India, New Delhi,1999 • Urban Development Plans: Formulation & Implementation; Guidelines, 1996. • Master Plan for Madras Metropolitan Area; Madras Metropolitan Development Authority, Second Master Plan, 2007. • Report of the National Commission on Urbanisation; Government of India 1988. • Regional Policy and Regional Integration by N. Hansen; Edward Elgar, UK, 1996. • Sustainable Human Settlements by R. S. Sandhu; Asian Experience, Rawat publications, 2001. • Living Plans: New concepts for advanced housing by P. Gastek; Brikhauser publications, 2005 • URDPFI Guidelines Vol I-2014 (<http://moud.gov.in/URDPFI>) • URDPFI Guidelines II A-II B-2014(<http://moud.gov.in/URDPFI>)

B. Arch. Semester-IX**BR 561 – Heritage & Conservation (Elective-IV)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
2	0	0	50	50	2	100

Focus: To develop an understanding about the importance of Heritage and the need of architectural conservation.

Objectives

- To introduce the various issues and practices of Conservation.
- To familiarize the students with the status of conservation practice in India and the various agencies involved in the field of conservation.
- To inform the students about the character and issues in our heritage towns through case studies
- To outline the various guidelines for the preservation, conservation and restoration of buildings.

Contents:**Unit-1: Introduction to Heritage and Conservation**

Understanding Heritage, Types of Heritage. Heritage conservation- Need and purpose. Defining Conservation, Preservation and Adaptive reuse. Distinction between Architectural and Urban Conservation. International agencies like ICCROM, UNESCO and their role in Conservation.

Unit-2: Conservation in India

Meaning of Architectural Conservation, need and degrees of conservation. History of conservation in India and West, conservation charters, role of Archaeological survey of India in conservation of India's cultural heritage. Museum conservation – monument conservation- inventories and projects- select case studies of sites such as Hampi, Golconda, Mahabalipuram - craft Issues of conservation.

Unit-3: Conservation practice and methods

Listing of monuments, documentation of historic structures and assessing architectural character, historic structure report, guidelines for preservation, rehabilitation and adaptive re-use of historic structures. Case studies of Forts and Palaces in Rajasthan, Chettinad houses and Swamimalai dwellings. Seismic retrofit and service additions to historic buildings and heritage site management.

Unit-4: Urban Conservation

Urban conservation, methodologies to be adopted for conservation management. Case studies in conservation related to Adaptive reuse, building in context and preservation. Overview of urban history in India: understanding the character and issues of historic cities. Case studies of towns with heritage precincts like Srirangaram, Kumbakonam and Kanchipuram.

Unit-5: Conservation Planning

Conservation as a planning tool, financial incentives and planning tools such as Transferable Development Right(TDR). Heritage tourism; case studies like Pondicherry French town, etc.

Unit-6: Role and schemes of Government Agencies

Role of Archeological Survey of India, Role of INTACH, Central and state government policies and legislations, HRIDAY Scheme.

Outcome:

S.No.	Outcome	Taxonomy
1	Acquire knowledge about diverse heritage across the country.	Understand
2	Acquire the importance of heritage, issues and practices of conservation.	Understand
3	Develop the various approaches and concepts in Architectural Conservation.	Understand
4	Analyze the historic materials, traditional and modern repair methods.	Analyze
5	Exposure to the various case studies in Architectural Conservation .	Understand
6	Make presentations on the various conservation studies.	Create

Text book

- Handbook on Architectural Conservation by Sir Bernard Fielden. INTACH, New Delhi.
- Living Heritage of Mewar: Sikha Jain & Vanicka Arora.
- Humayun's Tomb Conservation: RETHINKING CONSERVATION: Aga Khan Trust for Culture.
- Architectural Conservation: Principles and Practice: Aylin Orbasli.
- Conservation of Historic Buildings: Bernard Feilden.

References:

- Robert E. Stipe, A Richer Heritage: Historic Preservation in the Twenty-First Century".
- University of North Carolina press, 2003.
- Conservation Manual, Bernard Fielden; INTACH Publication, 1989.
- B.K. Singh, "State and Culture", Oxford, New Delhi.
- A.G. K. Menon ed. "Conservation of Immovable Sites", INTACH Publication, N.Delhi., 1988.
- Seminar Issue on Urban Conservation.

Web link

- <https://cpwd.gov.in/Publication/ConservationHertBuildings.pdf>
- <http://www.intach.org/publications.php>
- https://www.indiaculture.nic.in/sites/default/files/E-Book/MinofCulture_eBook_17-02-2015.pdf
- https://www.researchgate.net/publication/316643759_HERITAGE_CONSERVATION_IN_INDIA_CHALLENGES_AND_NEW_PARADIGMS
- https://pearl.niua.org/sites/default/files/books/GP-IN4_HERITAGE.pdf

B. Arch. Semester-X**BR 512 – Architectural Design Thesis**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
1	0	11	400	400	18	800

Focus:

- Bachelor of Architecture Thesis is the final stage of learning Architectural Design. With the help of a thesis project, students are expected to demonstrate the understanding of a systematic design process which includes identification of project requirements, site study and analysis, case studies, programming, schematic design and Design Development.
- It provides the students with an opportunity to culminate the nine semesters of architectural education by demonstrating the body of knowledge and skills gained during their education and the professional training.

Objectives:

The main objective of this exercise is to provide an opportunity to the students to handle a complete design project of their own choice in a practicable manner using their creative ability. This will prepare them for the challenges of the practical world once they graduate.

Contents/ Pedagogy:**Synopsis**

- The synopsis will be a brief introduction of the proposed thesis / project and has to be submitted by the student at the end of the previous semester.

CASE STUDY, SITE ANALYSIS AND AREA PROGRAMMING**Case Study**

- The students have to conduct literature study and case studies – live & literature, to form a basis for their own design.
- Literature Review: It includes gathering the relevant standards and other information from all the available sources related to their thesis topics that will help them during the later stages of their thesis programme.
- Case Studies: The students have to conduct live and literature studies of similar projects. Instead of mere documentation of these projects, information must be collected about the requirements; salient design features clearly stating the positive and negative aspects of the design. Idea of the case study is to form a base for candidates own design.

Site Analysis

The purpose of the site analysis is to record and evaluate information on the site and its surroundings, and to use this evaluation in the design response. The site analysis should identify issues that will influence the design of a development in order to make a considered response to both site opportunities and constraints, to provide a good quality living environment, and respect, acknowledge and improve the character of the area.

Area Analysis and Programme

The students are required to prepare a comparative statement of the various available design standards, areas provided in the various case studies and the area requirements stated in the project brief, so that the area requirements for the various functions / spaces for the proposed building can be finalized. This area programme should be an exhaustive list and will form the basis of the design process to be undertaken in upcoming stages.

SCHEMATIC DESIGN

- The students have to express their ideas generated on the basis of the studies (case studies / literature studies / area analysis) conducted so far in the form of conceptual drawings, sketches and models.
- The emphasis during this stage should be on the basic concept explaining the principal ideas / thought process / dream of the student for the project in terms of planning / built form / massing of different components, leading to the design, through sketches / 3D images / block models etc.

DESIGN FINALIZATION

- The schematic drawings presented in the previous module needs to be detailed out as per the comments/ suggestions received from the guides and the reviewers.
- The detailed drawings as per the final area programme with due consideration to structural and service requirements of the building needs to be presented at this stage.

PRE-FINAL DESIGN

- The students are required to submit the final drawings, views, models, etc. incorporating the comments received in the previous reviews, to be presented before a panel of internal / external reviewers.
- All the submittals should be complete in all respects except their final renderings.

FINAL THESIS SUBMISSION

- The students are supposed to present all the submittals (drawings, model, report, etc.) complete in all respects as per the comments and suggestions received from thesis guide and various review members before the final review panel for B. Arch. Thesis.

Outcomes:

S.No.	Outcomes	Taxonomy
1	Designs a Thesis project responsive to the contextual and program requirements.	Remember
2	Combines the systematic/methodological learning from various stages of study and analysis in design process towards culmination of an informed design.	Apply
3	Communicates the ideas clearly using writing, verbal and visual presentation.	Create
4	Demonstrates self-reliance when working independently	Apply
5	Integrates ideas with design requirements	Creating
6	Compares data and information gathered from Pre-design research	Analyze
7	Evaluates data and information gathered from Pre-design research and summarizes the information to used for design	Evaluating
8	Applies various codes, standards and regulations governing the project.	Apply
9	Demonstrates synthesis of creativity and technical knowledge	Apply
10	Demonstrate the ability for decision making required to progress the understanding already developed.	Apply
11	Demonstrate the ideas clearly using detailed physical Model.	Apply

Learning Resources / References & Learning Strategy

- Bachelor of Architecture Thesis Manual
- Lectures on various related topics such as Site study and Analysis, Case Studies, Building bylaws and standards, Area Programming, structure design, Building services, Drafting conventions and Drawing Coordination.
- Tutorial on one-to-one basis
- Supervision by assigned Guide
- Supervision by assigned Guide
- Presentation to External and Internal Examiners
- Supervision by assigned Guide

B. Arch. Semester-X**BR 522 – Housing (Elective – V)**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
4	0	0	50	50	4	100

Focus:

- To create awareness about the causes and consequences of housing problems and to impart knowledge about the possible solutions.
- Understanding of the various issues involved in urban and rural housing and knowledge about the planning and design solutions for low income groups

Objectives

- Historically, human settlement has been the manifestation of socio-cultural, economic and environmental understanding.
- Designs of Adobe and habitat has been characterised and practiced by people presents huge variety mainly responding to the contextual setting that strive to achieve comfort conditions within a prevailing challenges.
- Growing urbanization, scarcity of land and housing shortage for poor, has imposing challenges whereas, new technology, concepts and capacity of real estate sector for mass housing production providing opportunities. This is quite important that, budding architects should understand challenges and opportunities of housing development.
- The course Housing acts as bridge between architecture and urban planning thus will require inter-linkages with planning aspects, housing policies, development regulations, site planning, urban design and infrastructural service designs at neighbourhood levels.

Contents:**Unit-1: Introduction**

- Definition, terminologies and importance.
- Ecological and environmental aspects of human habitat.
- Concept of Neighbourhood and community.
- Hierarchy of human needs and Housing typologies.

Unit-2: Housing Scenario

- Urbanization and housing statistics
- Housing policies and programmes
- Factors of housing demand and supply
- Housing delivery mechanism

Unit-3: Slum and Housing for Poor

- Definition , causes and characteristics OF SLUMS
- Slum statistics and initiatives for housing for poor
- Affordable housing design case studies
- Design of affordable housing for poor

Unit-4: Development Norms and Standards

- Housing and its relationship with neighbourhood and city plan
- Zoning regulation, its impact on quality of life of neighbourhood
- Density; definitions, types of density, factors, FAR, FSI, etc.
- Development norms and standards for services, amenities and facilities
- Sub- division techniques.

Unit-5: Land Economics and Real Estate Development

- Introduction to real estate market; potential and challenges
- Land economics; Concept of economics, Types of land holding and tenure systems
- Factor affecting demand and supply of housing

- Relationship between land use, location and land value (Theory of location and growth pole theory)
- Land use constraints, reservations and Land acquisition act, 2013
- Land economics and feasibility analysis for housing projects
- Models of land development in real estate market (Land pooling and sharing)

Unit-6: Site Planning and Neighbourhood Design

- Factors and principles of site planning
- Analysis for physical, climatic, legal, financial, socio-cultural aspects
- Principles of Neighbourhood design
- Housing case studies (Successful real estate projects)
- Design of Neighbourhood (concept and calculations)

Course Outcome:

S.No	Outcome	Taxonomy
1	To define basic elements of housing, neighbourhood, community, slums and real estate market and outline various housing policies and programmes	Remember
2	To explain inter-relationships between hierarchy of human needs and housing typologies or differentiate settlement design in terms of local context (Physical, economical, socio-cultural, ecological, environmental aspects) and interpret cause and effects housing demand and supply	Understand
3	To Apply zoning regulations and sub-division techniques and computation for density, FAR, built-up area, MOS, as per development norms.	Apply
4	Site planning through analysis of physical, legal and environmental conditions and feasibility analysis of housing project through pre design calculations	Analysis
5	Critical appraisal of existing housing scheme in terms of quality of life through case study	Analysis
6	To prepare suitable design of a neighbourhood under given context includes specific physical, legal, socio-economic, cultural and environmental conditions.	Understand

References:

- Beyond Gated Community by Sameer Bagaeen
- China housing reforms and outcomes Ed. By Joyce Yanyun Man
- Cities and Housing by C.S. Yadav
- City slums by J.A. Ingham
- Cost effective rural housing technology by Reddy
- Design quality in Housing- Leanings from Netherlands by Matthew Cousins
- Gated community by Sameer Bagaeen
- High density housing for mixed income group by Ranjana Ashish Mittal
- Neighbourhood planning and community based development by W. Peterman
- Planning and design for future informal settlements by David Gouverneur
- Row Housing by Gunter
- Shadow cities by Robert Neuwirth
- The economics of urban property market by Paschalis A. Arvanitidis
- The modern economics of Housing by Randall Johnston
- Town Planning by A. Bandhopadhyay
- Town Planning by Rangawala
- Urban development and Housing in India (1974-2007) Ed. By Rishimuni Dwivedi
- Urban economics and real estate market by Denise DiPasqualle
- Urban Housing and Slums by A.K. Jain
- Urban land economics by Jack Harvey and Ernie Jowsey
- Urban Planning Theory and Practice by M. Pratap Rao
- Urbanization and urban systems in India by R. Ramchandran
- Urbanization in India Ed. by R.S. Sandhu
- Journal of Housing and built environment
- Journals of Housing studies
- Planning sustainable cities- UNHabitat

B. Arch. Semester-X**BR532 – Sustainable cities and communities**

PERIODS			EVALUATION SCHEME		CREDIT S	SUBJECT TOTAL
LECTUR E	LA B	PRACTICA L	SESSIONAL ASSESSMENT	EXTERNAL ASSESSMENT		
4	0	0	50	50	4	100

Focus: Understand the concept of smart city: how to attain sustainability, Concepts of sustainable systems relating to energy, water, food and urban living; system modeling and simulation

Objectives:

- To appreciate the concept of sustainable development
- To know do's & don't for sustainable development
- To contribute as a designer towards sustainable development

Contents:**Unit-1: Introduction to Smart City concepts and Intelligent buildings**

- Explores the challenges facing urban environments
- The system of systems that comprise a city
- Sustainable Frames the attributes of a smart city
- Explores converged physical/digital structures that respond to & anticipate the needs/actions of occupants and are aware of the environment around them.

Unit-2: Sustainable Sites, Area Planning

- Site identification, evaluation and selection
- Site inventories of physical, biological, and cultural attributes

Unit-3: Green building Rating systems:

- Green Building Codes and standards, Structure of rating system
- Assessment criteria, assessment agencies like World Green Building Council, The Energy Resource Institute (TERI), Certifications like BREEAM, LEED, Green Globes, LEED INDIA, GRIHA etc. METHODOLOGY

Unit-4: Smart Villages:

Explores how the enabling technologies behind smart cities can be applied to villages remote rural areas, particularly in emerging economies.

Outcome:

S.No.	Outcome	Taxonomy
1	Nature and aspects of Smart cities	Remember
2	Determine eco friendly planning approach	Analyze
3	Awareness on the green building rating system and how it works	Analyze
4	Solution for the environmental hazards both at rural and urban level	Remember
5	Smart village: development and concepts	Remember
6	Application of the same in Design Studio Project	Create

Text book:

References:

**Sustainable Cities and Communities
Design Handbook**

Green Engineering, Architecture, and Technology

Book • 2nd Edition • 2018 • 2018

Web link

<https://www.researchgate.net/publication/308802350> Sustainable Urban Development Textbook

B. Arch. Semester-X**BR 542 - Disaster Mitigation Management (Elective -VI)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
4	0	0	50	50	4	100

FOCUS

In the face of climate change, occurrence of natural disaster has become more frequent, influencing livelihoods and existence of human civilization. In this context, this course is designed to provide an overview of the occurrence, causes and consequences of disaster and understanding of fundamental concepts and application of disaster resilient design.

OBJECTIVES:

- To understand the role of Seismic-resistant Architecture
- To identify the suitable methods of all for Seismic-resistant Architecture
- To understand Advantages and Disadvantages for the method adopted while constructing architecture.
- To understand behavior of building materials during earthquake
- To understand torsion and moments in the members

COURSE CONTENTS**Unit 1.****Introduction to Disaster Management**

- Define and describe disaster, hazard, emergency, vulnerability, risk and disaster management
- Identify and describe the types of natural and non-natural disasters. Important phases of Disaster Management Cycle.

Unit 2.**Disaster Mitigation and Preparedness**

- Natural Hazards: causes, distribution pattern, consequences and mitigation measures for earth quake, tsunami, cyclone, flood, landslide drought etc.
- Man-made hazards: causes, consequences mitigation measures for various industrial hazards/disasters, Preparedness for natural disasters in urban areas.

Unit 3.**Hazard and Risk Assessment:**

- Assessment of capacity, vulnerability and risk, vulnerability and risk mapping, stages in disaster recovery and associated problems.

Unit 4.**Emergency Management Systems (EMS):**

- Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

Unit 5.**Capacity Building:**

- Gender sensitive disaster management approach and inculcate new skills and sharpen existing skills of government officials, voluntary activists, development of professional and elected representative for effective disaster management, role of media in effective disaster management, overview of disaster management in

India, role of agencies like NDMA, SDMA and other International agencies, organizational structure, role of insurance sector, DM act and NDMA guidelines.

Unit 6.

Application of Geo-informatics and Advanced Techniques:

- Use of Remote Sensing Systems (RSS) and GIS in disaster Management, role of knowledge based expert systems in hazard scenario, using risks-time charts to plan for the future, early warning systems
- Integration of public policy
- Planning and design of infrastructure for disaster management, Community based approach in disaster management, methods for effective dissemination of information, ecological and sustainable development models for disaster management.

Outcome

S.No.	Outcome	Taxonomy
1	Differentiate the types of disasters, causes and their impact on environment and society	Remember
2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.	Remember
3	Draw the hazard and vulnerability profile of India, Scenarios in the Indian context.	Understand
4	Differentiate the types of disasters, causes and their impact on environment and society	Understand
5	Disaster damage assessment and management keeping a sustainable approach.	Remember
6	Asses and create ecological and sustainable development models for disaster management	Analyze

References

- “Natural Hazards and Disaster Management: Vulnerability and Mitigation” by R B Singh
- “Disaster Management and Mitigation approaches in india” by Paritosh Srivastava,
- “Management and Mitigation of Natural Disasters” by Rajan Kumar Sahoo,
- “Disaster Mitigation and Management: Post-Tsunami Perspectives” by Jegadish P Gandhi,
- “Disasters: Strengthening Community Mitigation and Preparedness” by Khanna B K
- “Strengthening Resilience in Post – Disaster Situations: Stories, Experience and Lessons from South Asia” by IDRC
- “Disaster Management at Health Care Settings Comprehensive Assessment and Effective Mitigation” by Shreen Gaber

Web Link

https://www.researchgate.net/publication/292655874_Disaster_Mitigation

https://www.researchgate.net/publication/292655874_Disaster_Mitigation

B. Arch. Semester-X**BR 552 - Earthquake Resistant Architecture(Elective-VI)**

PERIODS			EVALUATION SCHEME		CREDITS	SUBJECT TOTAL
LECTURE	LAB	PRACTICAL	SESSIONAL ASSESMENT	EXTERNAL ASSESMENT		
4	0	0	50	50	4	100

FOCUS

Students would be able to understand the formation and causes of earthquakes and factors to be considered in the design of buildings and services to resist earthquakes.

OBJECTIVES

- To share the knowledge regarding the earthquake resistant buildings.
- To impart knowledge of Origin of Earthquakes, magnitude, intensity, ground motions, sensors.
- To impart knowledge about Concepts of Earthquake Resistant Design of Reinforced Concrete Buildings.
- Identify the role of engineers in Earthquake Resistant Design of Buildings.

COURSE CONTENTS**Unit 1: Fundamentals of earthquake.**

- Earth structure, seismic waves, plate tectonic theories, origin of continents, seismic zones in India.
- Predictability, intensity and measurement of earthquake.
- Basic terms like faultline, focus, epicentre, focal depth etc.

Unit 2 : Site planning, performance of ground and buildings.

- Historical experience, site selection and development.
- Affects of earthquake on ground, soil rupture, liquefaction, landslides.
- Behaviour of various types of building structures, equipments, lifelines, collapse patterns.
- Behaviour of non structural elements like services, fixtures in earthquake prone zones.

Unit 3 : Seismic design codes and building configuration.

- Seismic design code provisions- Introduction to Indian codes.
- Building configuration – scale of building, size, horizontal and vertical plane, building proportions, symmetry of building- torsion, irregularities in buildings like shortened floor heights and short columns etc.

Unit 4 : Various types of construction details used in urban planning and design.

- Seismic design and detailing of non-engineered construction- masonry structures, wood structures, earthen (mud) structures.
- Seismic design and detailing of RCC and steel structures.
- Design of non-structural elements – Architectural elements, water supply, drainage, electrical and mechanical components.
- Vulnerability of existing buildings, planning of facilities, fires after earthquake, socio-economic impact after earthquakes.

Outcome

S.No.	Outcome	Taxonomy
1	Differentiate the types of seismic waves, causes and their impact on environment and society	Remember
2	Develop a familiarity with design codes and building configuration.	Remember
3	To understand the fundamentals of earthquake and basic terminology related to earthquake resistant design concepts	Understand
4	Understand the various types of construction details to be adopted in a seismic prone area.	Understand
5	To apply the knowledge in Seismic design and detailing of RCC and steel structures.	Remember
6	To apply the knowledge gained in the architectural design assignment.	Analyze

TEXT BOOKS:

1. Guidelines for earthquake resistant non engineered construction, National information centre for earthquake engineering (NICEE).IIT Kanpur, 2006.
2. C.V.R Murthy Andrew Charlson, 'Earthquake Design Concepts', (NICEE).IIT Kanpur, 2006.
3. Agarwal. P, 'Earthquake resistant Design', Prentice Hall of India,2006.

REFERENCE BOOKS:

1. "Disaster Management in the Hills", Dr. Satendra, Concept Publishing Company, 2003.
2. "Disaster Management", Harsh K. Gupta, Universities Press, 2003.
3. "Natural Hazards and Disaster Management: Vulnerability and Mitigation",R. B. Singh, Rawat; Reprint edition, 2006.
4. "Proceedings of the National Conference on Disaster & Technology, 1998, Manipal, India", Nirmita Mehrotra, 1998.
5. "Disaster Risk Reduction in South Asia", Sahni, Pardeep, Ariyabandu and Madhavi Malalgoda, PHI Learning, 2003.
6. Ian Davis, 'Safe shelter within unsafe cities: Disaster vulnerability and rapid urbanization', Open House International. UK, 1987.
7. Socio-economic development record – Vol.12, No.1, 2005.
8. Mary c. Camrio, Lugia Binda, 'Learning from practice-A review of Architectural Design and construction experience after recent earthquakes' – Joint USA-Italy Workshop, October 18-23, 1992, Orvieto, Italy.
9. Improving Earthquake & Cyclone Resistance of Structures by Shekhar Chandra Dutta & Parth Sarthi Mukhopadhyay

Web Link

<https://www.youtube.com/watch?v=fd7DzoZM5sM>
https://www.youtube.com/watch?v=Fw94a_qKRuU

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



BACHELOR OF ARCHITECTURE

Programme Code: AR

Duration
5 Years Full Time

Programme Structure
And
Curriculum & Scheme of Examination

2020-21

Ar. (Prof.) Rishi Raj Kapoor

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INTRODUCTION

Give me, but a Firm spot, on which to stand.....

And I shall move the earth. !!

The Bachelor of Architecture Degree programme prepares students for professional practice in the field of Architecture. Being an undergraduate programme, it has a broad scope, providing exposure to a variety of interests in this field and assisting students to discover their own directions for further development.

There is increasing recognition today of Architecture as an intellectual discipline, both as art and as a profession. Architects make a vital contribution in the shaping of our environment and society, in the design and technology for a diverse range of situations, both in the rural and urban contexts. In India, we have further complexities of different social, cultural, geographical, economic and technical nuances which are unique and typical of every region in our country.

It is the appreciation of this over-changing context that the architect must bring to bear of his work. This demands appropriate skills, understanding and knowledge and a deep commitment to professed ideals. Addressing Architectural Design as a comprehensive creative process, this programme is based on the following broad intentions:

There is a need for redefining the Student of Architecture today. A student of architecture is not only a learner, but also a producer of knowledge. The student's tools include a critical, evaluative, conceptual mind, the ability to interconnect concepts/ facts, to use theory and argument and seek a higher level of explanation in the process of learning and its application to design. The student's initial challenges shall be to differentiate between objective and accepted reality, to appreciate architecture as a cultural process, and to perceive change as a series of discontinuities, more than cause/effect transitions. Only then can the student become relevant in today's world, rather than mindlessly repeat the dogma of the past. In the creation of a new syllabus for the Bachelor of Architecture Course, certain adjustments to older mind sets must be made:

1. Architecture has to be appreciated as a 2nd Order Discipline. It is a Meta discipline, a critical attitude, not merely an empirical discipline like engineering that needs/seeks/works with data.
2. Architecture deals with fundamental issues of users, cities and societies, and not only materials, processes and aesthetics. It questions the presupposed, and seeks new and contemporary meanings.

ARCHITECTURAL EDUCATION

The advent of the 21st century has witnessed globalization, urban growth, new materials and techniques, information technology and climate change at an unprecedented rate. The four C's of education, viz., creativity, critical thinking, collaboration and communication are especially relevant to architectural education when laying a foundation for lifelong learning for students. Architectural education also needs to be viewed in the context of an ongoing paradigm shift in the field of higher education: a shift towards a learner-centric educational approach where the student is an active participant in the learning processes. These challenges make it imperative to re-visit our existing curriculum and apply new approaches to prepare students to face them and be creative, innovative, and responsible shapers of our built environment. The main aims of the program are as follows:

- To establish a foundation for **lifelong learning**
- To apply current educational theories that see learning as a process wherein the learner constructs or builds new concepts, focusing on **learner-centric education vs. teacher-centric education**.
- To transform the role of teacher to that of **facilitator**, guide and mentor and not a transmitter of information
- To encourage diverse learning styles, acknowledging Kolb's Experiential Learning Theory, which suggests that **learning is cyclical** and moving through this continuum over time every learner discovers the learning style best suitable to the person.
- To enable students to learn to find meanings and connections by critical contemplation of available resources, in the context of information overload, strengthening the innate skills of reflection, evaluation, re-iteration and research.
- To empower learning by doing. The Design studio is considered both a course and a place of study at the heart of an academic environment fostering design thinking that is simultaneously analytical and creative.
- Ultimately, to produce graduates capable of critically synthesizing architecture, engineering systems, social sciences and entrepreneurial skills to be future leaders in the field.

The proposed curriculum revision is to be seen in the context of the above stated goals, the overall vision of the school, objectives of the curriculum, content of syllabus and advances in pedagogy, while also incorporating current Guidelines for Minimum Standards of Architectural Education stipulated by the COA.

Syllabus should reflect the following objectives:

- Architecture is 'discipline'/ meta-discipline, not merely an empirical process
- Critical thinking/ criticality is important. The student must be given the tools to critically evaluate the world she lives in
- The student needs to be redefined as more than a learner, but a producer of knowledge
- In the spreading world of information technology and easily available knowledge, the teacher needs to be redefined as more than a giver of information, but one who can show the student how design is a critical process

The Curricular Progression

The curriculum is envisaged as a Two-stage, Ten-semester program of five years duration.

STAGE 1

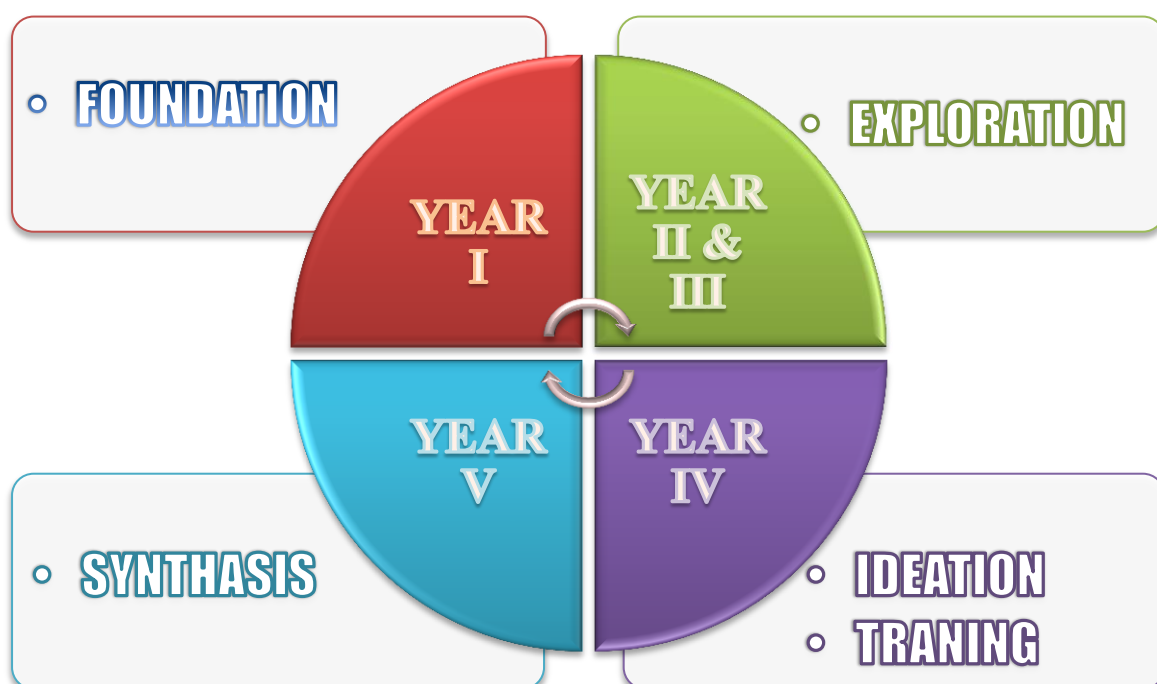
The first six semesters comprise Stage 1:

A period of Foundation and Exploration where basic competencies are developed and students are exposed to a breadth of knowledge in various subjects that are embedded Architectural firmament.

STAGE 2

The next four semesters comprise Stage 2:

Students undergo a one-semester Practical Training and three semesters of in-depth Ideation and Synthesis. During the second stage students are encouraged to follow their interests and develop depth of understanding in any chosen field through studios, electives and research-based study.



Explanatory notes on New Aspects in the Syllabus

Sessional work

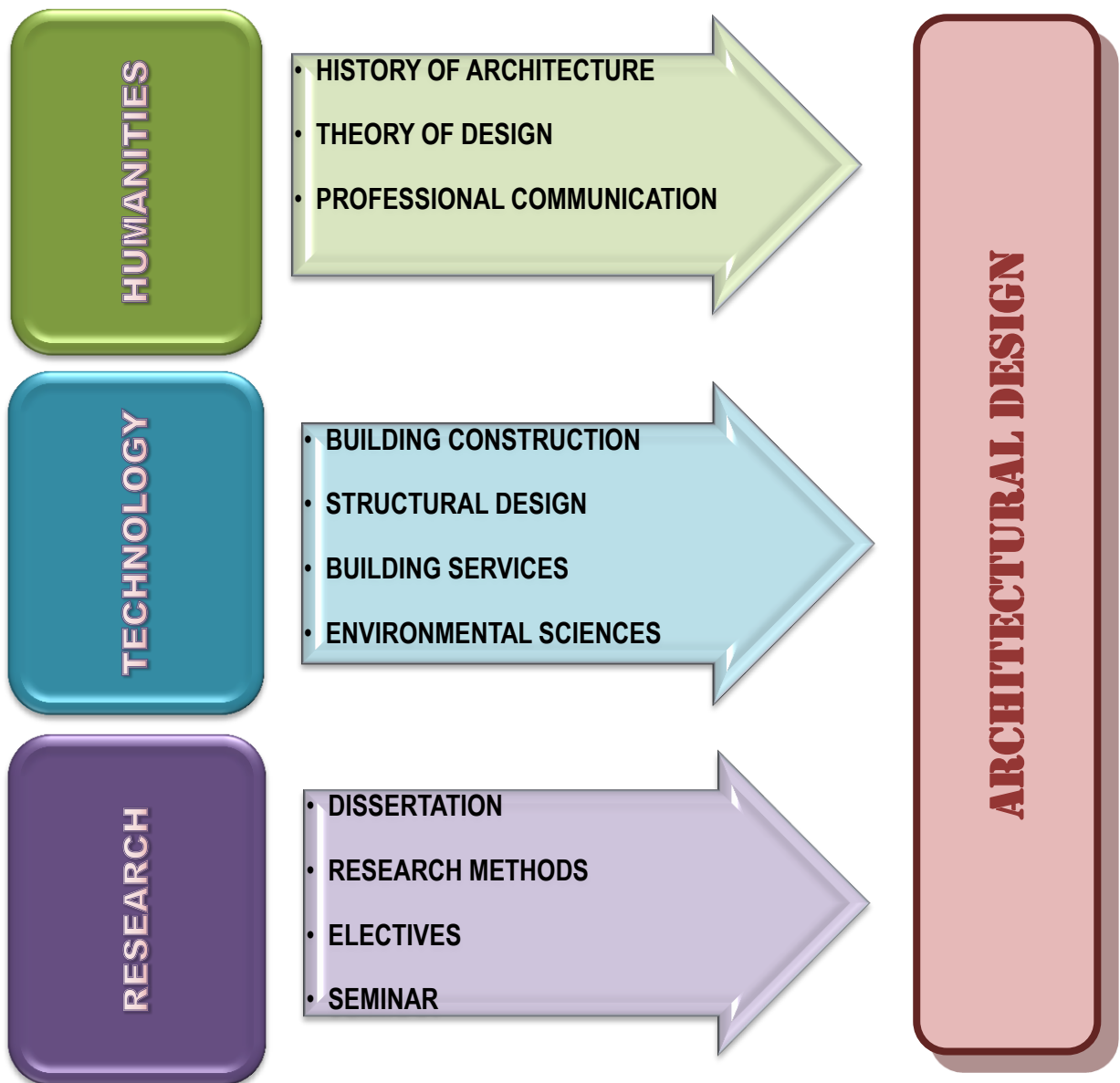
Sessional work in the B. Arch. Course can be defined as mandatory assignments carried out by students in the classroom or the studio during the course of the semester (session). Sessional work will be detailed out in the course content for each subject, which may include drawings, sketches, reports, presentations, models as per the requirements. In the case of theory intensive subjects, sessional work may be in the form of class tests, seminars, presentation of reports or documentation. In the design studio or for the technical subjects, sessional work shall consist of supervised design development, the working out of technical details, reports and documentation. All these assignments are marked in process and upon completion may be assessed in the form of Critics or Juries. Sessional work in all subjects shall be designed, carried out and assessed by the subjects in charge and collated as Internal Marks.

Allied Design Studio

The Architectural Design Studio is the central subject in the architecture course; other subjects supplement knowledge, skills and critical understanding of the design of architecture. The **Allied Design Studio** is also a studio where subjects allied to Architectural Design can be taught and sessional work carried out in the form of design projects. These subjects are closely associated with the core of design and architecture. In the previous syllabus, these subjects included Basic Design, Interior Design, Landscape Design and Urban Design/ Urban Planning. In the new syllabus, these subjects shall form part of a representative list that may include other design based subjects such as Visual Studies, Graphic Design, Product Design, Furniture Design, the Design of Outdoor Spaces and Public Places, or Town Planning.

The college may determine the teaching modules and sessional work for these subjects, as also their location in the first three years. Each subject shall have both a Lecture as well as a Studio component. Credits for the Allied Design Projects will be given to each student as per his/her attendance, participation and contribution towards the projects. These Credits will be given by the respective Project teachers/ coordinators for the term.

The program aims at attaining a high level of excellence in Architectural Design. To this end, the design course is seen as the core of the programme with supportive inputs from courses in other streams viz., the Humanities, the Technological and the Professional, built upon a strong foundation of enabling skills in communications and data processing. The emphasis is on the development of faculties of discernment and decision-making with the aid of both objective information and subjective attitudes, based on reason.



Architecture Begins where Engineering Ends.

**Assessment and Evaluation Pattern
for Practical (Sessional) and Theory Subjects :**

SN	Practical Subjects	Credits	No. of Sem.	Internal 60%		External 40%		
				CW	MTE	Theory	Viva	Pract.
1	Architecture Design / Housing / Urban Design / Thesis	108	10	YES	NO	NO	YES	NO
2	Buld. Material and Const. Technology	56	7	YES	YES	YES	YES	NO
3	Architectural Graphics skills	10	6	YES	NO	NO	YES	
4	Basic Design & Visual Art	6	2	YES	NO	NO	YES	
5	Arch. workshop	3	2	YES	NO	NO	YES	
6	Working Drawing	2	1	YES	NO	NO	YES	NO
7	Study Tour	2	1	YES	NO	NO	YES	NO
8	Dissertation	5	1	YES	NO	NO	YES	NO
9	Interior & landscape Design Studio	3	1	YES	NO	NO	YES	NO
Total Credits		195						

SN	Theory Subjects	Credits	No. of Sem.	Internal 50%		External 50%		
				CW	MTE	Theory	Viva	Pract.
1	Structural Design & System	12	6	YES	YES	YES	NO	NO
2	History of Architecture, Art & Culture	8	4	YES	YES	YES	NO	NO
3	Environmental Studies	2	1	YES	YES	YES	NO	NO
4	Building Services	8	4	YES	YES	YES	NO	NO
5	Arch. Climatology	2	1	YES	YES	YES	NO	NO
6	Surveying & Leveling	2	1	YES	YES	YES	NO	YES
7	Theory of Design	1	1	NO	YES	YES	NO	NO
8	Research methodology	2	1	YES	YES	YES	NO	NO
9	Town Planning & Buld. By-Laws	2	1	YES	YES	YES	NO	NO
10	Housing Theory	2	1	YES	YES	YES	NO	NO
11	Specification Estimation & Costing	2	1	YES	YES	YES	NO	NO
12	Professional Practice	2	1	YES	YES	YES	NO	NO
13	Urban Design Theory	2	1	YES	YES	YES	NO	NO
14	Elective	8	3	YES	YES	YES	NO	NO
Total Credits		55						

1	Office Training	30	1					

Credits Load Calculation :

- a) 1 Lecture Period / Hour 1 Credit
b) 2 Lab / Workshop / Seminar Period / Hour 1 Credit
c) 1 Design / Construction / Thesis Studio Period / Hour..... 1.5 Credits

Grade and Grade Point Calculating System :

For the Award of Grades in the Course, all components-wise evaluation shall be done in term of Marks. The marks of different components viz. Internal assessment / Course work sessional assessment (CWS), Mid-term Examination (MTE), End Term Examination (ETE), Practical Sessional (PS), etc. would be reduced to relative approved weightage of each component and added. Marks so obtained, is converted into absolute marks out of 100 and the same would be converted to Grades as per the table below. The grades will be further converted into grade points for the calculation of SGPA & CGPA as per university rules.

Marks %	Equal or More than	Grade	Academic Performance	Grade Point	Equal or Less than	Marks %
90 %	≤	A+	Outstanding	10	≤	100 %
81 %	≤	A	Excellent	9	≤	89 %
72 %	≤	B+	Very Good	8	≤	80 %
63 %	≤	B	Good	7	≤	71 %
54 %	≤	C+	Average	6	≤	62 %
48 %	≤	C	Below Average	5	≤	53 %
45 %	≤	D	Marginal	4	≤	47 %
0 %	≤	F	Fail		≤	44 %

Abbreviation : S : Studio , L : Lecture , Lb : Lab , Prd's : Periods

PC : Professional Courses, **BS** : Building Sciences, **EEC** : Employability Enhancement Courses, **EC** : Elective Courses, **NTCC** : Non-Teaching credit Courses,

CWS : Classwork Sessional , **MTE** : Mid Term Exams, **ETE** : End Term Examination

SCHOOL OF ARCHITECTURE
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LAKSHMANGARH, RAJASTHAN



Bachelor of Architecture

YEAR I
SEMESTER I

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -I, SEMESTER– I

Course Title	Architectural Design - I	S	L	Lb	Prds	Credits
Course Code	AR 20.101	4	2	0	6	8
Course Type	PC					

Course Objective:

Orientation of students to the profession of Architecture.

Introduction to the fundamentals of basic design and understanding of forms and spaces in architecture

Familiarizing students with visual grammar, elements of design and methods of visual composition with various mediums and colour.

Theme : Elements and Principal of Design

Course Contents:

Module I: Orientation to the Architecture Profession

Introduction to Architecture Profession, Roles, Responsibilities and Liabilities of an Architect and other professionals in the building and construction field. Architect's Act – C.O.A, I.I.A, NASA

Module II: Elements and principal of Design.

Principles of Design and their application in building design, Principles of organization of forms and spaces. Understanding forms to design a particular environment and space, Understanding Architectural Aesthetics. Use of Materials, Textures, Colors and Light in space design

Module III: Forms, Space and composition.

Positive and Negative spaces, Additive and Subtractive spaces, Composition of design, Scale and Proportions in design, Exercises primarily through 3-D models of simple geometric, Anthropometrical study of various spaces, Application of Anthropometrics

Module IV: Architectural design process and product

Design brief - its importance and interpretation. Preparation of circulation/flow diagrams. Design parameters- physical, socio-cultural, economic, climatic etc. Study and design of small spaces like drawing room, dining room, bed room, kitchen, toilets, study room, class room, offices etc. And making their measured drawings.

Suggestive design exercises :

Design of simple structure like Bus Shelter, Milk Bar, Small Ice Cream Parlor, Gift Shop, Florist Kiosk, Enquiry, Snack Bar, Suvidha Kendra etc.

Student Learning Outcomes:

The student will gain elementary knowledge of Architectural principles. They will learn to apply the observation and logical skills to involve understanding of a space creation. These applications will be used in designing buildings, interior spaces and sites

Pedagogy for Course Delivery:

Drawing and model making skills will be taught along the subject to improve the abilities to understand space and form

Prerequisite:

Min. 2 single day site visits to nearby places to study shelter and human habitat requirements.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**Text:**

1. Francis D.K. Ching, Architecture: Form, Space and Order,
2. Ernst Neuferts Architects Data, Blackwell 2002
3. Alexander Christopher, A Pattern Language,
4. Heller Robert and Salvadori Mario, Structure in Architecture,
5. Walter Gropius, Design Fundamental in Architecture
6. Peter Streens, Pattern of Nature,
7. MeissPieree Von, Elements of Architecture,

References:

8. Joseph D.C. and John Callender, Time Saver standards for building types.
9. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of
10. Design, 1975
11. Jan Bilwa and Leslie Fair Weather, A.J. Metric Handbook
12. Ramsey et al, Architectural Graphic Standards, Wiley 2000
13. Hideaki Hareguchi, A Comparative analysis of 20th century houses, Academy Editions,1988
14. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand
15. Reinhold, 1995.
16. Terence Conran, The Essential House Book, Conran Octopus, 1994

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -I, SEMESTER– I

Course Title	Building material & construction Technology - I	S	L	Lb	Prds	Credits
Course Code	AR 20.103	4	2	0	6	8
Course Type	BS					

Course Objectives:

The basic idea of the subject is to make aware of the primary building materials used in construction, their properties, types and specific use and related technique for a required material. This will enable students to equip themselves with the knowledge of materials and their judicial usage.

Course Contents:

Module I: Introduction to Building Components & Basic Building materials

Introduction to elements of building from foundation to roof, Introduction to various methods, technology & materials. Basic Typical section of a single storey building showing details from foundation to parapet wall.

Module II: Brick, Clay & Clay products

BRICK: Manufacturing, Composition, Sizes, Properties and Classification of bricks, Tests for bricks. Introduction of Brickworks: masonry bonding & ornamental bonding, which will focus on: types of Brick bonds: English, Flemish & Stretcher bond for both 230 mm & 115 mm brick wall, detail brick layout at corners, junctions and brick columns. Brick Arches, Substitutes for bricks

CLAY & CLAY PRODUCTS: Mud including stabilized Earth, Brick tiles, Types of Tiles, Properties and Characteristic of an good tiles, manufacturing, Variety and uses for roofing and flooring, availability & application, terra-cotta.

Module III: Stones

Classification of stones. Common building stones used in India. Characteristics and use of stones. Dressing of stone. Artificial stones. Introduction of Stonework: Rubble and Ashlars masonry. Stone cladding.

Module IV: Lime & Sand and Mortar :

LIME: Sources, Classification and Characteristics of lime. Fat and hydraulic lime – properties and use.

SAND : Sources, Classification, Test, Grade and Properties of sand and its uses.

MORTAR : Classification, Proportion of Clay, Lime and cement Mortar.

Module V: Cement :

Composition of ordinary cement. Function of cement ingredients. Properties of cement – Fineness, Soundness, Setting times, etc. Manufacturing Grades and test of cement. Different types of cements used in construction. Storage of cement on site.

Student Learning Outcomes:

To comprehend the basic principles and appropriate application and performance of construction materials, products, components, and assemblies, including their environmental impact and reuse.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, group presentation by students, market visit by students. Development of construction yard/court. Conduction of practical exercises in construction yard.

Prerequisite:

Site visit to brick kilns and nearby construction sites to familiarize the students with glossary of vernacular terminology as prevalent in this part of the country

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
25%	75% %	PR/R/VV/P/SW/MSE	Theory + VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Building Construction, Materials by M.V. Naik
2. Structure in Architecture, Salvadori and Heller
3. Building Construction & Materials, S.C. Rangwala
4. A text book of Building Construction, B.C. Punmia
5. Building Materials & Construction, Shushil Kumar.
6. W.B. Mackay, Building Construction, Orient Blackswan
7. Chudley, Construction Technology, Prentice Hall
8. Barry, Construction of Buildings,
9. Building Construction Illustrated by Francis D. K. Ching

References:

10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -I, SEMESTER– I

Course Title	Structural Design System- I	S	L	Lb	Prds	Credits
Course Code	AR 20.105	0	2	0	2	2
Course Type	BS					

Course Objectives:

To introduce the structural system in a building with all the basic components to understand the the functions of various elements and building technologies used in various types of buildings.

Course Contents:

Module I: Forces :

Concept of Forces, Graphical presentation of forces, coplanar and non-coplanar force, concurrent and non- concurrent forcers, composition and resolution of coplanar forces by graphical and analytical methods.

Module II: Types of Loads :

Requirement of good structure, safety, stability, economy. Dead and live loads, Impact, Earthquake, concentrated, Uniformly distributed and varying loads, loads system, critical combination of loads, wind loads on tall buildings.

Module III : Lifting Machines :

Mechanical advantage, Velocity ratio and efficiency, Law of machine, Pulleys and pulley blocks.

Module IV : Simple stress and Strains :

Concept of stress and strain in three dimensions, generalized Hooke's Law, Young's Module, Tension test of mild steel and other material, true and apparent stress, ultimate strength, yield stress and permissible stress, Stress in prismatic and non-prismatic members and in composite member, Thermal stress, sheer stress, sheer strain, modulus of rigidity, Complementary shear stress, Poisson's ratio, Volumetric strain, Bulk modulus, relation between elastic constants, stress in composite members, Compatibility conditions.

Module V : Centroids and Moment of Inertia of plane Areas :

Centre of Gravity and moment of Inertia, Parallel axes theorem, Product of Inertia, radius of Gyration, Perpendicular axis theorem.

Student Learning Outcomes:

Understanding of principles of structural behavior in withstanding gravity and lateral forces and the evolution, range, and appropriate application of contemporary structural systems

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, group presentation by students, market visit by students. Development of construction yard/court. Conduction of practical exercises in construction yard.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**Text:**

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R. S.
3. Applied Mechanics and Strength of Materials, Khurmi R. S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

8. Elements of Structure, Morgan
9. Structures in Architecture, Salvadori
10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
12. Elementary Building Construction, Mitchell
13. Structure and Fabric, Everet

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YEAR -I, SEMESTER– I

Course Title	Architectural Graphic Skills Manual - I	S	L	Lb	Prds	Credits
Course Code	AR 20.107	0	1	4	5	3
Course Type	PC					

Course Objective:

Familiarizing the students with various drawing tools and accessories used in drafting and lettering techniques to produce any geometrical composition and form.

To provide a clear understanding about the scale measurement; plane geometry, solid geometry and projections used as drawing technique.

To analyze and solve basic problems involving graphics and spatial manipulations for architectural applications to represent the future forms of her/his projects.

Development of surfaces to develop understanding of 2-dimensional drawings and 3-dimensional models.

Course Contents:

Module I: Basic technical Drawing and Lettering :

Introduction to basics- introduction to subject, drawing equipments and its setting, Drafting and quality of lines with pencil, Basic Geometry- Construction of planes, curves, circles tangent and regular polygons, Free hand and mechanical lettering- Free hand drawing and lettering for titles, line work with the use of Drawing Instruments

Module II: Scale and dimensioning

Types and uses of scales: Plain, diagonal, comparative, and scale of chords, Scales used in architecture, Reducing and enlarging scales, Representative fraction, Dimensioning of lines and plane figures, Measuring and drawing to scale the following: furniture pieces, rooms, doors and windows, etc.

Module III: Orthographic Projections:

Introduction to orthographic projections - isometric and axonometric projections, Planes of Projections, First angle projections, Drawing of lines, basic geometrical shapes in different positions, Projection of regular rectilinear and circular solids (prisms, pyramids, cones, cylinders, spheres etc.) in different positions, construction of plan, elevation and section of 3D objects and projections in various positions.

Module IV: Surface Development:

Surface development of solids and sectional solids- Study of development of surfaces, drawing of unfolded surfaces of right solids like Cubes, Prisms, Cylinders; drawing the development of the lateral surface of a pyramid & Cone

Student Learning Outcomes:

Ability to use appropriate representational media, including freehand drawing and computer technology, to convey essential formal elements at each stage of the programming and design process

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Assignments and group presentation by students.

Prerequisite:

Knowledge of basic drawing and colors.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
0%	100%	PR/PRC/R/VV/P/SW	Practical / VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Boaz Joseph , Architectural Graphic standards editor
2. Bhatt, N.D., “Engineering Drawing: Plane and Solid Geometry”, Charotar Publishing House, 2006
3. Ching, Francis D. K., “Architectural Graphics”, Van Nostrand Reinhold, 2003.

References:

4. Leslie, Martin C., “Architectural Graphics”, Macmillan Pub Co, 1970.
5. Parkinson, A.C., “A First Year Engg. Drawing”, Sir Issac Pitman and Sons.
6. Black, Earl D., “Engineering and Technical Drawing”, Van Nostrand Reinhold Co., 1972.

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
 LAKSHMANGARH, RAJASTHAN



YEAR -I, SEMESTER– I

Course Title	History of Architecture, Art and Culture I	S	L	Lb	Prds	Credits
Course Code	AR 20.109	0	2	0	2	2
Course Type	PC					

Course Objective:

Introduction to Architectural elements, forms, development trends, characteristics of construction techniques and technologies, buildings, civilization transformation over the time period
 Familiarize with the socio-economic, historical, political influences of time period in Architectural development. Identify the buildings and the major works of the period.

Course Contents:

Module I: History of Civilizations

Pre-Historic Period till 3000B.C. - The type of Architectural development during the period taking few building examples of the different periods – Neolithic, Mesolithic and Iron age.

Egyptian Civilizations (3000B.C. – 100 A.D) –Introduction to Egyptian Architecture and civilization, Architectural characteristics and developments over the period in respect of Buildings, Tomb Architecture- MASTABAS, PYRAMIDS and ART FORM built in the period – explain with examples of the buildings, construction technology, building materials used, evolution of form and development with significant changes over the time period.

Module II: History Indian Architecture (2,500B.C. – 100 A.D.)

Indus valley civilization, The Aryan civilization, Hindu Architecture – Indo Aryan and Dravidian Jain/Buddhist Architecture – Development by Ashoka - explain with examples of the buildings, construction technology, building materials used, evolution of form and development with significant changes over the time period.

Module III: Indian Architecture (100 A.D. – 1800 A.D)

Andhras of South, Gupta Period, Chalukyas, Pallavs, Feudalism in North, Rajputs, Kaliga period – Ashoka the grate, Chandelas, Cave and Rock Architecture of Medieval India – Ajanta and Ellora, Lakshmana Temple at Khajurao, Kailash temple, Cholas and Pandyas, Sun Temple at Modhera and Konark, Orissa- Lingraja and Raja Rani Temple ant Bhuvneshwar (1000 A. D.), Meenakshi Temple at Madurai (15–18 Cent).

Module IV : Buddhist and Jain Architecture in India :

Study of religious philosophy, evolution of building typologies, Types of structures and elements developed eg: Stupas, Viharas, Chaityas, Stambhas, Toranas, sacred railing etc. in India. Study of form variations across various countries. Introduction and study of Jain Architecture with significant examples.

Student Learning Outcomes:

Students will understand and relate Architecture elements and familiarize with the socio-economic, historical, political influences of time period in Architectural development. Identify the buildings and the major works of the period.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Assignments and group presentation by students.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. "Landscape of Man" of Goeffrey and Susan Jellicoe
2. "Understanding Architecture, Its elements, history and meaning" by Leland & M. Roth
3. "Concepts of space in Traditional Indian Architecture" by YatinPandya
4. "The History of Architecture" by Sir Bannister Fletcher
5. "Buddist and Hindu Architecture" in India by Satish Grover

References:

6. History of Architecture – J E Swain
7. History of Architecture by Dora Couch
8. A study of History – Almond Toynbee
9. Traditions in Architecture – Dora Couch

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -I, SEMESTER– I

Course Title	Basic Design and Visual Art - I	S	L	Lb	Prds	Credits
Course Code	AR 20.111	0	1	4	5	3
Course Type	PC					

Course Objective:

Introduction to Art and appreciation of art and its philosophies
Familiarize with principles and theories of arts and architectural composition
Development of art and graphic skills Familiarize students with visual grammar, elements of design and methods of visual composition with various mediums and colour. To understand representation of forms using basic semiotics, and importance of Colours and proportion in Graphics.

Course Contents:

Module I: Application of elements of design,

Elements of Design, Visual Grammar & Gestalt principles, Creation of Color wheel and relationships among various color, Application of colors in built form and objects, Elements of Design in basic composition, Application of visual grammar and gestalt principles, Evaluation of two-dimensional composition with the help of above aspects

Module II: Application of Colour theory and Visual grammar in composition,

Design of two-dimensional composition in black and white medium
Design of two-dimensional composition in color medium
Evaluate the composition with Visual Grammar

Module III: Transformation from two-dimensional shape to three-dimensional form

Form generation techniques – from 2D to 3D, Additive and Subtractive form
Construction of 3D form with various material and colors
Evaluation and Analysis of 3D form with visual grammar

Module IV: Anthropological study of human activity space

Study of relationship between human body movement and human activity
Relationship between human activity and built space
Measured drawing of human activity space – a case study

Module V: Art and Graphic Skills

Free hand sketching and drawing, Drawing curves and other shapes, Comprehension of scale, still life drawing- from observation & memory, Nature.

Student Learning Outcomes:

Student will learn to appreciate art and its philosophies and develop the skills of art and graphics.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Assignments and group presentation by students.

Prerequisite:

Knowledge of basic drawing and colors.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
0%	100%	PR/PRC/R/VV/P/SW	Practical / VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Perspective for the Architect: Themes and Hudson
2. Perspective and Sciography, Shankar Mulik
3. Mastering AutoCad: George Omura
4. Interior Design: Ahmed Kasu
5. Architectural Graphics, Ching Frank
6. Engineering Drawing, N.D. Bhatt

References:

7. Architectural Graphic standards editor, Boaz Joseph
8. Planning – the Architect’s handbook, E and E.O.
9. Time Saver standards for building types, Editor Joseph D.C. and John Callender.
10. Rendering with pen and ink
11. Practical Plane and Solid Geometry, H. Joseph and Morris

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -I, SEMESTER– I

Course Title	Environmental Studies	S	L	Lb	Prds	Credits
Course Code	AR 20.113	0	2	0	2	2
Course Type	BS					

Course Objective:

To provide fundamental knowledge about natural and built environment.
To introduce the students to fundamental concepts to understand environmental processes.
The curriculum further incorporates understanding in relation to Indian context.
An attempt to have a detailed understanding of India's natural environment and the threats to them.

Course Contents:

Module I: Fundamental of Ecosystem

- Fundamentals of ecosystem,
- Components of an Ecosystem – Abiotic and Biotic
- Relationship cycles between Abiotic and Biotic components within an ecosystem
- Types of Ecosystem

Module II: Our Earth's Environment

- Global Climatic factors, altitude, latitude and longitude
- Major climatic zones of world
- Climatic Zones of India
- Global warming

Module III: Resource and Environment

- Sources of natural resources used in construction industry
- Environmental impact on extraction of natural resources used for construction.
- Pollution caused in processing of natural construction material
- Concept of Alternate Building Material
- Concept of Generating Construction Material out of waste like stone dust, fly ash bricks

Module IV: Human Impact on Environment

- Introduction to waste generated by human habitat at a single dwelling unit level and urban level
- Generation of waste from construction sites and its appropriate disposal
- Generation of Industrial Waste and its impact on Environment

Module V: Management of Environment

- Treatment of solid, liquid and gaseous waste generated by human habitat
- Treatment of waste from construction sites
- Water conservation and harvesting

Module VI: Applications of Ecological Methods and Techniques in Architecture

- Ecological conservation methods at site planning and master planning scale.

Student Learning Outcomes:

Students will be sensitive with global & national environmental issues, the scale of impacts, important conventions, laws and policies in the field of biodiversity, and environmental protection.

Students will understand cause-and-effect relationships between various human, natural and climatic factors that impinges upon ecological systems and their linkages.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Assignments and group presentation by students.

Prerequisite:

Knowledge of basic **environmental and ecological concerns**

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:

1. The Environment – Principles & Applications by Charis Park
2. Dictionary of Ecology and Environment by P.H.Collin
3. Ecology by M. Begon et al
4. Theoretical Ecology by R.May & A.McLean

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



Bachelor of Architecture

YEAR I
SEMESTER II

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -I, SEMESTER– II

Course Title	Architectural Design - II	S	L	Lb	Prds	Credits
Course Code	AR 20.102	4	2	0	6	8
Course Type	PC					

Course Objective:

Relating Anthropometrics to human activities and analyzing the forms and space requirements for activities. To understand the concept of Form follows function and to appreciate the elements in Architecture.

Theme : Form Space Circulation and Anthropometry.

Course Contents:

Module I : Space Form and Structures :

Interdependence of form, structures, function and space. Study of simple structural system and behavior under loads, working models of structures like post and lintels, cantilever, arches, corbelled, trussed etc.

Module II : Architectural Concept :

Various sources of inspiration for design. Types of concept. Concept as a response to the site and context. Design determinants.

Module III : Circulation and Space :

Types of Circulations such as Internal, external. Elements of Circulation. Types of spaces such as public, semi public, private, served and servant spaces etc.

Module IV : Form and composition :

Relationship of Plan, Elevation, and section. Organization of Form, Composition and built form.

Design :

Application of anthropometry in design of simple living and working spaces through study of furniture placements and clearances in space.

Suggestive design exercises :

Small living space, Home stay, Small showroom, Shop, Exhibition space, Meditation hall etc.

Student Learning Outcomes:

The student will gain elementary knowledge of architectural principles, Interdependence of Form, Structure, Materials, Spaces and human scale. These applications will be used in designing buildings, interior spaces and sites

Pedagogy for Course Delivery:

Drawing and model making skills will be taught along the subject to improve the abilities to understand space and form.

Prerequisite:

Min. 2 single day site visits to nearby places to study shelter and human habitat requirements.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**Text:**

1. Francis D.K. Ching, Architecture: Form, Space and Order,
2. Ernst Neuferts Architects Data, Blackwell 2002
3. Alexander Christopher, A Pattern Language,
4. Heller Robert and Salvadori Mario, Structure in Architecture,
5. Walter Gropius, Design Fundamental in Architecture
6. Peter Streeb, Pattern of Nature,
7. MeissPieree Von, Elements of Architecture,

References:

8. Joseph D.C. and John Callender, Time Saver standards for building types.
9. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of
10. Design, 1975
11. Jan Bilwa and Leslie Fair Weather, A.J. Metric Handbook
12. Ramsey et al, Architectural Graphic Standards, Wiley 2000
13. Hideaki Hareguchi, A Comparative analysis of 20th century houses, Academy Editions,1988
14. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand
15. Reinhold, 1995.
16. Terence Conran, The Essential House Book, Conran Octopus, 1994

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 LAKSHMANGARH, RAJASTHAN



YEAR -I, SEMESTER– II

Course Title	Building material & construction Technology - II	S	L	Lb	Prds	Credits
Course Code	AR 20.104	4	2	0	6	8
Course Type	BS					

Course Objectives:

The basic idea of the subject is to make aware of the primary building materials used in construction, their properties, types and common usage. This will enable students to equip themselves with the knowledge of materials and their judicious usage.

To classify the different types of building materials used primarily in building construction work.

To identify the types of materials and their compositions.

To illustrate use of materials and ascertain their application..

To identify the specific use and related technique for a required material.

Course Contents:

Module I: Timber & Bamboo- As building material

Timber: Qualities of timber for construction. Seasoning, Storage, defects and preservation of timber. Use of different types of wood in various parts of building..

Bamboo: Types, properties and joineries. Basic concepts to use it as a building material.

Module II: Carpentry & Joinery in Timber

Timber Joinery, Types, Classification, Usage & the application of various tools & machinery used in the process.

Module III: Timber Doors & Windows

DOORS: Details of doors which will include Basic Doors (Battened /ledged/Braced door), Flush Doors (both solid & hollow core flush doors) & Paneled Door (both single & double shutter panel doors – in timber, wire mesh & glazed panel door.)

WINDOWS: Details of window which will include Casement window, fully glazed window, Ventilator Simple & pivoted, Fixed Glass window, louvered window, corner and Bay window

Module IV: Industrial Timber :

Ply board, Block boards, Impreg timber, Compreg timber, Fiber boards, MDF, Veneers, laminates, etc. Properties, Manufacturing, Applications and uses.

Module V: Timber Partition, Cupboard and Wardrobes

Timber and its associated products – Ply, Block board, Veneers, Laminates, etc.

Details of Timber Paneled and Soft board Partitions. Wooden Cupboards/Wardrobes / Cabinets (Living & Kitchen both) details with emphasis on the new fixing hardware.

Student Learning Outcomes:

To comprehend the basic principles and appropriate application and performance of construction materials, products, components, and assemblies, including their environmental impact and reuse.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, group presentation by students, market visit by students.

Development of construction yard/court. Conduction of practical exercises in construction yard.

Prerequisite:

Site visit to Timber market, and nearby construction sites to familiarize the students with glossary of vernacular terminology, latest materials and rates, as prevalent in this part of the country

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
25%	75% %	PR/R/VV/P/SW/MSE	Theory + VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R.S.
3. Applied Mechanics and Strength of Materials, Khurmi R.S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

8. Elements of Structure, Morgan
9. Structures in Architecture, Salvadori
10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
12. Elementary Building Construction, Mitchell
13. Structure and Fabric, Everet

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YEAR -I, SEMESTER– II

Course Title	Structural Design System- II	S	L	Lb	Prds	Credits
Course Code	AR 20.106	0	2	0	2	2
Course Type	BS					

Course Objectives:

To understand the basic principles of structural system so that it forms the basis for study of structural design. To help students to understand the basic principles of structural behavior and requirements of buildings with emphasis laid on the principles of various load distribution in beams and columns.

Course Contents:

Module I : Shear Force and Bending Moment :

Shear force and bending moment diagram, in case of simple supported , cantilevered and over hung beams with concentrated and distributed loads.

Module I: Stresses in Beams and Trusses

Theory of simple bending- neutral layer, bending stresses in beams, Bending equation, Definitions, forces in members, analytical method, Method of sections, graphical method, link polygon in trusses, Distribution of shear stress in section of a beam – rectangular, semi- circular, T and I sections.

Module II: Direct and Bending stresses

Combined bending and direct stresses, axial and eccentric loads, effects of eccentricity etc.

Module III: Deflection of Beams

Deflection in simply supported beams and cantilevers with distributed and point loads. Fixed beams simple support and fixed support, advantages and disadvantages of fixed beams. Determination of positive and negative bending moments in fixed beams for various loadings and symmetrical Portal frames.

Module IV: Columns

Definition, end conditions, Euler's Theory of long columns, effective length of columns, Empirical formulae for columns, buckling and critical loads, slenderness ratio.

Module V : Torsion :

Elementary concept of Torsion. Shear stress in solid and hollow circular shafts, angle of twist, power transmitted by shaft, combine bending and torsion.

Student Learning Outcomes:

Understanding of principles of structural behavior in withstanding stress and deflection and the soil mechanics for the foundations in structural systems

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, group presentation by students, market visit by students. Development of construction yard/court. Conduction of practical exercises in construction yard.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

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1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R. S.
3. Applied Mechanics and Strength of Materials, Khurmi R. S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
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10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
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YEAR -I, SEMESTER– II

Course Title	Architectural Graphic Skills Manual II	S	L	Lb	Prds	Credits
Course Code	AR 20.108	0	2	2	4	3
Course Type	PC					

Course Objective:

Architectural Graphics-II intends to develop essential manual skills such as proficiency in drawing, largely used as primary mode of communication of ideas in architectural design.

Introduction to a variety of tools and techniques for visual to various essentials of architectural drawings such as principles, tools and techniques for communicating design ideas and expression with emphasis on manual drawing.

Advanced techniques for architectural drawing such as perspective projection, mix-media renderings etc.

To understand and identify suitable methods of representation in different built environment scenarios.

The subject will be taught in congruence with the Design studio, and assignments for the subject will be linked to the design exercises to achieve higher level of learning and understanding the practical application of the same.

Course Contents:

Module I: Metric Drawing

Types, uses and advantages, Isometric, Axonometric and Pictorial views, Metric Drawing and projection and their Dimensioning. Metric of plane figures composed of straight lines, Metric of simple and complex block.

Module II: Perspective Drawing

Purpose and use. Differences with Metric projections, Anatomy of a perspective-cone of vision, station Points, picture plane, eye level horizon line, ground line, vanishing point, etc, Angular and Parallel Perspective. Perspective for Exterior and Interior spaces with 2 point and 3 point perspectives.

Module III: Shades, Shadows and Rendering

Values in shades and shadows, Constructing plan shadows (point, line and plane), Constructing shadows in elevations (Point, line and Plane). Short-cut methods for constructing shadows Presentation techniques in different types of rendering techniques and materials.

Module IV : Manual presentation of Architectural Drawings :

Techniques of presenting Architectural presentation drawings in various mediums and in monochrome and multi-colour shades and materials.

Student Learning Outcomes:

Ability to use appropriate representational media, including freehand drawing in different materials and techniques to convey essential formal elements at each stage of the programming and design process

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, workshops, studios. Assignments and group presentation by students.

Prerequisite:

Knowledge of basic drawing and colors.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
0%	100%	PR/PRC/R/VV/P/SW	Practical / VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Architectural Graphics, C. Leslie Martin
2. Perspective for the Architect, Themes and Hudson
3. Perspective and Sciography, Shankar Mulik
4. Mastering AutoCad, George Omura
5. Interior Design, Ahmed Kasu
6. Architectural Graphics, Ching Frank
7. Engineering Drawing, N.D. Bhatt

References:

8. A.J. Metric Handbook, editors, Jan Bilwa and Leslie Fair weather
9. Architectural Graphic standards editor, Boaz Joseph
10. Planning – the Architect's handbook, E and E.O.
11. Neufert's Architect's data
12. Time Saver standards for building types, Editor Joseph D.C. and John Callender.
13. Rendering with pen and ink
14. Practical Plane and Solid Geometry, H. Joseph and Morris

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YEAR -I, SEMESTER– II

Course Title	History of Architecture, Art and Culture II	S	L	Lb	Prds	Credits
Course Code	AR 20.110	0	2	0	2	2
Course Type	PC					

Course Objective:

Understanding of the period in term of its location, climate as well as the socio-cultural historical, economical and political influences of the time.
 Study of the building types and development of architectural form with examples that identify the works of the period.

Course Contents:

Module I: Introduction to Islamic Period

Introduction and understanding of “Islam’s” philosophy and its interpretation in building types – Mosque, Tomb, Fort and their elements like dome, arches, minarets etc.

Module II: The Sultanate Style

With reference to the Slave, Khalji, Tughlaq, Lodi and ShershahSuri (who ruled from Delhi), architecture at Punjab, Gujrat, Bijapur and deccan.

Module III: Islamic cities & Monuments

Concepts of city Planning of various Islamic towns example- Shahajahanabad, FhatehpurSikri etc.Monumemts – Qutab Complex, Tuglakabad, TajMahal, GolGumbaj, Golconda Fort, Jami Masjid etc.

Module IV: Mughal Architecture

The Architecture related to Babur, Humanyu, Akbar, Shahajan Period and later Mughal period its implication on Architectural field.

Student Learning Outcomes:

Students will understand and relate Architecture elements and Familiarize with the socio-economic, historical, political influences of time period in Architectural development. Identify the buildings and the major works of the period.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Assignments and group presentation by students.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. "Landscape of Man" of Goeffrey and Susan Jellicoe
2. "Understanding Architecture, Its elements, history and meaning" by Leland & M. Roth
3. "Concepts of space in Traditional Indian Architecture" by YatinPandya
4. "The History of Architecture" by Sir Bannister Fletcher
5. "Buddist and Hindu Architecture" in India by Satish Grover

References:

6. History of Architecture – J E Swain
7. History of Architecture by Dora Couch
8. A study of History – Almond Toynbee
9. Traditions in Architecture – Dora Couch

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YEAR -I, SEMESTER– II

Course Title	Basic Design and Visual Art - II	S	L	Lb	Prds	Credits
Course Code	AR 20.112	0	1	4	5	3
Course Type	PC					

Course Objective:

To Understand the Architectural elements as determining factor to perceive and articulate space, to stimulate form – space relation and to understand the principal of compositions in the organization of space, shape, form, color and texture.

Course Contents:

Module I: Theory of Design:

Introduction to Architectural Composition, Application of elements and Principles of Design through 2-D and 3-D compositions, Unity, Elements of Unity, Texture, Color, Tone Direction Proportion, Form and shape, solids and voids

Module II: Art and Graphic Skills

Free hand sketching – Drawing People, Furniture and various rendering skills and techniques like textures, materials, finishes using various equipment like transfer, airbrush and architectural drafting. Charcoal shading

Module III : Sciography and Sheet Presentation

Understanding various technique to determine the shadow angle of an object. To Determine the composition with direction of light on an object. Dot Rendering and Inking Techniques. Presentation and Composition using above techniques

Module IV : Photography and Printing Techniques :

Advanced Graphics technique. Poster, Book cover and Logo using shading Technique. Architecture Photography, techniques , angles, shades and shadows, highlighting buildings and elements.

Student Learning Outcomes:

Student will learn to appreciate art and its philosophies and develop the skills of art and graphics.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Assignments and group presentation by students

Prerequisite:

Knowledge of basic drawing , colors and use of cameras.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
0%	100%	PR/PRC/R/VV/P/SW	Practical / VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Perspective for the Architect: Themes and Hudson
2. Perspective and Sciography, Shankar Mulik
3. Mastering AutoCad: George Omura
4. Interior Design: Ahmed Kasu
5. Architectural Graphics, Ching Frank
6. Engineering Drawing, N.D. Bhatt

References:

7. Architectural Graphic standards editor, Boaz Joseph
8. Planning – the Architect’s handbook, E and E.O.
9. Time Saver standards for building types, Editor Joseph D.C. and John Callender.
10. Rendering with pen and ink
11. Practical Plane and Solid Geometry, H. Joseph and Morris

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YEAR -I, SEMESTER– II

Course Title	Architectural workshop– I (Model making)	S	L	Lb	Prds	Credits
Course Code	AR 20.114	0	1	2	3	2
Course Type	PC					

Course Objective:

To develop the skill in making models using different materials by understanding the scale and proportion of objects.

Course Contents:

Module I : Workshop

Understanding the use of different materials in model making – paper, box board, foam board, sun board, thermocol, balsa wood, etc. and use of colors

Use of different types of joints and model making techniques like surface development, etc

Understanding the difference between block and presentation models

Module I: The Language of Visual Experience

Visual elements, Principles of design, Evaluating art.

Module II: The Media of Art

Drawing, Painting, Printmaking, Camera arts and digital imaging, Graphic design and illustration, Sculpture, Clay, glass, metal, wood, fiber.

Architecture and environmental design.

Module II:: 3-D forms

Use of surface development for creation of different 3-D forms. Working with the clay, thermocole, soap, paper and other innovative materials to create forms and compositions,.

Prepare a scale model for a single activity, single space structure.

Student Learning Outcomes:

Student will learn to enhance the ability to understand the scale and proportions of the design objectives and to work with different materials.

Pedagogy for Course Delivery:

The course will be delivered by means of practical working at Model making workshops and tutorials and assignments.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
0%	100%	PR/PRC/R/VV/P/SW	Practical / VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Architectural Model Building: Tools, Techniques, & Materials, Roark T. Congdon
2. Model Making: A Basic Guide, Martha Sutherland
3. Engineering Drawing, N.D. Bhatt

References:

4. Model Making, Megan Werner
5. Wooden World, John Smith
6. Model-Making: Materials and Methods illustrated edition, David Neat
7. Designing With Models: A Studio Guide To Making And Using Architectural Design Models, Criss B. Mills
8. Model Building for Architects and Engineers, John Taylor
9. Architectural Models, Rolf Janke
11. Architecture”, Andreas Papadakis
12. New rural housing design theory [Paperback] by NING YU LUO ZHONG ZHAO ZHANG HUI FANG
13. Housing Design: A Manualby Bernard Leupen and HaraldMooij
14. The Housing Design Handbook: A Guide to Good Practiceby Levitt, David

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Bachelor of Architecture

YEAR II
SEMESTER III

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YEAR -II, SEMESTER– III

Course Title	Architectural Design - III	S	L	Lb	Prds	Credits
Course Code	AR 20.201	6	0	2	8	10
Course Type	PC					

Course Objective:

To understand and interpret the importance of Environment , surroundings and climate in the process of designing and to handle the challenges with the understanding of local materials constructions techniques and design strategies. It also strives to enable students to translate conceptual strategies into architectural design propositions through design of structures / building / spaces involving simple spatial organizations

Theme : Material, Environment and Climate

Understanding the nature of the built environment as a resultant of determinants of built form, such as climate. Introduction of determinants of built form.

Parameter : Form & Space – Understanding user and its surroundings and devising requirements with the help of space and material standards.

Form & Function - Exposure to building elements and components and their effect on air circulation, day lighting, thermal comfort, etc. Study of human considerations like privacy, comfort, security etc.

Skills : Developing the ability to translate abstract principals of design into architectural solutions for small problems. 3D visualization and presentation through models. Developing the skills with respect to site analysis and application.

Design Outlines : Application of Climate in design of simple program. Building scale project on a site area of approx.. 100-200 sq. mt. Location of site can be Urban or Rural setting and in any climatic zones and can be any annexure building of any existing setup. One major and one minor problem should be given.

Suggestive design exercises :

Educational Institutes- Kindergarten, Balwadi etc. Public facilities – Dispensary, clinic etc. Commercial facilities – General store, Boutique etc. Residential – Farm house, Cottage etc.

Measure Drawing Tour

Measure Drawing camp as essential part of the design studio, include study of a building/ group on buildings / settlements of Architectural Importance, Involving detailed drawings, construction details, etc. is to be documented through physical measurements and transforming these measurements into Architectural drawings.

Students have to visit one/ two cities/ sites of Architectural importance for a period one week (5 to 7 days) , and identify the historical building/s of Architectural Importance, to measure the Building in parts by the groups of students. After coming back from the tour, students have to produce proper Architectural Drawings through drafting for the documentation of these buildings. These drawings will retained and preserved by the Institution. This tour may be scheduled in the month of September. The class going for the study tour must be accompanied by the subject teacher/s min. 2 with one female faculty compulsory. The student teacher ration should not be less than 20 :1.

Student Learning Outcomes:

Students will be able to translate conceptual thoughts into design through a systematic design process in response to use, need and context of the Environment , climate, surroundings and physical environment.

Pedagogy for Course Delivery:

Lectures and field visit supporting design exercise. Model on each stage enhancing design development for comprehension of working in studio

Prerequisite:

Min. 2 single day site visits to the reference places to study needs and requirements.

One week Tour to place of Architectural Importance , to study and document building through measure drawing.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:

Text:

1. Francis D.K. Ching, Architecture: Form, Space and Order,
2. Ernst Neuferts Architects Data, Blackwell 2002
3. Alexander Christopher, A Pattern Language,
4. Heller Robert and Salvadori Mario, Structure in Architecture,
5. Walter Gropius, Design Fundamental in Architecture
6. Peter Streens, Pattern of Nature,
7. MeissPieree Von, Elements of Architecture,

References:

8. Joseph D.C. and John Callender, Time Saver standards for building types.
9. Julius Panero, Martin Zelnik, Human Dimension and Interior Space, Whitney Library of
10. Design, 1975
11. Jan Bilwa and Leslie Fair Weather, A.J. Metric Handbook
12. Ramsey et al, Architectural Graphic Standards, Wiley 2000
13. Hideaki Hareguchi, A Comparative analysis of 20th century houses, Academy Editions,1988
14. Sam F. Miller, Design Process: A Primer for Architectural and Interior Design, Van Nostrand
15. Reinhold, 1995.
16. Terence Conran, The Essential House Book, Conran Octopus, 1994

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YEAR -II, SEMESTER– III

Course Title	Building Material & Construction Technology - III	S	L	Lb	Prds	Credits
Course Code	AR 20.203	4	2	0	6	8
Course Type	BS					

Course Objectives:

The basic Objective of this course is to provide knowledge about the process of Construction in Timber and its associated and related products.

Course Contents:

Module I: Temporary Timbering

Temporary Structures and temporary supports – Timbering to trenches, shoring and underpinning. Centering, shuttering and scaffolding.

Module II: Roofing & Flooring Systems in Timber

Concept of spanning and its extension in formation of timber roofs (Lean to roof, closed couple roof, collar roof) and floors.

Module III: Vertical Transportation- Stairs in Timber

Concept of vertical connector – Study of staircases – Types on the basis of geometry (Dog Legged Stairs, Circular, open well etc.), Design and Detail of construction of staircase in timber. Brief introduction to lifts, escalators & conveyor belts.

Module IV: Surface Finishes, Adhesive , Sealants :

Surface Finishes: wood carving, Paints and Varnishes,
Adhesives & Sealants: Introduction, Natural Adhesives, Modifiers & Plasticizers, Sealants.

Module V: Glass & Fiber Glass, Plastic and polymer :

GLASS : Classification of glass, types of glass, physical properties and uses of glass.
FIBER GLASS, PLASTIC, POLYMER : Difference, Properties, Application, Uses in Building construction.

Student Learning Outcomes:

The student will distinguish and summarize application and construction of timber structures and different surface finishes. The student will illustrate the purpose and construction of different vertical circulation systems.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Field Trips, and Studio Work and presentation by students ,

Prerequisite:

Site visit to Construction Sites of timber. Min. 2 visits in a semester and the physical documentation of the studied work.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
25%	75% %	PR/R/VV/P/SW/MSE	Theory + VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R.S.
3. Applied Mechanics and Strength of Materials, Khurmi R.S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

14. Elements of Structure, Morgan
15. Structures in Architecture, Salvadori
16. Building Construction, Mackay WB Vol. 1-4
17. Construction Technology, Chudley Vol. 1-6
18. Elementary Building Construction, Mitchell
19. Structure and Fabric, Everet

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YEAR -II, SEMESTER– III

Course Title	Structural Design System- III	S	L	Lb	Prds	Credits
Course Code	AR 20.205	0	2	0	2	2
Course Type	BS					

Course Objectives:

This course aims to provide basic knowledge of plain cement concrete & reinforced cement concrete and designing of the structural elements like slab, beam.

Course Contents:

Module I: Basics of Soil Mechanics

Soil formation and resulting soil deposits, nomenclature of different soil types, basic physical properties and their inter-relationships, Indian Standard System of Classification

Module II: Bearing Capacity and Test of Soil

Safe bearing capacity, bearing capacity failure. Soil exploration methods, standard penetration test, dynamic cone penetration test, concept of bore log for soil description, ground water tab

Module III : Earth Pressure :

Active Passive and Earth Pressure at rest. Rankine's theory of earth. Stability analysis of Retaining walls.

Module IV: Footing

Introduction and guidelines for depth for footing, dimensioning of footings on basis of given values of bearing capacity, allowable pressure and soil borelog, codal provisions, use of plate load test data, effect of variation of ground water table

Module V: Design of Footing:

Design of Isolated Footing, Design of Combined Footing, Design of Raft Foundation

Student Learning Outcomes:

The student will demonstrate the knowledge as gained earlier about the designing of structural elements by computing the same for various types of soil and further enhance their skills by designing various footing / foundations for variety of soils.

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students.

Prerequisite:

Knowledge of building components and elements.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

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Text & References:**Text:**

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R. S.
3. Applied Mechanics and Strength of Materials, Khurmi R. S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

8. Elements of Structure, Morgan
9. Structures in Architecture, Salvadori
10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
12. Elementary Building Construction, Mitchell
13. Structure and Fabric, Everet

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YEAR -II, SEMESTER– III

Course Title	Architectural Graphic Skills (Computer aided) - I	S	L	Lb	Prds	Credits
Course Code	AR 20.207	0	0	2	2	1
Course Type	EEC					

Course Objective:

To develop a theoretical understanding of AutoCAD and its relevance in Architecture. Students would develop skills of 2D drafting using various tools and techniques. They would be able to generate 3D from 2D drawing using the rendering skills like material, lighting, background etc.

Course Contents:

Module I: Introduction to Computer Aided Drafting

- Introduction to computer aided drafting
- To develop and understand the tools and basic set up for computer aided drafting
- Theoretical understanding of CAD

Module II: Computer Aided Drafting Methods and Techniques – 2D

- To comprehend tools and systems for 2d drafting
- Develops and draws various architectural plans, elevations and sections through 2 d Cad
- Manipulate and alter through various tools and techniques existing architectural drawings in 2D Cad

Module II : Computer Aided drafting methods and techniques – 2d – Demonstration

- To apply more complex tools and methods to edit drawings in 2D Cad
- Demonstrate presentation drawings in 2D Cad
- Draw and create a complete set of architectural drawings for a dwelling unit in 2 D Cad

Module II Computer Aided Drafting Methods and Techniques – 3d

- To comprehend tools and systems for 3d modelling in CAD
- Develops and draws various architectural volumes, forms and surfaces through 2 d Cad
- Convert and draw 2 d architectural drawings to 3d forms

Module II Computer Aided Drafting Methods and Techniques – 3d – Demonstration

- To apply more complex tools and methods to edit drawings in 3D Cad
- Demonstrate presentation drawings , material application and lighting in 3D Cad
- Draw and create a complete set of architectural drawings for a dwelling unit in 3 D Cad

Student Learning Outcomes:

Developing skills and Ability to understand and use different computer software for computer tools and techniques to create architectural drawings and presentation drawings, with the help of CAD software.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Practicals on Computers and computer Assignments and presentation by students.

Prerequisite:

Knowledge of basic Computers and its functioning. .

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
0%	100%	PR/PRC/R/VV/P/SW	Practical / VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. AutoCAD architectural user guide – Autodesk Inc., 1998.
2. Shyamtikoo, 'AutoCAD 2008'
3. DH Sanders, 'Computers Today' McGraw Hill
4. Mitchell, 'Computer Aided Architectural Design', Van Nostrand

References:

5. Broad bent, 'Design in Architecture', Wiley International A. Watt, Fundamentals of Three-Dimensional Computer Graphics, Addis Wesley, Massachusetts, 1989.
6. The Illustrated AutoCAD 2002 Quick Reference, Ralph Grabowski,
7. Autocad 2000: A Problem-Solving Approach, Shamtikoo. Pub: Thomson Learning, 1999 Computer graphics and design, Radhakrishnan

Web links

8. <https://www.youtube.com/watch?v=TebtsatwiiU>
9. <https://www.youtube.com/watch?v=hO865EIE0p0>
10. <https://www.youtube.com/watch?v=-iX-ZyvOiQA>
11. <https://www.youtube.com/watch?v=2n5AikPvIjA>
12. <https://www.youtube.com/watch?v=zM3TTdGNNrQ>
13. <https://www.youtube.com/watch?v=swWcUxrDR1g>
14. <https://www.youtube.com/watch?v=-mTh-Aj4JiA>
15. <https://www.youtube.com/watch?v=4MtUWTI0YWY>

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -II, SEMESTER– III

Course Title	History of Architecture, Art and Culture - III	S	L	Lb	Prds	Credits
Course Code	AR 20.209	0	2	0	2	2
Course Type	PC					

Course Objective:

Understanding the world architecture during the Greek, Roman and Romanesque Period, Study of specific Architectural characteristics and their origin in above mentioned period

Course Contents:

Module I: Greek Architecture

Classical orders and constituent elements of architecture- Column orders and the articulation of temples. Classification of temples, Geometry and symmetry of individual buildings and their relationship with others based on different organizing principles and conditions of site. Study of importance- Acropolis, Agora, Temples, Theatres, Tombs and House forms

Module II: Roman Architecture

Multiple building types to correspond the complex social functions and structure. Complex axial organization of forms. Concrete and construction of vaults and domes. Uses of classical orders in surface articulation. Study of important forums, Temples, Basilicas, Theaters, Amphitheaters, Circuses, Tombs, Triumphal arches, palaces, houses and villas.

Module III: Early Christian Architecture

Development of early church and Roman basilica. Design of early churches based on Christian religious beliefs. Interiors of churches and the articulation of interiors to create spiritualized space. Study of Italian basilicas and churches

Module IV: Byzantine Architecture

Centralization in churches, Centrality and interiors of both cross domed and cross in square plan churches. Interior and exterior of churches with heavenly interiors. Construction of domes over polygonal compartments through the use of pendentives. Study of important churches

Module V: Romanesque Architecture

Massiveness and verticality of medieval churches. Combination of five towered structures and longitudinal basilica. Gradual integration of tower from early to later examples. Integration of centralized and longitudinal plans. Articulation of external wall like arcaded interiors resulting in dematerialization of exterior. Study of important cathedrals and churches from Italy and France.

Student Learning Outcomes:

Students will understand and relate Architecture elements and Familiarize with the socio-economic, historical, political influences of time period in Architectural development. Identify the buildings and the major works of the period.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Assignments and group presentation by students.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. "Landscape of Man" of Goeffrey and Susan Jellicoe
2. "Understanding Architecture, Its elements, history and meaning" by Leland & M. Roth
3. "Concepts of space in Traditional Indian Architecture" by YatinPandya
4. "The History of Architecture" by Sir Bannister Fletcher
5. "Buddist and Hindu Architecture" in India by Satish Grover

References:

6. History of Architecture – J E Swain
7. History of Architecture by Dora Couch
8. A study of History – Almond Toynbee
9. Traditions in Architecture – Dora Couch

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -II, SEMESTER– III

Course Title	Building Services– I (Water supply and Sanitation)	S	L	Lb	Prds	Credits
Course Code	AR 20.211	0	2	0	2	2
Course Type	BS					

Course Objective:

This course aims to provide knowledge about the building services part covering water supply, sanitation, drainage and waste disposal systems. To assist them in designing Plumbing and drainage system at individual and community level.

Course Contents:

Module I: Water supply

Introduction to water supply- Source of water, Quality of water, Impurities and treatments, Demand, calculations and standards, Storage and distribution and methods of water supply and distribution of water at macro and micro level (For varying building typologies). Plumbing pypes , apparatus , Joints, fixtures. Water distribution within building and at campus level.

Module II: Drainage systems

Concept, design and detailing of drainage systems at micro and macro level. Basic terminology, Calculation for gradient and slopes, Various sanitary fixtures and its connections. Introduction to municipal drainage systems at town level, Building/ Site planning for drainage systems, Rainfall, Storm water drains, gullies, open drains (construction, gradients, ventilation and maintenance etc.). Concept, design and detailing of rainwater harvesting systems

Module III: Sanitation- Sewerage

Purpose and principles, collection and conveyance of waste matter. Sewage treatment plants and bye products, gas plants. Sewage system design at building and town level. Sanitary appliances, traps, pipes and joints, drainage in non-municipal areas. Plumbing bye laws. Septic tank, Cesspool, Soak pit. Design of a toilet and kitchen

Module IV: Sanitation- Solid waste management

Garbage disposal- Purpose and methods (Incinerator, Dry disposal etc.).Garbage disposal in multistory buildings, Treatment of industrial refuse, Refuse and pollution problems.

Student Learning Outcomes:

The student will relate with the building services as laid down within their own houses, residential buildings, campus etc. and will produce a fresh layout according to the knowledge gained.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Field trips and presentation by students. Site visit min. two at a construction site is essential, to make the students understand the systems practically.

Prerequisite:

Knowledge of basics of building services.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Water supply, waste disposal and environmental engineering, Chatterjee
2. Water supply and sanitary engineering, Singh
3. Water supply and sanitation, Shah

References:

4. Design and practical handbook of plumbing, Mohan & Anand
5. Plumbing- Design and practice, Deolalikar
6. Civil handbook, Khanna
7. Building construction details, Banz
8. Maintenance of buildings, Panchdhari
9. Kitchen and baths, HBI

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -II, SEMESTER– III

Course Title	Architectural workshop– II	S	L	Lb	Prds	Credits
Course Code	AR 20.213	0	0	2	2	1
Course Type	PC					

Course Objective:

To provide knowledge about analysis of existing piece of furniture in its functional & technical aspects. Materials used for furniture design and their properties. Design of simple furniture based on ergonomic, anthropometric, aesthetic and economic considerations.

Course Contents:

Module I: : Analyzing Furniture

Understanding furniture and materials used. Working with the joineries in wood , aluminum, steel, and other materials. Creating murals, sculptures, colarges etc.

Module II: Architectural Photography

To provide technical know how about the cameras, Its accessories and their applications including – Camera definition, history, types and usages, aperture, shutter speed, types of lenses and accessories. Shooting picture of landscape, portraits, Interiors of a buildings.

Module III: Furniture Design

Design of a simple furniture unit incorporating various design principles. The exercise will include all drawings & a model. Suggestive Exercises: Executive Chair, Computer Table, drafting stool or table, sofa, dining table and chair , stairs etc.

Module II: Collage, Mural, Sculptures (3-D)

Collage with paper and various waste materials with theme and presentation, Mural with different materials on live scale, Sculpture with different materials like P.O.P, Clay etc.

Student Learning Outcomes:

Knowledge about analysis of existing piece of furniture in its functional & technical aspects. Materials used for furniture design and their properties.

Pedagogy for Course Delivery:

The course will be delivered by means of practical working at Model making workshops and tutorials and assignments.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
0%	100%	PR/PRC/R/VV/P/SW	Practical / VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. A visual dictionary of Architecture, Francis D K Ching
2. Creative Interiors (Design of Enclosed Space)
3. Interior Design Illustrated, Francis, D K Ching
4. House Book (The Complete Guide to Home Design), Terence Conran

References:

5. ModelBuilding for Architects and Engineers, John Taylor
6. Architectural Models, Rolf Janke
7. Illustration + Perspectives (In Pantone Colours), EijiMitooka

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -II, SEMESTER– III

Course Title	Architecture Climatology	S	L	Lb	Prds	Credits
Course Code	AR 20.215	0	2	0	2	2
Course Type	BS					

Course Objective:

To acquaint students to various concepts of climate analysis and its use in Architecture.
To familiarize students with human thermal comfort as an essential function of building

Course Contents:

Module I: Introduction to Climate :

Introduction to climate as a factor of human shelter, comfort and environment. Its classification as global, macro and micro climate. Preparation of sketches showing earth sun relationship and atmospheric depletion. Understanding maps showing ocean currents, wind pattern and wind shifts with respect to seasonal changes. Study of climatic zones along with traditional dwelling units.

Module II: Climatic Zones

Study of analysis of climatic zones (Hot –dry, Hot-Humid, Composite, Cold-dry, Cold-humid) in India along with data analysis. Study measurement and analysis of micro climatic elements and its use for a Designer.

Module III: Human thermal comfort & Ventilation and air movement

Study of heat exchange process between human body and its surroundings with respect to criteria of comfort. Study of heat exchange processes between building along with periodic change and the calculations required for heat exchange. Study of bio-climate charts its analysis and extension of comfort zone with respect to given data and relating this with (b) of unit 2. Requirement, size and position of openings, air flow pattern inside and outside buildings. Solar passive strategies

Module IV: Shading devices

Method of recording the position of sun in relation to earth, solar chart, shadow angle protractor and its application in design of shading devices. Methods of calculating and designing of shading devices.

Module V: Day light & Orientation

Natural light, glare, day light factor and day lighting in tropics. Design strategies for Indian climate zones with respect to various climate zones, Orientation of buildings in relation to sun and wind.

Student Learning Outcomes:

To acquaint students to various concepts of climate that governs the design of the building model.

Pedagogy for Course Delivery:

The course will be delivered through lectures and practical examples.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**Text:**

1. Climatology Fundamentals and application – John R Mather
2. Introduction to Climatology – Anthony Sealey.
3. Climatic Design – Watson Donald.
4. Sun, Wind and Light by G. Z. Brown.
5. Climatically Responsible Energy Efficient Architecture by Arvindkrishnan
6. Housing Climate and Comfort by Martin Evans.
7. Manual of tropical housing and building, Koenisberger

References:

8. Energy Efficient Housing by MiliMajumadar, Published by TERI.
9. Climatologically & Solar data for India – T. N. Seshadry.
10. Manual of tropical housing and building – Koenigsberger&Ingersol.
11. Tropical Architecture – Maxwell Fry & Jane Drew
12. Design Primer for Hot Climate – Allan Konya

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Bachelor of Architecture

YEAR II
SEMESTER IV

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
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YEAR -II, SEMESTER– IV

Course Title	Architectural Design - IV	S	L	Lb	Prds	Credits
Course Code	AR 20.202	6	0	2	8	10
Course Type	PC					

Course Objective:

Understanding essential character of an Institution. Learn to relate interrelationship and Influence of culture, community, land, climate, technology, and finance on the building design. Characteristics of an Institutional or public building at the community scale.

Theme : Culture fabric and its reflection on built form

Understanding the Design of built space as a resultant of Socio-cultural influences of the place

Parameter : Organization of functional activities in relation to the user requirement and the site, considering material and structure in relation to the design proposal. Influence of humanities and culture in a design project. Response to the socio-economic factors such as income level, privacy, territoriality, interaction etc.

Skills : Developing the ability to understand the cultural frame work of meaning and symbolism in Architecture and incorporation of climate strategies and constructional system appropriate to social and economic context.

Design Outlines : Application of vernacular style in design of simple function and simple program. Project on a Site scale of approx.. 250 -500 sq. mt. Location of the site can be Urban and rural setting and in any climatic zones. One major and one minor, at least two projects should be given

Suggestive design exercises :

Educational Institutes- Primary Schools etc. Public facilities – Neighborhood library, Bank local branch, Primary health center etc. Commercial facilities – Neighborhood shopping center, Restaurant etc. Residential – Row house, bungalows etc.

Student Learning Outcomes:

Students are prepared to apply the process of site planning and are enabled to illustrate their design in response to Socio economic and Socio Cultural conditions. Students will also modify the building design as a process of varied functions and activities.

Pedagogy for Course Delivery:

Lectures and field visit supporting design exercise. Model on each stage enhancing design development for comprehension of working in studio

Prerequisite:

Min. 2 single day site visits to the reference places to study needs and requirements for the existing structures with same functions of their project.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:

Text:

1. Bousmaha Baiche & Nicholas Walliman, Newfert Architect's Data
2. De Chiara & Callender, Time Saver Standards for Building Type
3. O.H. Koenigsberger, Manual of Tropical Housing & Building
4. M. Evans, Housing, Climate & Comfort
5. Donald Watson & Kenneth Labs, Climatic Design
6. Building for a Changing Climate by Peter S. SMI
7. Francis D.K. Ching, A Visual Dictionary of Architecture

References:

8. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
9. Architectural Graphic standards editor – Boaz Joseph
10. Ernst Neuferts Architects Data, Blackwell 2002
11. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967

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YEAR -II, SEMESTER– IV

Course Title	Building material & construction Technology - IV	S	L	Lb	Prds	Credits
Course Code	AR 20.204	4	0	2	6	8
Course Type	BS					

Course Objectives:

Course aims to provide knowledge about Cement, its admixtures and RCC. The construction in RCC and how various structural elements of a building like foundation, staircase etc. are detailed out and constructed.

Course Contents:

Module I: RCC Construction

Introduction: Ingredients of RCC, requirement and grading of aggregates and sand, properties of concrete, role of water in concrete, reinforcement, admixtures, mixing, batching, compaction, curing. Fiber reinforced / Light weight / Fly ash / RMC concrete.

Module II: Foundation and Footing

RCC footing, Composite foundation and Concrete in foundation.

Module III: Super structure - Frame, Slabs, and Stairs

Ground / Plinth beam, load bearing construction, RCC framed structures, study of column grid, detailing of RCC slab (one way and two way) , reinforcement, beams, columns, and RCC Staircase

Module IV : Special structure advance concreting

Coffered Slab, Flat Slab. Ferrow cement, Their applicability and uses as large span and special structures. Expansion Joint, Retaining walls, Fiber reinforced and Polymer concrete
Products :RCC Beams and lintels, RCC Door and window frames, RCC Jali etc.

Student Learning Outcomes:

The student will comprehend application and construction of RCC structures. The student will distinguish between various structures used for the construction purpose and will identify the usage as per different locations.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Field Trips, and Studio Work and presentation by students ,

Prerequisite:

Site visit to Construction Sites of RCC . Min. 2 visits in a semester and the physical documentation of the studied work.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
25%	75% %	PR/R/VV/P/SW/MSE	Theory + VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R.S.
3. Applied Mechanics and Strength of Materials, Khurmi R.S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

8. Elements of Structure, Morgan
9. Structures in Architecture, Salvadori
10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
12. Elementary Building Construction, Mitchell
13. Structure and Fabric, Everet

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YEAR -II, SEMESTER– IV

Course Title	Structural Design System- IV	S	L	Lb	Prds	Credits
Course Code	AR 20.206	0	2	0	2	2
Course Type	BS					

Course Objectives:

This course aims to provide knowledge of soil mechanics including bearing capacity & test of soil and designing of footing & foundations.

Course Contents:

Module I: Plain & Reinforced Cement Concrete

Introduction & properties of concrete and test, reinforcing steels. requirements of governing & detailing, IS code 456-2000, Grades of concrete.

Module II: Design Method

Working and Limit State Design of reinforced concrete sections for bending and shear; Bond strength and development length; Serviceability; Limit states of deflection and cracking, Elastic theory of RCC, Permissible stress and Permissible deflection for RCC.

Module III: Design Of Beams

Theory & Design Of Single & Doubly Reinforced Beams, L& T Beams (Simple Supported, cantilever & Continuous), Concept Of Over Reinforced & Under Reinforced Sections and balance section

Module IV: Design Of Slabs

Classification, Load Estimation, Design Of One Way slab, Two Way slab, Flat slab, Continuous Slab and cantilever slab

Module V : Design of Retaining walls :

Introduction, types of retaining walls, Design of T shaped retaining wall.

Student Learning Outcomes:

The student will review and summarize designing and construction of the structural elements in RCC. The student will identify and predict the design implication of these structural elements during the construction process.

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students.

Prerequisite:

Knowledge of building components and elements.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:

Text:

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R. S.
3. Applied Mechanics and Strength of Materials, Khurmi R. S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

8. Elements of Structure, Morgan
9. Structures in Architecture, Salvadori
10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
12. Elementary Building Construction, Mitchell
13. Structure and Fabric, Everet

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YEAR -II, SEMESTER– IV

Course Title	Architectural Graphic Skills (Computer aided) - II	S	L	Lb	Prds	Credits
Course Code	AR 20.208	0	0	2	2	1
Course Type	EEC					

Course Objective:

To develop practical understanding of Sketch-UP and its relevance in Architecture. Students would develop skills of 3D modelling using various tools and techniques. They would be able to generate 3D from 2D drawing using the rendering skills like material, lighting, background etc.

To learn Sketch-UP layouts to create presentations including the renders, floor plans, sections and elevations in an organized manner.

Course Contents:

Module I : Introduction to Sketch-UP

Toolbars, Camera controls, Pan, Zoom, orbit, Basic tools, Rectangle, Circle, Select, pencil, push /pull, Groups, Components, Move, Rotate, copy, offset, Paint bucket etc.

Modelling

- Walls + floor, Windows, Doors, Frames, tables, Roof, etc.
- Openings

Materials

- Creating materials - Search online for materials, Create new material
- Edit materials – Scale, Rotate, Edit
- Modeling practice – Chair, Shelves, Accessories
- Warehouse - Download models, Edit models, Groups vs components, Scale

Module II : 3D project modeling

- Interior Space – Residence
- Object placement
 - Locking to axis
 - Reference points

Module III : Section & Layouts

- Sections – Elevations, Floor plans, Layouts, Preparing views, Sending to layouts, Positioning, Sizing, Moving, copy, Using scenes, Scale, Dimensions, Updating model reference, Styles in layout, Title block

Module IV : Structures

- Floor, Walls / store front, Doorways, Window frames, Stairs, Columns, Rails etc.

Module V : Detailing & Lighting

- Tables, Counters, Rugs, Picture frames / posters, Light fixtures, Doors, Windows, Planters, Accessories
- Lights and settings, Lighting with shades, Directional lights, Ambient lights, General lights, Accent lights, Test renders 2.1.

Module VI : Render & Presentation

- Fixing the lighting, Editing materials, V-Ray material effects, Camera positioning, Render settings
- Views, Views in SketchUP for use in Layouts, Set up layout, Image hierarchy, scale, Inserting renderings, Dimensions and labels, Title block, Presentation Tips

Student Learning Outcomes:

Developing skills and Ability to understand and use different computer software for computer tools and techniques to create architectural drawings and presentation drawings, with the help of Sketch-up software.

Pedagogy for Course Delivery:

The course will be delivered through Practical Tutorials and Lab exercises based on a particular project

Prerequisite:

Basic Knowledge of Computers.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
0%	100%	PR/PRC/R/VV/P/SW	Practical / VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Web links

1. Getting started with Google SketchUp Part 1 - YouTube
2. Google SketchUp 8 For Dummies aidanchopra.com
3. Chaos Group / Chaos Software official website - home - V-Ray® - award winning, produc...chaosgroup.com
4. Fine Woodworking's Google SketchUp® Guide for Woodworkers: The Basics - Woodworking - ...tauntonstore.com
5. Gallery : Corona Renderer corona-renderer.com
6. <https://forums.sketchup.com/t/recommended-book-for-sketchup-starter/23832>
7. <https://3dwarehouse.sketchup.com/?hl=en>

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
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YEAR -II, SEMESTER– IV

Course Title	History of Architecture, Art and Culture - IV	S	L	Lb	Prds	Credits
Course Code	AR 20.210	0	2	0	2	2
Course Type	PC					

Course Objective:

Understanding the world architecture during the Gothic, Renaissance and Baroque Period; Study of specific Architectural characteristics and their origin in above-mentioned period.

Course Contents:

Module I: Gothic Architecture

Integration of centralized and longitudinal plans. Spatial and formal integration of Romanesque churches. Integration of wall and vaults. Ribbed vault and the dissolution of external wall to allow light. Sensitivity to light and use of stained glass for mysterious interiors. Need and development of different external buttressing. Study of important cathedrals and churches in France

Module II: Renaissance Architecture

Break with medieval churches for sources from Roman antiquity. Spatial centralization through simple addition of independent spatial elements. Use of elementary geometrical forms unified through symmetry and simple mathematical ratios. Reintroduction of anthropomorphic classical orders. Study of palazzos and development of centralized church form through specific examples from Italy. Study of philosophy and works of various architects – Filippo Brunelleschi, Bartolomeo, Battista Alberti, Donato Bramante.

Module III: Mannerism

Conflict and tension in mannerism in place of harmony and order of Renaissance. Dynamic interplay of contrasting elements as against static addition of independent units of Renaissance church. Interplay between manmade and nature in villas dynamics of urban spaces. Centralized longitudinal and the elongated central church plans. Study of important villas, churches and urban spaces from Italy. Study of philosophy and works of various architects – Michelangelo, Andrea Palladio.

Module IV: Baroque & Rococo Architecture

Dynamism and systemization of Baroque architecture vitality and spatial richness with underlying systematic organization. Space as constituent element of architecture, as a complex totality and indivisible figure, comprising of interacting spatial elements based on inner and outer forces. Sensitivity to effects of texture, color, light and water. Study of important urban spaces and churches in Italy and Germany. Study of philosophy and works of various architects – Bernini, Christopher Wren.

Module V: Neo-Classical Period (1750- 1830 A.D.)

Definition of Neo-classic with taking few examples of the period. Study the buildings and structures relation to form, ratio, symmetry etc. Study of the different areas in France

Student Learning Outcomes:

Students will understand and relate Architecture elements and Familiarize with the socio-economic, historical, political influences of time period in Architectural development. Identify the buildings and the major works of the period.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Assignments and group presentation by students.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:*Text:*

1. "The History of Architecture" by Sir Bannister Fletcher
2. "Glimpses of World History" by Pt. JawaharLal Nehru
3. "Urbain Pattern" by A.B. Gallion
4. "Understanding Architecture, Its elements, history and meaning" by Leland & M. Roth
5. Prehistory to post modernism by Marvin & Isabel

References:

6. History of Architecture, J E Swain
7. History of Architecture, Dora Couch
8. A study of History, Almond Toynbee
9. Traditions in Architecture, Dora Couch

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YEAR -II, SEMESTER– IV

Course Title	Building Services– II (Electrical Services and HVAC)	S	L	Lb	Prds	Credits
Course Code	AR 20.212	0	2	0	2	2
Course Type	BS					

Course Objective:

Integration of electrical system with building design & application of indoor and outdoor lighting in appropriate way in building planning and designing.

To expose the students to the areas of air-conditioning, heating and ventilation

Course Contents:

Module I: Electrical Systems

Basic of electricity. Electricity demand, calculations, norms and standards. Generators , transformers Supply , distribution, at building and site level. Single/Three phase supply, protective devices in electrical installation. Earthing for safety, types of earthing, ISI Specifications. Electrical installations in buildings, types of wires, wiring systems and their choice, planning electrical wiring for building. Main and distribution boards, Transformers and Switch gears, Layout of Substations. Fixing and Fixtures, materials and apparatus, Electrical drawings.

Module II : Heat

Behavior of heat propagation, thermal insulating materials and their co-efficient of thermal conductivity. General methods of thermal insulation: Thermal insulation of roofs, exposed walls.

Module III: Ventilation

The wind, The effects of topography on wind patterns, Air currents around the building, Air movement through the buildings, air changes, quality of air, use of fans, thermally induced air currents, pressure losses: Buoyancy-driven (Stack effect, Venturi effect) – Use of court yard. Air distribution system- fans, filters, ductwork, outlets, dampers.

Lab: Types of anemometer and its use. Wind tunnel experiment for wind movement around the buildings, Simple experiments to measure outdoor and indoor wind velocity.

Module IV : Air Conditioning

Principles of air conditioning, Essentials of air-conditioning system. Window Air Conditioners.Split Air Conditioners. Packaged Air Conditioners. Direct Expansion Air Conditioning Systems. Central or All-water Air Conditioning Systems. Selection criteria, design / structural considerations and energy requirements for above mentioned air conditioning systems.

Student Learning Outcomes:

The student will relate with the building services as laid down within their own houses, residential buildings, campus etc. and will produce a fresh layout according to the knowledge gained.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Field trips and presentation by students. Site visit min. two at a construction site is essential, to make the students understand the systems practically.

Prerequisite:

Knowledge of basics of building services.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. National Building Code 2005
2. Mechanical and Electrical Equipment for Buildings by Walter T. Grondzik, Alison G. Kwok, Benjamin Stein.
3. Modern Air-Conditioning, Heating and Ventilation: Carrer and G. Pitman.
4. Air Conditioning and Ventilation, Servems and Fellows, John Wiley
5. Architectural Acoustics: E. David
6. An Introduction to Building Physics: Narsmhan

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YEAR -II, SEMESTER– IV

Course Title	Surveying and Leveling	S	L	Lb	Prds	Credits
Course Code	AR 20.214	0	1	2	3	2
Course Type	BS					

Course Objective:

Course is aimed to impart basic surveying principles and skills commonly needed in the planning of projects.

Demonstrate the role and application of modern surveying techniques and technologies

Course Contents:

Module I: Introduction to surveying

Role of surveying in Architecture, Principle of surveying, types of surveying, units of measurements.

Module II: Linear measurement

Role of linear measurement, Different methods, Equipment- Tape, chain, Odometer, Arrows, Ranging rods, Stadia Tachometry, EDM, Total station. Procedure, errors, applications of linear measurement

Module III: Positioning of the Plan

Rectangular and polar coordinates, Definition of Traverse, Application of traversing, Equipment and field procedure. Theodolite – Study, definition of different terms, Measuring horizontal and vertical angles.

Module IV: Leveling

Definition, Leveling instruments, differential leveling, Booking and reduction, Longitudinal and cross sectioning, Contouring, Characteristics of contours, locating contours.

Module V: Global Positioning Systems

Basics of GPS, application and uses

Student Learning Outcomes:

To understand the mechanism involved in surveying of the sites, levels and slopes and to measure them.

Pedagogy for Course Delivery:

The course will be delivered through lectures and practical on the site.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
50%	50%	PR/R/VV/P/SW/MSE	Theory + Practical

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Engineering surveying – W. Schofield and Butterworth Heinemann
2. Surveying vol 1- B.C. Punmia
3. Surveying vol 1- S.K. Duggal

References:

4. Building Construction by Mackay WB Vol. 1-4
5. Construction Technology by Chudley Vol. 1-3
6. Elementary Building Construction by Mitchell

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YEAR -II, SEMESTER– IV

Course Title	Theory Of Design	S	L	Lb	Prds	Credits
Course Code	AR 20.216	0	1	0	1	1
Course Type	EC					

Course Objective:

Providing a brief idea about the buildings, style, beauty, proportion, symmetry etc. To understand that the idea of any design is the result of these fundamentals. Understanding, how tradition follows, which acts as a base of other subjects and design problems during coming semesters.

Course Contents:

Module I : Organization of forms and spaces

Primary elements of architecture – point, line, plane, volume. Primary forms, properties of form, transformation of forms – dimensional transformation, subtractive, additive forms, organization of additive form – articulation of forms. Space defining elements – horizontal, vertical, opening in space defining elements, spatial relationship, spatial organization. Classification of Spaces based on a notion of enclosure.

Module II : Formulation of design

Formulation of design through elements and principles of architectural design. Applications of Ordering principal such as axis, symmetry, hierarchy, datum, rhythms, repetition, visual perception, proximity, repetition, simplest and largest figure, continuity and closure, figure and ground relationship

Module III : Principles and design Philosophies / work of Architects

To appreciate the guiding principles in the words and philosophies of Master Architects

Study of time, life, works and philosophies of Louis Sullivan, Frank Lloyd Wright, Walter Gropius, and Mies Vander Rohe, Le Corbusier.

- Louis Sullivan: Guaranty Building, Wainwright building, Auditorium building etc.
- Walter Gropius: Bauhaus, Fagus Shoe Last Factory etc.
- Mies Vander Rohe: Farnsworth Houses, Lake Shore Apartment, Seagram Building etc.
- Frank Lloyd Wright: Parie Houses organic Architecture etc.
- Le Corbusier: Early and later works in Chandigarh & Ahmadabad as well as specific study of Chandigarh.
- Louis-I-Kahn: IIM Ahmedabad

Student Learning Outcomes:

Student will learn and understand the design philosophies of great Architects , through which they understand the Fundamentals of Architectural design.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Field trips and presentation by students.

Prerequisite:

Knowledge of basics of building.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Pattern language, by christopher alexander
2. Principles of sociology, by tabussum, henna
3. Architecture elements, materials, form, by prina
4. Form, space, and order, by francis d.k. ching

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Bachelor of Architecture

YEAR III
SEMESTER V

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YEAR -III, SEMESTER– V

Course Title	Architectural Design - V	S	L	Lb	Prds	Credits
Course Code	AR 20.301	6	2	2	10	12
Course Type	PC					

Course Objective:

Understanding the different structural systems, their limitation, uses, spanning and limitations in relation with the Material and technologies. Selecting the appropriate Structural system in accordance with the Space, form and spanning system, complexity in planning, latest technologies, relevant building byelaws, and landscape.

Theme : Integration of Structure and Construction system in design of Built space.

Understanding built environment as a resultant of structural elements and system. To relate materials and its limitations for different structure systems as determinants of built form.

Parameter : Structure and construction, associated with the material limitations and material exploration is a discipline that evolve making of spaces. Structure system as a choice based on program, space, form, and character. Structural elements as creator of spaces and order.

Skills : Developing ability to understand, study and analyze natural and manmade structural system. Co-relation between structure, function, space, and form. Different structure models in building system as analytical tool of decision making. Understanding gravity, loads, transfers, structural grid and framing system. Co-relation between structural grid, Design grid and Parking grid. Analyze the possibility of Load bearing, Frame, and composite structural systems.

Design Outlines : Integration of Structure and Construction in the design of a multi- functional simple programmatic Building Project at a Neighborhood level In Urban or rural Context, Ideally a Building site for a building with built up area of 500 – 1000 Sq. Mtr. The project may be integrated with Structure, Building material and Technology. A min. two design project, one major and one minor.

Suggestive design exercises :

Educational Institutes- Secondary Schools, startup centers etc. Public facilities – Health clubs, banks, etc. Commercial facilities – Shopping malls, Marriage halls etc. Residential – Apartment buildings, Students Hostels etc.

Student Learning Outcomes:

Students will learn to understand cross functioning influences of structure and its elements and its impact on built form.

Pedagogy for Course Delivery:

Lectures and field visit supporting design exercise. Model on each stage enhancing design development for comprehension of working in studio

Prerequisite:

Min. 2 single day site visits to the reference places to study needs and requirements for the existing structures with same functions of their project.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. BousmahaBaiche& Nicholas Walliman, Newfert Architect's Data
2. DeChiara&Callender, Time Saver Standards for Building Type
3. O.H. Koenigsberger, Manual of Tropical Housing & Building
4. M. Evans, Housing, Climate & Comfort
5. Donald Watson & Kenneth Labs, Climatic Design
6. Building for a Changing Climate by Peter S. SMI
7. Francis D.K. Ching, A Visual Dictionary of Architecture

References:

8. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
9. Architectural Graphic standards editor – Boaz Joseph
10. Ernst Neuferts Architects Data, Blackwell 2002
11. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967

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YEAR -III, SEMESTER– V

Course Title	Building material & construction Technology - V	S	L	Lb	Prds	Credits
Course Code	AR 20.303	4	2	0	6	8
Course Type	BS					

Course Objectives:

Course aims to provide knowledge about Ferrous and non ferrous metals , Manufacturing, properties, quality and its use as a building construction material. Construction in Steel and how various structural elements of a building like foundation, staircase etc. are detailed out and constructed.

Course Contents:

Module I: Ferrous Metals

Brief study on manufacturing, properties and uses (of cast iron, wrought iron, pig iron and steel)
Market forms of steel, properties, uses and current advancements

Module II: Construction using ferrous metals

Types of connections in steel, steel in different structural members (foundation, column, beam)
Steel Truss Frames (saw tooth roof truss with north light glazing, simple trusses in steel),
Universal beam, Girders, castellated beams, plate girders, lattice girders.
Gates (collapsible & entrance gates).
Steel Components (doors, windows, stairs)

Module III: Non – Ferrous Metals

Brief study of Aluminum & Aluminum alloys, properties and uses
Uses of metals such as copper & copper based alloys, tin, cadmium etc. in construction

Module IV : Construction using non-ferrous metals

Aluminum sections, Doors and windows in Aluminum, Aluminum products used in construction.

Student Learning Outcomes:

The student will comprehend application and construction of Steel structures. The student will demonstrate the use of knowledge as gained regarding construction materials and structural elements in steel and aluminum and differentiate the materials as per different locations. The student will interpret and practice to use the details during the designing of their buildings.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Field Trips, and Studio Work and presentation by students ,

Prerequisite:

Site visit to Construction Sites of Steel. Min. 2 visits in a semester and the physical documentation of the studied work.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
25%	75%	PR/R/VV/P/SW/MSE	Theory + VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R.S.
3. Applied Mechanics and Strength of Materials, Khurmi R.S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

8. Elements of Structure, Morgan
9. Structures in Architecture, Salvadori
10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
12. Elementary Building Construction, Mitchell
13. Structure and Fabric, Everet

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YEAR -III, SEMESTER– V

Course Title	Structural Design System- V	S	L	Lb	Prds	Credits
Course Code	AR 20.305	0	2	0	2	2
Course Type	BS					

Course Objectives:

This course aims to provide knowledge of steel structures (beams, footing) used for construction purposes and their fixing details along with connections & joints (riveted, welded).

Course Contents:

Module I: Steel as Structural Material

Steel, masonry and B.I.S. specifications, design loads as per B.I.S. codes

Module II: Steel Connections

Riveted and welded Simple connections and connections subjected to moments (simple cases only)

Module III: Members subjected to Axial Compression

Introduction to Steel struts and columns including built-up columns, designing of steel struts and columns and their uses.

Module IV: Steel Beams

Introduction of Steel Beams, Laterally supported and laterally unsupported beams, Built-up sections.

Module V: Bases and Footings

Types, design of slabs and gusseted bases, Grillage foundation.

Student Learning Outcomes:

The student will analyze and apply the knowledge acquired about structural elements, techniques and materials to their design problems, and select the best possible solution whenever designing for the projects to show the understanding of the course of structures.

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students.

Prerequisite:

Knowledge of building components and elements.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R. S.
3. Applied Mechanics and Strength of Materials, Khurmi R. S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

8. Elements of Structure, Morgan
9. Structures in Architecture, Salvadori
10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
12. Elementary Building Construction, Mitchell
13. Structure and Fabric, Everet

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YEAR -III, SEMESTER– V

Course Title	Architectural Graphic Skills (Computer aided) - III	S	L	Lb	Prds	Credits
Course Code	AR 20.307	0	0	2	2	1
Course Type	EEC					

Course Objective:

The purpose of the course is to prepare students to use BIM for model building to flesh out ideas. The course should enable the student to bring ideas from concept to construction with a coordinated and consistent model-based approach. The program will enhance the visualization for creating building design view, capturing of design ideas in a photo realistic state.

Course Contents:

Module I : Introduction to BIM

- Introduction to BIM and Revit Architecture, Special Features of Revit Architecture.
- Understanding Revit Elements, Working in one model with many views,
- Understanding Recent files and Application Menu, Using Ribbon & Quick Access Toolbar (QAT), Using Properties Palette, Modifying Properties & Professional Palette, Using Project Browser, Salutation and Modifying Basics, Understanding Selection toggles, Accessing Revit Operation,.
- Understanding view extends and cropping regions Navigation Views (Zoom, Pan, and Rotate).

Module II : Working with Project and Modeling

- Creating a new project from file, Accessing Multi-user Projects using work share, Configure Project Settings, Adding Levels, Adding Grids, Referring Layout with temporary dimensions, Adding Columns
- Adding Walls - Using snaps, Wall Properties and Types, Locating Walls, Using Modifying Tools, Adding Doors and Windows, Using Constraints, Adding Plumbing Fixtures and other components, Wall Joints
- Linking AutoCAD Drawing Files
- Creating Topography Link, Understanding CAD Inserts, Import Tips, Create a Group, Minor Groups to Create a Layout, Creating Revit Links, Rotating and Aligning a Revit Link, Establishing Shared Co-ordinates, Managing the links, Understanding File Formats.

Module III : Modeling Roof, Ceiling & Floor and Stairways

- Making Working with Footprint Roofs, Working with Ceilings, Working with Floors, Working with Extrusion Roofs, Attaching Walls to Roofs, Using Slope Editing tools, Create a Flat Roof.
- Working with Stairs, Railings to Stairs, Working with Component based Stairs, Adding Extensions to Railings, Working with Slope Arrows, Adding Openings.

Module IV : Working With Complex Walls, Views, Visibility & Graphic Controls

- Creating Custom Basic Wall Type, Understanding Stacked Walls, Adding Curtain Walls, Adding Curtain Grids, Mullions and Panels, Creating Wall Sweeps and Reveals, Model Lines.
- Using Object tiles, Working with Visibility & Graphics, Using View Templates, Hiding and Isolating objects in a model, Understanding View Range, Displaying Objects Above and Below in Plan Views, Using Line Work Tool, Using Cutaway Views, Using Sketchy Lines..

Module V : Documentation, Annotations, Detailing & Plotting

- Understanding the Tags, Adding Schedule Views, Modifying Schedule Views, Creating Key Schedule, Using Images in the Schedule, Adding Sheets, Working with Place Order Sheets, Aligning Views with Guide Grid, Outputting Sheets to DWF file, Exporting to AutoCAD
- Adding Text, Adding Dimensions, Adding Symbols, Adding Legend Views.
- Creating Detail Callout, Adding Detail Component, Using Arrays to Duplicate Parametrically, Adding Filled and Masking Regions
- Plotting Sheets, Creating PDF.

Student Learning Outcomes:

Students will illustrate and express their work, design and ideas on different types of Design software using computers, will enhance presentation and precision in work.

Pedagogy for Course Delivery:

The class will be supplemented by class presentations and preparation of drawings with the help of different software's on computer.

Prerequisite:

Basic Knowledge of Computers.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
0%	100%	PR/PRC/R/VV/P/SW	Practical / VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:

1. Jeff Hanson, Revit 2018 Architectural Command Reference, SDC Publications
2. Lance Kriby, Mastering Autodesk Revit, Sybex, 2018
3. Eddy Krygiel, Mastering Autodesk Revit, Sybex, 2018

Web Links :

4. <https://www.youtube.com/watch?v=FO374T7pGrA>
5. <https://www.youtube.com/watch?v=fiUr9B2yKiI>
6. <https://www.youtube.com/watch?v=5YDbi1Zn2RE>
7. <https://www.youtube.com/watch?v=lc0u10qB0j8>
8. <https://www.youtube.com/watch?v=wsnjAjZUImw>
9. <https://www.youtube.com/watch?v=2SNsYOoVXyc>

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YEAR -III, SEMESTER– V

Course Title	Working Drawing Studio.	S	L	Lb	Prds	Credits
Course Code	AR 20.309	0	0	4	4	2
Course Type	EEC					

Course Objective:

Learn to make and understand Architectural Construction and execution drawings along with the their detailing.

Course Contents:

Module I: Working Drawings and construction drawings :

Preparing construction drawings with dimensions, details, and levels – Plans- from excavation to terrace Plan, Sections- Building sections and Part sections, Elevations, Schedule of Openings, Details- Stairs , Kitchen Platform , Electrical and Plumbing drawings, Finishes and Flooring details, Drawings for the municipal approval.

Student Learning Outcomes:

Students will learn to make and understand the construction drawings issued through the Architects office for the actual construction on site.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Assignments and through projects by students.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:

1. Residential const. prof. Solver, Brat John
2. Working drawing hand book, Keith Styles- Architectural Press Oxford – 1998
3. Buildings with large clay blocks, Theodor Hugues, Klaus Greilich, Christine Peter
4. Arch. Drawing and light construction, Edward J. Muller, James G. Gausett Philip A.

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YEAR -III, SEMESTER– V

Course Title	Building Services– III (Acoustics, & Illumination)	S	L	Lb	Prds	Credits
Course Code	AR 20.311	0	2	0	2	2
Course Type	BS					

Course Objective:

To acquaint the student with the understanding about the science behind Lighting, Illumination and building acoustics. It will help students to apply prediction methods to assess the functional requirements of buildings.

Course Contents:

Module I: Day lighting

Physics of light, Photometry, Transmission of light, recommended illuminances, Glare, Daylight illuminance, Luminance distribution, Design methods, Total flux method, Daylight factor method, BIS method, Pepper–pot diagram, Models and computer tools. Planning for daylight, day light utilization factor.

Lab: Introduction to Lux meter. Simple experiments to measure Lux levels under different sky conditions, Class room lux measurements, etc.

Module II : Electric Lighting

Lamps, Power factor, Luminaries, reflector, type of lens, cove lighting, valance lighting, cornice lighting, track lighting, light strip, troffer, wall washer, flood light, down light, spot light, spill, point, line and area source. Design methods: Point method, lumen method, IES glare Index system.

Lab: Introduction to brightness meter, experiments on colour & light, brightness & colour etc.

Module III: Basics of Acoustics

Basic laws and terminologies related to Acoustics. Sound Intensity and Sound Intensity Level. Sound Absorption, Transmission, Reflection, Diffusion and Diffraction. Free field conditions and Inverse Square Law for noise reduction with distance. Sound Absorbing Materials – descriptions and characteristics.

Module IV: Acoustics for an Enclosure / Building Design

Reverberation Time and its importance for acoustical performance of an enclosure.

Sabin's Equation and its application for designing new auditoriums and correcting RT of existing ones. Acoustical defects in an auditorium and their remedies. Acoustical design of auditorium and other acoustically sensitive enclosures meant for speech, music, lecture, etc. Properties of materials and their application for acoustical treatment, shape analysis for different enclosures. Designing enclosures for variable RT's. Sound Amplification Systems.

Module V: Noise Isolation and Control

Noise and its effects. Types of noise and its transmission. Sound Insulation and Transmission Loss. Speech privacy and noise control in specific situations. Methods of Sound Insulation - control of mechanical noise and vibrations. Codal Provisions

Student Learning Outcomes:

The student will relate with the building services as laid down within their own houses, residential buildings, campus etc. and will produce a fresh layout according to the knowledge gained.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Field trips and presentation by students. Site visit min. two at a construction site is essential, to make the students understand the systems practically.

Prerequisite:

Knowledge of basics of building services.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**Text:**

1. Barron, M. (2009). Auditorium acoustics and architectural design. 2nd Ed. Taylor & Francis. Conceptnine, R. (2008). The Architecture of Light: Architectural Lighting Design Concepts and Techniques. Sage Publications.
2. Cox, T. J. and D'Antonio, P. (2009). Acoustic Absorbers and Diffusers. 2nd Ed. Taylor & Francis
3. Cuttle, C. Lighting by Design. 2nd Ed. Architectural Press.
4. Eagan, D. M. (2002). Architectural Lighting, 2nd Ed. McGraw-Hill.
5. Eagan, D. M. (2002). Concepts in Architectural Acoustics.
6. Guzowski, M. (1999). Daylighting for Sustainable Design. McGraw Hill.

References:

7. Harold, B. M. and Goodfriend, L. Acoustics for Architects. Reinhold.
8. Hescong, L. (1976). Thermal Delight in Architecture. Cambridge : MIT Press.
9. Hopkins, C. (2008). Sound Insulation: Theory into Practice. 1st Ed. Butterworth Heinemann. Randall, W. (2008). Residential Lighting: A Practical Guide to Beautiful and Sustainable Design. 2nd Ed. Wiley.
10. Rea, M. (2000). The Lighting Handbook. 9th Ed. Illuminating Engineering Society of North America.
11. Reinhart, C. (2014). Day lighting Handbook.
12. Smith, B. J., Peters, R. J. and Owen, S. (1982). Acoustics and Noise Control. New York : Longman.
13. Steffy, G. (2000). Time-Saver Standards for Architectural Lighting. McGraw-Hill.
14. Szokolay, S. V. (2008). Introduction to architectural science. Taylor & Francis.
15. Vigran, T. E. (2008). Building Acoustics. 1st Ed. Taylor & Francis.

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YEAR -III, SEMESTER– V

Course Title	Estimation, Costing and Specification	S	L	Lb	Prds	Credits
Course Code	AR 20.313	0	2	0	2	2
Course Type	PC					

Course Objective:

To familiarize the students with the theory and practice of estimation.

To develop the understanding of writing the specifications as per the prescribed standard.

Course Contents:

Module I: Specification :

Definition, importance and uses of specification – principles and practice; method of writing specification; Writing general and detailed specification for various common building materials and construction work items. Specification of BIS and other institutions; general Abbreviations used in specifications.

Specifications writing for the following items – Bricks; sand; cement; coarse aggregate; water; reinforcement; storing and handling of materials; Earth work in foundation; PCC; RCC; First class brick work in cement mortar; half brick thick partition in cement mortar; reinforced brick work; DPC; glazed tiles in skirting and dado; cement plaster; joinery in wood, steel & aluminum; painting to walls – cement paint, oil bound distemper, acrylic emulsion, enamel paint ; painting to joinery ; varnishing etc.

Module II: Estimation :

Introduction to estimation and definitions of terms related to estimates, Importance and significance. Units of measurement, rules for measurement, Methods of taking out quantities Measurement of various construction work items, , Types of estimates, preparation of abstract and detailed estimates; preparation of B.O.Q. ,use of schedule of rates; break up of material requirements, making estimate of two room structure, various terminology used for in construction work for preparation of estimates.

Module III: Analysis of Rates

Principles of analysis of rates, factors affecting the rate analysis, workout the rate analysis of labor and materials of different building works. Rate analysis for: earth work, concrete works, first class brick work, reinforced brick work, cement plastering, DPC with cement mortar/ concrete, finishing (cement paint, distemper, acrylic emulsion, enamel paint) to walls & ceiling etc.

Student Learning Outcomes:

Will Learn to apply the knowledge of preparing estimates of construction projects along with the skill to develop specifications of materials and construction techniques essential for preparing estimates in the design projects.

Pedagogy for Course Delivery:

Lecture based learning along with exercises as tutorials related on the lecture delivery.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Estimating and Costing in Civil Engineering: B. N. Dutta
2. Handbook on Building Economics and Productivity, Central Building Research Institute, Roorkee: S.C. Singh and G.C. Sofat

References:

3. Civil Engineering Handbook – P.N. Khanna
4. M. Chakraborty; Estimating, Costing, Specification & Valuation
5. D.D.Kohli&R.C.Kohli ; A Text Book of Estimating and Costing

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Bachelor of Architecture

YEAR III
SEMESTER VI

SCHOOL OF ARCHITECTURE
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YEAR -III, SEMESTER– VI

Course Title	Architectural Design - VI	S	L	Lb	Prds	Credits
Course Code	AR 20.302	6	2	2	10	12
Course Type	PC					

Course Objective:

To understand the complexity of the special buildings with special services in relation to the building services. Integrating services like Plumbing, electrical, firefighting, Fire rescue, Mechanical and underground parking etc.

Theme : Integration of Building services and its Functioning in special building .

Understanding the integration of Building services in design of Built spaces. Introduction to various building services as functional enhancer of spaces.

Parameter : Environmental concerns in design such as light, ventilations, water and waste management, Energy efficiency, Integration of structure, construction and special systems with building services.

Skills : Developing ability to study and analyze natural and manmade, ancient and modern building service systems. Co-relation between electrical, plumbing, drainage and other services in the building. Building codes and firefighting system and their layouts.

Design Outlines : Multifunctional simple programmatic Building project at community level in urban or rural context ideally on building site for a built up area of 1000 – 2500 Sq. Mtr. Courses to be Integrated with Special services and Plumbing and Electrical services. Underground parking, mechanical parking and landscape design integration. One major and one minor project to given in a semester.

Suggestive design exercises :

Institutional Hostels, Special schools, Spatiality Hospitals, Hotels and motels, Club houses, Commercial complexes, Industry and Industrial setups.

Student Learning Outcomes:

Students will discover the complexity of service oriented buildings and appraises the design with Mechanical and physical services.

Pedagogy for Course Delivery:

Lectures and field visit supporting design exercise. Model on each stage enhancing design development for comprehension of working in studio

Prerequisite:

Min. 2 single day site visits to the reference places to study needs and requirements for the existing structures with same functions of their project.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. BousmahaBaiche& Nicholas Walliman, Newfert Architect's Data
2. DeChiara&Callender, Time Saver Standards for Building Type
3. O.H. Koenigsberger, Manual of Tropical Housing & Building
4. M. Evans, Housing, Climate & Comfort
5. Donald Watson & Kenneth Labs, Climatic Design
6. Building for a Changing Climate by Peter S. SMI
7. Francis D.K. Ching, A Visual Dictionary of Architecture

References:

8. Joseph De Chiara, Michael J Crosbie, Time Saver Standards for Building Types, McGraw Hill Professional 2001.
9. Architectural Graphic standards editor – Boaz Joseph
10. Ernst Neuferts Architects Data, Blackwell 2002
11. Kevin Lynch, Site planning, MIT Press, Cambridge, 1967

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YEAR -III, SEMESTER– VI

Course Title	Building material & construction Technology - VI	S	L	Lb	Prds	Credits
Course Code	AR 20.304	4	2	0	6	8
Course Type	BS					

Course Objectives:

Course aims to provide knowledge about latest and new alternative materials and technologies prevailing in the market. Properties, quality and its use as a building construction material.

Course Contents:

Module I: Advance Glazing systems :

Glass as building material, Manufacturing, Properties, types. Glass walls, Glass partitions, Glass floors, Structural glazing, Curtain walls, facade skins, glass walls– Design, detailing, materials used and latest technologies.

Module II: Smart and Alternative Building materials :

Eco-friendly and low cost building materials and construction technologies – Mud Bricks, Hollow concrete blocks, aerated concrete blocks, fly ash bricks, Innovation in materials like Translucent concrete, LED tiles, Eco Glass etc.

Module III: Damp proofing, Water Proofing and Thermal insulation :

Causes of Dampness, difference between water proofing and damp proofing. Techniques, materials and methods for damp proofing and water proofing. Water proofing of Terraces, Parapet walls, Copings details, Swimming pools at ground and on terrace, terrace gardens, covering of expansion joints. Behavior and effect of heat transfer of different materials and building components. Materials and technologies for thermal insulations. Block Insulation, Blanket insulation, loose fill, insulating boards, reflective sheets and materials.

Student Learning Outcomes:

The student will analyze and apply the knowledge acquired about the façade treatments, and the alternative building materials in various construction elements and techniques in their building designs. .

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Field Trips, market surveys and Studio Work and presentation by students ,

Prerequisite:

Site visit to related Construction Sites, and market surveys . Min. 2 visits in a semester and the physical documentation of the studied work.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
25%	75% %	PR/R/VV/P/SW/MSE	Theory + VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R.S.
3. Applied Mechanics and Strength of Materials, Khurmi R.S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

8. Elements of Structure, Morgan
9. Structures in Architecture, Salvadori
10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
12. Elementary Building Construction, Mitchell
13. Structure and Fabric, Everet

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YEAR -III, SEMESTER– VI

Course Title	Structural Design System- VI	S	L	Lb	Prds	Credits
Course Code	AR 20.306	0	2	0	2	2
Course Type	BS					

Course Objectives:

This course aims to provide knowledge of Complex structural forms .

Course Contents:

Module I: Forms of Structures

Concept of Bulk active structures and Form active structures, Vector active structures, Surface active structures.

Module II: Arches, Vaults, Shells and Domes

Introduction of Arches , Vault and Domes. Three hinged, two hinged and fix type Arches, Shells, domes and Membrane structure.

Module III: Tensile and Pneumatic Structures

Cable Structures, Folded plate structures, and Pneumatic structures.

Student Learning Outcomes:

The student will analyze and apply the knowledge acquired about structural elements, techniques and materials to their design problems, and select the best possible solution whenever designing for the projects to show the understanding of the course of structures.

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students.

Prerequisite:

Knowledge of building components and elements.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R. S.
3. Applied Mechanics and Strength of Materials, Khurmi R. S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

8. Elements of Structure, Morgan
9. Structures in Architecture, Salvadori
10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
12. Elementary Building Construction, Mitchell
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YEAR -III, SEMESTER– VI

Course Title	Architectural Graphic Skills (Computer aided) - IV	S	L	Lb	Prds	Credits
Course Code	AR 20.308	0	0	2	2	1
Course Type	EEC					

Course Objective:

To Equip students with the technical knowledge of various Architectural software and its application for better presentation skills and to prepare students to use 3DS Max Basics for modeling and rendering to flesh out ideas and present their ideas in a timely manner.

Course Contents:

Module I : Tools

- Introduction to 3ds Max, Interface and use in Architecture.
- Understanding 3ds Max Elements, Working in one model with many views,
- Understanding Basic tools, Objects, Objects primitives, Modifiers, sub-object level,

Module II : 3D Modeling

- Poly modeling,
- Extruding, Lathing
- Compound objects, Boolean, lofting
- Cameras
- Lighting basics & presentation

Module III : Materials

- Materials – Color
- Materials – Bump maps
- Materials – Jpeg maps

Module IV : Lighting

- Lighting : basics
- Lighting : presentation

Module V : Animating

- Everything in 3D Max is animatable. Learn to animate models, lights and cameras.
- Animate the texture/color on an object: animate the color of the lighting in a scene.

Module VI : Rendering Skills

- Understanding the Render - To turn a 3D scene into a JPEG, QuickTime Movie or other end product.
- Active Time Segment - The number of frames to be rendered.
- Output Size - The proportions and pixel settings of the rendering.
- Scanline - The default renderer for 3D Max.
- Mental Ray - An optional, higher quality renderer.

Student Learning Outcomes:

Students will illustrate and express their work, design and ideas on different types of Design software using computers, will enhance presentation and precision in work.

Pedagogy for Course Delivery:

The class will be supplemented by class presentations and preparation of drawings with the help of different software's on computer.

Prerequisite:

Basic Knowledge of Computers.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
0%	100%	PR/PRC/R/VV/P/SW	Practical / VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:

1. Architectural Rendering with 3ds Max and V-Ray: Photorealistic Visualization
2. 3D Photorealistic Rendering: Interiors & Exteriors with V-Ray and 3ds Max
3. 3ds Max Design Architectural Visualization: For Intermediate Users

Web Links

4. <https://www.youtube.com/watch?v=9i8xbaIcU9w>
5. <https://www.youtube.com/watch?v=57wNALKKkBk>
6. <https://www.youtube.com/watch?v=xGZdnuYQLyc>
7. <https://www.youtube.com/watch?v=yvcO72PSut4>
8. https://www.youtube.com/watch?v=S7aoF_TfFRg
9. <https://www.youtube.com/watch?v=yCM-likGd60>
10. <https://www.youtube.com/watch?v=3YjQ5KrYWOE>

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YEAR -III, SEMESTER– VI

Course Title	Town Planning & Building By-Laws	S	L	Lb	Prds	Credits
Course Code	AR 20.310	0	2	0	2	2
Course Type	EC					

Course Objective:

To generate an understanding about the development control regulations and the bye-laws abiding in the country. Introduction to the discipline of town planning and its various related aspects. Familiarizing planning theories with suitable examples of different cities in the world.

Course Contents:

Module I: Introduction to Building Bye Laws

Introduction to Building Bye Laws and regulation, their need and relevance, general definitions such as building height, building line, FAR, Ground Coverage, set back line et all. Role of various statutory bodies governing building works like development authorities, municipal corporations etc. Introduction to Master Plan and understanding various land uses like institutional, residential etc. and related terminology

Module II: Building Bye Laws & Code of Practice :

Study of National Building Code. Study of Building byelaws in accordance to different cities in the country. Procedures for development and implementation of acts and bye laws for land development and building design and execution process.

Module III: Introduction to Town Planning

Introduction to town planning, need and definition. Industrial Revolution era planning. Origins, evolution and growth of settlements.

Module IV: Town Planning in Ancient Period

Characteristics and planning of towns and cities. Historical background with special emphasis on basic concepts of planning and urban spaces. Egyptian, Greek, Roman, Medieval, Early Indian town planning.

Module V: Planning Survey and Techniques

Introduction to survey of planning, planning acts and bye laws, planning process, zoning and documentation. Different Survey Techniques, methodology of conducting surveys and analysis of survey data.

Student Learning Outcomes:

Students will apply the laws laid down by the government agencies regulating the physical development of the projects.

Pedagogy for Course Delivery:

Through lectures, review of development regulation documents prepared by the government; Presentations, Case studies by the students.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Unified Delhi Building Bye-Laws
2. Model – Bye-laws by TCPO
3. National Building Code
4. D.D.A. – Delhi Master Plan
5. The Urban Pattern: City Planning and Design by Gallion and Eisner
6. Urban Planning by Chapin
7. Town planning by G.K.Hiraskar
8. City planning by Bandopadhyia.

References:

9. Various IS Codes
10. UDPFI Guidelines
11. Other Cities Bye laws/ Masterplan
12. Campbell, S. and Faintstein, S. (2003) 'Readings in Planning Theory. Oxford. Blackwell.
13. Alexander, E.R. (2001) 'The Planner-prince: Interdependence, Rationalities and Post-communicative Practice', Planning Theory & Practice 2(3): 313–26.

Additional Reading:

14. Architects Act 1972.
15. Publications of Handbook on Professional practice by IIA.
16. Publications of Council of Architecture-Architects (Professional conduct) Regulations 1989, Architectural Competition Guidelines
17. Roshan Namavati, Professional practice, Lakhani Book Depot, Mumbai 1984.

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MODY UNIVERSITY
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YEAR -III, SEMESTER– VI

Course Title	Building Services– IV (Firefighting And Building Automation)	S	L	Lb	Prds	Credits
Course Code	AR 20.312	0	2	0	2	2
Course Type	BS					

Course Objective:

To acquaint the student with the fire safety regulation and security systems to be adopted in the buildings. Study the development codes and bye-laws of fire safety regulations. Developing the understanding of Building Automations and Intelligent Buildings. Techniques , Technologies and adaptive uses.

Course Contents:

Module I : Fire Fighting

Behavior of fire, Combustible contents, causes of fire, Mechanism of fire spread in building and prevention, concepts in fire protection. High temperature effects and combustibility of building materials and structure, Fire resistance of buildings, firefighting installation and requirements. Passive and active fire precautions, site planning and fire brigade access. Heat sensitive detectors, smoke detectors, Automatic water system

Module II : Fire Safety

Fire safety standards, fire & human behavior, means of escape, design and planning of escape halts and corridors to final exit. Classification of buildings based on occupancy. Psychological aspects, concept of panic, domestic, Multiple occupancy and Hospital fires.

Module III : Intelligent Buildings

Introduction to Intelligent Buildings, definitions, building elements, descriptions, definitions and components, historical overview, Energy and Intelligent Buildings, Energy consumption in buildings, micro climate, human comfort in buildings, energy conservation in buildings, active and passive systems, advanced building energy management systems.

Module IV : Building Automation

Building Automation, Intelligent control of building components, automating building services system integration and optimization with building envelope, communication systems and safety and security systems, Performance Evaluation and Standards, Building performance evaluation and intelligent building standard.

Student Learning Outcomes:

The student will relate with the building services as laid down within their own houses, residential buildings, campus etc. and will produce a fresh layout according to the knowledge gained.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Field trips and presentation by students. Site visit min. two at a construction site is essential, to make the students understand the systems practically.

Prerequisite:

Knowledge of basics of building services.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Fire Protection for the Design Professional, D. Jenson
2. Industrial Fire Hazard Hand Book
3. Industrial Fire Protection

References:

4. BIS CODES: 2189, 2190, 8096, 928, 957, 3614, 2175, 931, 494, 2171, 6382, 5896, 6070, 3844, 1648, 1646, 1526, 5495
5. Understanding Building Automation Systems (Direct Digital Control, Energy Management, Life Safety, Security, Access Control, Lighting, Building Management Programs) by Reinhold A. Carlson, Robert A. Di Giandomenico
6. Building Automation: Control Devices and Applications by In Partnership with NJATC (2008)
7. Building Control Systems, Applications Guide (CIBSE Guide) by The CIBSE (2000)

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YEAR – III, SEMESTER – VI

Course Title	Study Tour	S	L	Lb	Prds	Credits
Course Code	AR 20.314	0	0	0	0	2
Course Type	NTCC					

Course Objective:

To provide exposure to the students to the real Architectural world and to make them aware of the construction techniques of the real time of different places of Architectural importance

Course Contents:

Module I : Selection of the study area :

Student have to select field / area / buildings for the detail study.

Module II: Case study :

Detailed work out through case studies and requirements of the field of study area to formulate the working guidelines.

Module III: Detailing & Presentation:

Detailed drawings including plans, sections, elevations, details, working technology, materials and planning aspects of the selected area of study.

Student Learning Outcomes:

Student will learn the methodology to undergo a deep research in the field of architecture.

Pedagogy for Course Delivery:

Students have to visit one/ two cities/ sites of Architectural importance for a period one week (5 to 7 days) which should not be within the city of the institution. This Study tour may be scheduled in the month of February OR March. The class going for the study tour must be accompanied by the subject teacher/s min. 2 with one female faculty compulsory. The student teacher ration should not be less than 20 :1.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	End Term Examination
NILL	100 %	NA

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Lab / Practical / Studio Assessment :

Not Applicable.

Text & References:

Nil

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Bachelor of Architecture

YEAR IV
SEMESTER VII

SCHOOL OF ARCHITECTURE
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YEAR -IV, SEMESTER– VII

Course Title	Architectural Design –VII (Housing)	S	L	Lb	Prds	Credits
Course Code	AR 20.401	8	0	4	12	14
Course Type	PC					

Course Objective:

The studio aims to explore design fundamentals and bye-laws for designing Housing projects in urban areas integrating allied disciplines of architectural field like landscape, environment, cost effective technologies and energy conservation etc. to provide a holistic approach indeed.

Theme : Housing and Neighborhood design.

Design development through different progressive stages include – Site zoning and layout, design area brief, dwelling unit types, building plans, housing cluster planning, neighborhood concept, physical and social infrastructure facilities, housing utilities in relation with the urban development regulations, building by-laws, and Architectural controls. Inferences from case studies of public / government / private / cooperative housing schemes, its need, advantages and disadvantages and execution process. Emphasis on site planning as well as on advance building services and building an onsite level.

Suggestive design exercises :

Housing projects, Redevelopment schemes, Rehabilitation schemes, within 10 -15 Acre land areas,

Student Learning Outcomes:

The student will demonstrate knowledge of architectural design for housing projects / schemes and application of building bye-laws for group housing. The students will analyze the housing schemes in urban area, along with necessary infrastructure, services and amenities.

Pedagogy for Course Delivery:

Tutorial and studio based learning with live and literature case studies

Prerequisite:

Understanding developed from previous Architectural Design exercises and theoretical base provided by theory courses.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**Text :**

1. Ching, F.D.K., "A Visual Dictionary of Architecture", John Wiley & Sons
2. Norberg-Schulz, C., "Principles of Modern Architecture", Andreas Papadakis
3. New rural housing design theory [Paperback] by NING YU LUO ZHONG ZHAO ZHANG HUI FANG

References:

4. Babur Mumtaz and Patweikly, Urban Housing Strategies, Pitman Publishing, London, 1976.
5. Martin Evans, Housing, Climate and Ocmfort, Architectural Press, London, 1980.

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YEAR -IV, SEMESTER– VII

Course Title	Advance construction Technology - VII	S	L	Lb	Prds	Credits
Course Code	AR 20.403	4	2	0	6	8
Course Type	BS					

Course Objectives:

Course aims to provide knowledge about latest technologies adopted for high rise and on reclaimed lands. Most modern techniques for fast pace construction and for large span structures.

Course Contents:

Module I: High rise Structures :

Definition and types of High Rise structures, Different types of forces on high rise structures, Forms and shapes of structures counter acting the external forces, Braced frame / Diagrid / Bundled tube / Rigid Frame / Shear wall structures.

Module II : Advance Foundation

Design, detailing, and technical detailing of Advance deep and shallow foundations for high rise and sky scrapers. Pile foundations, Raft foundations, Floating foundations.

Module III: Fast pace construction

Methods and types of construction system adopted for fast pace construction – lift slab construction technology, slip form construction technology, prefabricated construction system, pre stressed and post tensioning system.

Module IV: Large Span and Tensile Structures :

Details and design of large span steel structures – Geodesic dome, and Space frame structures. Tensile Structures, long span tensile structures. Airports and Sports stadiums and arenas. Properties , materials , techniques.

Student Learning Outcomes:

The student will analyze and apply the knowledge acquired about the most modern construction system and technologies.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Field Trips, market surveys and Studio Work and presentation by students ,

Prerequisite:

Site visit to related Construction Sites, and market surveys . Min. 2 visits in a semester and the physical documentation of the studied work.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
25%	75% %	PR/R/VV/P/SW/MSE	Theory + VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Building Construction – Materials, M.V. Naik
2. Strength of Materials, Khurmi R.S.
3. Applied Mechanics and Strength of Materials, Khurmi R.S.
4. Civil Engineering Handbook, P.N. Khanna
5. R.C.C. Design, Khurmi, Punmia, Sushil Kumar
6. Design of Steel Structure, Negi
7. Structure in Architecture, Salvadori and Heller

References:

8. Elements of Structure, Morgan
9. Structures in Architecture, Salvadori
10. Building Construction, Mackay WB Vol. 1-4
11. Construction Technology, Chudley Vol. 1-6
12. Elementary Building Construction, Mitchell
13. Structure and Fabric, Everet

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YEAR -IV, SEMESTER– VII

Course Title	Green Buildings	S	L	Lb	Prds	Credits
Course Code	AR 20.405	0	2	0	2	2
Course Type	EC					

Course Objective:

To familiarize students with principles, techniques and guidelines for planning and design of energy efficient and conserving architecture. Skills to understand the energy consumption and hence cater to reduction. To create awareness about tools and practices to calculate energy consumption

Course Contents:

Module I: Introduction

Classification and characteristics of resources, Use and exploitation of resources, Resource use in architecture / exploitation of resources for development, Resource shortage and constraint, Concepts and need for conservation, Renewable and non-renewable resources.

Module II: Energy conserving architecture

Principles of energy conservation, Pattern of energy use in buildings, Technologies and methods of conservation, Economic, technological and environmental implications Fundamentals of planning and design, Elements and principles of design, Study of design problems, Application of relevant principles for design solutions, Innovative and appropriate construction technologies.

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Module III: Green Rating

Green Rating agencies in India and their Approach – BEE (ECBC), IGBC, TERI, EDGE etc.
Process of rating and Certification.

LEED Rating system

- Brief background of the rating system, Need and purpose of rating
- Various criteria for site development and building design
- Provisions for green certification

GRIHA rating system

- Brief background of the rating system, Need and purpose of rating
- Various criteria for site development and building design.
- Building typologies and the necessitated GRIHA rating.

Student Learning Outcomes:

To familiarize with the technologies used for energy conserving Architecture and understanding Rating agencies and system.

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text :**

1. Alternative Natural Energy Sources in Building Design: Davies and Schubert.
2. Design with nature: I.McHarg
3. The Ecological Context: H. McHale.

References:

4. Human Ecosystems: W. B. Jr. Clapham.
5. Review our dying planet: S. Devi.
6. Energy Conservation Standards: for building design, construction and operation, S. Fred Dubin.
7. GRIHA Manual (Vol 1-5)
8. Climate Responsive Architecture "by Arvind Kishan, Baker & Szokolay".
9. Man, Climate and Architecture by Givoni, B.,

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YEAR -IV, SEMESTER– VII

Course Title	Disaster Resistant Structures.	S	L	Lb	Prds	Credits
Course Code	AR 20.407	0	2	0	2	2
Course Type	EC					

Course Objective:

To expose the students to the various theoretical and practical aspects of disaster resistant structures.

Course Contents:

Module I: Introduction

Overview of disaster; major natural disaster – flood, tropical cyclone, droughts, landslide, heat waves, earthquakes, fire hazards etc. Basic understanding on fragile eco-system, physiographic and geo-chemical data mapping, soil and topography, hydrological factors, climatic conditions

Module II: Designing and Planning

Designing the disaster resistant building using modern construction techniques and materials

Module II: Renovation and re-strengthening

Retrofitting and methods of strengthening the damaged buildings due to natural disasters.

Student Learning Outcomes:

Students will learn and understand the effects of natural disasters on built environment and its precautions and rectifications.

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students

Prerequisite: Nil.**Assessment/ Examination Scheme:**

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Dynamics of Structures by A. K. Chopra
2. Building Configuration and Seismic Design, C. Arnold and R. Reitherman
3. EARTHQUAKES An Architect's Guide to Non-Structural Seismic Hazard, H. J. Lagorio

References:

4. The Seismic Design Handbook, F. Naeim
5. Design for Earthquakes, J. Ambrose and D. Vergun

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YEAR - IV, SEMESTER – VII

Course Title	Interior Design	S	L	Lb	Prds	Credits
Course Code	AR 20.409	0	2	0	2	2
Course Type	EC					

Course Objective:

Understanding of an enclosed space and the importance of Space planning for any user. Acquiring proper knowledge of any space and designing it with the help of furniture, various other fixtures and colour choices. Understanding the importance of designing a space according to the requirements with a proper knowledge of principles and elements of design.

Course Contents:

Module I: Introduction to Interior design

Introduction to basic principles of designing a space. Introduction to elements of design for an interior space. Introduction to design a space according to function, color and theme.

Module I: Elements of Interior Design

Introduction to various elements of an Interior space; Ceiling, False ceiling, Walls, Floors, Staircases, Openings, and other Interior Services. Treatments on the various elements of Interior design; Finishing and fixtures. Introduction to Various materials for Interior design; Choosing a right material, Construction and method of application, Finishing of the material.

Module I: Furnishings for Interior Space

Introduction to Furnishings in Interior design. Importance of furnishings for a required space according to the functionality and aesthetics. Types of furnishings for different types of Interiors; surface furnishings. Study on relation between the choice of furnishing and the theme of a space.

Module I: Elements of Interior designing- Lighting

Types of lighting for an Interior space; Natural and Artificial lighting. Importance of Lighting in Interior spaces. Natural Lighting; Source, Finishes. Artificial Lighting; Sources, Types, Installation, Designs. Application of lighting according to need and aesthetics.

Module I : Space planning – Furniture design

Introduction to Furniture Design. Importance of furniture for an Interior space to achieve an ideal Interior design. History of Furniture design through ages; Types of Furniture for an Interior space, Different types of design styles through ages, Evolution of furniture design through ages. Study of the relation between Furniture and space; Human movement; design according to the human comfort. Methods of construction different types of Furniture. Various materials for Furniture design; Types of materials for different parts of a furniture, Importance of materials, Advantages and disadvantages of these materials, Choosing an ideal material to achieve a good furniture design, Application technique, Finishing, Caring of the material.

Student Learning Outcomes:

Knowledge of Interior Space management, and use of Furniture and other elements of Interior designing for enhancement of the available space.

Pedagogy for Course Delivery:

Lectures, Case studies and Seminars

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**References:**

1. The Interior Design by Linda O'Shea, Chris Grimley, Mimi Love.
2. Elements of Style by Erin Gates
3. Furniture Design by Stuart Lawson

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YEAR -IV, SEMESTER– VII

Course Title	Housing Theory	S	L	Lb	Prds	Credits
Course Code	AR 20.411	0	2	0	2	2
Course Type	PC					

Course Objective:

Housing acts as bridge between architecture and urban planning thus will require inter-linkages with planning aspects, housing policies, development regulations, site planning, urban design and infrastructural service designs at neighborhood levels. Growing urbanization, scarcity of land and housing shortage for poor, has imposing challenges whereas, new technology, concepts and capacity of real estate sector for mass housing production providing opportunities. This is quite important that, budding architects should understand challenges and opportunities of housing development.

Course Contents:

Module I: Introduction

Definition, terminologies and importance. Ecological and environmental aspects of human habitat. Concept of Neighborhood and community. Hierarchy of human needs and Housing typologies.

Unit-2: Housing Scenario

Urbanization and housing statistics Housing policies and programs. Factors of housing demand and supply. Housing delivery mechanism

Unit-3: Slum and Housing for Poor

Definition , causes and characteristics OF SLUMS. Slum statistics and initiatives for housing for poor Affordable housing design case studies. Design of affordable housing for poor

Unit-4: Development Norms and Standards

Housing and its relationship with neighborhood and city plan. Zoning regulation, its impact on quality of life of neighborhood. Density; definitions, types of density, factors, FAR, FSI, etc. Development norms and standards for services, amenities and facilities. Sub- division techniques.

Unit-5: Land Economics and Real Estate Development

Introduction to real estate market; potential and challenges. Land economics; Concept of economics, Types of land holding and tenure systems. Factor affecting demand and supply of housing. Relationship between land use, location and land value (Theory of location and growth pole theory). Land use constraints, reservations and Land acquisition act, 2013. Land economics and feasibility analysis for housing projects. Models of land development in real estate market (Land pooling and sharing)

Unit-6: Site Planning and Neighborhood Design

Factors and principles of site planning. Analysis for physical, climatic, legal, financial, socio-cultural aspects. Principles of neighborhood design. Housing case studies (Successful real estate projects) Design of neighborhood (concept and calculations)

Student Learning Outcomes:

Students will learn and understand causes and consequences of housing problems and to impart knowledge about the possible solutions. .

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students

Prerequisite:

Basic Knowledge of Housing schemes.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Urban economics and real estate market by Denise DiPasqualle
2. Urban Housing and Slums by A.K. Jain
3. Urban land economics by Jack Harvey and Ernie Jowsey
4. Urban Planning Theory and Practice by M. Pratap Rao
5. Urbanization and urban systems in India by R. Ramchandran
6. Urbanization in India Ed. by R.S. Sandhu
7. Journal of Housing and built environment
8. Journals of Housing studies
9. Planning sustainable cities- UNHabitat

References:

10. Beyond Gated Community by Sameer Bagaeen
11. China housing reforms and outcomes Ed. By Joyce Yanyun Man
12. Cities and Housing by C.S. Yadav
13. City slums by J.A. Ingham
14. Cost effective rural housing technology by Reddy
15. Design quality in Housing- Leanings from Netherlands by Matthew Cousins
16. Gated community by Sameer Bagaeen
17. High density housing for mixed income group by Ranjana Ashish Mittal
18. Neighbourhood planning and community based development by W. Peterman
19. Planning and design for future informal settlements by David Gouverneur
20. Row Housing by Gunter
21. Shadow cities by Robert Neuwirth
22. The economics of urban property market by Paschalis A. Arvanitidis
23. The modern economics of Housing by Randall Johnston
24. Town Planning by A. Bandhopadhyay
25. Town Planning by Rangawala
26. Urban development and Housing in India (1974-2007) Ed. By Rishimuni Dwivedi

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YEAR -IV, SEMESTER– VII

Course Title	Research Methodology	S	L	Lb	Prds	Credits
Course Code	AR 20.413	0	2	0	2	2
Course Type	EC					

Course Objective:

Understanding the importance of research in architecture. Theoretical and practical significance of research, types of research process of formulating a research plan. Various methods of research, their applications, data and simple statistical analysis, interpret the data. Technical writing and presenting a research report

Course Contents:

Module I: Introduction to Research Methodology

Introduction to Research: Meaning, Characteristics, Need, Objective and importance in architecture, Types of Research and Stages in Research Process.

Module II: Identification of topic and hypothesis formulation

Identification of areas of interest for the study, Need of the study, Formulation of research questions, research gap and hypothesis formulation.

Module III: Data Collection Techniques

Techniques and Methods of Data Collection. Quantitative and Qualitative Methods in Research. Primary and Secondary data collection: literature reviews, case studies, reports and research papers from reputed journal and Government agencies.

Module IV: Research Survey and Techniques

Introduction to survey in research, Different Survey Techniques, methodology of conducting surveys in research work. Methods of survey: Literature, Visual, sampling, interviewing, Design program/ranking scale/ priority chart, questionnaire.

Module V: Analysis of Data Interpretation

Methods of analysis, Data Analysis: Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations. Data sampling Meaning and types of Sampling: Probability sampling methods and Non-Probability Sampling Methods, Need of sampling. Random Sampling, Simple and stratified Random Sampling. Other type of sampling, Requisites of a good sample method, sampling distribution, Sampling Error.

Module VI: Research Writing and Documentation

Synopsis formulation, Research Proposal, Abstract, Content, Literature review, Summary, Bibliography and referencing. Report making: Dissertation/Thesis. Minor Research Project on the topic selected in the beginning of the semester in line with all the steps of Research process starting from Identification of Research topic to Findings & Conclusion.

Student Learning Outcomes:

Students will learn and understand the elements and procedure of research and learn how to conduct research.

Pedagogy for Course Delivery:

The course is delivered through lectures and presentation by the students.

Prerequisite:

Basic Knowledge to Books, papers and Research.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text**

1. Research Methodology: Methods and Techniques by CR Kothari.
2. Research Methods: The Basics by Nicholas Walliman.

References:

3. Architectural research methods; Linda Groat & David Wang, John Wiley and sons, New York.
4. Visual research methods in Design; Henry Sanoff, Van Nostrand Reinhold, New York.
5. Architectural research; Snyder James C; Van Nostrand Reinhold RECOMMENDED BOOKS:
6. Creswell, J.W. Research Design: Qualitative & Quantitative Approaches. Thousand Oaks: Sage.1994.
7. Groat, L. & Wang, D. Architectural Research Methods, NY: John Wiley and Sons Inc. 2002.
8. Kothari, C.R. Research Methodology: Methods and Techniques, New Delhi: Wishwa Prakashan. 2005.
9. Norman K Denzin and Yvonna S Lincoln (Eds.) Handbook of Qualitative Research,

Web link:

10. http://www.sociology.kpi.ua/wp-content/uploads/2014/06/Ranjit_Kumar-Research_Methodology_A_Step-by-Step_G.pdf
11. https://www.researchgate.net/publication/303381524_Fundamentals_of_research_methodology_and_data_collection
12. https://www.researchgate.net/publication/319207471_HANDBOOK_OF_RESEARCH_METHODOLOGY
13. <http://www.modares.ac.ir/uploads/Agr.Oth.Lib.17.pdf>

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YEAR -IV, SEMESTER– VII

Course Title	Professional Practice & Management	S	L	Lb	Prds	Credits
Course Code	AR 20.415	0	2	0	2	2
Course Type	EEC					

Course Objective:

To acquaint the students with the responsibility, scale of charges and Architect's conduct in Architectural practice. To understand the office and administration of an Architect's office, Tenders and contracts

Course Contents:

Module I: Role of professional bodies

Role of different bodies i.e. COA, IIA, Uttar Pradesh Architect Association, their working constitution and bye-laws, categories of membership and election procedures.

Module II: Architect's Act 1972 & Office and administration

Detail study of the Act and procedures of membership. Office set up and administration, Filing and recording, nature of partnership, registration of firm and dissolution, copy rights of drawings, practice procedures and conduct etc.

Module III: Scale of charges and code of professional conduct

Conditions of engagement of Architect – Duties, Responsibilities, Liabilities of the profession, scale of charges, mode of payment etc. Clauses governing conduct of professional practice.

Module IV: Tendering and Contract

Tendering - Types of tenders and tender documents, tender drafts notices, Inviting Tenders, Procedure of opening and selection Analysis and report of owner.

Contract – Types, conditions of contract – Earnest money, Security deposit, Retention money, Mobilization fund, Bank Guarantee, Architect's Instructions, Defects, Certificates and payments, Penalties, Insurance, Liquidated damages, Termination of contract, breach of contract.

Module V: Valuation

Introduction, Techniques, elements and factors affecting valuation, Methods, Types – renewal or lease/ extension of lease, standard rent, easement right, dilapidation, valuation of landed property, comparable cost of scale, purchase and mortgage, Capital gain tax, wealth tax, property tax and other taxes.

Student Learning Outcomes:

Student will be acquainted with the roles and responsibilities of an Architect and functioning of the Office.

Pedagogy for Course Delivery:

Lecture based learning along with exercises as tutorials related on the lecture delivery. Preparing a report of study of an Architects office.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. COA document of Architect's Act 1972
2. Architectural Practice in India – Prof. MadhavDeobhakta
3. Construction Project Management – K.K. Chilkar
4. Construction Planning and Management – M.B. Dhir& S.P. Ghilot

References:

5. Professional Practice in India – S.K. Sahu
6. Code of Architectural Practice – B.M. Basu
7. Project Management with CPM and PERT – Moder and Philipese
8. Construction Method and Techniques – MullickMullind

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Bachelor of Architecture

YEAR IV
SEMESTER VIII

SCHOOL OF ARCHITECTURE
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YEAR -IV, SEMESTER– VIII

Course Title	Practical Training	S	L	Lb	Prds	Credits
Course Code	AR 20.402	0	0	0	0	30
Course Type	NTCC					

Course Objective:

'Professional Training' is to enable the students to gain the kind and range of practical experience which will prepare them for their likely responsibilities, immediately after qualifying B. Arch. Course. Also to understand the various aspects of architecture practice and to learn about the office management and other professional dealings through the practical exposure of the Architectural practice, construction and execution.

Prerequisite and Procedures :

Student has to undergo practical working for a period of 140 days in an Office of an Architect approved by the Council of Architecture and by the institution. Students should preparing their Portfolios in advance during late VII semester, to be submitted at different Architects office. The whole process for confirmed placement for Internship at Architects office is to be completed by the end of the seventh semester. Once selected and confirmed from the office, students are advices to join the office as soon as possible, say from the starting of January so to complete the required duration comfortably.

Students are required to submit all the drawings on which they have worked and supervised by the Architect under whom they completed the training. Student shall submit monthly report, critical appraisal of the built project. The report can be compiled under the following heads:

- Planning and Design
- Presentation drawings
- Working drawings
- Municipal Drawings
- Services design details
- Interiors
- Models
- Site supervision/ Visit
- Estimation & Costing
- Specification

The students shall prepare exhaustive formal Log Book issued by the College, week by week, which will cover detailed record of the work done in the office, site visit reports, interviews with clients and any other agency, interaction with principal architect etc. The professional with the seal of the organization, under whose guidance the student worked, will sign the report and also his reflection about the student's work and his overall approach and attitude towards the office work.

Training Manual / Guidelines provide the details of the expected outline of work and other procedures in detail.

Student Learning Outcomes:

The student will learn to interpret the link between architectural study and practice and the professional aspects of office management.

Pedagogy for Course Delivery:

Students has to go for a 140 working days of practical Office training with the practicing Architect approved by the institute, in a city not to be student's home town. After successful completion of the training students shall prepare a three set of report in a prescribed format containing the details of the work done during the training period which shall include the work report, critical appraisal of the built project, field documentation, architectural details and drawings on which students have worked. All the details and drawings must be duly signed by the principal Architect and must bear the seal of the organization. Students shall also submit the Certificate issued by the Principal Architect of the firm stating the successful completion of his/ her training.

Prerequisite:

Knowledge gained till all previous semesters.

Pedagogy for Course Delivery:

As per Office rules and dependent on Architects approaches.

Assessment / Examination Scheme:

Evaluation of the work of a student for her 140 days of professional practice completed as per the guidelines and manual of Professional Practice will be done through Viva Voice by a panel of Examiners, in her ninth semester, when she will be back to school after her Training. The Evaluation will be on her report and Drawings, she has worked upon at Office.

Theory %	Lab/ practical/studio %	End Term Examination
NILL	100%	NA

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:

- Training manual/report

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Bachelor of Architecture

YEAR V
SEMESTER IX

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YEAR -V, SEMESTER– IX

Course Title	Architectural Design –VIII (Urban Design)	S	L	Lb	Prds	Credits
Course Code	AR 20.501	8	2	4	14	16
Course Type	PC					

Course Objective:

To understand the city/ part of the city, read the issues and after a methodical analysis design the spaces at the urban scale- linking people and their activities with the built fabric in an urban context

Theme : Buildings in Urban Context / Urban issues & concerns / Urban Planning

Introduction to Urban Design. Need for urban design. Visualization of image of the city and its elements. Perception of urban environment: Kevin Lynch's Principles. Understanding the organization and articulation of urban spaces. Urban spaces and urban activities and their response pertaining to Human Sensitivities. Elements of townscape – Gordon Cullen.

A brief background of the Intervention area shall be given to the students. The various subheads in this module shall be; study of historical evolution of the area, studying similar contexts and case examples, Documentation of the Study area (all layers), and also Secondary data Assimilation. The project would be a medium sized urban design intervention.

Analyzing the Documented data, be it the primary data like land-use, movement networks, open space analysis, historicity, condition of the buildings, heights of the buildings as well as secondary data like demographic data, socio economic surveys, services etc. and drawing inferences on the same.

Generation of Concept, Design development, Area program Statement, User Space Analysis, Building Envelopes, Urban Design Guidelines for the area etc. Part of scheme must be done in groups to develop teamwork and multi-faceted approach to design. Models should be made compulsory at every stage for the students to be able to visualize the Design Context.

Analysis leads to generation of issues which when addressed impact the area on a macro scale. Also a vision for integrating the study area into a larger context of the city. Large scale models to be used for assessing site conditions and restrictions.

Suggestive design exercises :

- **Redevelopment of area in Urban context,**
- **River front developments**
- **ISBT's, Metro stations etc.**

Student Learning Outcomes:

Students will interpret and assess urban envelopes and spaces in context of city design. Further, students will relate human activities with built fabric

Pedagogy for Course Delivery:

Documentation through field and Site Observation, and presentation.

Prerequisite:

Understanding developed from previous Architectural Design exercises.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Time Savers Standard for Urban Design
2. Jonathan Barnett, An Introduction to Urban Design
3. Ching, F.D.K., "A Visual Dictionary of Architecture", John Wiley & Sons
4. Norberg-Schulz, C., "Principles of Modern Architecture", Andreas Papadakis
5. University Planning and Architecture: The Search for Perfection by Coulson, Jonathan, Roberts, Paul and Taylor, Isabelle

References:

6. Edmund Bacon , Design of Cities , Penguin, 1976
7. Gordon Cullen, The Concise Townscape, The Architectural Press, 1978
8. Lawrence Halprin, Cities, Reinhold Publishing Corporation, New York, 1964
9. Gosling and Maitland, Urban Design, St. Martin's Press, 1984
10. Kevin Lynch, Site Planning, MIT Press, Cambridge 1967

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YEAR -V, SEMESTER– IX

Course Title	Dissertation	S	L	Lb	Prds	Credits
Course Code	AR 20.503	2	0	4	6	5
Course Type	EEC					

Course Objective:

Dissertation is intended to enlighten on a research topic or thrust area in Architecture and to understand the methodology of the research.

Course Contents:

Module I: Introduction to the topic

To Understand the methodology to undergo a research topic in the field of architecture.

Module II: Selection of the topic

The finalized research topic should be detailed and framework of the research methodology adopted should be outlined in detail in the following sequence.

- A) Topic
- B) Hypothesis
- C) Aim,
- D) Objective
- E) Methodology

Module III: Compilation and assimilation of the data, research collected and methodology.

The Dissertation will include presentation of the topic furnishing the above mentioned information along with selection of case studies of the buildings, structures that are directly associated with the research topic [minimum 2], format / questionnaire for case studies, literature review / study [also minimum 1 case study from secondary sources], requirements, current design trends/ philosophies etc. and to be reflected in a report form and in the form of presentation.

- F) Chaptalization – systematic research on the topic
- G) Case studies- Literature and live
- H) Live research – questionnaires and interviews
- I) Analysis
- J) Conclusion
- K) Suggestions
- L) Bibliography

Guidelines provide the details of the expected outline of work and other procedures in detail.

Student Learning Outcomes:

Student will learn the methodology to undergo a deep research in the field of architecture.

Pedagogy for Course Delivery:

Lectures, Case studies and Seminars

Prerequisite:

Basic understanding of Architectural research and the methodology adopted in research topics of seminars.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**Text :**

1. Design research in architecture: An overview, Murray Fraser, 2011
2. Demystifying Architectural Research: Adding value to your practice: Anne Dye and Flora Samuel, 2013

References:

3. Architectural Research Methods: second addition, Linda Groat, David Wang: willey, 2009

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YEAR -V, SEMESTER– IX

Course Title	Barrier Free Architecture	S	L	Lb	Prds	Credits
Course Code	AR 20.505	0	2	0	2	2
Course Type	EC					

Course Objective:

The subject looks at barrier free design principles and concepts of universal design. Barrier free design principles in urban design. Provides an idea about barrier free construction principles in buildings

Course Contents:

Module I: Introduction to Barrier Free Architecture

Defining the basic concepts of barrier free design, need for barrier free concepts in architecture, concepts of universal design and types of disabilities. Design principles for barrier free architecture and accessibility for all.

Module II: Barrier free elements in Interiors and Urban Design

Design elements outside the building like curb ramps, pedestrian crossing, public toilets, and parking, signage, flooring and street furniture. Case examples of Barrier free architecture in India and across the globe. To study the anthropometrics and dimensions of mobility devices, special fixtures for barrier free design. Barrier free construction materials and dimensions for flooring, walls, doors, windows, staircases, elevators, toilets, entrances and corridors.

Module III: Case Study, Presentation & Design elements

Barrier free architecture in Public Buildings – dimensions and standards. Case Study of Barrier free elements in Public buildings, Photographic documentation and Presentation. Incorporation of barrier free elements in project being pursued in architectural design.

Student Learning Outcomes:

Learning the principles of barrier free design. Understanding of the key aspects and systems of barrier free and disabled friendly built space in architecture.

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. History of Furniture – John Morley
2. Furniture Making Techniques
3. Interior Design: Ahmed Kasu
4. The New Office – Francis Duffy
5. Design Secrets: Office Spaces – Elana Frankel
6. Interior Construction & Detailing – David Kent Ballast

References:

7. A.J. Metric Handbook, editors, Jan Bilwa and Leslie Fair weather
8. Architectural Graphic standards editor – Boaz Joseph
9. Planning – the Architect's handbook, E and E.O.
10. Time Savers Standards for Interiors – JD, JP & MZ
11. Building Construction Illustrated – Francis DK Ching& Cassandra Adams.
12. Designing for the disabled by Selwyn Goldsmith
13. Building access: Universal Design and the Politics of Disability by Aimi Hamraie

Web link

14. https://www.ted.com/playlists/372/designing_for_disability

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YEAR -V, SEMESTER– IX

Course Title	Sustainable Architecture & Cities	S	L	Lb	Prds	Credits
Course Code	AR 20.507	0	2	0	2	2
Course Type	EC					

Course Objective:

Understand the concept of smart city: how to attain sustainability, Concepts of sustainable systems relating to energy, water, food and urban living; system modeling and simulation.

Course Contents:

Module I: Concepts of sustainability, Planning & Design

Energy and Global environment, Energy use and Climate change – Its Impact, Types of Energy systems, Concept of Sustainability - Principles of conservation -synergy with nature. Introduction to Sustainable Development. Sustainable approach to site planning and design - site inventories- relationships between site factors Development impacts from one area of the site on the other areas. Model ecosystem of the site, phasing of development - limits of change. Design facility within social and environmental thresholds Solar passive/ Active techniques.

Module II: Sustainable Building Materials and Construction

Properties, Uses and Examples of -Primary, secondary and Tertiary Sustainable Materials, Principles to improve energy efficiency - siting and vernacular design, shade, ventilation, earth shelter, thermal inertia and air lock entrances. Techniques of sustainable construction - technologies, methods of effectiveness, and design synthesis. Alternative materials and construction methods: Use of local materials and on site growth of food, fuel and building materials

Module III: Recycling and Reuse

Pre building, Building, Post building stages - Architectural Reuse, Waste prevention, Construction and Demolition recycling- Conservation of natural and building resources. Energy and material savings. Elimination of waste and minimize pollution- various Decomposition methods Innovative reuse of various wastes

Module IV: Introduction to Smart City concepts and Intelligent buildings

Explores the challenges facing urban environments. The system of systems that comprise a city. Sustainable Frames the attributes of a smart city. Explores converged physical/digital structures that respond to & anticipate the needs/actions of occupants and are aware of the environment around them.

Module V: Sustainable Sites, Area Planning

Site identification, evaluation and selection
Site inventories of physical, biological, and cultural attributes

Student Learning Outcomes:

Students will learn the science of Sustainability at Building level and at City level and its principal.

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Principles and practice of Town and Country Planning, Kebble
2. Urban and Regional Planning – A System Approach, J. B. McLoughlin
3. Town Planning in its social context, G. Cherry
4. Integrated approach to sustainable Development by B.C.Bose
5. Environmental control systems Heating, Cooling, Lighting By Fuller Moore
6. Sustainable practices in built Environment by Caring A.Langston, Grace K.C.Ding
7. Sustainable Building Design Manual Vol I & II

References:

8. The Development of the Planning Process, J. F. Amos
9. Ekistics: An Introduction to the Science of Human Settlements, C. A. Doxiadis
10. Town Planning in Ancient India, BinodeDutt
11. Urban Pattern, Arthur B. Gallion

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YEAR -V, SEMESTER– IX

Course Title	Art & Craft Of Rajasthan	S	L	Lb	Prds	Credits
Course Code	AR 20.509	0	2	0	2	2
Course Type	EC					

Course Objective:

To Understand the Cultural Tradition and its impact on art and craft of Rajasthan. Understanding use of traditional and local material in the construction Industry and craft.

Course Contents:

Module I: Back Ground & Regional formation of Rajasthan :

Traditional geographical, political and cultural divisions; Pre and Post history of Rajasthan focusing on various prehistoric cultures; Inter-religious relationship aspects of Arts and craft, Literature and cultural relations with neighboring states during respective historical eras.

Module II: Classification of Arts and Craft based on nature and material used

The *Chhatiskarkhana* of Jaipur, Craft – Jewelry, metal, wood, lac based, crafts, textile, paper craft, miscellaneous arts etc. Miniatures painting, frescoes, Tribal craft, Influence of art and Craft in Built form.

Module III: Building Stone Craft tradition in Rajasthan :

Rock formations in Rajasthan and stone types; Shaping the stones – quarrying, selection, dressing, finishing, carving, patterning, Stone craft clusters in Rajasthan, Stone masonry –walls, Jalties, Cladding, and finishing.

Module IV: Building Elements in Stone :

Structural elements in stone - foundation , Coloumns, beams, brackets, and roofs – flat and domed Architectural elements in Stone – jharokas, coping, railings, jaalis; Landscape elements in stone – fountain , waterbodies, benches, signage, lamps etc. Interior elements in Stone – Sculptures, Artifactsof various shorts. Maintenance of Stone Buildings

ModuleV : Reinterpretation of Stone Craftsmanship :

The new generation artisan; Innovation and adaptation to new tools and applications in stone; contemporary uses of stone while studying works of Raj Rewal, Charles Correa, Ashok B. Iall and Nimesh Patel.

Student Learning Outcomes:

Students will understand the interrelationship of culture and its impact on art forms of Rajasthan.

Pedagogy for Course Delivery:

Lectures, Case studies and Seminars and Site Visits.

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**References:**

1. Rima Hooja, History of Rajasthan, Rupa Co.
 2. The stone craft of Rajasthan- A Manual , CDOS Jaipur
 3. V.S. Bhatnagar, Life and Time of Sawai Jai Singh, Impex India,
 4. Rajasthan State Gazetteers, Volume 2, History and Culture.
 5. Jadunath Sarkar, History of Rajasthan.
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SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
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YEAR -V, SEMESTER– IX

Course Title	Urban Design Theory	S	L	Lb	Prds	Credits
Course Code	AR 20.511	0	2	0	2	2
Course Type	PC					

Course Objective:

Understanding the scope and nature of urban design as a discipline and components of a city and their interdependent roles. Interpreting the city in different ways and layers and understanding contemporary urban issues as well as learn about possible ways to address them.

Course Contents:

Module III : Introduction to Urban Design

Components of urban space and their interdependencies- outline of issues/ aspects of urban space and articulation of need for urban design- scope and objectives of urban design as a discipline.

Module III : Historic Urban Form

Morphology of early cities in western world- Greek agora, Roman forum, Medieval towns and Renaissance ideal cities. Industrialization and city growth, the eighteenth century city builders, Garnier's industrial city, the American grid planning, anti-urbanism, the picturesque cite industrielle and radiant city.

Module III : Evolution of urbanism in India

Temple towns in India, Mughal city form, medieval cities, colonial urbanism, urban spaces in modernist cities. Case studies of Chandigarh, Bhubaneshwar, Amritsar and Gandhi Nagar.

Module III : Theories of Urban Space

Ideas of Image ability and townscape: Cullen, Lynch, collective memory, historic reading of the city and its artefacts. Rossi- social aspects of urban space: life on street and between buildings, gender and class, Jane Jacobs, William Whyte.

Module III : Issues of Urban Space

Understanding and interpreting the urban problems/ issues, place-making and identity, morphology: sprawl, generic form, incoherence, privatized public realm, roles of real estate, transportation, zoning, globalization, ideas of sustainability, heritage conservation and renewal, contemporary approaches: idea of urban catalyst, transit metropolis, community participation.

Module III : Best Practice in Urban Design

Contemporary case studies from developing and developed economies that offer design guidelines and solutions to address various issues/ aspects of urban space.

Student Learning Outcomes:

Knowledge and understanding of Urban Issues, Concepts and Interpreting Cities.

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**Text book**

1. By The City/For The City: Anne Guiney
2. Combinatory Urbanism: Thom Mayne
3. A Country of Cities: Vishaan Chakrabarti
4. The Death and Life of Great American Cities: Jane Jacobs
5. The Nature Of Urban Design alexandros Washburn
6. A New Theory Of Urban Design: Christopher Alexander

References:

7. A.E.J. Morris, "History of Urban Form before the Industrial Revolution", Prentice Hall, 1996.
8. Edmund Bacon, "Design of Cities", Penguin, 1976.
9. Gordon Cullen, "The Concise Townscape", The Architectural Press, 1978.
10. Michelle Provoost et al., Dutchtown, NAI Publishers, Rotterdam, 1999.
11. "Time Saver Standards for Urban Design", Donald natson, McGraw Hill, 2003.
12. Kevin Lynch, "The Image of the City", MIT Press, 1960.
13. Rithchie. A, "Sustainable Urban Design: An Environmental Approach", Taylor & Francis, 2000.
14. Jonathan Barnett, "An Introduction to Urban Design", Harper Row, 1982.
15. Lawrence Halprin, "Cities", Reinhold Publishing Corporation, New York, 1964.
16. Gosling and Maitland, "Urban Design", St. Martin's Press, 1984
17. Molcolm Moor, "Urban Design Futures", Routledge, 2006
18. Geoffrey Broadbent, "Emerging Concepts in Urban Space Design", Taylor & Francis, 2003.

Web link

19. https://www.mfe.govt.nz/sites/default/files/media/Extra%20downloads/Other%20documents/urban-design-case-studies-bw_0.pdf
20. https://issuu.com/sminusudhakaran/docs/kolkata_ud
21. <https://www.ijser.org/researchpaper/Urban-streets-and-nodes-A-case-of-Bangalore.pdf>
22. <https://archnet.org/sites/6398/publications/6714>

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Bachelor of Architecture

YEAR V
SEMESTER X

SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -V, SEMESTER– X

Course Title	Architectural Thesis	S	L	Lb	Prds	Credits
Course Code	AR 20.502	10	0	6	16	18
Course Type	PC					

Course Objective:

- To prepare a student to independently handle and present all aspects of an architectural design: from its evolution to final solution in totality.
- To understand the importance of the evolutionary stages of a design process and to attain independent professional approach analysis based design projects achieving high level of workability, efficiency and aesthetics in 3-D form with all the services properly worked out.
- To demonstrate the understanding of a systematic design process which includes identification of project requirements, site study and analysis, case studies, programming, schematic design and Design Development.
- It provides the students with an opportunity to culminate the nine semesters of architectural education by demonstrating the body of knowledge and skills gained during their education and the professional training

Pedagogy :

Project Introduction & Synopsis

An introduction to the thesis project, submitting synopsis; finalizing topic which should be Architectural/ building Design based. Introduction to the thesis design and get the project approved with the finalization of thesis guides.

Literature Review & Analysis

Study of various literatures in the form of published papers, architectural theories, articles or other piece of literature related to the thesis topic.

Study of various projects (minimum 2 for literature study) of similar nature & magnitude under the heads like, site plan, Plan with functions, Geometry & Structure of the building, Area study, Section Studies, Circulation; Vehicular, Pedestrian & Parking, etc., Service ; Areas under various services i.e. Electric , HVAC, Fire Fighting , Building Automation System, Materials & Fenestration ; Standards of the place to be studied. Pros and cons in the design; Inference & Inputs to be drawn from the case studies; comparison to be done with standards.

Primary Case Studies & Analysis

Study of various case studies (minimum 2 for primary case study) of similar nature & magnitude under the heads like, site plan, Plan with functions, Geometry & Structure of the building, Area study, Section Studies, Circulation; Vehicular, Pedestrian & Parking, etc., Service ; Areas under various services i.e. Electric , HVAC, Fire Fighting , Building Automation System, Materials & Fenestration ; Standards of the place to be studied. Pros and cons in the design; Inference & Inputs to be drawn from the case studies; comparison to be done with standards.

Site study and analysis/ Requirement framing of project

Relevance of site selection; detailed site analysis focusing on parameters like climate, topography, landscape, neighborhood analysis, building bye laws, environmental sustainability, site services, soil bearing capacity, volumetric analysis, Inferences of site analysis including zoning plan. Along with the framing of requirements, a detailed area program of the proposed design project needs to be done.

Concept Development

Development of concept at various stages and levels with conceptual drawings, model and 3-D sketches. Design to be developed through a series of appraisals and open discussions. Design and planning at site as well as building level to be finalized.

Design Development

Project design development may be progressively done in 2-3 stages with emphasis on building Plans at various levels; Elevations & Sections of all the buildings, 3D depiction of the design with the tools of views, Perspectives etc.

Final Presentation

Complete project development and analysis. Drawing sheets & report to be compiled containing all the details of the project. Presentation in terms of 3-D drawings and detailed Model to be submitted. Mode of presentation may be mutually devised by the faculty and student that may be project specific.

Pedagogy for Course Delivery:

- Selection of site, Project, and Synopsis is to be submitted by the student in IX sem.
- Approval of the Project and site is to be finalized and completed by the Panel of guide, Senior faculty members, and HOD.
- After Finalization of the project and site, students must move out for three to five days, depending on their site/ case study location, by their own and on their own expenses for the detail study of the site and case studies.
- Evaluation and assessment should be done only through Juries and reviews
- Minimum 4 and max. 6 stages of assessment/ juries for Sessional marking is to be conducted.
- All Internal assessment Juries must be done by panel of internal Jurors, comprising Guide, HOD, and senior faculty.
- End Term Viva Voice/ Jury must be conducted by the Panel of External examiners comprising min. one professional Architect from the field and one Professor from the academics.
- Set of three reports to be submitted at the time of End term VV, from which one duly signed hard copy will be returned to the students, one will be the Library copy, and one for the Guide.
- The report is to submitted in a prescribed format.

Prerequisite:

- Min. 10'000/- Sq. meter built-up is essential in a site of 3 to 5 Hectare land Area.
- Project may the Proposed, Ongoing, or hypothetical Gov./ Private Projects, of same magnitude and nature.

Student Learning Outcomes:

The students will produce the complete design solution for a projects comprising of all the required drawings, service details and structural techniques with a support of 3-D or static model.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Texts:**

1. Complexity and Contradiction in Architecture, by Robert Venturi
2. Intention in Architecture, N. S. Christian
3. Form and Structure, D. Philip and O. Frei
4. Modern Architecture through Case Studies, Peter Blundell Jones
5. Site Planning Standards, J. D. Chaiara
6. Planning – the Architect’s handbook, E and E.O
7. Form and Structure, D. Philip and O. Frei
8. Practical Plane and Solid Geometry – H. Joseph and Morris

References:

9. Time Saver Standards, J. H. Callender and J. D. Chaiara
10. Neufert’s Architects Data, V. Jones, Ed. Gen.
11. Architectural Graphic standards editor – Boaz Joseph
12. Architectural Thesis completed by Students
13. UDPFI Guidelines, MoUD, 1996
14. Time Saver standards for building types, Editor Joseph D.C. and John Callender.

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YEAR -V, SEMESTER– X

Course Title	Landscape Design Studio	S	L	Lb	Prds	Credits
Course Code	AR 20.504	0	2	2	4	3
Course Type	EC					

Course Objective:

Understanding the theoretical and practical aspects of designing the interiors of a building. To acquaint the student with the various natural elements used to design transitional and outside spaces and establish a linkage between nature and the built environment

Course Contents:

Module I: Introduction and basic principles of Landscape design

Definition, scope, landscape architecture in relation to architecture. Landscape design elements and principles, historical review of gardens in India, Persia, Japan, Italy, France and England , contemporary landscape design

Module II: Elements of Landscape Design :

Understanding Landscape layout, with all its elements like Plants- its type, suitability, paving, roads, pathways, exterior lighting, water bodies etc. with the construction technique, types, construction materials, cost estimation, understanding works of great masters.

Module III: Designing with Plants

Plant ecology and processes: aquatic plants, terrestrial plants, Climatic adaptation in plants
Classifications in plant kingdom, Ecological sensitive plantation, Spatial principles of planting design, Planting techniques and maintenance.

Land Scape Architectural design exercises :

Students will select a part /s of the green space/s of their Thesis Project and will complete their landscape design with all required sheets of that part as their Land Scape studio. These sheets may be added as additional sheet to their Thesis Sheet for their External Jury.

Student Learning Outcomes:

Student will learn the basic principal of Landscape Architecture and its practical use in construction Industry.

Pedagogy for Course Delivery:

The course will be delivered by means of lectures, Assignments and group presentation by students.

Prerequisite:

Knowledge of basic Art and materials.

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
NILL	100 %	PR/R/VV/P/SW	VV

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. An Introduction to Landscape architecture by M. Laurie.
2. An Introduction to Landscape Design by H. V. Hubbard
3. Fundamentals of Landscaping and Site Planning by James B. Root.
4. History of Garden Design by D. Clifford
5. Tropical Garden Plants in Colour by Bose and Chowdhury
6. Architectural Graphics: C. Leslie Martin
7. Perspective for the Architect: Themes and Hudson
8. Perspective and Sciography, Shankar Mulik
9. Architectural Graphics – Ching Frank

References:

10. Colour and Design for Every Garden by Ortoloff and Raymore
11. Design with Nature by I.Mcharg
12. The Way We Live by Alfresco
13. New Landscape Design by Robert Holden
14. Fundamentals of Ecology by M. C. Dash.
15. Landscape Detailing by Michael Ittlewood.
16. A.J. Metric Handbook, editors, Jan Bilwa and Leslie Fair weather
17. Architectural Graphic standards editor – Boaz Joseph
18. Planning – the Architect's handbook, E and E.O.

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YEAR -V, SEMESTER– X

Course Title	Alternate source of energy and built environment	S	L	Lb	Prds	Credits
Course Code	AR 20.506	0	2	0	2	2
Course Type	EC					

Course Objective:

Understanding role of alternative sources of energy in built environment. Understanding the methodology to be followed and application while using other sources of energy in a building.

Course Contents:

Module I: Introduction to alternative sources of energy:

Understanding the other sources of energy – solar energy, wind energy, tidal energy etc. Scope and factors influencing built environment. Site and climatic requirements, site constraints, construction and technical requirements and limitations.

Module II: Understanding Application of Solar energy in architecture

Ways of adopting energy in architecture :-- Active and Passive. Carefully study the examples of both.

Module III: Live study & Application

To understand the thorough application of renewable and alternative energy, students should visit and submit a detailed report on any one building using solar energy.

Student Learning Outcomes:

To familiarize with the technologies using renewable sources of energy in developing and harnessing energy for built environment .

Pedagogy for Course Delivery:

The course is delivered through lectures, field trips and presentation by the students

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:

1. CLIMATE RESPONSIVE ARCHITECTURE:A Design Handbook for Energy Efficient Buildings.ArvindKrishan (Author), Nick Baker (Author), SimosYannas (Author),Steve Szokolay (Author)
2. A Golden Thread: 2500 Years of Solar Architecture and Technology by Ken Butti (Author), John Perlin (Author)

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YEAR -V, SEMESTER– X

Course Title	Project Management	S	L	Lb	Prds	Credits
Course Code	AR 20.508	0	2	0	2	2
Course Type	EC					

Course Objective:

Basic knowledge about construction industry, project management techniques needed for managing and coordinating building projects in a professional manner. Understanding of basic building execution process having a quality construction project from start to completion while maintaining budget, schedule, and safety requirements

Course Contents:

Module I: Introduction to Project Management

Introduction to project management, construction industry, stakeholders, roles, responsibilities and functional relationships, Construction projects – objectives and lifecycle, existing construction practices & project management systems, Project Team, organization, roles, responsibilities.

Module II: Introduction to Project Planning

Concepts of project planning, scheduling & controlling. Project scale and construction technology, Human aspects in managing projects.

Module III: Project Planning and Scheduling & Monitoring

Inputs for project planning, defining activities and their interdependency, Time and resource estimation. Work breakdown structures. Linear scheduling methods - bar charts, LOB, their limitations. Principles, Definitions of network based scheduling methods: CPM, PERT. Network representation, Network analysis – forward and backward passes. Site layout and organization, Site investigations. Quality tests for construction material and processes. Project direct and indirect costs. Safety in Construction Projects.

Module IV: Resources Management and Value Engineering

Methods of material/resource estimation and management,

Resources scheduling and levelling.

Construction equipment types, characteristics & applications.

- Value engineering, its application in building design and construction.
- Labor welfare, applicable labor Legislations.

Student Learning Outcomes:

Students will learn networking techniques and construction planning practices.
Use of construction equipment and method along with quality control

Pedagogy for Course Delivery:

Lecture based learning along with exercises as tutorials related on the lecture delivery.

Prerequisite:

NILL

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**Text:**

1. Construction, Planning Management – U.K.Srivastav
2. Construction Planning, Equipment and Methods – R.L. Peurifoy
3. Construction Performance control ny networks – H.N. Ahuja
4. Construction Project Management – K.K. Chilkar
5. Construction Planning and Management – M.B. Dhir& S.P. Ghilot

References:

6. Project Management – S. Chaudhary
7. Project Management with CPM and PERT – Moder and Philipese
8. Construction Method and Techniques – MullickMullind

Web link:

9. https://www.coa.gov.in/pub_show.php?det=1&pub_id=11&lang=1
10. [https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/doc/stan_pah/PAH%202016%20Chapter%207%20Rev%2000%20\(clean\)-161229.pdf](https://www.cedd.gov.hk/eng/publications/standards_handbooks_cost/doc/stan_pah/PAH%202016%20Chapter%207%20Rev%2000%20(clean)-161229.pdf)
11. https://indiacode.nic.in/handle/123456789/2187?view_type=browse&sam_handle=123456789/1362
12. https://www.designingbuildings.co.uk/wiki/Tender_documentation_for_construction_projects

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YEAR -V, SEMESTER– X

Course Title	Digital Design	S	L	Lb	Prds	Credits
Course Code	AR 20.510	0	2	0	2	2
Course Type	EC					

Course Objective:

Understanding Digital Design system, Techniques and Illustrations to achieve design formulation of most complex Architectural Design patterns.

Course Contents:

Module I: Introduction to Digital design

Digital Design and its Practices. Digital or Computational Designs such as Parametric, Metamorphic etc. and their techniques. Inter relationship of geometric and architectural parameters.

Module II: History and evolution of Digital Architecture.

Works of Gehry Partners, Zaha Hadid, Morphosis, SOM, KPF, Foster and Partners, Greg Lynn etc. with respect to computational design and contemporary Practices.

Module III: Computational Design Thinking & Fundamental of Software :

Basic Concept formulation, computational thinking and lexicon, visualization, Rhino + Grasshopper (exploring new NURB system, using generative algorithms and 3D modeling tools and required plug-ins.

Module IV: Digital Fabrication & Scaled Models :

Creation of Shop Drawings (Drawings used for fabrication and production) . coordination of Autodesk software with Rhino, grasshopper and similar files format. Introduction to 3D printing. Laser cutting and fabrication techniques.

Module V : Design Portfolio :

At the end of the term, a portfolio will be made containing process documentation (Sketches, diagram both 2D and 3D) by setting up a layout or a scheme (Composition of information on paper) using Adobe Illustration & In-design.

Student Learning Outcomes:

Understanding the complex design and its implementation through computer software's.

Pedagogy for Course Delivery:

Lectures, Case studies and Seminars and Practicals

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, **PRC** : Practical, **R** : Review, **MSE**: Mid semester Exam, **VV**: Viva Voice, **P**: Project, **CT**: Class test, **SW** : Studio Work.

Text & References:**References:**

1. Jane Burry + Mark Burry : The New mathematics of Architecture, Thames & Hudson.
 2. Helmut Pottman, Andrea Asperl, Michael Hofer & Axel Kilian; Architectural Geometry
 3. Roland Knauer, Transformation; Basic Principal & Methodology of Design,
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YEAR -V, SEMESTER– X

Course Title	Architecture Conservation	S	L	Lb	Prds	Credits
Course Code	AR 20.512	0	2	0	2	2
Course Type	EC					

Course Objective:

To appraise the students about the architectural conservation and sensitize them the values of heritage and traditional building materials needed in restorations.

Course Contents:

Module I: : Introduction

Introduction to historic structures; Values and Ethics in Conservation, the various principles and scope.

Module II: Terminologies, Charters and Acts

Terminologies such as Authenticity, Integrity, Adaptive Reuse, Preservation, Rehabilitation, Prevention, Conservation, Restoration, Reproduction, Reconstruction defined in the various charters such as the Burra Charter, Nara Document, Venice Charter, Florence Charter, INTACH Charter

Legal Framework in Indian context :

AMASR Act, State Acts, Antiquities and Art Treasures Act, Role of Archeological Survey of India, National Monument Authority, etc in protection of heritage in India.

Module III: Traditional Materials and decay patterns

Introduction to building materials: location, formation, physical and chemical properties and sourcing of building materials; Diagnosis and assessment of defects in building materials. Natural stones, Granite, Brick, Concrete, Various types of wood and wooden construction. Study of various types of mortars and plastering, steel and plastic, glass. Lime and stucco, paints and painting.

Module IV: Conservation Methods and Practices

Typology of historic buildings pertaining to regional context; Study of structural behavior of historic building as a whole; Identification and mapping of structural problems; Remedial measures – different techniques pertaining to each problems and case studies.

Module V: Professional Practice

Understanding historic buildings/site; Demarcation of historic sites and its relationship to surroundings; Understanding the building and composition of building materials; Identification of function, use and condition of the buildings/site; Statement of Significance of historic buildings/site; Condition assessment; Maintenance, Management and Conservation plan.

Student Learning Outcomes:

Students will interpret the knowledge of architectural conservation specifically catering to the regional heritage & awareness of holistic nature of restoration and conservation practices.

Pedagogy for Course Delivery:

Lectures, Case studies and Seminars

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**Text:**

1. An Introduction to Conservation by B. M. Feildan
2. Conservation Handbook- INTACH Publications
3. Why Lime? By SangeetaBais- INTACH Publications
4. Stone Glossary by ICOMOS Publications
5. Charters and Guidelines by UNESCO

References:

6. The Conservation of Historic Buildings by B. M. Feildan
7. Manual on Systems of Inventorying Immovable Cultural Property, UNESCO, 1984

Web link

8. <https://cpwd.gov.in/Publication/ConservationHertBuildings.pdf>
9. <http://www.intach.org/publications.php>
10. https://www.indiaculture.nic.in/sites/default/files/E-Book/MinofCulture_eBook_17-02-2015.pdf
11. https://www.researchgate.net/publication/316643759_HERITAGE_CONSERVATION_IN_INDIA_CHALLENGES_AND_NEW_PARADIGMS
12. https://pearl.niua.org/sites/default/files/books/GP-IN4_HERITAGE.pdf

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YEAR -V, SEMESTER– X

Course Title	Disaster Mitigation	S	L	Lb	Prds	Credits
Course Code	AR 20.514	0	2	0	2	2
Course Type	EC					

Course Objective:

Occurrence, causes and consequences of disaster and understanding of fundamental concepts and application of disaster resilient design.

Course Contents:

Module I: : Introduction to Disaster Management

Define and describe disaster, hazard, emergency, vulnerability, risk and disaster management
Identify and describe the types of natural and non-natural disasters. Important phases of Disaster Management Cycle

Module II: Disaster Mitigation and Preparedness

Natural Hazards: causes, distribution pattern, consequences and mitigation measures for earth quake, tsunami, cyclone, flood, landslide drought etc.

Man-made hazards: causes, consequences mitigation measures for various industrial hazards/disasters, Preparedness for natural disasters in urban areas.

Module III: Risk Assessment & Emergency Management Systems (EMS):

Assessment of capacity, vulnerability and risk, vulnerability and risk mapping, stages in disaster recovery and associated problems.

Emergency medical and essential public health services, response and recovery operations, reconstruction and rehabilitation.

Module IV: Application of Geo-informatics and Advanced Techniques:

Use of Remote Sensing Systems (RSS) and GIS in disaster Management, role of knowledge based expert systems in hazard scenario, using risks-time charts to plan for the future, early warning systems
Integration of public policy. Planning and design of infrastructure for disaster management, Community based approach in disaster management, methods for effective dissemination of information, ecological and sustainable development models for disaster management.

Student Learning Outcomes:

Knowledge of Natural and Manmade disasters and its managements from micro to macro level.

Pedagogy for Course Delivery:

Lectures, Case studies and Seminars

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**References:**

1. "Natural Hazards and Disaster Management: Vulnerability and Mitigation" by R B Singh
2. "Disaster Management and Mitigation approaches in india" by Paritosh Srivastava,
3. "Management and Mitigation of Natural Disasters" by Rajan Kumar Sahoo,
4. "Disaster Mitigation and Management: Post-Tsunami Perspectives" by Jegadish P Gandhi,
5. "Disasters: Strengthening Community Mitigation and Preparedness" by Khanna B K
6. "Strengthening Resilience in Post – Disaster Situations: Stories, Experience and Lessons from South Asia" by IDRC
7. "Disaster Management at Health Care Settings Comprehensive Assessment and Effective Mitigation" by Shreen Gaber

Web link

8. https://www.researchgate.net/publication/292655874_Disaster_Mitigation
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SCHOOL OF ARCHITECTURE
MODY UNIVERSITY
LAKSHMANGARH, RAJASTHAN



YEAR -V, SEMESTER– X

Course Title	Product Design	S	L	Lb	Prds	Credits
Course Code	AR 20.516	0	2	0	2	2
Course Type	EC					

Course Objective:

Understanding the product design process and research and understanding the utility of the product designing in present scenario.

Course Contents:

Module I: Introduction :

Product design and its types and need. Role of Product designer, product design process,- research, development, production, and marketing. Difference between Industrial product design.

Module II: Historical & Cultural context of Product Design :

Industrial revolution, Great reform movement, 1850 – 1914, Modernism to pre-World War; 1900 – 1945, Post World War 1945 – 1970s, Post Modernism; 1970 – 2000, Emerging design trends of 21st Century.

Module III: : Common material and their application :

Materials used for Product designing- Hard Materials, Wood, Metal, Stone, Plastic, Synthetic materials. Manufacturing processing and process using these materials.

Module IV: Design and Production:

Concept generation and methods and design, Developing Design via Sketching, on scale drawing techniques, skills – analog and digital, Technical drawings – design and detail and model on scale. Emphasis on ergonomics, material and aesthetics and User experience.

Module V : Design :

The subject may be integrated with the concurrent course of design problem. A portfolio comprising of design for products, presented in an appropriate scale. The design must fulfill the requirements such as ergonomics, aesthetics, and construction techniques.

Student Learning Outcomes:

Students will understand the use and utility of product design and materials and techniques used for Designing different types of products .

Pedagogy for Course Delivery:

Lectures, Case studies and Seminars and Site Visits.

Prerequisite:

Nil

Assessment/ Examination Scheme:

Theory %	Lab/ practical/studio %	Sessional work	End Term Examination
100%	0%	PR/P/CT/MSE	Theory

PR : Presentation, PRC : Practical, R : Review, MSE: Mid semester Exam, VV: Viva Voice, P: Project, CT: Class test, SW : Studio Work.

Text & References:**References:**

1. Juli Capelia & Quim Larrea, Designed by Architects in the 1980's.
2. Roland Knauer, Transformation : Basic Principal & Methodology of Design
3. European Masters 3 Vol. 10 Industrial design, EDICIONES Atrium S.A.,
4. Drawings for 3 dimensional Design, Concept, Presentation Illustration , Thames & Hudson.
5. Robert W. Gill; Rendering with pen & Ink. Thames & Hudson..