



**DEPARTMENT OF ARCHITECTURE
AU COLLEGE OF ENGINEERING, ANDHRA UNIVERSITY**

**SCHEME OF INSTRUCTIONS & EVALUATION
CHOICE BASED CREDIT SYSTEM PATTERN**

w.e.f. ADMITTED BATCHES 2015-16

Program Educational Objectives (PEOs)

The curriculum of the Bachelor of Architecture programme is specifically intended to equip graduates with the necessary aptitude and expertise.

- PEO1** Holistic Development: To produce architects who possess comprehensive knowledge in the core areas of architectural design, building materials, construction techniques, and environmental science, and are also equipped with essential life and soft skills.
- PEO2** Interdisciplinary Approach: To cultivate an understanding of the interdisciplinary nature of architecture, encompassing history, urban design, climatology, structural mechanics, and computer applications, ensuring that graduates can effectively collaborate with diverse teams in the professional world.
- PEO3** Ethical and Sustainable Practice: To instill values of sustainable design, environmental consciousness, and ethical professional practices, enabling graduates to contribute positively to society and the built environment.
- PEO4** Research and Lifelong Learning: To foster a culture of research, critical thinking, and lifelong learning, encouraging graduates to continuously adapt to evolving architectural trends, technologies, and global challenges.

Program Outcomes (POs):

- PO1** Knowledge: Demonstrate an understanding of foundational concepts in architectural design, history, and building materials.
- PO2** Design Skills: Apply design principles to create functional, aesthetic, and sustainable architectural solutions.
- PO3** Analysis: Evaluate architectural designs based on functionality, aesthetics, and sustainability.
- PO4** Investigation: Conduct site surveys and research to inform design decisions.
- PO5** Modern Tool Usage: Utilize advanced computer applications and software in architectural design and visualization.
- PO6** Interdisciplinary Collaboration: Work effectively in interdisciplinary teams, integrating inputs from structural mechanics, climatology, and building services.
- PO7** Environment and Sustainability: Design structures with a focus on environmental sustainability, climatic responsiveness, and energy efficiency.
- PO8** Ethics: Practice architecture with professional ethics, considering societal, cultural, and environmental impacts.
- PO9** Communication: Communicate architectural ideas effectively through drawings, models, and verbal presentations.
- PO10** Project Management: Demonstrate skills in project management, estimation, costing, and maintenance of architectural projects.
- PO11** Lifelong Learning: Show a commitment to continuous learning, staying updated with evolving architectural trends and technologies.
- PO12** Innovation and Creativity: Exhibit creativity and innovation in architectural designs, considering the latest global trends and local contexts.

Program Specific Outcomes (PSOs):

- PSO1** Sustainable Design: Develop expertise in sustainable and bio-climatic architecture, with a focus on green buildings, rating systems, and sustainable urban communities.
- PSO2** Advanced Building Services: Gain specialized knowledge in advanced building services, including acoustics, electrical, HVAC, and water supply.
- PSO3** Professional Electives Mastery: Demonstrate proficiency in chosen elective areas such as architectural conservation, disaster-resistant buildings, interior design, or bio-climatic architecture.
- PSO4** Research & Dissertation: Engage in architectural research, culminating in a comprehensive design thesis and dissertation, showcasing in-depth understanding and innovative solutions to contemporary architectural challenges.



**DEPARTMENT OF ARCHITECTURE, AU COLLEGE OF ENGINEERING (A)
ANDHRA UNIVERSITY**

**SCHEME OF INSTRUCTIONS & EVALUATION
CHOICE BASED CREDIT SYSTEM PATTERN**

w.e.f. ADMITTED BATCHES 2015-16

1/5 B.ARCH 1ST SEMESTER										
Code	Title of Subject	Scheme of Instruction					Scheme of Examination			Duration of exam
		Credits	Lectures (periods/week)	Drawing (periods/week)	Lab Hrs	Total (periods/week)	Internal	External	Total	
AR111	Basic Design & Visual Arts	8	2	6	-	8	50	50	100	5 Hrs.
AR112	Architectural Drawing & Graphics-1	5	2	3	-	5	50	50	100	5 Hrs.
AR113	Building Materials & Building Constructins-1	6	2	4	-	6	50	50	100	5 Hrs.
AR114	Introduction to Architecture, Art & Culture	3	3	0	-	3	30	70	100	3Hrs.
AR115	Structural Mechanics-1	4	4	0	-	4	30	70	100	3Hrs.
AR116	English	3	3	0	-	3	30	70	100	3Hrs.
AR117	Survey & Site Studies	3	2	0	3	5	50	50	100	Practical
AR118	Sports/NSS/NCC	2	3	0	-	3	-	-	-	
	Total	34	21	13	3	37	290	410	700	

1/5 B.ARCH 2nd SEMESTER										
Code	Title of Subject	Scheme of Instruction					Scheme of Examination			Duration of exam
		Credits	Lectures (periods/week)	Drawing (periods/week)	Lab Hrs.	Total (periods/week)	Internal	External	Total	
AR121	Architectural Design-I	8	2	6	-	8	50	50	100	5 Hrs
AR122	Architectural Drawing & Graphics-II	5	2	3	-	5	50	50	100	5 Hrs
AR123	Building Materials & Building Construction-II	6	2	4	-	6	50	50	100	5 Hrs
AR124	History of Architecture -I	3	3	0	-	3	30	70	100	3 Hrs.
AR125	Structural Mechanics-II	4	4	0	-	4	30	70	100	3 Hrs.
AR126	English Lab	2	3	0	-	3	50	50	100	3 Hrs.
AR127	Workshop Practice	3	2	0	3	5	50	50	100	Practical
AR128	Sports/NCC/NSS	2	3	0	-	3	-	-	-	-
	Total	33	21	13	3	37	310	390	700	



DEPARTMENT OF ARCHITECTURE, AU COLLEGE OF ENGINEERING

SCHEME OF INSTRUCTIONS & EVALUATION

w.e.f. ADMITTED BATCHES 2015-16

CHOICE BASED CREDIT SYSTEM PATTERN

2/5 B.ARCH 1ST SEMESTER									
Code	Title of Subject	Scheme of Instruction				Scheme of Examination			Duration of exam
		Credits	Lectures (periods/ week)	Drawing (periods/ week)	Total (periods/ week)	Internal	External	Total	
AR211	Architecture Design-II	8	2	6	8	50	50	100	10 Hrs.
AR212	Building Materials & Building Construction-III	5	2	3	5	50	50	100	5 Hrs.
AR213	Structural Mechanics-III	4	4	0	4	30	70	100	3Hrs.
AR214	History of Architecture-II	4	4	0	4	30	70	100	3Hrs.
AR215	Building Services-I (Water supply & Sanitary Engineering)	4	4	0	4	30	70	100	3Hrs.
AR216	Climatology-I	4	3	1	4	30	70	100	3Hrs.
AR217	Seminar-I	2	2	1	3	50	50	100	Viva-Voce
	Total	31	21	11	32	270	430	700	

2/5 B.ARCH 2nd SEMESTER									
Code	Title of Subject	Scheme of Instruction				Scheme of Examination			Duration of exam
		Credits	Lectures (periods/ week)	Drawing (periods/ week)	Total (periods/ week)	Internal	External	Total	
AR221	Architectural Design-III	8	2	6	8	50	50	100	10 Hrs
AR222	Building Materials & Building Construction-IV	5	2	3	5	50	50	100	5 Hrs
AR223	Design of Structures-I	4	4	0	4	30	70	100	3 Hrs.
AR224	History of Architecture-III	4	4	0	3	30	70	100	3 Hrs
AR225	Building Services-II (Building Acoustics)	3	3	0	3	30	70	100	3 Hrs.
AR226	Climatology-II	4	3	1	4	30	70	100	3 Hrs.
AR227	Environmental Studies	2	4	0	4	30	70	100	3 Hrs.
	Total	30	22	10	31	250	450	700	



DEPARTMENT OF ARCHITECTURE, AU COLLEGE OF ENGINEERING

**SCHEME OF INSTRUCTIONS & EVALUATION
CHOICE BASED CREDIT SYSTEM PATTERN**

w.e.f. ADMITTED BATCHES 2015-16

3/5 B.ARCH 1ST SEMESTER									
Code	Title of Subject	Scheme of Instruction				Scheme of Examination			Duration of exam
		Credits	Lectures (periods/ week)	Drawing (periods/ week)	Total (periods/ week)	Internal	External	Total	
AR311	Architecture Design-IV	8	2	6	8	50	50	100	Viva-Voce
AR312	Building Materials & Building Construction-V	5	2	3	5	50	50	100	5 Hrs.
AR313	Design of Structures- II	4	4	0	4	30	70	100	3Hrs.
AR314	Human Settlements & Town Planning	3	3	0	3	30	70	100	3Hrs.
AR315	Building Services-III (Electrical and HVAC Services)	3	3	0	3	30	70	100	3 Hrs.
AR316	Landscape Design & Site Planning	4	3	1	4	30	70	100	3Hrs.
AR317	Computer Applications	4	2	2	4	50	50	100	Practical
	Total	31	19	12	31	270	430	700	

3/5 B.ARCH 2nd SEMESTER									
Code	Subject	Scheme of Instruction				Scheme of Examination			Duration of exam
		Credits	Lectures (periods/ week)	Drawing (periods/ week)	Total (periods/ week)	Internal	External	Total	
AR321	Architectural Design-V	8	2	6	8	50	50	100	Viva-Voce
AR322	Building Materials & Building Construction-VI	5	2	3	5	50	50	100	5 Hrs
AR323	Design of Structures- III	4	4	0	4	30	70	100	3Hrs.
AR324	Working Drawings-I	6	2	4	6	50	50	100	Viva-Voce
AR325	Specification, Estimation & costing	3	3	0	3	30	70	100	3 Hrs.
AR326	Elective-I	4	4	0	4	30	70	100	3 Hrs.
	a) Interior Design					30	70		3 Hrs.
	b) Building Construction & Management					50	50		Viva-voce
	c) Architectural Journalism					30	70		3 Hrs.
AR327	Soft Skills	1	3	0	3	100	-	100	
	Total	31	20	13	33			700	



DEPARTMENT OF ARCHITECTURE, AU COLLEGE OF ENGINEERING

**SCHEME OF INSTRUCTIONS & EVALUATION
CHOICE BASED CREDIT SYSTEM PATTERN**

w.e.f. ADMITTED BATCHES 2015-16

4/5 B.ARCH 1ST SEMESTER									
Code	Title of Subject	Scheme of Instruction				Scheme of Examination			Duration of exam
		Credits	Lectures (periods/ week)	Drawing (periods/ week)	Total (periods/ week)	Internal	External	Total	
AR411	Architecture Design-VI	8	2	6	8	50	50	100	Viva-Voce
AR412	Building Services -IV (Advanced Services)	4	4	0	4	30	70	100	3 Hrs.
AR413	Working Details	5	2	3	5	50	50	100	Viva-Voce
AR414	Disaster Management	4	4	0	4	30	70	100	3 Hrs.
AR415	Structural Thesis	4	4	0	4	30	70	100	Viva-Voce
AR416	MOOCS-1	2	0	0	0	100	-	100	
AR417	Elective-II	4	4	0	4	30	70	100	3Hrs.
	a) Urban Design and Architectural conservation-I								
	b) Spatial Cognition-I								
	c) Physical Planning-I								
Total		31	20	9	29	320	380	700	

4/5 B.ARCH 2ND SEMESTER									
Code	Subject	Scheme of Instruction				Scheme of Examination			Duration of exam
		Credits	Lectures (periods/ week)	Drawing (periods/ week)	Total (periods/ week)	Internal	External	Total	
AR421	Practical Training	25	0	0	20	50	50	100	Viva-voce
AR422	MOOC-2	2	0	0	0	100	-	100	
Total		27	0	0	20	150	50	200	
Note: 20 weeks of Practical Training in an Architectural Firm									



DEPARTMENT OF ARCHITECTURE, AU COLLEGE OF ENGINEERING

**SCHEME OF INSTRUCTIONS & EVALUATION
CHOICE BASED CREDIT SYSTEM PATTERN**

w.e.f. ADMITTED BATCHES 2015-16

5/5 B.ARCH 1ST SEMESTER									
Code	Title of Subject	Scheme of Instruction				Scheme of Examination			Duration of exam
		Credits	Lectures (periods/week)	Drawing (periods/week)	Total (periods/week)	Internal	External	Total	
AR511	Architecture Design-VII	8	2	6	8	50	50	100	Viva-Voce
AR512	Research Methodology	4	4	0	4	30	70	100	3 Hrs.
AR513	Design Workshop	4	1	3	4	100	00	100	Viva-Voce
AR514	MOOCS-3	2	-	-	-	100	-	100	
AR515	Elective-III a) Urban Design and Architectural conservation-II b) Spatial Cognition-II c) Physical Planning-II	4	4	0	4	30	70	100	3Hrs
AR516	Architectural Dissertation	3	4	0	4	50	50	100	Viva-Voce
	Total	25	15	9	24	360	240	600	

5/5 B.ARCH 2ND SEMESTER									
Code No.	Title of Subject	Scheme of Instruction				Scheme of Examination			Duration of exam
		Credits	Lectures (periods/week)	Drawing (periods/week)	Total (periods/week)	Internal	External	Total	
AR511	Architecture Design Thesis	25	4	21	25	50	50	100	Viva-Voce
AR512	Professional Practice & Legislation	4	4	0	4	30	70	100	3 Hrs.
AR513	MOOCS-4	2	-	-	-	100	-	100	
	Total	31	08	21	29	180	120	300	

Vision: To train and educate the students to become successful professional in the field of Humane architecture, to sensitize them, and to make them responsive to their sustainable built environment and society.

Mission: The mission of the department is to develop the students ability to harness their creative skills through latest scientific knowledge, and to design a humane built environment that responds to the local context.

Program Educational Objectives (PEOs)

The curriculum of the Bachelor of Architecture programme is specifically intended to equip graduates with the necessary aptitude and expertise.

- 1** Holistic Development: To produce architects who possess comprehensive knowledge in the core areas of architectural design, building materials, construction techniques, and environmental science, and are also equipped with essential life and soft skills.
- 2** Interdisciplinary Approach: To cultivate an understanding of the interdisciplinary nature of architecture, encompassing history, urban design, climatology, structural mechanics, and computer applications, ensuring that graduates can effectively collaborate with diverse teams in the professional world.
- 3** Ethical and Sustainable Practice: To instil values of sustainable design, environmental consciousness, and ethical professional practices, enabling graduates to contribute positively to society and the built environment.
- 4** Research and Lifelong Learning: To foster a culture of research, critical thinking, and lifelong learning, encouraging graduates to continuously adapt to evolving architectural trends, technologies, and global challenges.

Program Outcomes (POs):

- PO1** Knowledge: Demonstrate an understanding of foundational concepts in architectural design, history, and building materials.
- PO2** Design Skills: Apply design principles to create functional, aesthetic, and sustainable architectural solutions. Application of real-time problem solving in internship.
- PO3** Analysis: Evaluate architectural designs based on functionality, aesthetics, and sustainability.
- PO4** Investigation: Conduct site surveys and research to inform design decisions.
- PO5** Modern Tool Usage: Utilize advanced computer applications and software in architectural design and visualization.

- P06** Interdisciplinary Collaboration: Work effectively in interdisciplinary teams, integrating inputs from structural mechanics, climatology, and building services.
- P07** Environment and Sustainability: Design structures with a focus on environmental sustainability, climatic responsiveness, and energy efficiency.
- P08** Ethics: Practice architecture with professional ethics, considering societal, cultural, and environmental impacts.
- P09** Communication: Communicate architectural ideas effectively through drawings, models, and verbal presentations.
- P010** Project Management: Demonstrate skills in project management, estimation, costing, and maintenance of architectural projects.
- P011** Lifelong Learning: Show a commitment to continuous learning, staying updated with evolving architectural trends and technologies.
- P012** Innovation and Creativity: Exhibit creativity and innovation in architectural designs, considering the latest global trends and local contexts.

Program Specific Outcomes (PSOs):

- 1** Sustainable Design: Develop expertise in sustainable and bio-climatic architecture, with a focus on green buildings, rating systems, and sustainable urban communities.
- 2** Advanced Building Services: Gain specialized knowledge in advanced building services, including acoustics, electrical, HVAC, and water supply.
- 3** Professional Electives Mastery: Demonstrate proficiency in chosen elective areas such as architectural conservation, disaster-resistant buildings, interior design, or bio-climatic architecture.
- 4** Research & Dissertation: Engage in architectural research, culminating in a comprehensive design thesis and dissertation, showcasing in-depth understanding and innovative solutions to contemporary architectural challenges.

1ST YEAR 1ST SEMESTER

AR111: BASIC DESIGN AND VISUAL ARTS

Credits	08	Duration of Exam	5.00Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	06	External Marks	50

Course Objective:

Basic Design provides the framework for understanding design as a new language by sensitizing students to the conceptual, visual and perceptual issues involved in the design process. The Course provides with knowledge of the principles of design and design elements. Exercises complement the lectures and ensure that the students learn to develop a series of compositions in two and three dimension.

COURSE CONTENTS

UNIT I: Freehand drawing:

Introduction to fundamentals of drawings and its practice.
Free hand line sketching and drawing of natural and man-made.
Study of shades and shadows. Object drawing, simple, natural and geometric forms.
Outdoor Sketching of Historic or new built up structures of Architectural importance using different mediums.

UNIT II: Elements of Design:

Introduction to design: Meaning of design, importance of design.
Fundamental elements of design and their definitions-point, line, shape, form, space, texture, value and colour. Study historic examples.

UNIT III: Principles of design:

Introduction to the principles of design - unity, balance, symmetry proportion, scale, hierarchy, rhythm, contrast, harmony, focus etc.
Ordering principles: axis, symmetry, hierarchy, Rhythm, Datum, and Transformations
Study historic examples.

UNIT IV: Colour:

Colour theory, colour wheel, primary, secondary, tertiary colours, colour schemes, colour value & intensity.

UNIT V: Principles of Perception:

Proximity, Similarity, Closure (Gestalt type). Optical illusion

UNIT VI: Form and space:

Understanding properties of form, Articulation and Transformation of form – additive, subtractive and dimensional transformations.
Form defining space.

UNIT VII: Visual arts:

Present day trends in visual arts and architecture.

Note:

Sketches and Models to understand basic design principles, elements and their expressive qualities. Creative Exercises of 2D to 3D compositions. Exercise related to positive and negative spaces; Mural, ideogram, 3D Abstract models

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

Course Outcome:

- Demonstrate Proficiency in Freehand Drawing: Students will be able to apply the principles of freehand drawing to produce accurate and expressive sketches of natural and man-made objects, as well as historic and contemporary architectural structures using a variety of mediums.
- Comprehend and Apply Elements of Design: Students will develop a deep understanding of the fundamental elements of design, such as point, line, shape, form, space, texture, value, and color. They will be able to apply these elements in their design work, and analyze historic examples for inspiration.
- Apply Principles of Design in Architectural Context: Students will be capable of applying design principles, including unity, balance, symmetry, proportion, scale, hierarchy, rhythm, contrast, harmony, and focus, in architectural projects. They will understand how ordering principles like axis, symmetry, and hierarchy contribute to the design of spaces and structures.
- Mastery of Color Theory: Students will have a solid grasp of color theory, including the color wheel, primary, secondary, and tertiary colors, color schemes, and the manipulation of color value and intensity. They will apply this knowledge in architectural design, enhancing the visual impact of their projects.
- Understanding Principles of Perception: Students will understand the principles of perception, including proximity, similarity, and closure (Gestalt type), and how these principles impact the way people perceive and interact with architectural spaces. They will be able to design spaces that are intuitive and user-friendly.
- Create and Transform Forms and Spaces: Students will have the ability to create, articulate, and transform forms and spaces through additive, subtractive, and dimensional transformations. They will understand how form defines space and will use this knowledge to design functional and aesthetically pleasing architectural spaces.

Text books:

- 1) Form Space & Order by Francis, D.K.Ching

References:

- 1) Principles of two dimensional designs by Wong Wucius –
- 2) Designer s Guide to Colour by Ikuyoshi Shibikawa and Yumi Takahashi –
- 3) Elements of architecture by Von Mesis
- 4) Architectural Composition by Robkrier –
- 5) Design & Form by Johannes Itten

- 6) Architecture Drafting & Design by Donald E. Helper, Paul I. Wallach –
- 7) The Decorative Design of Frank Lloyd Wright by David A. Hanks
- 8) Principles of Design in Architecture by K.W.S mithies
- 9) Drawing for 3 – dimensional design by Alan pipes

AR112: ARCHITECTURAL DRAWING & GRAPHICS –I

Credits	05	Duration of Exam	5.00Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	03	External Marks	50

Course Objective:

The course introduces students to fundamental techniques of architectural drawing and develops the appropriate skills for representation.

COURSE CONTENT

UNIT 1: Introduction to Drawing:

Introduction to drawing equipment, familiarization, use and handling. Drawing sheet sizes, layouts and composition. Simple exercises in drafting, line types, line weights; dimensioning. Lettering Styles: Roman and Gothic style lettering; Freehand lettering, title panels and legends.

UNIT 2: Simple Geometrical Construction:

Constructing simple and complex geometrical shapes involving various drafting technique drawing regular shapes; Special methods of drawing regular polygons; Regular polygons inscribed in a Circle.

UNIT 3: Projections and section of Solids:

Solids of revolution, solids in simple position, Axis perpendicular to a plane, axis parallel to both planes, axis inclined to both planes etc
Section planes, true shape of section, Sections of Prisms, Pyramids, Cylinders, Cones, Spheres etc

UNIT 4: Advanced geometry:

Intersection of surfaces:

Line of intersection, intersection of prism and prism, cylinder and cylinder, cylinder and prism, cone and cylinder, cone and prism, cone and cone, sphere and cylinder or prism. Orthographic Projections-Representation of 3D elements in Plan and Elevations, Study of isometric, axonometric and oblique views, Ionic volute (by Gibbs Rule), Entasis of column, intersection of solids &

UNIT 5: Architectural Symbols:

Representation of building elements, openings, materials, furniture and accessories; human postures; vegetation; vehicles; terminology and abbreviations used in architectural representation.

UNIT 6: Measuring and Drawing to Scale:

Scales and construction of scales, scaled drawings of simple objects, furniture, rooms, doors and windows etc., in plan, elevation and section. Reduction and enlargement of drawings.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

Course Outcome:

- **Proficiency in Drafting Techniques:** Students will demonstrate proficiency in the use of drawing equipment, handling drawing sheets, and applying drafting techniques to create accurate and well-composed architectural drawings.
- **Geometric Shape Construction:** Students will be able to construct simple and complex geometrical shapes using various drafting methods, including regular polygons and circles, providing a foundation for architectural design.
- **Understanding Projections and Sections:** Students will develop the skills to create projections and sections of solids, including solids of revolution, and understand section planes, true shapes of sections, and their application to architectural drawings.
- **Mastery of Advanced Geometry:** Students will learn advanced geometric concepts, such as intersection of surfaces, and apply them to architectural elements like columns, intersecting solids, and complex geometric forms, ensuring precision in architectural design.
- **Architectural Symbolism:** Students will gain the ability to represent building elements, materials, furniture, and various architectural symbols accurately in their drawings, enhancing their ability to communicate architectural designs effectively.
- **Scaling and Measurement Skills:** Students will learn how to create scaled drawings of objects, furniture, rooms, doors, and windows in plan, elevation, and section. They will also acquire skills for reducing or enlarging architectural drawings while maintaining accuracy and proportion.

Text books:

- 1) "Engineering Drawing" – Plane and Solid Geometry by N.D.Bhat, V.M.Panchal
- 2) A text book of Geometrical Drawing by P.S.gill
- 3) Architectural Graphics by Francis D K Ching

References:

- 1) "Geometrical drawing for Art students" by Moris.I.H.
- 2) Hand book of Architectural & Civil Drafting by Nelson J.A
- 3) Architectural Drafting: Structure & Environment by JohnD.Bies –.
- 4) – graphic Science & Design by Thoms. E. French.
- 5) – Geometry of Construction by T.B.Nichols and Normal keep.
- 6) Building Drawing by Shah:.
- 7) Drawing architecture by Paul Hagarth
- 8) Drawings by architects by Claudius Conli
- 9) Pencil techniques in modern design by Alkin, Urbelleth and Lione

AR113: BUILDING MATERIALS & BUILDING CONSTRUCTION-I

Credits	06	Duration of Exam	5.00Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	04	External Marks	50

Course Objective: To expose students to the process of basic building construction and basic components

COURSE CONTENT

UNIT I: Elementary construction methods:

Explaining basic principles of Load bearing and Framed structures.

UNIT II: Mortars – Cement, sand, lime:

Sand: Sources of sand , classification, functions, properties, tests for silt and organic contents, size of sand and grading.

Mortar : Types, proportioning, mixing and grinding, mortar mills. Surkhi mortar, cement mortar, methods of preparing, handling and uses of mortars, light weight mortars i.e. cinder, sawdust and fibrous plasters, gypsum, plaster, composition and uses, Plaster of Paris.

UNIT III: Brickwork:

Clay bricks:

Constituents, harmful constituents, and selection of clay, requirements and tests. Fire clay bricks ;varieties; sand lime bricks; paving bricks; Terra-cotta-its varieties; ordinary, glazed, porous, polished and fine-uses and properties.

Various types of bonds, stopped ends, junctions, piers, jambs, footings, foundations, corbelling, damp proof course, window sills, thresholds, copings, mortar joints and pointing.

UNIT IV: Stone masonry:

Classification of stones: Granite, laterite, quartzite, marble and slates –properties and uses; stones, paving sets. Preservation of stonework, quarrying of building stones, quarry dressing tool used.

Technical terms; stone walls, rubble work, ashlar work, masonry joints, window sills, plinth, cornices, surface finishes.

UNIT V: Lintels & Arches:

Lintels of wood, stone, brick, etc.

Arches: Terms defined; various forms of arches like segmental, semicircular, elliptical, three-centred, flat and relieving arch, etc.

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

Course Outcome:

- Understanding of Structural Systems: Students will demonstrate a comprehensive understanding of the basic principles of load-bearing and framed structures, including their design, load distribution, and the role of various structural components.
- Mastery of Mortar Composition and Application: Students will be proficient in selecting appropriate mortars, preparing mortar mixtures, and applying them effectively in various construction contexts. They will also be able to assess the quality of sand and mortar through relevant tests.
- Expertise in Brickwork: Students will showcase expertise in brickwork, encompassing the knowledge of different types of bricks, their properties, and applications. They will be capable of executing various brick bonds and constructing structural elements like footings, foundations, and walls with precision.
- Proficiency in Stone Masonry: Students will acquire the skills to classify, select, and work with various types of stones, including granite, laterite, quartzite, marble, and slates. They will also demonstrate the ability to carry out quarrying, dressing, and finishing of building stones.
- Competence in Lintels and Arches: Students will demonstrate competence in designing and constructing lintels using wood, stone, and brick. They will also be proficient in understanding, designing, and building different types of arches, such as segmental, semicircular, elliptical, and three-centered arches.
- Application of Building Materials and Techniques: Students will apply their knowledge of building materials and construction techniques to practical scenarios, ensuring the use of appropriate materials, methods, and structural elements. They will be able to analyze construction problems and make informed decisions for effective building practices.

Text books:

- 1) "Building Materials", by SK Duggal, New Age International
- 2) , "A Text Book of Building Construction", by Dr B.C. Punmia Laxmi Publications (P) Ltd
- 3) "A Textbook of Building Construction", by Arora S.P and Bindra S.P, Dhanpatrai and sons, New Delhi
- 4) "Building Construction", by Jha J and Sinha SK Khanna Publishers

AR114: INTRODUCTION TO ARCHITECTURE, ART & CULTURE

Credits	03	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	03	Internal Marks	30
Tutorials/ drawing(periods/week)	--	External Marks	70

Course Objective:

The course creates awareness about fundamental ideas, methodologies and terminologies in art and architecture in different parts of the world, shedding light on what meanings they communicated, and how they are important to our contemporary society.

COURSE CONTENT

Unit I: Introduction to Art, Culture, Society, Civilization and Architecture.

Unit II: Earlier attempts of man for shelter and shelter forms since the prehistoric period with reference to culture, climate, technology and material

Unit III: Understanding the relationships of art, culture and architecture at different time such as: art, arts & crafts movement etc., and periods in the world history.

Unit IV: Indian Art and Architecture.

Unit V: Western Art and Architecture.

Unit VI: Study of ornament in Architectural Design, different types of ornamentation in buildings and study of historic examples.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcome:

- Demonstrate an Understanding of the Interplay Between Architecture, Art, Culture, and Society: By the end of this course, students will be able to articulate the intricate relationships between architecture, art, culture, and society, and how these elements have influenced and been influenced by one another throughout history.
- Analyze and Interpret the Evolution of Shelter Forms: Students will develop the ability to analyze and interpret the evolution of shelter forms from prehistoric times to the present day, considering the impact of cultural, climatic, technological, and material factors on the development of architectural styles.
- Identify Significant Art Movements and Periods: Students will be able to identify and discuss key art movements and periods in world history, including but not limited to the Arts and Crafts Movement, and explain how these movements have shaped architectural design and cultural expression.
- Examine Indian Art and Architecture: This course will enable students to critically examine the rich tradition of Indian art and architecture, allowing them to identify and analyze key features, elements, and historical contexts of Indian architectural styles.
- Analyze Western Art and Architecture: Students will gain the ability to critically analyze Western art and architectural styles, with an emphasis on understanding the historical and cultural contexts that have influenced the evolution of Western architecture.
- Apply Knowledge of Ornamentation in Architectural Design: By the end of the course, students will be able to apply their understanding of various types of ornamentation in architectural design and draw inspiration from historic examples to enhance their own architectural creations.

Text books:

- 1) G. K. Hiraskar- The Great Ages of World Architecture.

References:

- 1) Indian Art a Concise History by Craven, C. Roy.
- 2) , Pattern Language, by Christopher Alexander New York: Oxford University Press.
- 3) Redefining Designing: From to Experience by Thomas Mitchell.
- 4) – A history of architecture by Sir Banister Fletcher
- 5) Introduction to architecture by Stephen Gardner.
- 6) A chronology of western architecture by Doreen Yarwood.
- 7) The great ages of architecture by Bodo Lichy.
- 8) World architecture – an illustrated history by Trewin Copplstone and others

AR115: STRUCTURAL MECHANICS-I

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	--	External Marks	70

Course Objective:

To study the equilibrium of rigid bodies in static equilibrium and type of forces induced in the members of a truss. Study of basic types of internal forces (stresses) acting in a body and the elastic properties of a material. Calculate the cross-sectional properties of standard and built up shapes.

COURSE CONTENT**UNIT I:**

Introduction: forces, composition, resolution, moments and couples; transformation of couple; resolution of force into force and couple.

UNIT II:

Concurrent and non-concurrent co-planar force systems, resultant and equilibrate analytical solutions. Equilibrium of bodies acted upon by concurrent and non-concurrent co-planar force systems, forces and members of trusses by method of joints and method of sections.

UNIT III:

Simple stresses and strains, elasticity, stress, strain, types of stresses, elastic limit, modulus of elasticity, composite sections. Stresses due to change in temperature. Elastic constants, linear strain, lateral strain, Poisson's ratio, volumetric strain, relation between E, N (or G), and K.

UNIT IV:

Torsion of shafts – introduction to the basic equation $T/j = f_s/R = G\theta/l$. Derivation and Application of the basic equation.

UNIT V:

Beams: Shear force and bending moment diagrams for simply supported, cantilever and overhanging beams for various loads. Relation between shear force and bending moment.

UNIT VI:

Moment of inertia, Polar moment of inertia and section modulus for various structural shapes.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be $(20M+10M)=30M$.

Course Outcome:

- Understanding of Fundamental Principles: Students will develop a strong foundation in structural mechanics, gaining a comprehensive understanding of forces, moments, couples, and their resolutions.
- Analysis and Equilibrium Skills: Students will acquire the ability to analyze concurrent and non-concurrent co-planar force systems and apply analytical techniques to determine resultant forces and equilibrium of bodies.
- Truss Analysis Proficiency: Students will be proficient in analyzing forces and members of trusses using the method of joints and the method of sections, ensuring they can design and evaluate stable truss structures.
- Stress and Strain Knowledge: Students will gain a deep understanding of simple stresses and strains, elasticity, and material properties. They will be able to calculate and interpret stress, strain, elastic limits, modulus of elasticity, and other relevant parameters.
- Torsional Analysis Competence: Students will be able to analyze the torsion of shafts, understand the basic torsion equation, and apply it to practical engineering problems.
- Shear and Bending Analysis Skills: Students will develop the ability to calculate and draw shear force and bending moment diagrams for various types of beams under different loading conditions, enabling them to assess the structural integrity of beams effectively.

Text books:

- 1) Mechanics of solids by S.S. Bhavikatti
- 2) Engineering Mechanics by S.P.Timoshenko & D.H.Young
- 3) Analysis of Structures - Analysis, Design and Details of Structures (Vol.1) by V.N. Vazirani and M.M. Ratwani

References:

- 1) Elements of strength of materials by Timoshenko & Young
- 2) Applied Mechanics by S.Ramamrutham.

AR116: ENGLISH

Credits	03	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	03	Internal Marks	30
Tutorials/ drawing(periods/week)	--	External Marks	70

COURSE CONTENT

UNIT I:

Vocabulary: Word Search, Discuss and Note – Word Quiz – A List of 100 Basic Words – One Word Substitutes – 100 Difficult Words, Synonyms, Antonyms, Idioms, Technical Terms.

Grammar: Types of Sentences, Verbs, Adverbs, Pronouns, Adjectives, Gerunds & Infinitives, Articles, Quantifiers, Punctuations, Conjunctions, Exclamation.

Reading: Famous People – What is Personality, Personality based on Blood Groups – News Report, Magazine Article, Mobile Towers and Health – An Excerpt from Short Story, An Excerpt from a Biography – Open Letter to Prime Minister, Business Dilemmas: An Email Exchange – A Review of IPL: The Inside Story, Marck Zuckerberg: World's Youngest Billionaire – Solar Power: The Way Forward, From the Very Small to the Very Large.

Listening: Life in a Hostel – Eating Away those Blues!, Meeting Carl Jung – A Documentary on the Big Cat – A Consultant Interviewing Employees – A Conversation about a Business Idea – An Interview with a Woman Engineer.

Speaking: Your Favorite Holiday Destination – Describe Yourself – Why we need to save our Tiger – A Dialogue – Your First Interview – Pair Work: Setting up a New Business-Great Engineering Achievements.

Scenario: Sharing a Flat – Living in the Twenty First Century – Global Warming – Reality TV – Recession – The Sky-High Project.

Writing: Writing Sentences – Using your Dictionary – Paragraph Writing, Arguing a Case – Essay, Formal Letters, Emails, Reports and Presentations.

Life Skills and Core Skills: Self Awareness and Self Motivation – Communication, Adaptability – Motivation, Problem Solving – Personal Presentation Skills, Stress Management – Professionalism Ethics – Innovativeness and Creativity.

OBJECTIVES:

Reading Skills

- Addressing explicit and implicit meanings of a text on current topics.
- Understanding the context.
- Learning new words and phrases.
- Using words and phrases in different contexts.

Writing Skills

- Using the basic structure of a sentence.
- Applying relevant writing formats to create paragraphs, essays, letters, emails, reports and presentations.
- Retaining a logical flow while writing.
- Planning and executing an assignment creatively.

Interactive Skills

- Analyzing a topic of discussion and relating to it.
- Participating in discussions and influencing them.
- Communicating ideas effectively.
- Presenting ideas coherently within a stipulated time.

Life Skills and Core Skills

- Examining self-attributes and identifying areas that require improvement: self-diagnosis and self-motivation.
- Adapting to a given situation and developing a functional approach to finding solutions: adaptability and problem solving.
- Understanding the importance of helping others: community services and enthusiasm.

Text Book:

- 1) Life Through Language: A Holistic Approach to Language Learning. Board of Editors, Pearson Publishers, India 2013.

Life Through Language: An Effective Learning Experience

Life through Language has a systematic structure that builds up communicative ability progressively through the chapters. It will enable the learner to manage confusion; frame question for themselves and others; develop new ideas; support ideas with evidence; express themselves with poise and clarity; and think critically. Acquisition of skills leads to confidence.

UNIT I:

People and Places:- Word Search – Ask Yourself – Self-Assessment-I – Self-Assessment – II – Sentence and its types – A Guide book entry – Life in a Hostel- Your Favorite Holiday Destination – Designing a Holiday- Writing Sentences – Self-Awareness – Self-Motivation.

UNIT II:

Personality and LifeStyle:- Word Quiz – Verbs – Adverbs – A Big Fat Wedding – Wine and Dine – Going Places – Negotiations – Proving Yourself – Meeting Carl Jung – Describing Yourself – Living in the 21st Century – Using Your Dictionary – Communication – Adaptability.

UNIT III:

Media and Environment:- A list of 100 basic words – Nouns – Pronouns – Adjectives – News Report – Magazine Article – User's Manual for new iPod – A documentary on the big cat – Why we need to save our tigers: A dialogue – Global warming – Paragraph Writing – Arguing a case – Motivation – Problem Solving.

UNIT IV:

Entertainment and Employment:- One word substitutes – Parts of Speech – Gerunds and infinitives-An excerpt from short story-An excerpt from a biography- A Consultant interviewing employees-Your first Interview-Reality TV-Writing an essay-Correcting Sentences-Integrity Sense of humour.

UNIT V:

Work and Business:- A list of 100 difficult words – Articles, Quantifiers – Punctuation – Open Letter to Prime Minister Business Dilemmas: An email exchange – A review of IPL: The Inside Story, Mark Zuckerberg: World's Youngest Billionaire-A Conversation about a business Idea-Pair Work: Setting up a new business-Recession-Formal Letters-Emails-Reports-Professionalism-Ethics.

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both is to be taken for 20M.

Course outcome

- **Enhanced Reading Comprehension:** By the end of this course, students will be proficient in comprehending and analyzing a variety of texts, including news reports, magazine articles, and literary excerpts, while recognizing explicit and implicit meanings.
- **Vocabulary Expansion:** Students will significantly broaden their vocabulary by learning and effectively using new words and phrases in different contexts, including technical terms and idiomatic expressions.
- **Effective Writing Skills:** This course will enable students to master the basic structure of sentences, apply various writing formats for essays, letters, emails, reports, and presentations, and maintain logical flow and creativity in their writing.
- **Interactive and Communicative Skills:** Students will develop strong communication skills, actively participating in discussions and influencing them, while presenting their ideas coherently and effectively within stipulated timeframes.
- **Life and Core Skills Development:** This course will help students develop essential life skills, including self-awareness, self-motivation, adaptability, problem-solving, stress management, professionalism, ethics, and innovation and creativity, which are crucial for personal and professional growth.
- **Critical Thinking and Analytical Abilities:** Students will gain the ability to think critically, analyze topics of discussion, and relate to them, ultimately supporting their ideas with evidence and engaging in thoughtful problem-solving and decision-making.

References:

- 1) Basic Vocabulary. Edgar Thorpe, Showick Thorpe. Pearson P. 2008
- 2) Quick Solutions to Common Errors in English, Angela Bunt. MacMillan P. 2008
- 3) Know Your English (Volume 1 & 2), by Dr. S. Upendra, Universities Press, India 2012
- 4) Business Communication Strategies. Maathukutty Monipally. Tata McGrahill P. 2009.

AR117: SURVEYING & SITE STUDIES

Credits	03	Lab (Hrs.)	03
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	--	External Marks	50 Practical & Viva Voce

Course Objective:

To develop the knowledge and skills related to surveying and understand working principles of survey instruments and types of errors, obstacles encountered in field and calculations.

COURSE CONTENT

UNIT I: Basic principles and chain surveying:

Definitions, scales and symbols, sources of error in surveying and theory of probability, measurement of distance, instruments used, ranging of survey lines, chaining a line with examples, chaining on sloping ground, errors in chaining, tape corrections, chain surveying principles, off-sets, field notes, instruments, obstacles in chaining. Plotting chain survey with practical examples.

UNIT II: Plane table surveying:

Plane table surveying: Introduction-Advantages, Accessories-Working operations such as fixing the table to tripod, leveling-centering-orientation by back-sighting. Methods of plane tabling-Plane table traversing- two point and three point problems, Errors in plane tabling, exercise in preparation of base map of small areas..

UNIT III: Compass Survey:

Introduction to compass survey, Definitions of Bearing, Designation of bearing – W.C.B. & R.B, Conversion of bearings from one systems to the other, Calculation of angles for bearings and vice versa, Magnetic compass, Prismatic compass, Magnetic dip, Temporary and permanent adjustments of compass, Magnetic Declination, Local attraction, Precautions in using compass, Errors in compass survey.

UNIT IV: Traverse Surveying:

Chain and compass traversing-methods of traversing, Checks in closed and open traverse, Plotting methods of traverse Survey-Closing error-Balancing the traverse.

UNIT V: Levelling:

Introduction, instruments used, Definition of BS, IS, FS, HI, TP, Booking and reduction of levels, classification of levelling, Uses and adjustments of dumpy level, Temporary and permanent, Differential levelling, Profile leveling, Longitudinal section (L.S), Cross section leveling (C.S), Reciprocal levelling. Height of Instrument methods, Rise and fall method, Checks, Reciprocal leveling, Problems in leveling, Errors in levelling.

Contouring: Definitions, Interval, Characteristics of contours, methods of locating contours-Direct and indirect methods-interpolation of contours-Contour gradient-Uses of contour maps.

UNIT VI: Automated surveying:

Introduction to the use of digital surveying technologies such as total station, G.P.S through demonstrations.

UNIT V: Site studies:

Site studies: Plot, site, land and regions, size, shape of sites.

Analysis of accessibility: topography, climate, landforms, surface drainage, soil, water bodies and vegetation.

Field Work:

1. Finding the distance between two points by making use of chain.
2. Preparation of base map of small area and finding the area using Plane table surveying.
3. Profile leveling
4. Longitudinal and cross section leveling.
5. Closed traverse using compass surveying.
6. Height of remote point using theodolite.
7. Preparing Contour map of small area.

Note: Field book and record should to be submitted at the end of the semester.

Assessment:

Continuous assessment will be conducted for all the field studies mentioned in the syllabi for 50Marks as internal. Student has to submit Field book and record for external viva-voce. The student should attend a practical Exam and Viva-voce conducted by external examiner.

Course Outcome:

- Foundational Knowledge: Students will gain a strong understanding of the basic principles of surveying, including the measurement of distance, instruments used, sources of error, and the theory of probability.
- Practical Surveying Skills: Students will be able to perform chain surveys, considering factors like chaining on sloping ground, tape corrections, off-sets, and dealing with obstacles. They will also have the ability to create accurate field notes and plot chain surveys.
- Proficiency in Plane Table Surveying: Students will be proficient in plane table surveying, including leveling, orientation, and methods of plane tabling. They will be able to prepare base maps of small areas.
- Compass Surveying Competence: Students will be capable of using magnetic and prismatic compasses, calculating angles, and dealing with magnetic declination, local attraction, and errors in compass surveying.
- Traverse Surveying and Levelling Skills: Students will acquire skills in chain and compass traversing, along with the ability to plot traverse surveys, close errors, and balance traverses. They will also be proficient in leveling techniques, booking and reduction of levels, and contouring.

- Understanding of Modern Surveying Technologies: Students will gain insight into automated surveying technologies, including the use of digital surveying tools like total stations and GPS. They will understand how to integrate these technologies into surveying practices effectively.

Text books:

- 1) Surveying –Vol.-I by B.C. Punmia, Laxmi Publishers.
- 2) Text book of Surveying by C. Venkatramaiah, Universities Press.

AR118: Sports/NSS/NCC

Credits	02	Audit Course	--
Lectures (Periods /week)	03	Internal Marks	--
Tutorials/ drawing(periods/week)	--	External Marks	--

1ST YEAR 2ND SEMESTER

AR121: ARCHITECTURAL DESIGN-I

Credits	08	Duration of Exam	5:00 Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	06	External Marks	50

Course objectives:

To study and preparation of measured drawings and design of single unit spaces with emphasis on form including the furniture layout, circulation, clearances, lighting and ventilation, etc.

COURSE CONTENT

Organisation of form and space: Spatial relationship and spatial organisation

Circulation: Path space relationship, elements and form of circulation

Proportion and scale: golden section, classical orders, modular, anthropometry, Understanding of human and visual scale. Understanding of basic human functions and their implications for space requirements; Minimum and optimum areas for various functions, User data-Bubble and circulation diagrams.

The list of suggested topics to be covered as design problems including preparation of measured drawings and design of single unit spaces with emphasis on form

Detailed study of spaces such as living, dining, bedrooms, kitchen, toilet, etc. including the furniture layout, circulation, clearances, lighting and ventilation, etc.

Application in the design of simple household and street furniture At least two design problems Examples such as Design of Bus shelter/ Milk booth, /Security cabin/ATM center/ Internet center/ Gateway

Assessment:

Continuous assessment will be conducted for major (30M) and minor (20M) design problems i.e. total marks of (30M+20M) =50M

Course Outcome:

- **Spatial Proficiency:** Students will demonstrate an understanding of spatial relationships and organization in architectural design, being able to effectively organize forms and spaces to meet user needs and functional requirements.
- **Circulation Mastery:** Upon completion of the course, students will have a comprehensive knowledge of circulation design, including path-space relationships and elements, and be capable of developing effective circulation systems within architectural designs.
- **Proportion and Scale Expertise:** Students will be able to apply principles of proportion and scale in architectural design, including the golden section, classical

orders, modular design, and anthropometric considerations, ensuring that designs are harmonious and visually pleasing.

- **User-Centered Design:** Graduates will understand the fundamental human functions and their implications for space requirements. They will be capable of designing spaces that cater to user needs, incorporating minimum and optimum areas for various functions, and developing user-centric bubble and circulation diagrams.
- **Detailed Space Design:** After completing the course, students will be proficient in designing detailed spaces such as living areas, dining spaces, bedrooms, kitchens, and bathrooms, including considerations for furniture layout, circulation, clearances, lighting, and ventilation to create functional and aesthetically pleasing environments.
- **Practical Application:** Graduates will be able to apply the knowledge gained in the course to real-world design problems. They will be competent in designing simple household and street furniture, including structures like bus shelters, milk booths, security cabins, ATM centers, internet centers, and gateways, with a focus on functionality and user experience.

References:

- 1) Time Savers Standards by Joseph De Chiara & John Callender, McGraw-Hill International Edition
- 2) Architect's Data by Ernst Neufert, 3rd edition
- 3) Architects Handbook: Ready Reckoner by Charanjit Shah, Galgotia Publishing Company.
- 4) Architecture: Form Space & order by Francis D. K. Ching, John Wiley & Sons

AR122: ARCHITECTURAL DRAWING & GRAPHICS –II

Credits	05	Duration of Exam	5:00 Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	03	External Marks	50

Course Objective:

The course introduces students to fundamental techniques of architectural documentation and develops the appropriate skills for visual representation by Perspective, sciography and rendering techniques.

COURSE CONTENT

UNIT I: Perspective:

Introduction to Perspective in one point or parallel perspective, two point or angular perspective, introduction to three-point perspective of different geometrical form, built forms.

UNIT II: Sciography:

Introduction to Sciography in the study of shade and shadows, points, lines, surfaces, geometrical solids of various forms and groups of forms leading to advanced examples of shades and shadows on buildings or parts of buildings.

UNIT III: Rendering:

Introduction to the rules of composition and perspective in architectural rendering, color study, values, tones and general approach to rendering. Various colour schemes, water colour and poster colour rendering, pencil rendering and monochrome and wash rendering etc. treatment of sky, clouds, landscape elements, human figures, foreground and surroundings, shadow projections in renderings

UNIT IV: Architectural Documentation

Detailed measured drawing and documentation of any interesting building – preparation of maps, plans, elevations, sections, views etc.

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

Course Outcome:

- **Perspective Mastery** Upon completing this course, students will be able to demonstrate a deep understanding of perspective drawing techniques, including one-point, two-point, and three-point perspective. They will proficiently apply these techniques to represent various geometric and built forms accurately.
- **Advanced Sciography Skills** Students will develop advanced skills in sciography, enabling them to analyze and represent shade and shadows on complex objects, such as buildings and architectural elements. They will be capable of accurately rendering different forms and groups of forms with precision.
- **Architectural Rendering Proficiency** At the end of the course, students will showcase a strong command of architectural rendering. They will comprehend the principles of composition and perspective in rendering and be proficient in using various rendering mediums like watercolors, poster colors, pencils, and monochrome wash. Students will also be skilled in rendering sky, clouds, landscape elements, human figures, and surroundings, enhancing the aesthetic quality of their architectural drawings.
- **Comprehensive Architectural Documentation** Students will be capable of preparing detailed measured drawings and documentation for interesting buildings. They will develop the skills required to create maps, plans, elevations, sections, and various views accurately. This course outcome emphasizes precision and thoroughness in architectural documentation.
- **Creative Use of Color Schemes** Upon completion of the course, students will exhibit creativity in the use of various color schemes to enhance the visual appeal of their architectural renderings. They will understand the psychological and emotional impact of colors in architectural design and use this knowledge to create compelling visual representations.
- **Effective Communication through Architectural Graphics** Students will master the art of communicating architectural ideas and designs through graphics. They will be able to convey complex architectural concepts effectively through their drawings, making them valuable communicators in the field of architecture.

Text books:

- 1) "Engineering Drawing" – Plane and Solid Geometry by N.D.Bhat, V.M.Panchal.
- 2) Architectural Graphics by Francis D K Ching.

References:

- 1) Perspective – space and design by Lance Bowen Bellings.
- 2) "Geometrical drawing for Art students". by Moris.I.H.
- 3) Hand book of Architectural & Civil Drafting by Nelson J.A.
- 4) A text book of Geometrical Drawing by P.S.gill
- 5) Architectural Drafting: Structure & Environment by John D.Bies.
- 6) Graphic Science & Design by Thoms. E. French.
- 7) Geometry of Construction by T.B.Nichols and Normal keep.
- 8) Building Drawing by Shah.
- 9) Drawing architecture by Paul Hagarth
- 10) Drawings by architects by Claudius Conli
- 11) Perspective by H. Pranchlay
- 12) Pencil techniques in modern design by Alkin, Urbelleth and Lione
- 13) Perspective: space and design by Lance Bowen Bellings.

AR123: BUILDING MATERIALS & BUILDING CONSTRUCTION-II

Credits	06	Duration of Exam	5:00 Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	04	External Marks	50

Course Objective:

To familiarize of Timber, Wood materials; carpentry and joinery and building components such as Doors and Windows

COURSE CONTENT**UNIT I: Timber**

Timber Advantages of timber construction, exogenous and endogenous trees, hard wood and soft wood, growth of tree and its structure: wood and heart, felling of trees, conversion of felled logs, storage, sawing of timber, shrinkage and distortion, wastage, method of sawing. Drying and seasoning, moisture contents, purpose of seasoning, natural artificial.

Defects in timber: Natural defects, seasoning defects and defects due to fungal action. Causes of decay, factors affecting decay, preservation of timber by applying preservatives like tar, oil, water soluble and organic solvents.

UNIT II: Veneers and veneering

Resin bonded plywood, laminated wood, insulating boards and other miscellaneous Boards. Varieties of Timber, Characteristics and Uses

UNIT III: Carpentry and Joinery

Terms defined, mitring, ploughing, grooving, rebating, veneering, various forms of joints in wood work, such as lengthening joints, bearing joints, halving, dovetailing, housing, notching, tusk and tenon, etc.

UNIT IV: Doors

Definition of terms, types of doors: wooden, ledged, ledged and braced, panelled, flush doors. Hinged, single and double shutters, sliding folding, revolving, pivoted.

UNIT V: Windows

Ordinary casement, top and bottom hung, pivoted and sliding sash.

Hardware: fixtures, locks, hinges, fastenings, etc.

UNIT VI: Wooden Ground and Upper Floors

Terms defined, bridging, joists, binder beams and girders, solid and herringbone strutting, floor boards, ceiling joists, trimming floors to accommodate fire place.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

Course Outcome:

- Timber Expertise Students will develop a comprehensive understanding of timber, including its advantages in construction, the differences between exogenous and endogenous trees, and the characteristics of hard and soft woods. They will be able to explain the growth of trees, the structure of wood, and the process of felling trees, conversion of logs, and timber sawing. They will also gain knowledge about timber shrinkage, distortion, and the importance of drying and seasoning, both naturally and artificially.
- Defect Identification and Preservation By the end of this course, students will be equipped with the ability to identify natural defects, seasoning defects, and defects caused by fungal action in timber. They will also understand the causes of decay and the factors affecting it. Students will learn methods of preserving timber through the application of preservatives such as tar, oil, water-soluble, and organic solvents.
- Veneers and Wood-Based Products Students will become proficient in working with veneers and various wood-based products, including resin-bonded plywood, laminated wood, insulating boards, and miscellaneous boards. They will be able to identify different types of timber, understand their characteristics, and know the appropriate uses for each type.
- Carpentry and Joinery Skills Upon completing the course, students will gain expertise in carpentry and joinery. They will learn the terminology related to woodworking and various woodworking techniques such as mitring, ploughing, grooving, rebating, and veneering. Students will also become skilled in creating

different forms of joints used in woodwork, such as lengthening joints, bearing joints, halving, dovetailing, housing, notching, tusk and tenon, and more.

- **Mastery of Doors and Windows** Students will be able to define key terms related to doors and windows, and they will gain in-depth knowledge of various types of doors and windows, including wooden, ledged, ledged and braced, panelled, flush doors, and different door configurations (hinged, single and double shutters, sliding folding, revolving, pivoted). They will also become familiar with different types of windows, their operation, and the hardware components, including fixtures, locks, hinges, and fastenings.
- **Wooden Flooring Expertise** Students will understand the components and terminologies related to wooden ground and upper floors, including bridging, joists, binder beams, girders, strutting (solid and herringbone), floorboards, ceiling joists, and modifications required for accommodating features like fireplaces. They will acquire the skills and knowledge needed to work with wooden flooring systems effectively.

Text Books:

- 1) Arora, S.P and Bindra S.P, "A Textbook of Building Construction", Dhanpatrai and sons, New Delhi
- 2) Jha, J and Sinha SK "Building Construction", Khanna Publishers
- 3) SK Duggal, "Building Materials", New Age International
- 4) Dr B.C .Punmia, "A Text Book of Building Construction", Laxmi Publications (P) Ltd

AR124: HISTORY OF ARCHITECTURE-I

Credits	03	Duration of Exam	3:00 Hrs.
Lectures (Periods /week)	03	Internal Marks	30
Tutorials/ drawing(periods/week)	--	External Marks	70

Course Objectives:

To study development of building forms, ornamentation, structural solutions, construction methods, plans and building facade, organization in relation to aesthetic/ religious/social philosophy and environmental factors in history. The study should focus only on the general trends.

COURSE CONTENT

UNIT I: The Ancient Civilizations

Architectural development in the ancient civilizations in Egypt and Mesopotamia, study of pyramids, temples, mastabas, ziggurats, etc.

UNIT II: Classical Period

Architecture in the classic Greek and roman periods, temples, agoras gateways, circuses, amphitheatres, basilicas, etc.

UNIT III: Early Christianity

Architecture in the early Christian, Byzantine.

UNIT IV: The Age of Church Building

Romanesque, gothic periods in Europe and rest of the world excluding Asia.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcome:

- **Understand the Architectural Evolution of Ancient Civilizations:** Students will be able to demonstrate a comprehensive understanding of architectural developments in ancient civilizations such as Egypt and Mesopotamia, including the ability to identify and analyze key architectural structures like pyramids, temples, mastabas, and ziggurats.
- **Analyze Classical Greek and Roman Architectural Styles:** Students will develop the skills to critically analyze architectural styles from the classical Greek and Roman periods, and be able to identify and describe the distinctive features of structures like temples, agoras, gateways, circuses, amphitheatres, and basilicas.
- **Explore the Influence of Early Christianity and Byzantine Architecture:** By studying early Christian and Byzantine architecture, students will gain insight into the influence of religious and cultural factors on architectural design. They will be able to analyze and interpret key structures from this era.
- **Examine the Architectural Transformations in the Age of Church Building:** Students will be able to examine and compare the architectural styles and innovations during the Romanesque and Gothic periods in Europe and other regions of the world, excluding Asia. They will understand the significance of these periods in the history of architecture.
- **Appreciate the Cultural and Historical Context of Architectural Developments:** Students will be equipped with the ability to contextualize architectural structures within their respective historical, cultural, and social contexts. This includes recognizing the impact of religion, politics, and societal changes on architectural design.
- **Critically Evaluate the Evolution of Architectural Styles:** By the end of the course, students will have the skills to critically evaluate the evolution of architectural styles over time, connecting developments in different periods and regions. They will be able to engage in informed discussions on the historical significance of architectural structures and styles.

Text Books:

- 1) A History of Architecture by Sir Banister Fletcher, CBS; 20 edition (2002)

References:

- 1) World architecture – an illustrated history by Trewin Copplstone and others
- 2) Introduction to architecture by Stephen Gardner.
- 3) A chronology of western architecture by Doreen Yarwood
- 4) The great ages of architecture by Bodo Lichy
- 5) Meaning in western architecture by Christian Nøberg Schulz

AR125: STRUCTURAL MECHANICS-II

Credits	04	Duration of Exam	3:00 Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	--	External Marks	70

Course Objective:

To study the bending, shear stress distribution and combined stresses in beams for different symmetrical and unsymmetrical sections. The relation between slope, deflection and curvature and deflection of statically determinant beams for different loadings. Analysis of statically in determinant beams and Three-Hinged arches.

COURSE CONTENT

UNIT I:

Theory of simple bending; $M/I = f/y = E/R$, application of flexural formula.

UNIT II:

Bending and Shearing stresses distribution in beams for different sections. Combined stresses (direct and bending stresses) of symmetrical and unsymmetrical sections-beams

UNIT III:

Deflection of beams: Relation between slope, deflection and curvature, Deflection of cantilever and simply supported with different loadings using double integration method and moment area methods.

UNIT IV:

Propped cantilever beams: Shear Force and Bending Moment diagrams.

UNIT V:

Analysis of beams and frames: BM& SF diagrams for Fixed and Continuous beams. Application of Clapeyron's theorem of three moments, Moment distribution method for continuous beams. Kani's method of analysis for structural frames including sway.

UNIT VI:

Three Hinged Arches- determination of horizontal thrust, radial shear, normal force, and axial thrust. Shear force and bending moment diagrams for three-hinged arch.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be $(20M+10M)=30M$

Course Outcome:

- Understanding of Bending and Shearing Stresses: Upon completion of this course, students will be able to understand and calculate bending and shearing stresses in various beam sections, enabling them to design structural elements that can withstand these stresses effectively.

- Application of Flexural Formula: Students will learn how to apply the flexural formula ($M/I = f/y = E/R$) to analyze and design beams under simple bending conditions, demonstrating their ability to make informed structural decisions.
- Deflection Analysis: Graduates of this course will be proficient in analyzing deflection in beams, including the relation between slope, deflection, and curvature. They will be able to determine deflections for different loadings using double integration and moment area methods.
- Shear Force and Bending Moment Diagrams: Students will gain the ability to construct shear force and bending moment diagrams for various beam configurations, including cantilever beams and propped cantilever beams, which is essential for understanding the behavior of structures under different loads.
- Analysis of Beams and Frames: Graduates will develop skills in analyzing beams and frames, creating bending moment and shear force diagrams for fixed and continuous beams. They will apply Clapeyron's theorem of three moments and moment distribution methods to solve complex structural problems.
- Three-Hinged Arches Analysis: Students will acquire the knowledge to determine critical parameters such as horizontal thrust, radial shear, normal force, and axial thrust for three-hinged arches. They will also be capable of developing shear force and bending moment diagrams for three-hinged arches, which is crucial for the analysis of unique architectural structures.

Text books:

- 1) Analysis of Structures - Analysis, Design and Details of Structures-Vol.-1 by V.N. Vazirani and M.M. Ratwani and S.K. Duggal
- 2) Analysis of Structures - Theory, Design and Details of Structures-Vol.-2 by V.N. Vazirani and M.M. Ratwani and S.K.Duggal

References:

- 1) Basic structural analysis by C.S. Reddy
- 2) Intermediate Structural analysis by C.K.Wang
- 3) Elements of strength of materials by Timoshenko & Young
- 4) Structural mechanics by Punmia

AR126: ENGLISH LAB

Credits	02	Duration of Exam	3:00 Hrs.
Lectures (Periods /week)	03	Internal Marks	50
Tutorials/ drawing(periods/week)	--	External Marks	50

Course Objective:

- To make students recognize the sounds of English through Audio-Visual aids.
- To help students build their confidence and help overcome their inhibitions and self consciousness while speaking in English. *The focus shall be on fluency.*
- To familiarize the students with stress and intonation and enable them to speak English effectively.

COURSE CONTENT

UNIT I:

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations and contexts.

SYLLABUS:

- 1) English Sound Pattern-Letters
- 2) Sounds of English
- 3) Pronunciation
- 4) Stress and Intonation

Text Book:

Speak Well, Board of Editors, Orient Black Swan Publishers, Hyderabad, 2012.

Speak well, the print as well as audio materials, is learner friendly and suitable for use in a multimedia language laboratory. These materials are developed to facilitate practice in improving the intelligibility and communication skills in English, for technical, students at the undergraduate level.

The materials mainly aim at self-study, monitored by a teacher whenever essential. The teacher intervention is kept to a minimum, only to give right direction to the learners.

Communication in any language depends on clarity of speech. This is true of English too. Articulation of the sounds, and pronunciation of words form the basis for intelligibility. The few units focus on bringing home the importance of this aspect with copious examples and opportunities for practice. Models of standard pronunciation are given. Explanations are kept short and simple. The IPA symbols, presenting the sound system in English, used in this book are the same as in Standard English dictionaries. These symbols are to be used at the recognition level to facilitate the learners' use of the dictionary for pronunciation. Problem areas are pointed out and, where necessary, deviation in the pronunciation of Indian speakers of English are brought to the notice of the learners.

The units called 'Interactions' pay attention to natural conversational skills in different contexts with focus on various functions of the language. Model conversations are provided as samples. Notes on appropriate expressions used in different situations draw the learners' attention to the use of language in context. Exercises and activities reinforce the functions introduced.

Unit-1: Letters and Sounds- Worksheet-1

Unit-2: Interactions-1- Worksheet-2

Unit-3: The sounds of English- Worksheet-3

Unit-4: Interactions-2- Worksheet-4

Unit-5: Pronouncing words- some important patterns- Worksheet-5

Unit-6: Interactions-3- Worksheet-6

Unit-7: Stress and Intonation- Worksheet-7

Assessment

1. The practical examinations for the English Language Lab shall be conducted as per the University norms prescribed for the core Engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the semester for 50 Sessional marks and 50 semester-end Examination marks.
3. For the 50 Sessional marks, 20 marks shall be awarded for day-to-day performance, 10 marks to be awarded by conducting Internal Lab Test(s), and 20 marks for work sheets attached to the lab manual.
4. For the 50 semester- end (External) marks, 30marks shall be awarded for written examination (dialogues, the sounds of English and stress) and 20 marks for external examiner viva-voce, tested by way of reading a passage or a conversation.

Note: The external lab shall be conducted by the teacher concerned with the help of another English faculty of affiliated Colleges of the University/other Institutions.

Course Outcome:

- Improved Articulation and Pronunciation: Students will demonstrate improved articulation and pronunciation skills, enabling them to communicate clearly and effectively in English, which is essential for professional communication in the field of architecture.
- Enhanced Listening Comprehension: Students will develop better listening comprehension skills, allowing them to understand English spoken in different accents and contexts, which is vital for architectural research, collaboration, and project discussions with a global audience.
- Effective Stress and Intonation: Students will acquire the ability to use stress and intonation effectively in their spoken English, enabling them to convey nuances and emotions in their architectural presentations, discussions, and design pitches.
- Use of Appropriate Expressions: Students will learn how to use appropriate expressions in various architectural contexts, making them more adept at conveying ideas and concepts clearly and professionally.
- Conversational Skills: Students will develop natural conversational skills for different architectural settings, including client meetings, team discussions, and interdisciplinary collaborations, enhancing their ability to work seamlessly in a professional architectural environment.
- Independent Learning: Students will be equipped with the tools and self-study materials to continue improving their English language proficiency independently, reducing the reliance on external guidance and becoming more self-sufficient in their language development for lifelong use in their architectural careers.

Reference books:

- 1) Cambridge English Pronouncing Dictionary, Cambridge University Press, India, 2012.

- 2) A Textbook of English Phonetics for Indian Students by T. Balasubramanian, Macmillan Publisher, 1981.

AR127: WORKSHOP PRACTICE

Credits	03	Lab (Hrs.)	03
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	--	External Marks	50 Practical

Course Objective:

To Train the students in basic skills of carpentry work and to develop ability to appreciate the three dimensional implications of design.

COURSE CONTENT

Model making: Preparation of wooden base for model Making of three dimensional building blocks & forms using different types of materials such as paper, rubber, acrylic, polystyrene, FRP, etc. Three to four exercises to be done.

Assessment

Three carpentry joinery models (Maximum 25 Marks) and two three dimensional building blocks models for 25M, total marks of (25M+25M) =50M

Course Outcome:

- **Proficiency in Model Making:** By the end of the course, students will have gained the skills and knowledge to create detailed and accurate architectural models. They will be able to prepare wooden bases and utilize various materials, including paper, rubber, acrylic, polystyrene, and FRP to craft three-dimensional building blocks and forms.
- **Material Selection and Application:** Students will develop the ability to choose and apply suitable materials for specific model-making tasks. They will learn the properties and appropriate use of materials like paper, rubber, acrylic, polystyrene, and FRP in architectural model construction.
- **Craftsmanship and Precision:** Graduates of this course will exhibit a high level of craftsmanship and precision in their model-making work. They will be capable of producing architectural models that accurately represent building designs and exhibit attention to detail.
- **Creative Problem Solving:** The course will enhance students' creative problem-solving skills as they work on three to four model-making exercises. They will learn to overcome challenges related to design, materials, and construction techniques, developing innovative solutions in the process.
- **Interdisciplinary Collaboration:** Students will be equipped to collaborate with professionals from different disciplines within the field of architecture. They will understand how to communicate effectively with architects, engineers, and other stakeholders by using their model-making skills to convey design concepts and ideas.

- **Safety and Environmental Awareness:** The course will instill a strong awareness of safety practices when working with various materials and tools. Additionally, students will be conscious of the environmental impact of their choices, learning to use materials responsibly and efficiently.

References:

- 1) Designing with Models A Studio Guide to Architectural Process Models, 3rd Edition by Criss. B. Mills.

AR128: Sports/NSS/NCC

Credits	02	Audit Course	--
Lectures (Periods /week)	03	Internal Marks	--
Tutorials/ drawing(periods/week)	--	External Marks	--

2ND YEAR 1ST SEMESTER

AR211: ARCHITECTURAL DESIGN-II

Credits	08	Duration of Exam	10.00Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	06	External Marks	50

Course Objective:

To study theory of Architecture; principles of design & its process; Elements of composition; analytical classification of spaces for different uses and their relation to one another; Study of horizontal circulation in buildings and detailed studies on analysis of sites and its surroundings.

COURSE CONTENT

The design issues to be addressed are

- a) Functions and their spatial implications.
- b) Minimum and optimum areas for various functions.
- c) Anthropometrics, furniture layout and horizontal circulation.
- d) Interior volumes and material qualities.
- e) Lighting and ventilation.
- f) Integration of form and function.

Small Residences, Play School (Balwadi), Doctor's Clinic, Small Cafeteria, Village Post Office, Department Store, School Gymkhana, etc.

Note:

Necessary theoretical inputs highlighting the norms and design issues are to be given. At least one major exercise and one minor design/time problem should be given. The final submission shall necessarily include a model for the main problem.

Assessment

Continuous assessment will be conducted for major exercise (30M) and minor design problem (20M) i.e. total marks of (30M+20M) =50Marks

Course outcome:

- **Spatial Proficiency:** Students will demonstrate an understanding of spatial relationships and organization in architectural design, being able to effectively organize forms and spaces to meet user needs and functional requirements.
- **Circulation Mastery:** Upon completion of the course, students will have a comprehensive knowledge of circulation design, including path-space relationships and elements, and be capable of developing effective circulation systems within architectural designs.
- **Proportion and Scale Expertise:** Students will be able to apply principles of proportion and scale in architectural design, including the golden section, classical orders, modular design, and anthropometric considerations, ensuring that designs are harmonious and visually pleasing.

- **User-Centered Design:** Graduates will understand the fundamental human functions and their implications for space requirements. They will be capable of designing spaces that cater to user needs, incorporating minimum and optimum areas for various functions, and developing user-centric bubble and circulation diagrams.
- **Detailed Space Design:** After completing the course, students will be proficient in designing detailed spaces such as living areas, dining spaces, bedrooms, kitchens, and bathrooms, including considerations for furniture layout, circulation, clearances, lighting, and ventilation to create functional and aesthetically pleasing environments.
- **Practical Application:** Graduates will be able to apply the knowledge gained in the course to real-world design problems. They will be competent in designing simple household and street furniture, including structures like bus shelters, milk booths, security cabins, ATM centers, internet centers, and gateways, with a focus on functionality and user experience.

References:

- 1) Time savers standards of Building Types-Joseph de chiara& others.
- 2) A History of Building Types-Nikolays Pevsner.
- 3) Architect's Data-Ernst Neufert.
- 4) Architect's Hand book-Charanjit Shah
- 5) Doctor's offices & Clinics-Paul Hayden Klrk, Eugene D. Stermberg.
- 6) Time savers standards of Building Types-Joseph de chiara& others.
- 7) A History of Building Types-Nikolays Pevsner. Architect's Data-Ernst Neufert

AR212: BUILDING MATERIALS AND BUILDING CONSTRUCTION-III

Credits	05	Duration of Exam	5.00Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	03	External Marks	50

Course Objective:

To create in-depth understanding on use of RCC materials as Sub structure; Super structure components and different kinds of Floorings such as natural stone, timber flooring, different kinds of tiles, and other flooring materials like rubber, Linoleum, and PVC and PVA

COURSE CONTENT

Unit I: Cement and Concrete:

Cement: Raw materials, functions of cement ingredients, Setting action of cement, tests for strength and setting time.

Concrete and its constituents, aggregate: coarse and fine, properties of concrete, strength, durability, etc. Effect of age on strength, grading: importance, fineness modulus, combined aggregate, water cement ratio. Mixing; curing.

Unit II: Introduction to RCC:

Light weight concrete, Pre-cast concrete, solid and hollow blocks, their sizes, precast lintels, fence posts, sleepers, roof components, and partitions

Understanding the properties and characteristics of RCC. Its advantages and disadvantages. Cast-in-situ and pre-cast constructional methods in RCC.

Unit III: RCC frame structure:

Understanding the structural components of a typical RCC frame structure with reference to their location, junctions, load transfer and design.

Unit IV: Foundations:

RCC foundations details

Types of foundations, i.e. spread foundation, raft foundation, grillage foundation, pile foundation, bearing piles, precast & cast-in-situ piles; pile driving, foundation for black cotton soil.

Unit V: Sub Structure and Superstructure:

RCC columns: different shapes, different combinations and loading conditions (axial, bending, non axial/eccentric), slenderness ratio.

RCC beams: Single and doubly reinforced beams, T and L beams, continuous beams, lintels and brackets.

RCC slabs: One way and two way slabs.

Unit VI: Flooring:

Flooring: Introduction, essential requirements of a floor, factors affecting selection of flooring material, Various natural as well as artificial flooring materials like brick, flag stone, tiled, cement concrete, granolithic, terrazzo, marble, shahbad stones timber flooring, timber floor supported on RSJ, flag stone floor resting on RSJ, vitrified tiles, ceramic tiles, Mosaic, rubber, Linoleum, and PVC and PVA flooring, flooring and wall tiles.

Brick on edge, concrete, wood, Indian patent floor, pitch mastic, magnesium oxide, chloride, shahbad or flagstone.

Solid floor, floor finishing and floor coverings. Basement floor and retaining walls Madras terrace, jack arch roofs. Elementary knowledge about R.C.C roof and floor slabs.

Unit VII: Advanced concepts:

Flat slab, coffered slab, diaphragms, retaining walls and water tanks.

Assignments and class work includes making scale models of footing and beam reinforcement details, site visits to understand foundations and other relevant site Conditions, making reports on site visits to summarise the data collected

Site study and report:

Students should visit 1 or 2 industries/factories, sites and buildings which are related to the above discussed topics and they must prepare a brief report which contains sketches and drawings along with supportive photographs at the end of the semester.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

Course Outcome:

- Comprehend Cement and Concrete: Understand the properties and functions of cement ingredients, perform strength and setting tests, and evaluate concrete properties, including strength, durability, and the effects of age.
- Explore RCC Techniques: Explore different forms of reinforced concrete (RCC), such as lightweight and pre-cast concrete, and assess their advantages and disadvantages in construction.
- Analyze RCC Frame Structures: Analyze the structural components of an RCC frame structure, including their location, junctions, load transfer, and design principles.
- Master Foundation Types: Differentiate between various types of foundations, including spread, raft, grillage, and pile foundations, and comprehend foundation construction for different soil types.
- Understand Sub and Superstructure: Gain knowledge of RCC columns, beams, and slabs, including their different shapes and loading conditions, and identify suitable flooring materials for different applications.
- Grasp Advanced Concepts: Explore advanced RCC concepts, including flat slabs, coffered slabs, diaphragms, retaining walls, and water tanks, and apply this knowledge to practical assignments and site visits to enhance construction understanding.

Textbooks

- 1) "Building Construction" by Sushil Kumar, Standard Publishers Distributors
- 2) "Building Materials" by SK Duggal, New Age International
- 3) "A Textbook of Building Construction" by Arora S.P and Bindra S.P, Dhanpatrai and sons, New Delhi
- 4) "Building Construction" by Jha J and Sinha SK Khanna Publishers

AR213: STRUCTURAL MECHANICS –III

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course objectives:

To study the theory of columns and their corresponding critical loads and effective length for different edge conditions. Direct and bending (combined) stresses in columns loaded eccentrically for symmetrical and unsymmetrical sections. The variation of shear force and bending moment at a point; types of forces acting on a retaining wall under different field conditions. Plastic analysis of beams and frames for different loading conditions.

COURSE CONTENT

Unit I:

Columns and struts: Buckling and crushing failures, types of end conditions, Euler's theory & equivalent length and slenderness ratio. Rankine's equation and IS code formula for critical load on columns.

Unit II:

Direct and bending stresses, eccentricity about both axes, symmetric and unsymmetrical sections-Columns.

Unit III: Influence Line Diagrams of statically determinate beams for

- a) A single concentrated load
- b) uniformly distributed load (UDL) longer than the span
- c) uniformly distributed load (UDL) shorter than the span

Unit IV:

Retaining walls subjected to earth pressure.

Unit V:

Plastic Analysis: Introduction to Plastic analysis, Upper and Lower bound theorems, Uniqueness theorem, Shape factor and Load factor. Determination of shape factor for standard cross sections: Rectangle, Triangle, Diamond and Circle and Numerical problems for symmetric and unsymmetrical sections.

Unit VI:

Beam, joint and gable mechanism. Plastic analysis of simply supported, fixed, continuous beams and Frames (single bay single storey) for point load, UDL and unsymmetrical point load.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be $(20M+10M)=30M$

Course outcome:

- Analyze Columns and Struts: Students will understand the principles of buckling, crushing, and failure modes, applying Euler's theory and IS code formulas to determine critical loads for different end conditions.
- Evaluate Direct and Bending Stresses in Columns: Learners will calculate stresses and eccentricities for symmetric and unsymmetrical sections in columns, enhancing their design and analysis skills.
- Create Influence Line Diagrams: Students will develop the ability to construct influence line diagrams for statically determinate beams under various loading conditions, including single concentrated loads and uniform distributed loads (UDL).
- Design Retaining Walls: Participants will gain the knowledge to design retaining walls that can withstand earth pressure, ensuring stability in architectural projects.

- Master Plastic Analysis: Learners will grasp the fundamentals of plastic analysis, including upper and lower bound theorems and uniqueness theorem, and apply them to determine shape factors for different cross-sections.
- Apply Plastic Analysis to Beams and Frames: Students will learn to apply plastic analysis principles to beams, joints, and gable mechanisms, enabling them to analyze simply supported, fixed, and continuous beams and frames for different loading scenarios, enhancing their structural design capabilities.

Text books:

- 1) Analysis of Structures - Analysis, Design and Details of Structures-Vol.-1 by V.N. Vazirani and M.M. Ratwani and S.K.Duggal
- 2) Analysis of Structures - Theory, Design and Details of Structures-Vol.-2 by V.N. Vazirani and M.M. Ratwani and S.K.Duggal

References:

- 1) Limit State Design of Steel structures by S.K.Duggal, Publishers: McGraw-Hill Education.

AR214: HISTORY OF ARCHITECTURE –II

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objective:

To study development of building forms, structural solutions, construction methods, plans and building facade, ornamentation, organization in relation to aesthetic/ religious/social philosophy and environmental factors in history.

COURSE CONTENT

Unit I:

Indus Valley Civilization:

Town planning principles, house construction, drainage systems during Indus Valley Civilization and Vedic village settlement.

Buddhist architecture:

Evolution & golden age; Rock cut Architecture: Stupas, Chaitya, Vihara, Pillars, Ajanta, Ellora, Kailasanath, Rathas, etc.

Unit II:

Hindu Architecture: Elements of Hindu Temple.

Development of temple form from example like Ladh Khan, Temple at Deogarh, Bhattargaoon Temple,

North Indian Temple Architecture

- Architectural character of Gupta Temples
- Architecture style of Orissan temple with examples.
- Khajuraho group of Temples, and
- Architectural character of Gujarat Temples

Unit III:

South Indian Temple Architecture

- Pallava, Chola, Pandyas, Madura and Vijayanagar style with examples.

Unit IV:

Indo-Islamic Architecture

Special features of Mosque and Tomb

Influences of Indo-Islamic Architecture in India

Use of arches, vaults, domes, squinches, pendentives, jaalis, minarets, etc.

Special features: use of landscape, water bodies and gardens.

Ornamentation in structures with interplay of materials such as stones, mosaics, gildings.

Unit V:

Sultanate Architecture

Slave Dynasty, Tughlaq Dynasty, Lodhi Dynasty.

Provincial Styles of Sultanate Period: Punjab, Bengal, Jaunpur, Gujarat, Malwa, Bijapur and Golconda with examples.

Unit VI:

Mughal Architecture

Mughal Style prevalent during the reign of a) Babur; b) Humayun; c) Akbar; d) Jahangir; e) Shah Jahan.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course outcome:

- Understand the principles of town planning, house construction, and drainage systems in the Indus Valley Civilization and Vedic village settlements, as well as the evolution and characteristics of Buddhist rock-cut architecture.
- Analyze the elements of Hindu temple architecture and trace the development of temple forms through case studies, such as Ladh Khan, Deogarh Temple, Bhattargaon Temple, and North Indian and Orissan temple styles.
- Examine the distinct features of South Indian temple architecture, including the Pallava, Chola, Pandya, Madura, and Vijayanagar styles, supported by examples.
- Comprehend Indo-Islamic architectural elements like mosques and tombs, identifying their unique characteristics and influences in India, including the use of arches, vaults, domes, and ornamental materials like stones and mosaics.
- Analyze the architectural styles of the Sultanate period, including the Slave Dynasty, Tughlaq Dynasty, and Lodhi Dynasty, along with regional variations in Punjab, Bengal, Jaunpur, Gujarat, Malwa, Bijapur, and Golconda.
- Explore the evolution of Mughal architectural styles during the reigns of Babur, Humayun, Akbar, Jahangir, and Shah Jahan, highlighting the unique features and contributions of each period in Indian architecture.

Textbooks:

1. Indian Architecture by Percy Brown.
2. The Architecture of India by Satish Grover.

References:

1. Art Architecture of India by Benjamin Row.
2. The history of Architecture in India by Christopher Tadgell.
3. Vistara: The Architecture of India, The festivals of India, Tata Press Limited 1986.

AR215 : BUILDING SERVICES-I (WATER SUPPLY AND SANITARY ENGINEERING)

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objective:

To understand the water and its sources, the standard Code of basic requirements for water supply, drainage and sanitation at an urban level; water supply in residential buildings; various components of sewage systems and design of sewage system for a residential building. refuse collection and disposal of solid waste at domestic and city level in an urban area.

COURSE CONTENT**UNIT I: SOURCES OF WATER SUPPLY:**

Types of sources, surface sources, underground sources.

The quality of water:

The meaning of pure water, impurities in water, analysis of water, physical, chemical and bacteriological tests, maintenance of the purity of water, water-borne diseases, suitability of water for trade purposes.

UNIT II: TREATMENT OF WATER:

General theory and principles of sedimentation tank, coagulation of water, filtration of water, disinfection of water and water softening, colour, odour, taste and fluoridation.

UNIT III: DISTRIBUTION SYSTEM OF WATER:

Methods of distribution, service reservoirs, systems of supply of water, a method of layout of distribution pipes. Wastage of water, Prevention of water wastage and reuse of water.

UNIT IV: STANDARDS/ NORMS -WATER REQUIREMENTS:

Requirements for all types of Residential, Commercial, Industrial buildings and for the town - Indian Standard Code of basic requirements for water supply, drainage and sanitation – Municipal Byelaws and Regulations.

UNIT V: BUILDING SANITATION:

Principles of sanitation, collection and disposal of various kinds of refuse from buildings, methods of carrying refuse disposal, their principles. Plumbing definitions and related terms, plumbing systems (one pipe, two pipes etc). House drainage system, drainage of sub-soil water. Inspection chambers, manholes, sub-drains, culverts, ditches and catch basins, roads and pavements, storm overflow/regulators.

UNIT VI: PLUMBING AND SANITARY APPLIANCES:

Basic principles of plumbing and house drainage, need, scope, terminology. Specifications and installations of various sanitary fittings like wash basins, water closets, urinals, bidets, sinks, etc in buildings, use of various valves– Pipe Appurtenances, different types of taps, faucets, stop cocks, bib cocks, 'P', 'Q', 'S', Floor/ bottle traps used in buildings. Testing of drains and maintenance of house drainage systems.

UNIT VII: DESIGN OF PLUMBING SYSTEMS:

Design considerations on drainage scheme. Planning of bathrooms, lavatory blocks and kitchen in domestic and multi-storied buildings, preparation of plumbing drawings, symbols commonly used in these drawings.

UNIT VIII: SOLID WASTE, COLLECTIONS, TREATMENTS, AND DISPOSAL:

Refuse collection, disposal, Incinerator, Composting, Vermi-composting, Sanitary Land filling, Bio gas system and Modern renewable energy system.

Assignment:

Making Details of a Septic tank, sump and STP, Rainwater harvesting, Toilet detail, Kitchen plumbing details - Terrace drainage, drainage in cellars, drainage layout of a building, details of building pertaining to supply, disposal and ventilation.

Site visits:

The teacher should arrange various site visits to see water treatment plant, sewage treatment plant, multi-storeyed apartments for studying water supply and sanitary arrangements.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted as per the university academic calendar and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcome:

- Understanding Water Sources: Students will identify and differentiate between surface and underground water sources, and comprehend the concept of pure water, impurities, and water quality analysis.

- **Water Treatment Proficiency:** Students will grasp the principles of water treatment, including sedimentation, coagulation, filtration, disinfection, and water softening, along with addressing issues like color, odor, taste, and fluoridation.
- **Efficient Water Distribution:** Learners will be skilled in designing water distribution systems, recognizing methods, service reservoirs, and layouts, while focusing on reducing water wastage and exploring water reuse possibilities.
- **Compliance with Standards:** Students will be well-versed in the Indian Standard Codes, municipal bylaws, and regulations governing water supply, drainage, and sanitation, with an emphasis on different building types.
- **Sanitation Practices:** Graduates will comprehend sanitation principles and be capable of collecting and disposing of various building refuse types. They will also understand plumbing systems and related terminology.
- **Plumbing System Design:** Learners will acquire the knowledge and skills necessary to design plumbing systems, including bathrooms, lavatory blocks, and kitchens in diverse building types, and create plumbing drawings with commonly used symbols.

Textbooks:

- 1) "Water Supply and Sanitary Engineering", by S.C. Rangwala, Chartar publishing house, Anand, 1989.
- 2) "Waste Water Engineering", by Punmia B.C., Laxmi Publications, 2009.
- 3) "Water supply and Sanitary Engineering" by G.S. Birdie & J.S. Birdie Dhanpat Rai Publishing Co. New Delhi.
- 4) Waste Water Engineering. By Punmia, B. C., Jain, A. K. and Jain, A.K. New Delhi: Laxmi Publications (1998).

References:

- 1) Manual of water supply and treatment, Second edition, CPHEEO, Ministry of works and housing, New Delhi, 1977
- 2) Manual on sewerage and sewage treatment, published by CPHEEO, Ministry of ' works and Housing, New Delhi, 1980
- 3) Indian Standard Code of basic requirements for water supply, drainage and sanitation, Indian Plumbing Association

AR216: CLIMATOLOGY-I

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	03	Internal Marks	30
Tutorials/ drawing(periods/week)	01	External Marks	70

Course Overview:

It is Science that explores aspects of human comfort and energy efficiency in built environment for sustainable habitat. Tools, data, standards, methods and principles for design of climate responsive built environments, are dealt particularly for tropical climates found in India.

COURSE CONTENTS

UNIT I: INTRODUCTION TO BUILDING CLIMATOLOGY

Global climatic factors, Elements of climate and graphic representation of climatic data, macro and micro climate, Climate control elements of building, Climate and built form interaction, Mahoney Tables.

UNIT II: TROPICAL CLIMATES

General classification of tropical climates, Indian classification of climate, Characteristics of different climatic zones and design considerations, Traditional built forms with respect to climatic and cultural conditions.

UNIT III: HUMAN COMFORT

Elements of heat exchange between man and environment, Physiological and sensory responses, Biophysical effects of environmental factors, Thermal and visual comfort factors, indices/charts.

UNIT IV: BUILDING ENVELOPE

Heat flow through buildings, Periodic heat flow, Elements of building related to control of solar radiation and ventilation, Thermo physical properties of different materials, Principles of light and Day-lighting, Elements of building related to daylight.

Note:

Understanding climate data, its analysis and method of presentation, Study of traditional/vernacular architecture in relation with culture and climate of the study region, Study of conventional building envelope to assess comfort factors and undertake retrofitting/redesign for given parameters.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted as per the university academic calendar and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcome:

- Understand Climatic Factors: Gain a comprehensive knowledge of global climatic factors and the elements of climate, enabling the analysis and interpretation of climatic data for architectural design.
- Assess Micro and Macro Climate: Differentiate between micro and macro climates, demonstrating the ability to identify and apply climate control elements in building design to suit specific environmental conditions.
- Design for Tropical Climates: Evaluate and classify tropical climates, with an emphasis on Indian climate zones, and apply this knowledge to design buildings that are well-suited to local climatic conditions and cultural influences.
- Optimize Human Comfort: Evaluate the biophysical effects of environmental factors on human comfort, and use thermal and visual comfort factors to create environments that enhance the well-being of occupants.
- Manage Building Envelope: Analyze heat flow through buildings and design building envelopes to control solar radiation and ventilation effectively, while considering the thermo-physical properties of materials.

- Apply Climate-Responsive Design: Apply principles of climate data analysis, vernacular architecture, and conventional building envelopes to assess and retrofit buildings for improved comfort and environmental sustainability.

Text books:

- 1) Manual of Tropical Housing and Building by Koenigsberger, Ingersoll, Mayhew, Szokolay,.
- 2) Man, Climate and Architecture by B. Givoni,
- 3) GRIHA Manuals Volume 1-5, Ministry of New and Renewable Energy, Govt. of India
- 4) Energy Conservation Building Code, Bureau of Energy Efficiency, India

Reference books:

- 1) Design for Hot Climates by Konya Allan,.
- 2) Tropical Architecture by Kukreja, C.P.,.
- 3) Buildings, Climate and Energy by Markus T.A., Morris E.N.,
- 4) Solar Control and Shading Devices by Olgyay A., Olgyay V.,.
- 5) Sun, Wind and Light by Brown G.Z.,
- 6) Climate Responsive Architecture by Arvind Krishnan, Nick Baker, SimosYannas, S.V. Szokolay,
- 7) Website: <http://www.gsa.gov/portal/category/21049>

AR217: SEMINAR-I

Credits	02		
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drg(periods/week)	01	External Marks	50(Viva-Voce)

Course objective:

To improve the student skills in presentation of architectural projects, documentation of Case Studies, report writing and taking notes from lectures.

COURSE CONTENT

Architectural projects and presentations which are part of the first and second-year curriculum are taken as the basis of training of the following skills.

Presentation skills: Writing skills

Logical presentation of ideas; precise report writing;
Documentation and Presentation of Case Studies;
Taking notes from lectures, speeches, debates, etc.
Interpretation and analysis of reports, text and technical literature.

Introduction to Computers:

Working knowledge of MS Word, Power Point and other word processing and presenting packages like Photoshop, etc.

Assessment

Continuous assessment will be conducted as per the syllabi by assigning two presentations and one report i.e. each presentation carries 20 marks and 10 marks for report i.e., of (20+20+10=50M). Student has to make a presentation for external Viva-voce conducted by external examiner.

Course outcome:

- Communication Proficiency: Students will exhibit effective presentation and writing skills, ensuring logical and precise communication of architectural ideas, case studies, and reports.
- Case Study Expertise: Students will demonstrate competence in documenting and presenting architectural case studies, effectively capturing the essence of design and problem-solving.
- Information Synthesis: Learners will acquire the ability to extract, interpret, and analyze information from various sources, including reports, texts, and technical literature relevant to architectural projects.
- Computer Literacy: Students will gain a working knowledge of essential software tools, such as MS Word, PowerPoint, and Photoshop, enabling them to create professional architectural presentations and documents.
- Assessment Proficiency: Participants will excel in continuous assessment, showcasing their capability to prepare and deliver two presentations and one report, while confidently facing external Viva-voce examinations.
- Professional Presentation: Graduates will exhibit competence in presenting their architectural work to external examiners, effectively communicating their design concepts and solutions within the industry's professional standards.

Text books:

- 1) Guide to Report Writing – 2010 by Michael Netzley and Craig Snow.

References:

- 1) How to write and speak better (Reader's Digest.).
- 2) Effective reports by MatraTreece.
- 3) Microsoft Office 2016 Step By Step by Lambert Joan

2NDYEAR2ND SEMESTER

AR221: ARCHITECTURAL DESIGN-III

Credits	08	Duration of Exam	10.00Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	06	External Marks	50

Course objective:

To understand the design issues like Functions and their spatial implications; Anthropometrics, furniture layout and horizontal circulation; Interior volumes and material qualities; Lighting and ventilation and Integration of form and function.

COURSE CONTENT

The list of suggested topics to be covered as design problems including:

Small resorts, Guest house, motels/small hotel, hostels, Police station, small office building, etc. Necessary theoretical inputs are to be given in highlighting the norms and design issues.

At least one major exercise and one minor design/time problems should be given. The final submission shall necessarily include a model for the main problem.

Assessment

Continuous assessment will be conducted for major (30M) and minor (20M) design problems i.e. total marks of (30M+20M) =50M

Course outcome:

- **Design Proficiency:** Students will demonstrate proficiency in designing small-scale architectural structures, such as resorts, guest houses, and motels, while adhering to relevant norms and design principles.
- **Norms Comprehension:** Understand and apply architectural norms and regulations in the design of public facilities like police stations, ensuring safety and functionality.
- **Conceptual Innovation:** Develop innovative design concepts for small office buildings, integrating functionality, aesthetics, and sustainability.
- **Problem-Solving Skills:** Employ problem-solving skills to address minor design and time constraints, enhancing adaptability in real-world architectural scenarios.
- **Model Construction:** Create a detailed architectural model for a significant design project, showcasing practical implementation and design intent.
- **Interdisciplinary Collaboration:** Foster collaboration skills for multidisciplinary projects, preparing students to work effectively in a team for holistic design solutions.

References:

- 1) Time savers standards of Building Types-Joseph de chiara & others.
- 2) A History of Building Types-Nikolays Pevsner.
- 3) Architect's Data-Ernst Neufert.

- 4) Architect's Hand book-Charanjit. Shah
- 5) Doctor's offices & Clinics-Paul Hayden Klrk, Engene D. Stermberg.
- 6) A History of Building Types-Nikolays Pevsner. Architect's Data-Ernst Neuffer
- 7) National Building Code: 2016

AR222: BUILDING MATERIALS AND BUILDING CONSTRUCTION-IV

Credits	05	Duration of Exam	5.00Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	03	External Marks	50

Course Objective:

To study properties and uses various metals, such as Pig iron, cast iron, wrought iron, steel, manufacturing processes; structural steel and its connections; Steel members and roof trusses; and stairs made of wooden, stone, metal and R.C.C.

COURSE CONTENT

UNIT I: Ferrous and non-ferrous metals:

Ferrous Metals: Pig iron, cast iron, wrought iron, steel, manufacturing processes and casting. Characteristics form and uses of cast iron, wrought iron and steel. Alloys steel, stainless steel, steel-treatment, steel tempering, annealing, normalizing, and case hardening, their objectives and effect on alloy steels. Galvanizing, oxidation and casting of metallic products, corrosion of iron and their prevention. Metallic protective coatings.

Non-ferrous Metals: Basic idea of important ores, properties and uses of Aluminium, Zinc, Copper, Tin and Lead

UNIT II: STRUCTURAL STEEL WORK AND CONNECTIONS:

General principles and terms defined, standard sections i.e. beams joints, angles, channels, tees, bolts, rivets and welding. Bolt Connections, Riveting and welding methods.

UNIT III: STEEL MEMBERS

Columns and stanchions, stanchions or column bases, beam and girders, column and beam connections plate girders, lattice or warren girder.

UNIT IV: STEEL ROOF TRUSSES

Steel trusses, types for various spans, tubular steel roofs, monitor roof, north light roof truss, details of steel –roof trusses. Lantern light, dome light, structural steel practice and drawings as per IS Code. Portal frame, Geodesic principles and cellular structures, cable net and tensile structures.

UNIT V: STAIRCASES:

Terms defined, Tread, riser, stringer, nosing, flight, landing, head room, handrail, types of stairs i.e., straight, doglegged, open well geometrical, circular, spiral,

bifurcated, balusters, newel post etc., wooden stairs, stone stairs, metal stairs and elementary knowledge of R.C.C. stairs.

UNIT VI:MISCELLANEOUS:

RCC staircases and ramp: Waist slab and folded plate staircases. RCC Balconies, chajjas etc.

Note:

Assignments and class work include making scale drawings of staircases, appropriate site visits to understand the practical application of materials. Construction of any one structure in the construction yard to a convenient scale.

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

Course Outcome:

- Understanding Materials: Students will comprehend the properties, manufacturing processes, and applications of ferrous and non-ferrous metals, including alloys, and be able to assess their corrosion resistance.
- Structural Steel Knowledge: Gain insights into the principles, terminology, and methods related to structural steelwork and connections, enabling students to design and analyze steel components for construction.
- Steel Member Design: Students will learn how to design and analyze various steel members such as columns, beams, and girders, with an emphasis on proper connections and plate girders.
- Steel Roof Trusses: Acquire the ability to design and understand various steel roof trusses, including tubular steel roofs and specialized types like north light and monitor roofs, in accordance with IS Code.
- Staircase Design: Develop skills in designing various types of staircases, including wooden, stone, metal, and RCC stairs, and apply knowledge of key components like treads, risers, and handrails.
- Practical Application: Students will apply theoretical knowledge by creating scale drawings of staircases, conducting site visits, and constructing a structure in the construction yard, gaining hands-on experience in building materials and construction practices.

Textbooks

- 1) "Building Construction Illustrated", and Francis D.K. Ching, Wiley Publishers
- 2) "Design of Steel Structures", by SK Duggal, Tata McGraw-Hill Publishing Company Ltd, New Delhi
- 3) "Design of Steel Structures", by Ramamrutham, Dhanpat Rai Publishing Company, New Delhi
- 4) "Building Materials", by SK Duggal, New Age International

AR223: DESIGN OF STRUCTURES-I

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course objective:

To study the stress strain behaviour of steel and concrete; the concept of limit state method and under & over reinforced sections. The basic idea of analysis and design different reinforced concrete members from substructure to superstructure of a reinforced concrete building.

COURSE CONTENT

UNIT I: INTRODUCTION TO RCC DESIGN

Introduction to IS 456:2000, Neutral axis; balanced, under & over reinforced sections.

UNIT II: DESIGN OF FLEXURE MEMBERS

- Design of singly reinforced beams, doubly reinforced beams and T-beams
- Design of lintels, cantilever beams
- Design of one way slab, two way slab and cantilever slabs

UNIT II: DESIGN FOR SHEAR AND BOND

- Design of beams for shear & bond

UNIT III: DESIGN OF COLUMNS

- Design of axially loaded columns, Design of columns subjected to uniaxial bending moment only.

UNIT IV: DESIGN OF FOOTINGS:

Types of RCC footings (isolated, square, rectangular, combined, pile and pile cap), Analysis and design of isolated Square and rectangular footings only.

UNIT V: DESIGN OF STAIRCASE: Design of Dog-Legged and Single Flight only.

Note: Design of reinforced concrete structures conforming to IS 456:2000

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M

Course Outcome:

- Analyze RCC Structures: Students will demonstrate the ability to understand and analyze reinforced concrete structures in compliance with IS 456:2000.
- Flexure Member Design Proficiency: Develop expertise in designing flexure members, including singly reinforced beams, doubly reinforced beams, T-beams, lintels, and cantilever beams.

- Slab and Cantilever Slab Design: Gain the skills to design one-way slabs, two-way slabs, and cantilever slabs, ensuring structural stability and safety.
- Shear and Bond Design Competence: Master the design of RCC beams for shear and bond strength, ensuring structural integrity and durability.
- Column Design Mastery: Demonstrate the ability to design axially loaded columns and columns subjected to uniaxial bending moment, ensuring load-bearing capacity and stability.
- Footing and Staircase Design Expertise: Acquire knowledge to design various types of RCC footings, including isolated, square, and rectangular footings. Additionally, develop the ability to design dog-legged and single-flight staircases with structural safety in mind.

Text Books:

1. Design of R.C.C. structures by S. Ramamrutham, Publishers: DhanpatRai
2. Reinforced Concrete Limit State Design by A.K.Jain, Publishers: Nem Chand & Brothers

References:

1. Limit State Design of Reinforced Concrete by P.C.Varghese, Publishers: Prentice-Hall of India Private Limited
2. Reinforced Concrete Limit state Design by P. Dayaratnam, Publishers: Oxford IBH

AR224: HISTORY OF ARCHITECTURE –III

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course objective:

To Understand significant developments in Modern Architecture with the advent of steel, Glass and Ferro-concrete; different schools of thought along with understanding of various architectural philosophies and works of 20th century contemporary architects in India and abroad.

COURSE CONTENT

UNIT I: INTRODUCTION, ADVENT OF STEEL, GLASS AND FERRO-CONCRETE

Late Renaissance and development of open spaces
 Advent of Steel and Henry Labrouste
 Great Exhibitions of 1851 and 1889 and their contributions
 Gustave Eiffel
 Development of Ferro concrete: Auguste Perret, Tony Garnier

UNIT II: DEVELOPMENT OF 'NEW ART & ARCHITECTURE

Le Art Nouveau movement and Victor Horta
 H.P. Berlage, H. H. Richardson and 'True Construction'
 Balloon Frame Structure and Plane Surfaces in America

UNIT III: CHICAGO SCHOOL & ORGANIC DEVELOPMENTS

Chicago School: Louis Sullivan

Organic Architecture: Frank Lloyd Wright

UNIT IV: PROGRAMMATIC FUNCTIONALISM

Walter Gropius and Bauhaus, Le Corbusier

UNIT V: Development of International Style

Mies van der Rohe, Philip Johnson, Louis I Kahn

UNIT VI: 20TH CENTURY WORLD ARCHITECTURE

Works of some master architects like, Eero Saarinen, Alvar Aalto, Oscar Niemeyer, Richard Neutra, Norman Foster, Antonio Gaudi, Frank O. Gehry, I. M. Pei, Kenzo Tange.

UNIT VII: INDIAN ARCHITECTURE

Revival of Indian Architecture under British patronage - Architecture in Colonial India. Indian architecture since independence, B. V. Doshi, Charles Correa, Raj Rewal, A. P. Kanvinde, Laurie Baker.

Note:

The latest developments in the field of architecture, architects and their philosophy need to be updated.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course outcome:

- CO1: Analyze the historical evolution of architectural materials and techniques, from the Renaissance to the emergence of steel, glass, and ferro-concrete in construction.
- CO2: Evaluate the impact of key architectural figures like Henry Labrouste, Gustave Eiffel, and Auguste Perret on the development of modern architecture.
- CO3: Examine the New Art & Architecture movement, including the works of Victor Horta, and understand its influence on architectural design.
- CO4: Explore the Chicago School and Organic Architecture, focusing on the contributions of Louis Sullivan and Frank Lloyd Wright to architectural theory and practice.
- CO5: Assess the principles of Programmatic Functionalism and its proponents, such as Walter Gropius and Le Corbusier, in shaping architectural design concepts.
- CO6: Investigate the development of the International Style and its notable practitioners like Mies van der Rohe, Philip Johnson, and Louis I Kahn, and its impact on 20th-century architecture worldwide.

REFERENCES:

- 1) History of Modern Architecture by Leonardo Benevolo.
- 2) Space, Time and Architecture: The growth of a New Tradition by Sigfried Giedion.
- 3) Contemporary Architecture by Ann Lee Morgan and Colin Mayer.

- 4) After the Masters by Vikram Bhatt.
- 5) Architecture of Independence by John Lang, Mickey Desai, Madhavi Desai.
- 6) Post Independence Architecture by S.S.Bahga.
- 7) The language of Post Modern Architecture by Charles Jencks.
- 8) The Architecture of the City by Aldo Rossi.

AR225: BUILDING SERVICES -II (BUILDING ACOUSTICS)

Credits	03	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	03	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course objective:

To develop the skills required for understanding the behavior of sound in built environment, Effects of geometry and shape; acoustical properties of building materials, Acoustical requirements of different types of buildings and its integration with architectural design.

COURSE CONTENT

UNIT I:

History of acoustics, examples from the past buildings and methods used for good acoustics.

UNIT II:

Sensibility of human ear, subjective effects.

UNIT III:

Generation, propagation, transmission; reception of sound; sound waves, sound pressure and other factors, decibel scale, behaviour of sound in enclosed spaces.

UNIT IV:

Echoes, reflectors; sound amplification and distribution Sound isolation, speech, privacy, and electronic sound systems.

UNIT V:

Effects of geometry and shape; acoustical properties of building materials, absorption coefficient; choice of materials and their application systems.

UNIT VI:

Principles of acoustical design process.

UNIT VII:

Acoustical requirements of different types of building.

UNIT VIII:

Source and type of noise in and around buildings, methods of noise control.

Note:

Assignment and class work includes case studies of auditorium, Resonance, reverberation time, simple exercises using Sabine's formula along with acoustic diagram of an indoor space.

Course outcome:

- Understand the historical evolution of acoustics, recognizing the significance of past techniques and structures in achieving good acoustic design.
- Gain insight into the human ear's sensitivity and its subjective effects on the perception of sound within architectural spaces.
- Comprehend the fundamental principles of sound generation, propagation, and reception, including sound wave properties, pressure, and the decibel scale.
- Analyze the behavior of sound in enclosed spaces, covering aspects such as echoes, reflectors, amplification, distribution, sound isolation, and electronic sound systems.
- Evaluate the impact of geometry, shape, and building materials on acoustics, and make informed choices for materials and application systems.
- Develop the skills necessary for acoustical design, considering the acoustical requirements of various building types and addressing sources of noise both inside and outside buildings while implementing noise control methods.

References:

- 1) Environmental Acoustics by Leslie L.Poella.
- 2) Design of Good Acoustics by J.E.Moore.
- 3) Acoustics for the Architect by Harold Burris, Reinhold.
- 4) The Architecture of Sound by Peter Lord, Duncan Templeton.
- 5) Architectural Acoustics by David Eager.

AR226: CLIMATOLOGY - II

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	03	Internal Marks	30
Tutorials/ drawing(periods/week)	01	External Marks	70

Course Objectives:

Methods and techniques to predict the effect of elements of climate on built spaces. Design of climate responsive and energy efficient built environment through Green building concepts for sustainable habitat.

COURSE CONTENTS**UNIT I: Solar Radiation and Day lighting**

Solar geometry and charts, Sun control through various elements of building, Day lighting prediction techniques, Fenestrations with focus on skylight, north-light etc.

UNIT II: Natural Ventilation and Air Movement

Principles and dynamics of air movement and ventilation, Effect of built environment on air movement and ventilation, Fenestrations and other elements to control air movement and ventilation.

UNIT III: Passive and Mechanical Controls

Passive methods of cooling, dehumidification, evaporative cooling etc., Substitutes of mechanical devices using renewable energy sources for cooling, dehumidification, evaporative cooling etc.

UNIT IV: Green Buildings and Energy Simulation Programs

Background of different rating systems, Relevance of rating system and GRIHA rating system, Introduction to building energy simulation program, Different simulation program software.

Assignments:

Calculation and design of elements of building for a project done in Architectural Studio the previous semester. Self-assessment of green rating system as per GRIHA specifications for their design project. To run ECOTECH simulation for a small block the elements of building that the student designed.

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be $(20M+10M)=30M$.

Course Outcome:

- **Analyze Solar Geometry:** Students will be able to understand solar geometry, create sun charts, and use this knowledge to design buildings with effective sun control strategies.
- **Enhance Daylighting:** Learners will develop techniques for optimizing natural daylight in architectural design, including the use of fenestrations like skylights and north-light.
- **Master Air Movement:** Students will grasp the principles of air movement and ventilation, allowing them to design spaces that encourage natural ventilation and comfort.
- **Control Microclimates:** Graduates will explore how the built environment impacts local microclimates and apply fenestrations and architectural elements to control air movement effectively.
- **Implement Passive Cooling:** Learners will acquire the skills to incorporate passive cooling methods, dehumidification, and evaporative cooling in architectural designs.
- **Promote Green Building Practices:** Students will gain knowledge of green building rating systems like GRIHA and learn to use building energy simulation software for sustainable design in architecture.

Text books:

- 1) Manual of Tropical Housing and Building by Koenigsberger, Ingersoll, Mayhew, Szokolay,.
- 2) GRIHA Manuals Volume 1-5, Ministry of New and Renewable Energy, Govt. of India
- 3) Energy Conservation Building Code, Bureau of Energy Efficiency, India
- 4) ECOTECH online tutorials

Reference books:

- 5) Design for Hot Climates by Konya Allan,.
- 6) Tropical Architecture by Kukreja, C.P.,.
- 7) Buildings, Climate and Energy by Markus T.A., Morris E.N.,
- 8) Solar Control and Shading Devices by Olgyay A., Olgyay V.,.
- 9) Sun, Wind and Light by Brown G.Z.,

AR227: ENVIRONMENTAL STUDIES

Credits	02	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objectives:

To study and understand functions of Ecosystems, environment and natural resources management, bio-diversity and its conservation, environmental pollution, economy and environment, social issues and the environment, institutions and governance, international conventions.

COURSE CONTENT**UNIT I: Introduction (1 Lecture)**

Definition, scope and importance measuring and defining environmental development: indicators

UNIT II: ECOSYSTEMS (2 Lectures)

Introduction, types, characteristics features, structure and functions of Ecosystems - Forest, Grassland, Desert, Aquatic (lakes, rivers, and estuaries)

UNIT III: ENVIRONMENT AND NATURAL RESOURCES MANAGEMENT LAND RESOURCES: (8 Lectures)

Land as a resource, Common property resources, Land degradation, Soil erosion and desertification, Effects of modern agriculture, fertilizer-pesticide problems
Forest resources: Use and over-exploitation, Mining and dams-their effects on forest and tribal people
Water resources: Use and over-utilization of surface and ground water, Floods, draughts, Water logging and salinity, Dams-benefits and costs, Conflicts over water
Energy resources: Energy needs, Renewable and non-

renewable energy sources, Use of alternate energy sources, Impact of energy use on environment

UNIT IV: BIO-DIVERSITY AND ITS CONSERVATION (3 Lectures)

Value of bio-diversity – consumptive and productive use, social, ethical, aesthetic and option values. Bio-geographical classification of India – India as a mega diversity habitat Threats to biodiversity-Hotspots, habitat loss, poaching of wildlife, loss of species, seeds etc. Conservation of bio-diversity-In-situ and Ex-situ conservation.

UNIT V: ENVIRONMENTAL POLLUTION – LOCAL AND GLOBAL ISSUES (8 Lectures)

Causes, effects and control measures of Air pollution, Indoor air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Solid waste management, composting, vermin-culture, Urban and industrial wastes, recycling and re- use Nature of thermal pollution and nuclear hazards, Global Warming, Acid Rain, Ozone depletion

UNIT VI: Environmental problems in India (6 Lectures)

Drinking water, Sanitation and public health, Effects of activities on the quality of environment, Urbanization, Transportation, Industrialization, Green revolution Water scarcity and Ground Water depletion, Controversies on major dams – resettlement and rehabilitation of people problems and concerns, Rain water harvesting, cloud seeding and water shed management

UNIT VII: ECONOMY AND ENVIRONMENT (4 Lectures)

The economy and environment interaction, Economics of development, preservation and conservation, Sustainability: theory and practice, Limits to Growth, Equitable use of resources for sustainable lifestyles, Environmental Impact Assessment

UNIT VIII: SOCIAL ISSUES AND THE ENVIRONMENT (2 Lectures)

Population growth and environment, Environmental education, Environmental movements, Environmental Development

UNIT IX: INSTITUTIONS AND GOVERNANCE (5 Lectures)

Regulation by Government, Monitoring and Enforcement of environmental regulation, Environmental Acts, Water (Prevention and Control of pollution) act, Air Prevention and Control of pollution) act, Environment Protection act, Wild life protection act, Forest Conservation act, Coastal Zone Regulations, Institutions and policies relating to India, Environmental Governance

UNIT X: INTERNATIONAL CONVENTIONS (2 Lectures)

Stockholm Conference 1972, Earth Summit 1992, World commission for environmental Development (WCED)

UNIT XI: CASE STUDIES (3 Lectures)

Chipko movement, Narmada Bachao Andolan, Silent Valley project, Madhura Refinery and TajMahal, Industrialization of Pattancheru, Nuclear reactor at NagarjunaSagar, Tehridam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – aquaculture, Florosis in Andhra Pradesh.

UNIT XII: FIELD WORK (5 Lectures)

Visit a local area to document and mapping environmental assets – river/ forest/ grass land / hill/ mountain Study of local environment – common plants, insects, birds, Study of simple ecosystems – pond, river, hill slopes etc., Visits to Industries, Water treatment plants, affluent treatment plants.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcome

- Understand the significance of environmental development, and demonstrate the ability to measure and define it using relevant indicators.
- Describe the characteristics, structure, and functions of various ecosystems, including forests, grasslands, deserts, and aquatic environments.
- Analyze the management of land and natural resources, including issues such as land degradation, forest exploitation, water utilization, and energy resource impact on the environment.
- Recognize the value of biodiversity and its conservation, identify threats to biodiversity, and differentiate between in-situ and ex-situ conservation methods.
- Evaluate the causes, effects, and control measures of local and global environmental pollution, including air, water, soil, marine, and noise pollution, as well as waste management and thermal pollution.
- Examine environmental issues specific to India, including water scarcity, urbanization, transportation, industrialization, and controversies related to major dams, while exploring sustainability, equitable resource use, and environmental governance in the context of the Indian environment.

3RD YEAR 1ST SEMESTER

AR311: ARCHITECTURAL DESIGN-IV

Credits	08		-
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	06	External Marks	50 Viva-voce

Course objective:

The studio shall emphasis on understanding the needs of privacy, communal spaces, efficiency of open spaces and ideas of extended living areas in creating the housing and its facilitates in the process of architectural design.

COURSE CONTENT

Course overview

Organisation of functional activities in relation to user requirements and the site.
Relating the system of horizontal & vertical circulation, open spaces, parking etc.
Responding to socio-economic factors such as income levels, privacy, territoriality, socializing etc.
Considering materials, structure and services in relation to the design proposal.
Integration of plan forms & three-dimensional compositions.
Detailing for the physically handicapped and the elderly.

The list of suggested topics to be covered as design problems include:

Apartment, row housing, block of flats and residential complexes at an intermediate scale such as staff housing, housing for specific communities in urban and rural areas such as home for the aged, fishermen's housing etc.
Necessary theoretical inputs to be given highlighting the norms and design issues.

At least one major exercise (8 weeks) and two minor design (6weeks) problems should be given. The final submission shall necessarily include a model for the main problem.

Course Outcome

- **Design Proficiency:** Students will demonstrate a high level of design proficiency in organizing functional activities that cater to user requirements and site constraints.
- **Spatial Integration:** Understand and apply principles of spatial integration, connecting horizontal and vertical circulation, open spaces, and parking to enhance user experience.
- **Socio-economic Sensitivity:** Develop a socio-economic awareness to create designs that address income levels, privacy, social dynamics, and cultural factors in various community settings.
- **Material and Structural Expertise:** Display competence in considering materials, structure, and services to align with the design proposal, ensuring architectural integrity.

- **Three-dimensional Composition:** Master the integration of plan forms and three-dimensional compositions, creating innovative and functional architectural solutions.
- **Universal Accessibility:** Demonstrate expertise in detailing for the physically handicapped and the elderly, ensuring inclusive and accessible designs in various housing typologies and community settings.

Assessment:

Continuous assessment will be conducted for major (30M) and minor (20M) design problems i.e. total marks of (30M+20M) =50M

References:

- 1) Time saver standards for housing and residential development, Joseph De Chaira
- 2) National Building Code : 2016, Bureau of Indian Standards

AR312: BUILDING MATERIALS AND BUILDING CONSTRUCTION-V

Credits	05	Duration of Exam	5.00Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	03	External Marks	50

Course objective:

Awareness of Building details such as Finishes, temporary structures, Modular components, Plastic and Glass products.

COURSE CONTENT:

UNIT I:PARTITION WALLS:

Brick partition, reinforced brick nogged partition, lath and plaster partition, precast concrete partition, glass block and glass Crete partition, and common wooden partition.

UNITII:MODULAR COMPONENTS:

Offices, kitchens, toilets etc.

UNITIII:WALL FINISHES:

Acoustic treatment, insulation, wall panelling with different materials, POP punning etc.

UNITIV: PLASTIC:

Types, thermo setting and thermo plastics, resins, common types of moulding powders used fabrication of plastics, polymerization and condensation. Plastic coatings reinforced plastic, plastic laminates.

UNITV:GLASS & GLASS PRODUCTS:

Composition, Glass fabrication, types of glass, wired glass, fibre glass, rock wool, laminated glass, glass Crete blocks, structural glass, their properties and uses in buildings.

UNITVI: ROOF COVERINGS:

Roof coverings: Introduction, requirements of good roof technical terms, classification, types of roof coverings for pitched roof. : Roofing tiles and roofing with cement products like A.C. sheet roofs, G.I. Sheets roofs, slates

UNIT VII: TEMPORARY STRUCTURES:

Shuttering and centring scaffolding, formwork, and timbering for trenches. Shoring, racking shores, flying shores and dead shores, underpinning.

UNIT VIII: Miscellaneous Materials and treatments:

Properties and uses of Rubber, Asphalt and Bitumen, Asbestos, cork, felt, mica, adhesive, glass, leather, canvass, jute

Assignments and class work include making scale drawings of PARTITIONS, appropriate site visits to understand the practical application of materials. Collection of materials like glass products and plastic products of building industry and catalogue them with specifications in the material library

Note

- Lecture classes shall be supplemented relevant construction drawings
- Latest trends and practices of the above topics need to be updated.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

Course Outcome:

- Understand Partition Walls: Students will comprehend the various types of partition walls and their applications, from brick to precast concrete, enhancing their knowledge of interior architectural elements.
- Mastery of Modular Components: Gain proficiency in designing modular components for diverse spaces, including offices, kitchens, and bathrooms, enabling creative and functional architectural solutions.
- Wall Finish Expertise: Acquire skills in acoustic treatment, insulation, and wall panelling, enabling students to create aesthetically pleasing and acoustically sound interior spaces.
- Comprehensive Knowledge of Plastics: Develop a deep understanding of plastic materials, including types, fabrication, and coatings, facilitating innovative and sustainable design solutions in architecture.
- Glass and Glass Products: Gain insight into the properties, fabrication, and uses of glass and related products, enabling the incorporation of natural lighting and aesthetic elements into architectural designs.

- **Roof Covering Proficiency:** Learn about different roof coverings and their applications, including roofing tiles and sheets, to design sustainable and weather-resistant roofing systems.

Textbooks:

- 1) Building Construction by S.P Arora, S.P Bindra
- 2) Building Materials by S.C.Rangwala

References

- 1) Building Construction by Rangwala
- 2) Building Construction by Sushil Kumar

AR313: DESIGN OF STRUCTURES- II

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course objective:

To study the stress strain behaviour of mild steel and the concept of limit state methods. The basic idea of design of bolted, welded connections. The design of tension members and compression members subjected to axial load and the design of beams subjected to bending and design of foundations.

COURSE CONTENT

UNIT I: Introduction to Steel structures:

Introduction, Advantages and disadvantages of steel as structural material, Stress-Strain curve for mild steel, Rolled steel sections, Introduction to IS 800:2007.

UNIT II: Design of connections: Bolted and Welded connections.

Bolted connections: Introduction, types of bolts, types of bolted joints, types of failure of bolted joints, Behavior of bolted joints, Strength and efficiency of a joint, Design of bolted connection (concentrically loaded).

Welded Connections: Introduction, Advantages of welding, types of welds, Types and properties of welds, Types of joints, weld specifications, Design of Groove welds and Fillet welds subjected to axial load.

UNIT III: Design of Tension Members

Introduction, Types of tension members, Slenderness ratio, Net sectional area, Effective net area, Types of failure, Strength of tension members, Displacement of tension members; Design of tension members subjected to axial load.

UNIT IV: Design of Beams

Introduction, Types of sections, Classification of Cross section, Lateral stability of beams, Elastic critical moment, Bending and Shear strength of beams, Web buckling, Web crippling, Deflection, Design of Laterally supported and unsupported rolled steel beams, Design of built-up beams (with flange plates only), checks for shear and deflection.

UNIT V: Design of Compression Members

Introduction, Types of sections, Classification of Cross section, Effective length, Radius of gyration, Slenderness ratio, Types of buckling, Deflection, Design of axially loaded compression members, built up compression members (Lacing only).

UNIT VI: Design of Foundations

Introduction, Types of column bases, Allowable stress in bearing, Design of slab base and Design of gusset base subjected to axial load only.

Note:

Design of steel structures conforming to IS 800:2007. The class and assignment work should be supplemented with appropriate site visits.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be $(20M+10M)=30M$

Course outcome:

- Understand the advantages and disadvantages of steel as a structural material, and interpret the stress-strain behavior of mild steel. (Knowledge)
- Analyze and design both bolted and welded connections, considering various types, strength, and efficiency. (Application)
- Demonstrate the ability to design tension members, considering factors like slenderness, net sectional area, and types of failure. (Application)
- Apply knowledge to design beams, accounting for lateral stability, critical moment, bending and shear strength, and deflection. (Application)
- Design compression members and built-up compression members, considering factors like slenderness, buckling, and deflection. (Application)
- Design various types of foundations, including column bases, slab bases, and gusset bases, while complying with IS 800:2007 standards. (Application)

Text books:

1. Limit State Design of Steel structures by S.K.Duggal, Publishers: McGraw-Hill Education.

Reference:

1. Design of Steel structures by N. Subramanian, Oxford University Press.
2. Limit State Design of steel structures by Ramchandra and Virendra Gehlot, Scientific Publishers (India)
3. Design of steel structures by K.S.Sai Ram, Pearson Education India.
4. Design of steel structures by Limit State Method as per IS: 800-2007 by S.S. Bhavikatti, IK International Publishing House, Bangalore.

AR314: HUMAN SETTLEMENTS AND TOWN PLANNING

Credits	03	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	03	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course objective:

An overview of the historical aspects of settlements ,planning and urbanisation.
To understand the scope of town planning and legislation in development.
To sensitise on the byelaws and contemporary policies/programmes with particular emphasis in Indian context.
Introduction to various planning techniques and surveys.

COURSE CONTENT:

UNIT I: SETTLEMENTS HISTORY

Brief review of the origin of early human settlements and factors responsible. Brief study of settlements up to and after the industrial revolution in Europe, U.S and India in particular. Out of economic and functional factors implication in settlement planning, an introduction to the theory of 'Ekistics'.

UNIT II: PLANNING THEORIES

Type and classification of settlements of Urban and Rural, according to formal, administration norms (census etc.) and according to planning theories. Physical differences and relationships between Urban and Rural settlements, Rural-Urban Migration

UNIT III: SCOPE OF TOWN PLANNING

Evolution and Necessity of Town Planning. General aim and principles of development control in urban areas, legislation as a tool in town planning;

UNIT IV: ADMINISTRATIVE ASPECTS OF TOWN PLANNING

Ecological, social and economic aspects of town planning in India. Brief introduction to the town planning organization in India (National & Local) and Urbanization – Fact, elementary theories and problems related to urbanization with social reference to India.

UNIT V: THE PLANNING CONCEPTS, TECHNIQUES AND URBAN RENEWAL

Introduction to the concepts of green belts, satellite towns, neighbourhood, housing, community facilities etc. Techniques of Planning: Planning survey techniques; An introduction to Master Plan. Basic methodology for planning industrial areas and recreation areas. Urban renewal, Techniques of identification of Urban Renewal areas

UNIT VI: BUILDING BYELAWS & CONTEMPORARY POLICIES/PROGRAMME

Principles, Objectives and Importance of Bye Laws. Basic standards like Setbacks, Plot Sizes, FSI, CBD, Land use, Net Density etc. Review of Housing & Slums in 5 Year Plans. Introduction to Policies/Programmes of urbanization, Housing, Slums and development with special reference to Andhra Pradesh.

UNIT VII:CITY PLANNING

City planning: principles of city planning; types of cities & new towns; eco-city concept; sustainable development.

UNIT VIII:TRAFFIC AND TRANSPORTATION PLANNING

Principles and Survey Methods, Classification of Urban R

Roads and Street Systems, Parking. Meaning and use of O-D surveys, desire line diagrams trip generation, attraction, distribution and model split. Traffic and Transport Management in urban areas, intelligent transportation System; mass transportation, para-transits and other modes of transportation, pedestrian & slow moving traffic planning.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course outcome:

- Students will understand the historical evolution of human settlements, factors influencing them, and the significance of 'Ekistics' in settlement planning, enhancing their knowledge of urban development.
- Learners will classify urban and rural settlements based on formal norms and planning theories, analyze physical differences, and explore the dynamics of rural-urban migration.
- Students will comprehend the evolution and necessity of town planning, gaining insights into development control principles and the legislative framework for urban areas.
- Participants will explore the ecological, social, and economic aspects of town planning in India and gain an understanding of the organization of town planning at national and local levels.
- Learners will grasp planning concepts such as green belts, satellite towns, and urban renewal, along with survey techniques, master planning, and the methodology for planning industrial and recreation areas.
- Students will gain knowledge of building bylaws, contemporary policies, and programs related to urbanization, housing, and slum development, with a special focus on Andhra Pradesh. They will also understand the principles of city planning, eco-city concepts, sustainable development, and traffic and transportation planning, including intelligent transportation systems, mass transit, and pedestrian planning.

Text books:

- 1) Ekistics-An introduction to the science of Human Settlement- C.L.Doxiadis.
- 2) House, Form and Culture by Amos Rappoport.
- 3) Urban Pattern by Arthur.B.Gallion.

References:

- 1) Town Planning by Rangwala.
- 2) Planning the Indian city by Mahesh.N.Buch.

- 3) Strategies in Development Planning Edited by Alok Kumar Singh, Vinay Kumar Rao, Anand Promod Mishra.
- 4) Land-use Planning Techniques of Implementation by T. William Patterson.
- 5) Land Acquisition Manual in Andhra Pradesh by E.L. Bhagiratha Rao.
- 6) Urban and Rural Development in India. By R.K. Khosla.
- 7) Commentaries on Land Reforms laws in Andhra Pradesh by Padala Rama Reddy, Padala Srinivasa Reddy.
- 8) Urban and Regional Planning by K.S. Rame Gowda.
- 9) Regional Planning in India by Mahesh Chand., Vinay Kumar Puri.

AR315: BUILDING SERVICES- III (ELECTRICAL & HVAC SERVICES)

Credits	03	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	03	Internal Marks	30
Tutorials/ drawing (periods/week)	00	External Marks	70

Course objective:

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

COURSE CONTENT

UNIT I: Electrical services:

Fundamentals of electricity, voltage, generation and distribution of power, HT and LT. Three- (3) phase current substation, generator, UPS.

UNIT II: Building using system:

Electricity, circuit, service wires, household, meter and circuit breakers, ISI standard materials switch boards, light circuits and power circuits using for general buildings.

UNIT III: Domestic Application:

Construction and working of at least six domestic appliances.

- Voltage
- Electric motor types
- Safety
- Location in a building.

UNIT IV: Lighting:

- Comparison, advantage and disadvantages
- Types of Artificial light source,
- Methods of lighting Direct, Indirect.
- Lighting system adapted in building, eg: suspended lighting, concealed lighting, spot lighting, under water lighting & task lighting.
- Illumination level (NBC) nominal calculations of lighting for small application.
- Decorative lighting, flood lighting of buildings.

UNIT V: Air Conditioning:

Different types of air conditions single zone, Multi zone, equipment and Systems. Condenser, Compressor, evaporator, heat exchanger, dehumidifier. Window air conditioning, Split air conditioner, Duct able air conditioner. Central air

conditioning, VRV/VRF System and their installation process. All air system Chilled water system. Fan Coil unit.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcomes:

- Understand the fundamentals of electricity and power distribution, distinguishing between HT and LT systems, and demonstrating knowledge of three-phase current and related equipment.
- Demonstrate the ability to design and implement safe and efficient electrical systems in buildings, including circuit layouts, metering, and circuit protection using ISI standard materials.
- Describe and analyze the construction and functioning of at least six domestic appliances, while considering voltage requirements and their suitable locations within a building.
- Compare various types of artificial lighting sources, lighting methods, and systems used in buildings, including decorative, flood, and task lighting, and calculate lighting levels based on NBC standards for small applications.
- Explain the different types of air conditioning systems and their components, including single and multi-zone units, and understand their installation processes, from window and split air conditioners to central air conditioning and chilled water systems.
- Gain an in-depth understanding of HVAC systems, including condenser, compressor, evaporator, and heat exchanger, as well as air distribution systems like VRV/VRF and fan coil units, allowing for informed decisions in architectural design.

References:

- 1) Electrical Wiring & Contracting (Vol.1 to Vol.4)
- 2) Electrical Engineering Hand Book by Dr.Frith Abnwas& Others.
- 3) Mechanical & Electrical Equipment for Buildings by WillimJ. Mc. Guinness.
- 4) Handbook of Mechanical & Electrical systems for Buildings by H.E.Bovay.

AR316: LANDSCAPE DESIGN AND SITE PLANNING

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	03	Internal Marks	30
Tutorials/ drawing(periods/week)	01	External Marks	70

Course Objective:

- To provide an overview of evolution of landscape through time.
- To understand various elements of landscape
- To be able to do site studies
- To develop skills of design, planting design and construction details

COURSE CONTENT

UNIT I: MAN AND THE LANDSCAPE

Landscape development in historical perspective: brief review of development of garden styles. Importance and role of landscape in architecture. Contemporary approach to landscape design – brief review of evolution of concepts in landscape design after industrial revolution and increasing awareness of ecological variables in landscape design.

UNIT II: SITE STUDIES AND SITE PLANNING:

Understanding different site characteristics and evaluation of their potential for development. Philosophical and design issues related to site development –i.e. citing of buildings, spatial and contextual relationships of built and outdoor spaces, site and its relationship to its surroundings. Importance of climatic, social factors in development of site. Process of design development. Identifying functional requirements of site, development of site by mutual exploitation of forms and use of grading principles. (Study should include at least two exercises in site planning)

UNIT III: ELEMENTS IN LANDSCAPE DESIGN:

Use of landform, water, vegetation as elements of Landscape design and types of garden furniture, lighting and water feature Pavement types, patterns, and hard landscapes Sculptures and architectural features and elements Design concept related to use of landscape elements in outdoor design - Grouping of elements, visual effects etc.

UNIT IV: PLANTS AND DESIGN:

Botanical nomenclature, anatomy and physiology
Plant growth and development, plant communities and their environments in Indian Context
Plants and landscape - Basic principles, appearance of plants, functional and visual effects with plants in landscape. Landscape layout and planting techniques Planting design and practice

UNIT V: LANDSCAPE CONSTRUCTION:

Elementary knowledge of grading cut and fill, shaping the site Use of materials use in landscape and their details; Laying paths with different materials like pebble paving slabs, stone etc., Construction of garden steps, Construction of screen, trellis, wall fences, gates, decks Construction and detailing of drain inlets, curbs and gutter details Fountain and pool construction. Elementary knowledge of irrigation systems, and water supply, lighting systems

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcomes:

- Understand the Evolution of Landscape Design Students will gain an appreciation of historical garden styles, the significance of landscape in architecture, and the modern ecological focus in landscape design.

- **Site Assessment and Planning** Develop the ability to evaluate site characteristics, incorporate philosophical and design considerations, and consider climatic and social factors in site development.
- **Master Landscape Elements** Students will be proficient in using landform, water, vegetation, garden furniture, lighting, and other elements in landscape design, and understand their impact on visual and functional aspects.
- **Plant Integration in Design** Learn the principles of plant anatomy, physiology, and their role in landscape design. Understand how to create aesthetically pleasing and functional planting layouts.
- **Landscape Construction Techniques** Gain practical knowledge of grading, material usage, path construction, fencing, drainage, fountains, irrigation, and lighting systems for effective landscape construction.
- **Synthesize Landscape Design Concepts** Students will be able to apply their knowledge to create comprehensive landscape designs that integrate various elements and considerations, addressing both aesthetics and functionality.

Textbooks:

- 1) An introduction to Landscape Architecture – Michael Laurie

Reference:

- 1) Site planning by Kelvin Lynch
- 2) Landscape Construction and detailing by Alan Blanc
- 3) T.S.S. for Landscape Architecture
- 4) Planting Design by Brian Hacheat
- 5) Land and Landscape – Brenda Colise
- 6) Common trees by Snatapaer
- 7) Beautiful Shrubs by Prathiba Devi

AR317: COMPUTER APPLICATIONS

Credits	04	Lab (Hrs.)	-
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	02	External Marks	50 Practical and Viva-Voce

Course objectives:

To impart training in Computer aided 2D drafting and 3D modelling through projects and enable to render of a building so as to create a photo realistic image.

COURSE CONTENT

UNIT I: INTRODUCTION TO COMPUTER AND IMAGE EDITING

Technology of small computer system, computer terminology operation principles of P.C, introduction to application software, and graphic system, and use of printers, scanner, plotter, File management, etc. Understanding Bitmap images and Vector Graphics, Image size and Resolution. Basic Tools for Editing and Creating Graphics.

UNIT II: THE BASICS OF BUILDING MODELLING

Creating a basic floor plan, About Temporary Dimensions, Adding and Modifying Walls, Working with Compound Walls, Using Editing Tools, Adding and Modifying Doors, Adding and Modifying Windows

UNIT III: VIEWING THE BUILDING MODEL

Understanding the drawing unit's settings, scales, limits, drawing tools, drawing objects, object editing, and text, dimensioning. Transparent overlays, hatching utilities, line type, line weight and colour. Multiline, Polyline, etc. Styles, blocks and symbol library.

UNIT IV: INTRODUCTION TO 3D MODELLING

Project: Create 3D sculpture using 3D primitives (cubes, spheres etc.)

Tools: Slide facilities script attributes, V-port, editing session. Introduction to 3D-modelling technique and construction planes, drawing objects, 3D surfaces setting up elevation thickness and use of dynamic projections. Solid modeling with primitive command and boolean operation.

UNIT V: 3D RENDERING AND SETTING

Project: Visualize a building. Explore the potential of lights and camera and use The same in the model created for the final submission.

Tools: Rendering and scene setting to create a photo realistic picture, understanding material mapping, environment setting and image filling. Exercise to identify and visualize a building using the above said utilities.

3D modelling software like sketch up, AutoCAD Rivet, etc

Assessment

Projects from previous semester Architectural Design-III Major and minor design problems shall be taken. Exercise 1: Computer aided 2D drafting; Exercise 2: Computer aided 3D modelling. i.e. total marks of (30M+20M)=50M

Course Outcome:

- **Fundamental Computer Skills:** Students will gain proficiency in small computer systems, application software, and peripheral devices, enabling them to efficiently manage digital resources for architectural design.
- **Architectural Drawing Basics:** Learners will acquire the essential skills to create and modify architectural plans, including walls, doors, and windows, using computer-aided design tools.
- **Advanced CAD Techniques:** Students will understand drawing unit settings, scales, and utilize advanced CAD features like object editing, text, dimensioning, and symbol libraries for precise architectural drawings.
- **Introduction to 3D Modeling:** This outcome involves students creating 3D sculptures using primitives and learning techniques for solid modeling, elevations, and dynamic projections for architectural designs.
- **Architectural Visualization:** Students will master 3D rendering and scene setting to create photorealistic architectural visualizations, exploring lighting, camera usage, material mapping, and environmental settings.

- **Proficiency in 3D Modeling Software:** Graduates will be competent in using 3D modeling software such as SketchUp, AutoCAD, and Revit to transform architectural concepts into detailed, 3D representations.

Required Reading:

- 1) "Photoshop 7 Bible Professional Edition", by Deke McClelland, Wiley John & Son INC, New York, 2000.
- 2) "Fundamentals of Three-Dimensional Computer Graphics", by A. Watt, Addison Wesley, Massachusetts, 1989.
- 3) "Computer Aided Design guide for Architecture, Engineering and construction", by Aouad, Spon process, 2012

References:

- 1) "The Illustrated AutoCAD 2002 Quick Reference", 1st edition, by Ralph Grabowski, Cengage Learning, 2001
- 2) "Autocad 2000: A Problem-Solving Approach", by Sham tikoo, Delmar Cengage Learning, 1999.
- 3) "CAD for Interiors beyond the basics", by Fiorello. J. A., Wiley publications, 2011.

3RD YEAR 2ND SEMESTER

AR321: ARCHITECTURAL DESIGN – V

Credits	08		-
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	06	External Marks	50 Viva-voce

Course objectives:

To study issues related to institutional design development, understanding the norms and design issues associated with urban infrastructure design in urban context, Integration of climate, sound; structure and services into group of buildings; functional movement; landscape and site planning; Institutional character; User behaviour and requirements pertaining to the physically handicapped.

COURSE CONTENT

The design studio shall conduct on Institutional design addressing to nature of contemporary institution, correlation to urban structure; Development control and urban infrastructure affecting design; Various attitudes to building in urban context; Integration to function and movement, climate, and sound, structure and services into group of buildings; landscaping and site planning; Institutional character from abstract to detail; User behaviour and requirements pertaining to the physically handicapped along with necessary theoretical inputs to be given highlighting the norms and design issues.

Institution of learning–colleges with various departments such as medical, engineering, law, business, music and dance colleges, vocational training institutes etc., topics to be covered as design problem.

- Institutions of life such as hospitals, reformatories and rehabilitation institutes for the disabled.
- Institutions of research in various disciplines.
- Local/ legal institutions such as the high courts, secretariat, development authorities, directorates etc.

One major exercise (8 weeks) and two minor design (6weeks) problems shall be conducted. Use of 'SKETCHUP' software in development of design concepts and other related work during continues assessment of the major and minor design problems shall be compulsory. The final portfolio submission in AutoCAD and a model for the main problem shall be compulsory.

Assessment

Continuous assessment will be conducted for major (30M) and minor (20M) design problems i.e. total marks of (30M+20M) =50M

Course outcome:

- Demonstrate an understanding of contemporary institutions and their role in urban contexts, including development control and infrastructure factors affecting design.

- Develop a range of design attitudes and approaches for building integration within urban settings, considering function, climate, structure, and services.
- Apply principles of landscape design and site planning to create institutional spaces with distinct characters, from abstract concepts to intricate details.
- Design spaces that cater to the needs of physically handicapped individuals, adhering to relevant norms and addressing specific design challenges.
- Create architectural solutions for a variety of institutions, including educational, healthcare, research, and legal organizations, with a focus on user behaviour and requirements.
- Proficiently use 'SKETCHUP' software for developing design concepts and related work, culminating in the submission of a comprehensive portfolio in AutoCAD and a physical model of a major design project.

Reference books:

- 1) Libraries - Allan Konya.
- 2) Institutional Buildings Architecture of Controlled Environment –Louis G.Stone.
- 3) Hospital Architecture and Beyond – IsodoreRosenfield.
- 4) Time savers standards of building types – Joseph De Chiara & others
- 5) A History of Building Types – Nikolaus Pevsner
- 6) Architects` Data - Ernst Neufert
- 7) Handbook of Planning and Designing Data.
- 8) Doctor's office & clinics – Paul Hayden kirk ,EngeneD.Stermberg.
- 9) Libraries for Schools and Universities – Triedmann wild.

AR.322: BUILDING MATERIALS AND BUILDING CONSTRUCTION-VI

Credits	05	Duration of Exam	5.00Hrs.
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	03	External Marks	50

Course objective:

Introduce all the process relating to Building repairs and management

COURSE CONTENT

UNIT I: BUILDING FAILURES

Maintenance and renovation; causes of decay and damage in old buildings:

UNIT II: PRELIMINARY INSPECTION

General observations, general decayed elements, difference between decay and damage.

UNIT III: TIMBER

Use of timber, moisture content, control, prior to installation, strength reducing factors; approach to the repairs to the roofing system.

UNITIV: BRICKS

Strength of brick work; effect of ageing; weathering, temperature variations on brick work, joints and cracks, construction errors, repairs and maintenance.

UNITV: RCC CONCRETE

Mixing at site, structural design in repair job, causes of failure in concrete structures, guniting, pressure grouting. Propping; strutting, underpinning and wedges.

UNIT VI: METHODOICAL APPROACH TO PROBLEMS OF REPAIRS

Decayed ends of floor joists; cracks over openings; sinking and sagging of balconies; repair to floors; jack arch, Madras terrace; foundation sinking; repairs to wall stair cases, WC blocks etc.

UNIT VII: SOME UNUSUAL PROBLEMS

In situ brackets for supporting floor joists, repair to big span rooms; water proofing to terrace; case studies and site visits.

UNIT VIII: RENOVATIONS

Provision of chajja; renovation of balconies, external lintels; removing old flooring and providing alternate flooring. Multi-storeyed structures and extensions, above one or two storied buildings without actually loading it. False ceiling Shelves and Built in mesh.

UNIT IX: PAINTING & VARNISHES

Protective coating, paints, constituents of paints, their function, water paints, distempers, cement based paints, varnishes(oil and spirit), French polish, plastic emulsion paints, Anti corrosive paint, water proofing and damp proofing finishes

UNIT X: MATERIALS FOR SPECIAL TREATMENTS

Fire resistant, waterproofing, thermal insulation, acoustical treatment and anti-termite treatment.

UNIT XI: INTRODUCTION TO HIGH RISE BUILDING CONSTRUCTION TECHNIQUES:

Adopted in construction of foundation and superstructure.

Building byelaws, submission plan, methods of municipal approval, NBC, fire prevention and safety measures, other regulatory aspects such as master plan and zonal plan.

Note

Class work includes case studies relevant to decay, failure and renovation and presentation of the same in PPT format. Identifying the products available in the market and classifying them according to their purpose. Hands-on application of paints to understand the practical painting procedure.

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 30 Marks for continuous assessment (portfolio) i.e. total marks of (20M+30M)=50M

Course outcome:

- Understand the causes of decay and damage in old buildings and propose effective maintenance and renovation strategies.
- Distinguish between decay and damage in structures, conduct preliminary inspections, and identify deteriorated elements.
- Analyze the use of timber in construction, control moisture content, and implement strength-enhancing techniques in roofing repairs.
- Evaluate the strength and weathering effects on brickwork, address joint and crack issues, and rectify construction errors through repairs and maintenance.
- Demonstrate the knowledge of concrete mixing, structural design, and repair techniques for concrete structures, including guniting and pressure grouting.
- Apply systematic approaches to resolve various structural problems, such as sagging balconies, foundation sinking, and water proofing, with an emphasis on case studies and practical site visits.

Textbooks:

- 1) Building Repair and Maintenance Management – P.S.Gahlot . Sanjay Sharma
- 2) Maintenance Repair & Rehabilitation & Minor Works of Buildings – P.C.Varghese

References:

- 1) Practical Building Construction and Management – Sandeep Mantri
- 2) Building Construction-S.P Arora, S.P Bindra
- 3) Building Materials – S.C.Rangwala

AR323: DESIGN OF STRUCTURES-III

Credits	04	Duration of Exam	3.00 hrs
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course objective:

The idea of design of different reinforced concrete members such as Flat slabs, Circular footing and combined footing, Portal Frames and Cantilever type of Retaining wall. Learn the basic concepts of Prestressed concrete, Types of prestressing systems, Analysis of losses of prestress and advantages, disadvantages and application of prestressed concrete.

COURSE CONTENT

Unit I: Design of flat slabs: Design of flat slabs with Column Head and Column Drop only.

Unit II: Design of Footings: Design of Circular footing and Combined footing,

Unit III: Design of Reinforced Concrete Portal Frames (single bay single storey)

Unit IV: Retaining Walls: Cantilever and Counter fort type, Design of Cantilever type Retaining wall only.

Unit V: Prestressed Concrete Structures: Introduction, Principles, Materials, Classification, Advantages and disadvantages of prestressed concrete. Pretensioning systems, Post-tensioning and Post-tensioning anchorages.

Unit VI: Analysis of prestress and bending stresses. Losses of prestress.

Note: Prestressed concrete conforming to IS: 1343 1980

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course outcome:

- Analyze and design flat slabs with column heads and drops, demonstrating an understanding of load distribution and structural stability in real-world applications.
- Create well-engineered circular and combined footings that can support diverse architectural designs, incorporating knowledge of soil-structure interaction.
- Develop a comprehensive understanding of reinforced concrete portal frames, enabling the design of single-bay, single-storey structures that are both functional and aesthetically pleasing.
- Design cantilever-type retaining walls that effectively resist soil pressures, ensuring safety and stability in construction.
- Explore the principles of prestressed concrete, including materials, classification, and advantages, and apply them to real-world scenarios involving pre-tensioning and post-tensioning systems.
- Analyze and mitigate prestress and bending stress losses in prestressed concrete structures, ensuring the durability and performance of architectural designs conforming to IS: 1343 1980 standards.

Text books:

- 1) Design of Reinforced Concrete Structures by S. Ramamrutham, Publishers: Dhanpat Rai
- 2) Prestressed Concrete by N. Krishna Raju, Publishers: McGraw-Hill Education.

References:

- 1) Design of Reinforced Concrete Structures by M.L.Gambir, Publishers: Prentice-Hall of India Private Limited
- 2) Design of Reinforced Concrete Structures by P. Dayaratnam, Publishers: Oxford & IBH
- 3) Advanced Design of Reinforced Concrete Structures by N. Krishna Raju, Publishers: CBS Publishers and Distributors

AR324: WORKING DRAWINGS - I

Credits	06	Duration of Exam	Viva-Voce
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	04	External Marks	50

Course objective:

Enable the students to illustrate and prepare the drawings good for construction explaining the overall building design and preparation of structural layout drawings and the type of structural system to be used. Enable the students to illustrate and prepare the detail drawings of masonry work, staircase drawings, openings, and their material and detail specification required for the construction.

COURSE CONTENT

Course Overview:

The Design of a building needs to be executed and constructed on the site. The building drawings so prepared become part of the Working drawings / Contract drawings/ Execution Drawings with proper labelling and dimensioning, specifications, detailing. The drawings shall be based on building design prepared as architectural design studio assignment in the previous semester.

UNIT I: Architectural Drawings at Building level

- Preparation of detail site plan, floor plans, furniture layout, and roof level plan required for the execution of work at the site.
- Preparation of drawings giving detail of site sections, building sections and elevation to depict building heights, projections, floor levels and material used.

UNIT II: Structural Layout Drawings

- Preparation of detail drawings like Centre line drawing, trench layout, footing layout, plinth beam and beam layout and RCC Slab layout and the cross sections wherever necessary as per the design.

UNIT III: Architectural Drawings of Masonry and Openings

- Preparation of detail masonry drawing of the whole building as per the design.
- 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 IV: 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 V: Architectural Drawings for Landscape and Site Development

- Preparation of drawing for the landscape layouts at the building level and at site level as per the design.
- Detailing of the site for example different level on the site, as required for the site development.

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.

Assessment:

Continuous assessment will be conducted for all the listed drawings mentioned in the syllabi for 50Marks as internal. Student has to submit final portfolio for external viva-voce. The student should attend a practical Exam and Viva-voce conducted by external examiner.

Course outcome:

- **Mastery of Site Planning:** Students will demonstrate the ability to prepare comprehensive site plans, floor layouts, and roof plans, integrating essential details for on-site execution.
- **Proficiency in Structural Drawings:** Learners will produce precise structural drawings, including centerline, footing, plinth beam, beam, and slab layouts, aligned with architectural designs.
- **Skill in Masonry and Openings:** Students will develop detailed masonry drawings and design doors, windows, and openings with material specifications, contributing to a well-rounded building plan.
- **Expertise in Vertical Circulation:** Participants will create layouts for staircases and lifts, along with specification drawings for handrails, balusters, and rail fittings, ensuring safe and functional vertical circulation.
- **Landscape and Site Development Proficiency:** Learners will be capable of designing landscape layouts at both building and site levels, and they will provide detailing for site development, accommodating diverse terrain requirements.
- **Applied Knowledge and Market Insights:** Students will gather practical insights by conducting site visits, case studies, and market surveys related to construction materials and detailing, enhancing their real-world problem-solving skills in architectural design and execution.

Textbooks

- 1) Architectural Working Drawings –Ralph W.Liebing, Mimi Ford, Raul

References

- 1) Architectural Graphics by Francis D. K. Ching
- 2) Architectural Graphics Standard by Charles George Ramsey
- 3) Architectural Graphics Standard for Residential Construction by Dennis J. Hall
- 4) Drafting & Design: Basics for Interior Design by Travis Kelly Wilson
- 5) Specification in detail –Frank W.Makay
- 6) Building Drawing – M.G.Shah, CM,Kale, S.Y.Paoui

AR325: SPECIFICATIONS, ESTIMATION & COSTING

Credits	03	Duration of Exam	3.00 hrs
Lectures (Periods /week)	03	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course objective:

This course is intended to impart training in the preparation of Specifications and Estimation for a building.

COURSE CONTENT

Unit I:

Definitions and terms used principles of measurements in estimating. Methods of preparing approximate estimates on plinth area and cubic contents (volume) basic differences and advantages. Method of obtaining detailed quantities for earth works, building items and other allied structures (P.W.D. system to schedule of rates, standard mode of measurements. Example and exercise in obtaining all items from excavation to painting including RCC and steel works.

Specifications: brief specification of different items in a building.

Defining specifications; Purpose of specifications

As a contract document

As a guide to builder and supervisors

Importance of specifications in the execution of building projects with respect to drawings.

Types of specifications

Manufacturer's specifications

Detailed clause writing of specifications of any three items of work for a normal standard building with at least three other items as part of the internal assessment from the following:

- a) Earth work excavation in all types of soils including blasting operations.
- b) Foundation in CRS and UCRS in RCC
- c) Superstructures in brick masonry.
- d) RCC works in slabs, sunshades, lintels, etc.
- e) Doors and windows in wood and steel.
- f) Finishing work (I) painting, (II) flooring, (III) Cladding.
- g) Built in furniture.
- h) Partitions.
- i) Modes of measurements.

Knowledge of manufacturer's specifications as a database for writing specifications for the following materials, components of the building based on surveys:

Glass

Plywood and laminates

Hardware

Electrical wires and accessories

Water supply and plumbing: fittings and fixtures

Flooring and cladding

NOTE:

This has to be taken by the students in the form of surveys monitored by the teacher. The end output should be in the form of a report submitted by the students consisting of the specifications writing as given above.

Course Outcome:

- Understand the fundamental principles of measurement and estimation, enabling students to prepare accurate estimates for construction projects.

- Develop the ability to write comprehensive specifications that serve as essential contract documents and guides for builders and supervisors in various types of construction work.
- Recognize the significance of specifications in the successful execution of building projects, aligning them with project drawings to ensure project quality and compliance.
- Differentiate between various types of specifications and apply manufacturer's specifications as a reliable database for writing specifications for building materials and components.
- Demonstrate practical knowledge and skills by conducting surveys and creating detailed reports with specifications for different building materials and components.
- Acquire proficiency in modes of measurement and their applications, including an understanding of standard mode of measurements in construction projects.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Textbooks:

- 1.) Estimating and costing in Civil Engineering by B.N. Dutta
- 2.) Standard Schedule of Rates – C.P.W.D

AR326: ELECTIVE-1

AR326 (a): INTERIOR DESIGN

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objective:

To understand interior design concepts and elements that produce functional and aesthetic interior spaces. study on human ergonomics; socio-economic and cultural values for appropriate and realistic design evolution.

COURSE CONTENT

UNIT I: Elements of interior design:

Form, scale, texture, colour and light, style and furniture, plant material, painting, sculpture, light fixture, floor covering, draperies. Ways of achieving unity among these various uses designed by architects and designer.

UNIT II: Introduction to interior:

Concept, space, form, illusion, colour and texture, interior detail.

UNIT III: Discussion

Discussion on economics, maintenance, durability, flexibility and environmental affects, colour scheme and interior arrangement for different spaces like Hotel rooms, office spaces, class rooms, etc.

UNIT IV: Furniture and cabinetry:

History – Indian and European terminology, woodworking detail.

UNIT V: Design:

Concept development and detailing.

UNIT VI: Building Materials and Application:

Ceiling and ceiling finish; Floor and floor finishes; Wall and wall finishes; and Window dressing.

UNIT VII: Natural & Man-made Material:

Wood, stone, earth, etc., & Glass, plastics, ceramics, metals, garden design.

UNIT VIII:: Building Services:

Lighting, electrical and sanitary and plumbing layout, emphasis on fixtures design and detailing.

UNIT IX: Design of interior spaces: Residential, commercial and institutional.

Note:

Assignment and class work includes case studies of each space type presented in seminar format, design of Residence; Office and showroom, making colour schemes and study of designers' work and hard copy presentation . Hands-on workshop with different materials and model making. Making detailed drawings of interior spaces and furniture.

Course Outcome:

- **Understanding Design Elements:** Students will grasp the fundamental elements of interior design, such as form, scale, texture, color, and light, enabling them to apply these principles effectively in their design projects.
- **Conceptualizing Interior Spaces:** Learners will develop the ability to conceptualize interior spaces, considering factors like illusion, color, and texture, to create harmonious and aesthetically pleasing designs.
- **Analyzing Practical Aspects:** Students will critically discuss economic, maintenance, durability, and environmental factors, and apply this knowledge to devise appropriate color schemes and interior arrangements for diverse spaces.
- **Exploring Furniture and Cabinetry:** This course outcome focuses on exploring the history, terminology, and woodworking details of furniture and cabinetry, enhancing students' design capabilities in these areas.
- **Refining Design Skills:** Learners will refine their design skills by developing concepts and detailing their designs, providing them with the ability to produce sophisticated interior designs.
- **Comprehensive Knowledge of Building Materials and Services:** Students will gain a comprehensive understanding of various building materials and their

applications, as well as building services like lighting, electrical, and plumbing layouts, enabling them to design interior spaces for residential, commercial, and institutional purposes with proficiency.

Reference books:

- 1) Archi World. Interior Best Collection: Residence, Commerce, Office, Restaurant Asia I-IV. Archi World Co., Korea, 2003.
- 2) Friedman, Arnold and Others. Interior Design: An Int. to Architectural Interiors. Elsevier, New York, 1979.
- 3) Miller, E. William. Basic Drafting for Interior Designers. Van Nostrand Reinhold, New York, 1981.
- 4) Kurtich, John and Eakin, Garret. Interior Architecture, Van Nostrand Reinhold, New York, 1993.
- 5) Rao, M. Pratap. Interior Design: Principles and Practice, 3rd ed. Standard Pub., 2004

AR326: ELECTIVE-1

AR326 (b): ARCHITECTURAL JOURNALISM

Credits	04	Exam	.Viva-Voce
Lectures (Periods /week)	04	Internal Marks	50
Tutorials/ drawing(periods/week)	00	External Marks	50

Objective:

To understand the fundamental issues related to architectural journalism and documentation in writing case studies, book reviews, literature reviews; Photo documentation of buildings highlighting quality of architectural spaces.

COURSE CONTENT

Unit-I: Communication Methods

Interviewing techniques, framing Questionnaires, Group discussions.

Unit-II; Critical Writing Skills

Writing Case studies, book reviews, literature reviews. Avoiding Plagiarism, collecting clippings from articles, blogs and books.

Unit-III: Photographic Communication

Introduction to photography, types of Cameras, equipment- cameras & lenses, Principles of photo composition. Exposure, Aperture, Speed, colour, black & white, Film processing, printing & developing.

Unit-IV: Architectural Photography and Photo Journalism

Architectural Photography, Exterior and Interior photography. Photo journalism, Practical exercises to understand composition.

Unit-V: Photographic Documentation

Photo documentation of buildings highlighting quality of architectural spaces.
Photo documentation of places – rural, urban, public relations.

Assignment:

Assignments should include an article based on ability to originate, plan, research, present and produce a piece of architectural journalism. The techniques and processes used in the production should be identified by the student.

Course Outcome

- Communication Mastery: Graduates will demonstrate proficiency in various communication methods, including effective interviewing, questionnaire development, and group discussion facilitation.
- Critical Writing Proficiency: Students will acquire the skills to write compelling case studies, book and literature reviews, while maintaining integrity by avoiding plagiarism.
- Photographic Expertise: Graduates will gain comprehensive knowledge of photography, including camera types, composition principles, and advanced techniques like exposure, aperture, and film processing.
- Architectural & Photojournalistic Competence: Graduates will master architectural and interior photography, as well as photojournalism, by applying their skills in practical exercises to capture compelling compositions.
- Photographic Documentation Skills: Students will be able to meticulously document architectural spaces and diverse locations, showcasing the quality of design and the essence of different environments.
- Effective Visual Storytelling: Graduates will be equipped to convey narratives through the lens, enhancing their ability to create visually engaging content for architectural journalism in diverse contexts.

References:

- 1) Professional Architectural Photography. Harris, M. (2001). Focal Press.
- 2) Professional Interior Photography. Harris, M. (2002). Focal Press.
- 3) Basics Architectural photography, Heinrich, M. (2008). Birkhauser Verlag AG.
- 4) Professional Advertising Photography, Sounders, D. (1988). London: Merchurst.
- 5) How to photograph buildings and interiors, 3rd ed., by Kopelow, Gerry. New York: Princeton Architectural Press, 2002.
- 6) Architectural Criticism and Journalism by Mohd, Al Asad.

AR326 Elective-1

AR326 (c): BUILDING CONSTRUCTION MANAGEMENT

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Objective:

To provide an insight into Management of Buildings/Construction projects involving management of money, manpower and machinery.

COURSE CONTENT

Unit-1: Construction Organization

Need for management of building/construction projects – role of Project or Construction Managers in the building industry.

Aim, objectives and functions of Construction Management.

Construction stages, Construction team

Role of an architect in construction management.

Management techniques and tools.

Unit-2: Construction Management Techniques

Construction planning, scheduling and controlling phases.

Bar charts and limitations of bar charts.

Program Evaluation and Review Techniques (PERT)

Critical Path Method (CPM) for project management

Development and analysis of CPM network

Cost time analysis in network planning

Scientific methods of construction management

Unit-3: Construction Equipment

The role of equipment/machinery in construction industry, factors affecting selection of construction machinery, standard versus special equipment, understanding of the various issues involved in owning, operating and maintaining of construction equipment, economic life of a equipment.

Brief description of earth moving (tractors, excavators, dragline, trenching equipment, etc.,) transporting (various types of trucks), spreading and compacting (motor graders and various types of rollers) and concreting equipment (including concrete mixers, transporting and pumping equipment)

Note: Use of computers to be encouraged although the same is not for the examination purposes.

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M

Course Outcome

- Understand the significance of construction management in building projects and appreciate the roles of project managers and construction teams. (Knowledge and Awareness)
- Demonstrate the ability to set clear objectives and perform key functions within construction management while ensuring project success. (Objective Setting and Functionality)
- Apply construction planning, scheduling, and control techniques, including the use of Bar Charts, PERT, and CPM, to effectively manage construction projects. (Project Planning and Control)

- Analyze the selection, operation, and maintenance of construction equipment, considering economic factors and the equipment's role in different construction processes. (Equipment Selection and Management)
- Gain a comprehensive understanding of various construction equipment, from earthmoving to concreting machinery, and their relevance in construction operations. (Equipment Proficiency)
- Appreciate the potential role of computer tools in construction management and its significance in modern construction practices. (Computer Integration Awareness)

Text Books:

- 1) PERT and CPM by L. S. Srinath.
- 2) PERT and CPM by Punmia.
- 3) Estimating and Costing by B.N. Dutta.
- 4) Construction Management and Planning by Guna and Sen Gupta, B.

References:

- 1) Project Management for Construction by Chris Hendrickson, Carnegie Mellon University, Pittsburgh, 1998
- 2) Construction Planning & Management by Gahlot P S,, New Age International, Bangalore 2007
- 3) Construction Planning and Management by U.K.Shrivastava
- 4) Total Construction Project Management by George J Ritz
- 5) , Construction Technology by R. Chudley Pearson, 2005.
- 6) The Construction of Buildings by R. Barry, The English Language Book Society and Crosby Lockwood, Staples, London, 1976.
- 7) Construction Planning equipment and Methods by RL Peuriboy Tata McGraw Hill, 1979
- 8) Modern Construction and Management by Frank Harris John Wiley and Sons, 1983

AR326 Elective-I: (d) BARRIER FREE ARCHITECTURE

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objective:

Indian Disabilities Act, is promulgated in 1995 for the purpose of ensuring equal opportunities to persons with disabilities in society for their development through education, training and rehabilitation services. The principle objective is to ensure their full participation by preventing discrimination and integrating them into the mainstream of society. An Architect plays a very crucial role in this endeavor by designing the needed barrier free environment. The objective of this course is to acquaint the students of architecture regarding the various provisions and design issues.

COURSE CONTENTS

Unit I:

Introduction to Provisions of persons with Disabilities (Equal opportunities, Protection of Rights and Full Participation) Act, 1995, Type of disabilities-

Orthopedic, Hearing, Visual Impairments, National Policy for provisions for elderly persons, Concept of equal opportunity, human rights, social justice and empowerment of physically challenged persons.

Unit II

Introduction to similar efforts in other countries. Initiatives at global and International level for protection of rights of disabled and also elderly person. American disabilities Act 1990 etc.

Unit-III

Information on various types of national Institutes, agencies and professional bodies involved in disabled welfare, associated norms and standards thereof. The role of NGO's, professional and outreach.

Unit-IV

Design principles in Architecture for creating environments friendly for various types of physically challenged persons. Educational Institutions, Hospitals, Transportation terminals such as bus, railway stations and airports for barrier free spaces. Study of standards as given in TSS, TCPO, CPWD, ADA etc., and others.

Unit-V

Provisions in public spaces and site planning- parks, play grounds, public transportation, parking lots, Details of sidewalks, road intersections, access to public toilets.

Unit-VI

Provisions in design of public buildings - Details in, ramps, guide rails, lifts, dimensions of wheel chairs, accessibility in public buildings, Signage, audio visual facilities etc. Design of Toilets and interiors spaces for use of physically challenged.

Exercises in design of user friendly spaces for physically challenged persons. Term paper on certain type of disability and requirements thereof for making environs barrier free or any other exercise appropriately framed by the subject faculty.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M

Course outcome

- **Understanding Legislation and Global Context:** Students will comprehend the key provisions of disability-related acts, international efforts, and their implications for creating inclusive environments.
- **Awareness of Supportive Institutions:** Students will identify and evaluate the role of national institutes, agencies, and NGOs in promoting disability welfare and adhering to relevant standards.
- **Architectural Design Principles:** Gain proficiency in applying design principles that ensure accessibility and user-friendliness for individuals with different types of disabilities in diverse architectural settings.

- **Creating Inclusive Public Spaces:** Students will demonstrate the ability to plan and design public spaces, ensuring accessibility, including parks, transportation terminals, sidewalks, and more.
- **Accessible Public Buildings:** Develop the skills to design accessible public buildings by integrating ramps, guide rails, lifts, and other essential features, while adhering to signage and audio-visual standards.
- **User-Centric Design:** Apply knowledge to create user-friendly environments for individuals with disabilities through practical exercises and term papers, addressing specific disability needs and making surroundings barrier-free.

References:

- 1) Micheal J. Bednar. "Barrier Free Environments", Dowden, Hutchinson and Ross, Ives 1977.
- 2) Ministry of Urban Affairs and Employment. Central Public Works Department, India, "Guidelines and Space Standards for Barrier Free Environment for Disabled and Elderly Person, 1998.
- 3) Unnati. "Design Manual for a Barrier – Free Built Environment", Handicap International, December, 2004.

AR327: SOFT SKILLS

Credits	01		
Lectures (Periods /week)	03	Internal Marks	100
Tutorials/ drawing(periods/week)	00	External Marks	--

CONTENT

Communication:

Importance of communication, Non verbal communication, Personal appearance Posture, Gestures, Facial expressions, Eye contact, Space distancing

Goal Setting:

Immediate, short term, long term,
Smart goals, strategies to achieve goals

Time Management:

Types of time, Identifying time wasters, Time management skills

Leadership and Team Management:

Qualities of a good leader, Leadership styles, Decision making
Problem solving, Negotiation skills

Group discussions:

Purpose (Intellectual ability, creativity, approach to a problem, solving, tolerance, qualities of a leader) Group behaviour, Analysing performance

Job interviews:

Identifying job openings, Preparing resumes & CV
Covering letter, Interview (Opening, body-answer Q, close-ask Q),
Types of questions

Reference books:

- 1) 'Effective Technical Communications' by Rizvi M. Ashraf, McGraw–Hill Publication
- 2) 'Developing Communication Skills' by Mohan Krishna & Meera Banerji, Macmillan
- 3) 'Creative English for Communication' by N. Krishnaswami & T. Sriraman, Macmillan
- 4) 'Professional Communication Skills' by Jain Alok, Pravin S.R. Bhatia & A.M. Sheikh, S.Chand & Co.

4th YEAR IST SEMESTER

AR 411: ARCHITECTURAL DESIGN - VI

Credits	08	Duration of Exam	VIVA-VOCE
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing (periods/week)	06	External Marks	50

Course objectives:

To understand complexities involved in built spaces that have huge footfalls. The nature of way finding behaviours in familiar and unfamiliar spaces is discussed. Design issues related to multi-functional (flexible spaces) and workspace architecture in different typologies of buildings. Barrier free and emergency safety design issues and provision for building services are dealt with. Emphasis is on how design of spaces considering all these issues can improve human performance and building efficiency.

COURSE CONTENT

Following building typologies that have more footfalls of users are dealt during the semester. One major design exercise and Two minor design problems are given for the semester.

Commercial / Recreational / Industrial / Terminal building typologies like shopping malls, corporate offices, conventional center, multiplex, museums, workshops, factories, bus terminal etc. could be considered during the semester.

Note: One major exercise (8 weeks) and two minor design (6weeks) problems shall be conducted. Use of 'SKETCHUP' software in development of design concepts and other related work during continues assessment of the major and minor design problems shall be compulsory. The final portfolio submission in REVIT software and a model for the main problem shall be compulsory.

Assessment:

Major design problem carries 30 marks and minor design problem carries 20 marks. Students will submit portfolio specified by the design faculty and attend external viva-voce to be conducted by an external examiner.

Course Outcome:

- **Integrated Design Proficiency:** Students will demonstrate the ability to create integrated architectural designs for high-footfall structures, such as shopping malls, corporate offices, and terminals, considering diverse user needs and functions.
- **Innovative Problem Solving:** Develop innovative design solutions for commercial, recreational, and industrial buildings, addressing unique challenges, and utilizing design-thinking principles.
- **Sustainable Design Application:** Apply sustainable design principles to commercial and industrial projects, considering environmental impact, energy efficiency, and resource conservation within the context of real-world typologies.

- **Digital Design Fluency:** Proficiency in utilizing software tools such as SketchUp, Revit, and other relevant software to develop and communicate design concepts effectively, aligning with industry standards.
- **Critical Analysis and Evaluation:** Hone skills in critically analyzing major and minor design problems, identifying design strengths and areas for improvement, and making informed design choices.
- **Comprehensive Portfolio Development:** Create a comprehensive design portfolio that includes major and minor design exercises, emphasizing the use of Revit for the final submission, and construction of a physical model for the main problem, showcasing professional competence in architectural design.

References:

1. The Architects Handbook – Quentin Pickard
2. Corporate Interiors, No11 – Roger Yee
3. Handbook on functional requirements of Industrial Buildings (lighting and ventilation) – Indian Standard Institution
4. Time savers standards of Building Types – Joseph De Chiara & others
5. A History of Building Types – Nikolaus Pevsner
6. Architects` Data - Ernst Neufert

AR 412: BUILDING SERVICES-IV

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objectives:

To Orient students on Special Services in High rise Buildings such as vertical transportation, fire safety systems & its design in buildings; specialty services required in hotels, sensitize students with Environmental management issues in buildings.

COURSE CONTENT

UNIT I: Vertical Transportation:

- Lifts: Working methods as per NBC and industry standards, Capacity, Parts of lift and location of them in the building, Types of lifts - passenger, capsule, hospital, goods.
- Introduction to escalators and travelators.

UNIT II: Fire Safety in Buildings:

Fire, causes of fire and spread of fire, firefighting, protection & fire resistance, equipment & methods of fighting fire, Code of fire safety, fire regulations, and combustibility of materials. Structural elements and fire resistance, planning and design of Fire escape routes and elements, wet risers, dry risers, sprinklers, smoke detectors, fire dampers, fire doors, water curtains etc.

UNIT III: Special Services in High-rise Buildings:

- Cooking gas distribution in High-rise buildings
- Garbage chutes
- Lightning arresters

Electronic Systems in Buildings:

- Security systems, burglar alarms, video surveillance, access control.
- Elevated flooring for computer application.

UNIT IV: Swimming Pools:

General layout, Pool tank design, finish, filtration plant and water circulation, cascades, channels.

• Hotel Service:

- Laundry services, • Kitchens

• Helipad:

- Usage and importance of Helipads, basic considerations to constructing a Helipad, construction of Helipad, examples.

UNIT V: Environmental Services:

Waste generation in buildings, various types of waste – solid, liquid, gas, treatment and disposal facilities, waste management in hospital buildings.

• Alternative Energy Sources for Buildings:

Hot water solar energy system, applications of photo voltaic cells, biomass digesters, wind energy.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted as per the university academic calendar and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcomes:

- Understand the principles and components of vertical transportation systems, including lifts, escalators, and travelators, in compliance with industry standards and NBC regulations.
- Demonstrate knowledge of fire safety in buildings by identifying fire causes, spread, and protection methods, as well as designing fire-resistant structural elements and escape routes.
- Evaluate and design special services in high-rise buildings, such as cooking gas distribution, garbage chutes, lightning arresters, and electronic security systems for enhanced safety and convenience.
- Develop a comprehensive understanding of swimming pool design, including layout, filtration systems, and water circulation, while also learning about hotel services like laundry and kitchens.
- Explore the usage and significance of helipads in high-rise buildings, including basic construction considerations and real-world examples.
- Gain insight into environmental services, waste management, and alternative energy sources for buildings, with a focus on sustainability and responsible resource utilization.

References:

1. Handbook of Designing and Installation of Services in High Rise Building - V.K.Jain.
2. Principles of Fire Safety Engineering: Understanding Fire and Fire Protection- Akhil Kumar Das.
3. Heating and Air Conditioning of Buildings – Oscar Fabes and others.
4. Water and Energy Resources – Satish Tiwari
5. Refrigeration and Air Conditioning – Manohar Prasad
6. National Building Code of India, 2016.

AR 413: WORKING DRAWINGS-II

Credits	06	Duration of Exam	VIVA-VOCE
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing (periods/week)	04	External Marks	50

Course Objective:

To Enable and train the students to illustrate and prepare the drawings good for construction for effective execution at construction site explaining the building services scheme inside and outside of the building envelop but within the site.to teach the students the specifications for the various internal and external finishes. To teach the students various fabrications which shall be required for the successful completion of the project.

COURSE CONTENT

The architectural drawings prepared in subject: Working Drawings-I in the previous semester shall be continued for preparation of services layouts. The building drawings so prepared become part of the contract documents with proper labelling and dimensioning, specification and detailing.

Unit I: Building Services Drawings (External)

Preparation of detailed drawings:

- water supply source and connections
- Sewage disposal and storm water disposal system, rain water harvesting systems, landscape details if required.
- Construction details of Septic tank/STP, Sump, Overhead water tank etc.
- Construction details of a Swimming pool along with its supporting services and its details for a size of a residence.

Unit II: Building Services Drawings (Internal)

- Preparation of drawings like kitchen, toilets and other utility spaces along with specification of fixtures.
- Plumbing layouts of kitchen and toilets.

Unit III: Building Finishes & Interiors Design

- Flooring patterns and specifications, Fabrication like gate, railings , fencing etc. and their specifications , Boundary wall design, fixtures and their specifications

- Preparation of suspended ceilings drawings with different materials like colloquial and innovative materials in use and finishing including fixing details of lighting fixtures and diffusers for ventilation and air conditioning.
- TV Unit and Wardrobes design and its details with finishes and hardware fixtures and its specifications.
- Special doors and windows constructions details with hardware details and specifications.

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

Assessment

The drawings will be assessed **Unit Wise**, i.e., each unit carries 15marks each and 5 marks for attendance. Student has to submit final portfolio for external viva-voce conducted by external examiner for 50 marks.

Course outcome:

- **Mastery of External Service Drawings:** Students will demonstrate the ability to create detailed external service drawings, including water supply, sewage disposal, and construction details for residential buildings with a focus on sustainable practices.
- **Proficiency in Internal Service Drawings:** Learners will be proficient in preparing internal service drawings for kitchens, toilets, and utility spaces, incorporating fixture specifications and plumbing layouts.
- **Expertise in Building Finishes & Interiors:** Students will exhibit expertise in designing interior finishes, including flooring patterns, fabrication of gates and railings, suspended ceilings, TV units, wardrobes, and special doors and windows, with a strong emphasis on materials and specifications.
- **Application of Innovative Materials:** Graduates will apply innovative materials for suspended ceilings and other architectural elements, integrating lighting fixtures and ventilation solutions in their designs.
- **Utilization of Market Data:** Learners will utilize market survey data to make informed decisions about construction materials and detailing in their working drawings, ensuring cost-effective and sustainable design solutions.
- **Integration of Site Visits:** Students will incorporate insights from site visits and case studies to enhance their understanding of real-world architectural challenges and practical applications in the development of service layouts and architectural details.

References

- 1) Architectural working drawings – Ralph W.Liebing, Mimi Ford,Raul
- 2) Architectural Graphics by Francis D. K. Ching
- 3) Architectural Graphics Standard by Charles George Ramsey
- 4) Architectural Graphics Standard for Residential Construction by Dennis J. Hall
- 5) Drafting & Design: Basics for Interior Design by Travis KellyWilson

- 6) Osamu, A. W., Linde, R. M. and Bakhoun, N. R. (2011). The professional practice of architectural working drawings. 4th Ed. Hoboken: John Wiley & Sons.
- 7) Weston, R. (2004). Plans Sections Elevations – Key buildings of the twentieth century. London: Laurence King Publishing.

AR 414: URBAN DESIGN

Credits	04	Duration of Exam	3Hrs
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objectives:

- To understand the scope and nature of urban design
- To understand the evolution of historic cities urban form
- To familiarize the theories of urban design
- To introduce the components of a city and their interdependencies and interpret the city in different ways and layers
- To familiarize with the implementation processes and create awareness of contemporary urban issues.

COURSE CONTENT

UNIT-I: Introduction to Urban Design

Relationship between Architecture, Urban Design and Urban Planning; brief review of the evolution of the urban design as a discipline. 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 II: History of Cities and Urban Form

Western: morphology of early cities- Greek agora- Roman forum- Medieval towns- Renaissance place making- ideal cities – Industrialization and city growth- the eighteenth century city builders Garnier's industrial city- the American grid planning- anti urbanism and the picturesque- cite industrielle- citte nuovo-radiant city . Modern movements in city design such as 'city-beautiful, Garden city utopian and model towns in the west.

Indian: evolution of urbanism in India- Temple towns- Mughal city form- medieval cities - colonial urbanism- urban spaces in modernist cities: Chandigarh, Bhuvaneshwar and Gandhi Nagar- subsequent directions – case studies

UNIT III: Theories of Urban Design

Ideas of Imageability and townscape: Cullen, Lynch- place and genius loci- collective memory- historic reading of the city and its artifacts: Rossi- social aspects of urban space: life on streets and between buildings, gender and class, Jane Jacobs, Wiliam Whyte, pattern language-Christopher Alexander,

UNIT-IV: Urban Design Elements, Typologies and Procedures

Understanding the city as a three dimensional element; determinants of Urban form Organization of spaces and their articulation in the form of squares, streets, vistas and focal points. Concepts of public and private realm; understanding different types and procedures of urban design interventions their scale relationships; constraints and challenges of urban design in democratic versus authoritarian settings.

UNIT-V: Urban Landscape

Design of streets, public parks, green ways, parkways, promenade Park systems, water fronts, and plaza. Public art. Plant selection criteria, furnishings and lighting of public space, maintenance and management of public spaces and parks, Open space development in urban design context and new towns. Green infrastructure. Urban ecology, urban water sheds.

UNIT-VI: Urban Design and Sustainability

Sustainability concept; Relationship of urban design with economic, environmental and social sustainability; Urban renewal and urban sprawl; Concepts of Transit Oriented Development, Compact City, Healthy City and Walk able City;

UNIT-VII: Urban Design Implementation

Urban design and its control; Institutional arrangements for design and planning, their roles, powers and limitations; Types of planning instruments, structure plans, master plans and local area plans and zoning guidelines; Design communication and role of public participation. eg. smart cities, HRIDAY, PRASAD etc.

UNIT VIII: Best Practice in Urban Design

Contemporary case studies and emerging trends from developing and developed economies that offer design guidelines and solutions to address various issues/ aspects of urban space – case studies.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted as per the university academic calendar and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcomes:

- Understanding Urban Design Fundamentals: Students will comprehend the fundamental principles and evolution of urban design, including its relationship with architecture and urban planning.
- Historical Perspective on Urban Form: Students will analyze the historical development of cities and urban form, both in Western and Indian contexts, and its influence on contemporary urban design.
- Theories and Concepts of Urban Design: Students will explore key urban design theories and concepts, such as imageability, townscape, and social aspects, to inform their design decisions.
- Urban Design Elements and Procedures: Students will learn to identify, analyze, and apply various urban design elements and typologies, as well as understand the procedures and challenges of urban design interventions.

- Urban Landscape and Sustainability: Students will design and manage urban landscapes, integrating green infrastructure, public spaces, and sustainability principles to create environmentally conscious and livable cities.
- Urban Design Implementation and Best Practices: Students will gain insights into urban design control mechanisms, institutional arrangements, and planning instruments, while also exploring contemporary best practices from around the world to address urban space challenges.

References:

- 1) City in History, Its origin transformation & its prospectus- Mimford, Lewis.
- 2) Design of Cities-Bacon, Edmund.
- 3) History of the City- Benevolo, Leonard.
- 4) Urban Space-Rob Krier
- 5) Urban Design, The Architecture of Towns, & Cities-Spreiregn, Paul.
- 6) Urban Design Street & Square-Moughtin, Cliff
- 7) Urban Design Ornament & Deocotation-Moughtin, Cli
- 8) Urban Design Green Dimensions-Moughtin, Cliff
- 9) Image of the city – Kevin Lynch
- 10)The Urban Pattern – Gallion – Eisner

AR 415: STRUCTURES DESIGN PROJECT

Credits	04	Duration of Exam	Viva-Voce
Lectures (Periods /week)	04	Internal Marks	50
Tutorials/ drawing(periods/week)	00	External Marks	50

Course objective:

The practical application of the analysis and design learnt in the previous semesters.

COURSE CONTENT

The students are free to choose any one of the structural design project mentioned below.

1. Structural Design Project: structural design calculations and structural drawings of a G+1 RCC framed residential building.
2. Structural Design Project: a steel truss including design calculations and structural drawings.

Assessment:

Two stage assessment are to be conducted each carrying 15 marks, 10 marks for report submission and 10 marks by the guide, i.e. 30+10+10 =50M. Each student should make oral presentation for the external Viva-voce conducted by the external examiner and internal guide for 50 marks.

Stage 1: The group /student should submit the drawings related to Proposed RCC G+1 plan/ Steel Truss. Each student should submit complete analysis of the RCC frames/ Steel truss. Drawings:

RCC G+1 plan: Plinth beam layout, Floor beams layout, Column centre line, Trench drawings, 2-D frames along with loads on each frame and reactions, moments etc.

Steel Truss: Type of truss with its span, truss with loads acting, truss with calculated reactions and load on each member.

Stage 2: The group /student should submit the structural drawings related to the project. Each student should submit complete design of different elements in the structure.

Course outcome:

- Demonstrate Proficiency in Structural Design: Students will showcase a strong command of structural design principles in either RCC or steel truss systems, emphasizing sound calculations and drawings.
- Apply Analytical Skills in Project Assessment: Students will utilize analytical techniques to evaluate the structural integrity and load-bearing capabilities of G+1 RCC buildings or steel truss systems.
- Generate Comprehensive Structural Documentation: Students will produce well-structured and detailed drawings for the proposed projects, including plans, layouts, and calculations.
- Develop Effective Presentation Skills: Students will enhance their oral communication abilities through a Viva-voce presentation to external examiners, showcasing their design knowledge and insights.
- Exhibit Collaboration and Group Work: Students will work effectively in groups to create a collective understanding of structural design, fostering teamwork and cooperation.
- Foster a Sense of Responsibility and Accountability: Students will learn to manage project deadlines and deliverables, assuming individual responsibility for report submissions and project progression.

Reference:

- 1) Design of reinforced concrete structures by Ramamrutham, Publishers : DhanpatRai
- 2) Limit state Design of Steel structures by S.K. Duggal, Publishers: Tata McGraw-Hill
- 3) Indian standard codes

AR 416 (A): (Elective II): ARCHITECTURAL CONSERVATION

Credits	04	Duration of Exam	3Hrs
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objectives:

The student will understand the various practices of Conservation in India and familiarize with the various agencies involved in the field of conservation.

COURSE CONTENT

UNIT I: Introduction to Conservation

Understanding Heritage; Types of Heritage.

Heritage conservation: Need and purpose. Definitions of Conservation, Preservation and Adaptive reuse. Distinction between Architectural and Urban Conservation. Conservation related charters, International agencies like ICCROM, UNESCO and their role in Conservation.

UNIT II: Conservation in India

The role of Archeological Survey of India (ASI) and INTACH in heritage conservation. Central and State Government policies and legislations in India; INTACH Charter. Norms for Grading and Enlisting of heritage sites.

UNIT III: Conservation Practice

The role of conservation architect, Values and ethics in conservation, degrees of intervention such as prevention of deterioration, preservation, consolidation, restoration, rehabilitation, reproduction and reconstruction.

Listing of monuments- documentation of historic structures- assessing architectural character, inventory, and initial inspection of buildings and preparation of historic structure report.

UNIT IV: Urban Conservation

Understanding the character and issues of historic cities – select case studies of towns like Srirangaram, and Kanchipuram-historic districts and heritage precincts.

UNIT V: Conservation Planning

Conservation as a planning tool- financial incentives and planning tools such as Transferable Development Right (TDR)-urban conservation and heritage tourism-case studies of sites like for Cochin, Pondichery French town.- conservation project management.

Note:

Students have to make a document of at least two heritage buildings and prepare historic structure report. The department has to arrange a case study of heritage building/ Precinct to study and understand aspects of preservation, rehabilitation and adaptive re-use adopted in the study area.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted as per the University academic calendar and average of the both are to be taken for consideration for 20 and 10 Marks for documentation of heritage building and structure report i.e. total marks will be (20M+10M)=30M.

Course Outcomes

- **Understanding Heritage Diversity:** Students will comprehend the various types of heritage and differentiate between architectural and urban conservation, recognizing their significance in heritage preservation.
- **Legal Framework Proficiency:** Develop a sound understanding of the legal and policy framework for heritage conservation in India, including the roles of ASI, INTACH, and government regulations.

- **Ethical Conservation Practices:** Gain insight into the ethical considerations and values involved in heritage conservation, along with the ability to evaluate and choose appropriate degrees of intervention.
- **Documentation and Assessment Skills:** Acquire the skills to effectively document and assess historic structures, including architectural character, inventory, and preparation of historic structure reports for heritage sites.
- **Urban Heritage Conservation:** Comprehend the unique challenges and characteristics of historic cities through case studies and apply conservation as a planning tool, exploring financial incentives and urban conservation strategies.
- **Conservation Project Management:** Develop proficiency in managing conservation projects, including financial aspects and planning tools like Transferable Development Rights (TDR), while analyzing heritage tourism through case studies.

References:

- 1) Protection, Conservation and Preservation of Indian Monuments- Shanti Lal Nagar
- 2) Architectural and urban conservation- Santosh Ghosh, Ranajit Gupta, Sumita Gupta
- 3) History of Architectural Conservation- Jukka Jokilehto
- 4) James M. Fitch, " Historic Preservation: Curatorial Management of the Built World" University Press of Virginia; Reprint edition, 1990
- 5) Robert E. Stipe, A Richer Heritage: Historic Preservation in the Twenty-First Century", Univ. of North Carolina press, 2003.
- 6) Conservation Manual, Bernard Fielden; INTACH Publication, 1989.
- 7) Architecture in Conservation: Managing Development at Historic Sites (Heritage: Care Preservation-Management) –James Strike

AR 416 (B): (Elective II): SPATIAL COGNITION-I

Credits	04	Duration of Exam	3Hrs
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objectives:

The course will examine behavioural factors of humans in environments they live through critical thinking, discussions and case studies. The emphasis is on how the environments around influence human behavior while performing activities and how humans perceive, use and adapt to surrounding environments. A variety of built and natural environments will be discussed ranging from interior to exterior spaces and from private to public spaces to evaluate human performance, health and wellbeing.

COURSE CONTENT

UNIT-I:

Introduction to Cognitive Psychology and importance of the subject and relevance to architecture, Familiarizing terms of Environmental psychology and Architectural psychology.

UNIT-II:

Built environment – Space, Time, Activity and Human behavior

UNIT-III:

Cognitive functions – Perception and Attention, Memory and Knowledge, Problem solving, Reasoning and Decision making

UNIT-IV:

Methods of case study, Post occupancy evaluation (POE), Questionnaires relating to Health and Wellbeing

Assignment:

After literature survey and deliberation in classroom sessions, students select a topic of interest either of interior/exterior spaces ranging from private to public scale. They perform POE and analyse the behavioural aspects with relevance to architecture for improving human performance and thereby health and wellbeing.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted as per the university academic calendar and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcome:

- Understand the Significance of Cognitive Psychology: Students will recognize the importance of cognitive psychology in architecture, demonstrating an awareness of its relevance to environmental psychology and architectural psychology.
- Comprehend the Elements of Built Environment: Students will gain a deep understanding of the components of the built environment, including space, time, activity, and human behaviour, and their impact on architectural design.
- Analyse Cognitive Functions: Students will be able to analyze and apply cognitive functions such as perception, attention, memory, problem-solving, reasoning, and decision-making in the context of architectural design and human behaviour.
- Apply Research Methods: Students will learn methods for conducting case studies, post-occupancy evaluations (POE), and questionnaires to assess the impact of architecture on health and well-being.
- Perform Behavioural Analysis: Students will select and analyse interior or exterior spaces and conduct POE to evaluate behavioural aspects, aiming to improve human performance, and consequently, health and well-being through architectural interventions.
- Engage in Continuous Assessment: Students will participate in two mid-examinations and continuous assessments, ensuring a comprehensive evaluation of their understanding and application of cognitive psychology principles in architectural design for the betterment of human experiences.

References:

- 1) A Pattern Language, Christopher Alexander and Murray Silverstein
- 2) Image of the City, Kevin A. Lynch
- 3) Cognitive Psychology, E. Bruce Goldstein

- 4) E-prime Psychology software tools tutorials
- 5) MS Excel tutorials

Journals

- 1) Environment and Behaviour <http://eab.sagepub.com/>
- 2) Journal of Environmental Psychology <http://www.journals.elsevier.com/journal-of-environmental-psychology>

Websites

- 1) <https://www.brikbase.org>
- 2) www.anfarch.org/research/recommended-reading
- 3) <https://architecturalpsychology.org>

AR416 (c) :(Elective-II): ADVANCED CONSTRUCTION

Credits	04	Duration of Exam	3Hr.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objectives:

Understanding the importance of advanced building construction and their application in building industry.

COURSE CONTENT

UNIT I

Beams and Slabs, Portal frames-Plane, Space Frames/Trusses, single and double layer grids, Braced and folded grid structures.

UNIT II

Arches and catenaries; vaults, domes - braced domes, ribbed domes, Network domes, Lamella domes, Geodesic domes

UNIT III

Folded plates, shells, cycloidal shells, the domical shell, Hyperbolic paraboloids.

UNIT IV

Advanced Construction Methods: Pre-stressed concrete beams slabs frames, lift slab construction, post tensioning, multi-storied building frames, circular slabs and beams. Pre-Engineered (Pre-Cast) Concrete.

UNIT V

Study suspended roofs, membrane structures, cable structures.
Study of Pre-engineered building systems (steel), various components, forms and their advantages.

UNIT VI : Multistoried / Tall Structures / Towers.

UNIT VII

Curtain walls: types of curtain walls, components, structural solutions, construction and erection. Glass wall system-glass; sheet metal wall systems sheet metal cladding, architectural skins

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted as per the university academic calendar and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Note:

The choice of the topic for the workshop will depend on the resource persons available.

Course Outcomes:

- Students will be able to analyze and design beams, slabs, and frames for various architectural applications, demonstrating a fundamental understanding of structural elements.
- Upon completion, students will exhibit knowledge of different structural systems, such as arches, domes, and trusses, and their applicability in architectural design.
- Students will gain proficiency in the design and construction of advanced structural forms, including folded plates, shells, and hyperbolic paraboloids, for innovative architectural solutions.
- By the end of the course, students will be equipped with the skills to implement advanced construction methods, including pre-stressed concrete and pre-engineered systems, in architectural projects.
- Students will develop an understanding of suspended roofs, membrane structures, and cable systems, enabling them to incorporate these contemporary architectural elements into their designs.
- Upon completion, students will be capable of integrating curtain walls and cladding systems, both glass and sheet metal, to enhance the aesthetic and functional aspects of architectural projects, demonstrating a holistic approach to building design.

Reference:

- 1) I. Shell Structures-Rama Swamy.
- 2) Prestressed Concrete-Krishnam Raju.
- 3) Great Engineers-Derek Walker
- 4) Multi-Storey Buildings in Steel-F.Hart, W.Henn, H.Sontag
- 5) Precast Concrete-Design and Applications-A.M.HASS
- 6) Development in Structural form-Rowland Mainstone
- 7) Structural Concepts & Systems for Architects-TY Lin, Sidney, D.Stotesbury
- 8) Principles of Space Structures-N.Subramaniam.
- 9) Reinforced Concrete- in Architecture-Aly Ahmad Raafat.
- 10)How Buildings Work-Edward
- 11)Contemporary Structures in Architecture - Michaels, Leonard..

AR 417: MOOCS-I

Credits (Non Credit Course)	0	Duration of Exam	VIVA-VOCE
Lectures (Periods /week)	00	Internal Marks	--
Tutorials/ drawing(periods/week)	00	External Marks	--

This is non-credit course. At the starting of the semester a list of subjects offered by **SWAYAM/ NPTEL** shall be given by Head of Department.

Assessment:

This process will be looked by a committee of members with HOD, Chairman, BOS and an expert in the field to be nominated by the Principal on recommendation from the department shall examine and declare whether the student has completed/ not completed the course.

4TH YEAR 2ND SEMESTER

AR421: PRACTICAL TRAINING

Credits	24	Duration of Exam	Viva-Voce
Lectures (Periods /week)	-	Internal Marks	50
Training period (periods/week)	24 weeks	External Marks	50

Course objective

The aim Professional Practice is to get hands on training under the guidance of a professional architect who is actively engaged in Architectural Practice. The students will get first-hand experience of dealing with live projects of various natures and also the site experience. The students will be able to learn about the, Project Management, new techniques of construction, advance building services, environmental designing and landscape etc.

COURSE CONTENT

Practical Training shall commence on the reopening day of Fourth Year 2nd Semester. The students shall undergo practical training in the office/ organization where architecture and its related practice are carried out and under the guidance of the professional who is registered with Council of Architecture, India with a minimum of 5 years professional standing. In case the student opts to go abroad he / she will work under the guidance of the professional who is registered with the council / any other organization controlling the profession of Architecture in the respective country. The students will decide very carefully about their placement venue as it is expected that they learn best ethics in Professional Practice.

During this training, students should have to work on Architectural projects and information include

- Preparation of schematic designs,
- Sanctioned drawings, Architectural drawings of various projects,
- Working details/ drawings
- Preparation of BOQ's, Projects Reports, Meetings with clients
- Site visits and
- Presentation drawings by using REVIT Architecture, Sketchup, 3D Max, Photoshop etc.,
- Other works if any;

Duration

The total duration of the training will be minimum 135 working days (excluding the holidays). The student may allow maximum of 10% of total working days as leaves, more than which subject to discretion of University to permit him/her for the Viva-Voce.

Note

The students shall prepare a Training Report or in a formal Log Book containing 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.

Assessment

Continuous Assessment for Practical Training shall be done for a weightage of 60% of the total marks assigned by the principal architect of the office/organization in whose office the candidate is undergoing training. During training period, the principal Architect will give three assessments in given format for every 8 weeks on his/her reflection about the student's work and his overall approach and attitude towards the office work. 20% of the total marks will be assigned for number of days attended.

During training period, 20% of internal marks will be awarded by the internal examiner (s) of the practical training (nominated by the Hon. Vice-Chancellor) for the submitted portfolio of works at the end of the Semester.

A candidate who secures not less than 50% of the total marks prescribed for Practical Training and a minimum of 50% of the total marks prescribed for the Viva Voce examination shall be declared to have passed in the examination.

If a candidate fails to secure a pass in the Practical Training, of VIII semester he/ she shall repeat the course in the subsequent semester and it will be evaluated at the end of that semester.

Course Outcome

- Understanding Practical Experience: Students will comprehend the practical aspects of architectural work by engaging in live projects, grasping project management, and site experience.
- Project Documentation Proficiency: Students will gain expertise in preparing various architectural documents, such as schematic designs, sanctioned drawings, and working details, ensuring they meet industry standards.
- Construction Techniques and Building Services: Students will learn advanced construction techniques and building services, staying updated with industry trends and innovations.
- Environmental and Landscape Design: Students will develop the skills to incorporate environmental considerations and landscape design principles into their architectural projects.
- Effective Communication and Client Interaction: Students will improve their ability to communicate with clients, prepare project reports, and conduct meetings, enhancing their client interaction skills.
- Software Proficiency: Students will become proficient in architectural software tools like REVIT Architecture, Sketchup, 3D Max, and Photoshop, allowing them to create impressive presentation drawings and enhance their design capabilities.

This experience is expected to enhance the students' ability to think comprehensively and better prepare them for understanding and handling the Architectural Project work.

External Viva-Voce Exam

The students shall produce a log book, drawings with the permission of his employer duly signed by the principal architect for viva-voce examination.

Pre Dissertation

Design Dissertation topic (project) shall be submitted to the department soon after completion of Practical training viva-voce. Dissertation project may be submitted based on ongoing, proposed development or new investigation in the related area.

Each student will be assigned a Thesis Guide (amongst the faculty), who will supervise the progress of the student's work on a regular basis. Students are required to stay for a week for discussion on their topics with internal faculty.

5TH YEAR 1st SEMESTER

AR511: ARCHITECTURAL DESIGN-VII

Credits	8	Duration of Exam	VIVA_VOCE
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	6	External Marks	50

COURSE OBJECTIVE:

This Course will be dealing with the design of large scale multistory complex projects and aims to develop skills for a comprehensive design approach in the areas of URBAN DESIGN, HOUSING DESIGN and CAMPUS DESIGN.

COURSE CONTENT

Urban Design: The issues are to be addressed for the Design Project pertaining to Urban Design includes:

- 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.
- Integration of diverse functional needs, access systems, parking, services etc.

Housing Design:

Some of the issues to be addressed for the design project pertaining to Housing design include:

- Urban density, land use, ground coverage, development controls.
- Urban systems, services and their integration with the project.
- User requirements (derived from surveys)
- Issues of hierarchy, identity, public, private, scale of space.
- Integration of community institutions etc.
- Detailing for the disable and the elderly.

Campus Design: Some of the issues to be addressed for the design project pertaining to Campus design includes:

- Issue of Master Plan preparation: academic, administrative, staff housing, student hostels etc.

Phase – wise development

- Environmental considerations.
- Safe and Comfortable vehicular and pedestrian movement.
- Issues of character and landscaping.
- Scope for expansion for future developments.
- Details pertaining to the disabled.

Students would need to undertake one of the design subjects for the studio exercise.

Students may be required to develop a brief, translate it into requirements and realize it, in which the student will take approval of the project brief. The evaluation shall be through periodic internal reviews. The final submission will also include a brief report of about 1000 words. Explaining the concept and design proposals along with the main portfolio. It will also include a model. Students should also to attempt a time problem of similar scale.

Course Outcome

- Analyze and address urban design challenges, including issues of structure, space, and conservation, to develop innovative design solutions for complex urban environments.
- Apply comprehensive knowledge of zoning, land use, and development control regulations to create sustainable and contextually relevant urban designs.
- Develop housing designs that cater to diverse user requirements, integrating urban systems and services while focusing on public-private dynamics and inclusivity for different demographics.
- Demonstrate proficiency in campus design through the formulation of master plans, addressing environmental concerns, ensuring safe mobility, and facilitating future expansion with a focus on inclusivity.
- Effectively translate project briefs into design requirements and propose creative solutions, supported by well-documented design concepts and models, meeting professional standards.
- Exhibit time management skills and the ability to work on design projects of a significant scale, meeting project milestones and delivering innovative design proposals for complex architectural challenges.

Assessment:

Major design problem carries 30 marks and minor design problem carries 20 marks. Students will submit all the materials specified by the design faculty and attend external viva-voce to be conducted by an external examiner.

Viva Voce: Student should submit their drawings and they should attend a practical Exam and Viva-voce conducted by both an external and an internal examiner.

References:

- 1) Campus Architecture.
- 2) Timesavers Standard for Housing and Residential Development.
- 3) Image of the City-Kevin Lynch.
- 4) Pattern Language- Christopher Alexander.
- 5) Defensible Space-Oscar Newman

AR512: DISASTER RESISTANT BUILDINGS AND MANAGEMENT

Credits	04	Exam	3 Hrs.
Lectures (Periods/Week)	04	Internal Marks	30
Tutorials/Drawing (Periods/Week)	00	External Marks	70

Course Objective:

To make the students to understand various types of disaster their significance, disaster prevention and disaster management cycle. To create awareness about natural disasters, factors that cause them, and to foster knowledge about strategies for disaster prevention and management.

Course Content

Unit I: Introduction to Hazards & Disasters

What is Disaster? Their Causes, consequences and after effects of disasters like Various types of Natural hazards and disasters- Earthquake, cyclone, floods, droughts, landslides, lightning, tsunami etc. & Man induced hazards & disasters- soil erosion-causes, conservation measures: nuclear explosion- environmental problems, corrective measures: fire mitigation measures; terrorism etc.

Introduction to disaster management - Indian scenario, understanding of disaster, hazard and its classification, vulnerability, capacity, risk.

Unit II: Disaster Preparedness, Response and Mitigation

Disaster management Act and policy, Guidelines, NDMA

Disaster Management Mechanisms: national, state and district levels; select global practices; disaster and development; physical planning and disaster management plans; various role players in disaster management, relief measures of pre and post disaster – NGOs / CBOs and Armed Forces; Community Based Disaster Preparedness (CBDP), Disaster Risk Mitigation; Preparing hazard zone maps, Predictability/ forecasting & warning, Community preparedness.

Unit III: GIS & Information Technology in disaster management

Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster; Disaster Damage Assessment; applications and case studies.

Unit IV: Design and Retrofitting of Buildings for Disaster Resistance

Different architectural forms to resist different disasters. Basic characteristics of disasters: its behaviour and important parameters. Design, construction and detailing of buildings, materials and methods to be adopted for different disasters discussed in unit 1 and retrofitting of disaster affected buildings.

Note:

To enable the students their role in design and planning solutions for reduction of risk and damages caused shall be exposed through case studies.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted as per the university academic calendar and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course outcome:

- Understand Disasters: Comprehend the causes, consequences, and classifications of natural and man-induced hazards and disasters, including earthquakes, cyclones, and terrorism.
- Disaster Management Proficiency: Demonstrate knowledge of disaster management policies, mechanisms, and roles at national, state, and local levels, integrating global best practices.
- GIS & IT Application: Apply Geographic Information Systems (GIS) and Information Technology in all phases of disaster management, including risk assessment, response, and recovery.
- Building Design for Resilience: Design and retrofit buildings for disaster resistance, considering various architectural forms and materials to mitigate risk and damage.
- Community Preparedness: Engage in Community Based Disaster Preparedness (CBDP) and disaster risk mitigation, including hazard zone mapping, predictability, and forecasting.
- Case Study Analysis: Analyze real-world case studies to develop solutions for reducing risk and damage, enabling active participation in disaster planning and resilience strategies.

References

- 1) Goel.S.L, 'Encyclopaedia of Disaster Management'
- 2) Government of India, (2004), 'Disaster Management in India' – A Status Report, Ministry of Home Affairs (Disaster Management Division), New Delhi.
- 3) Zebrowski, Ernest Jr, (1997)-, 'Perils of a Results Planet: Scientific Perspectives on Natural Disasters', Cambridge University Press, Cambridge.
- 4) Wind and Earthquake Resistant Buildings: Structural Analysis and Design By Bungale S. Taranath
- 5) Ministry of Home Affairs (MHA), (2004)-, 'National Programme for Capacity Building of Architects in Earthquake Risk Management (NPCBAERM)', National Disaster Management Division (Government of India), New Delhi.
- 6) Earthquake Architecture: New Construction Techniques for Earthquake Disaster Prevention by Belen Garcia
- 7) Heide, Auf der E (1989)-, 'Disaster Response: Principles of Preparation and Coordination', C.V.Mosby, Baltimore.

AR513: DESIGN WORKSHOP

Credits	04	Duration of Exam	VIVA_VOCE
Lectures (Periods /week)	01	Internal Marks	100
Tutorials/ drawing(periods/week)	03	External Marks	0

Course objective

This course will enhance learning through a combination of lectures, demonstration and interactive practical exercise sessions. Necessary theory background on the subject will be given to the students in the beginning. The students are required to involve themselves on a design focused on a specific theme for duration of one week to ten days. The students will produce outputs in the format as decided by the resource persons conducting through workshop.

Course Content

Suggested topics:

- Alternative Technologies
- Furniture Design
- Intelligent Architecture
- Product designing using recycled materials.

Stage 1: Understanding Design criterion

Stage 2: Arriving at Creative solutions through miniature model making

Stage 3: Hands on experience with innovative and latest technologies

Stage 4: Product presentation exercises and storyboard (Verbal presentation skills)

Course outcome:

- Understand Design Principles (Stage 1): Students will grasp fundamental design criteria, enabling them to analyze and critique designs effectively, with a focus on sustainability and innovation.
- Create Innovative Miniature Models (Stage 2): Develop creative problem-solving skills by constructing miniature models that demonstrate novel design solutions and concepts.
- Utilize Advanced Technologies (Stage 3): Gain hands-on experience with cutting-edge design technologies, fostering proficiency in their application to architectural and product design.
- Communicate Through Product Presentation (Stage 4): Enhance verbal presentation skills and storytelling abilities to effectively communicate and pitch design ideas and concepts.
- Apply Sustainable Design Principles: Demonstrate the ability to incorporate alternative technologies and recycled materials in design projects to promote sustainability in architecture and product design.
- Implement Intelligent Architecture Concepts: Understand and apply principles of intelligent architecture, integrating innovative technologies and smart design solutions into architectural projects, fostering creativity and efficiency.

Assessment:

The continuous assessment will be done in three stages i.e., Understanding Design criterion; Arriving at Creative solutions through miniature model making and Hands on experience with innovative and latest technologies. Each stage weighs 20marks (20+20+20=60M). For Final viva-voce, Student should submit field book and should attend for Practical Exam and Viva -voce conducted by both an external and an internal examiner for 40 Marks.

AR 514 (A): ELECTIVE-III: BUILDING CONSTRUCTION MANAGEMENT

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Objective:

To provide an insight into Management of Buildings/Construction projects involving management of money, manpower and machinery.

COURSE CONTENT**Unit-1: Construction Organization**

Need for management of building/construction projects – role of Project or Construction Managers in the building industry.

Aim, objectives and functions of Construction Management. Construction stages, Construction team, Role of an architect in construction management. Management techniques and tools.

Unit-2: Construction Management Techniques

Construction planning, scheduling and controlling phases. Bar charts and limitations of bar charts. Program Evaluation and Review Techniques (PERT); Critical Path Method (CPM) for project management; Development and analysis of CPM network; Cost time analysis in network planning; Scientific methods of construction management

Unit-3: Construction Equipment

The role of equipment/machinery in construction industry, factors affecting selection of construction machinery, standard versus special equipment, understanding of the various issues involved in owning, operating and maintaining of construction equipment, economic life of a equipment.

Brief description of earth moving (tractors, excavators, dragline, trenching equipment, etc.,) transporting (various types of trucks), spreading and compacting (motor graders and various types of rollers) and concreting equipment (including concrete mixers, transporting and pumping equipment)

Assessment

Two mid examinations (Maximum 20 Marks each) are to be conducted and average of the both are to be taken for 20M, and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M

Course Outcome

- Demonstrate an understanding of the essential role of Project Managers in the construction industry and their contribution to successful project execution.
- Develop the ability to set clear project aims, objectives, and functions in Construction Management, enabling efficient project planning.
- Apply various construction management techniques, including PERT, CPM, and network planning, to effectively plan, schedule, and control construction projects.
- Assess the significance of construction equipment in project execution, considering factors for selection and the economic life of machinery.
- Describe and differentiate between different types of construction equipment, such as earth-moving, transporting, spreading, compacting, and concreting equipment.
- Recognize the significance of collaboration within a construction team and the architect's role in Construction Management, ensuring seamless coordination for successful project completion.

Text Books:

- 1) PERT and CPM by L. S. Srinath.
- 2) PERT and CPM by Punmia.
- 3) Estimating and Costing by B.N. Dutta.
- 4) Construction Management and Planning by Guna and Sen Gupta, B.

References:

- 1) Project Management for Construction by Chris Hendrickson, Carnegie Mellon University, Pittsburgh, 1998
- 2) Construction Planning & Management by Gahlot P S,, New Age International, Bangalore 2007
- 3) Construction Planning and Management by U.K.Shrivastava
- 4) Total Construction Project Management by George J Ritz
- 5) , Construction Technology by R. Chudley Pearson, 2005.
- 6) The Construction of Buildings by R. Barry, The English Language Book Society and Crosby Lockwood, Staples, London, 1976.
- 7) Construction Planning equipment and Methods by RL Peuriboy Tata McGraw Hill, 1979
- 8) Modern Construction and Management by Frank Harris John Wiley and Sons, 1983

AR514 (B): ELECTIVE – III: SPATIAL COGNITION-II

Credits	04	Duration of Exam	3.00Hrs.
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	00	External Marks	70

Course Objective:

The course will explore critical attributes of built environment that influence human behaviour manipulating their performance. The emphasis is on understanding attributes of built environment that facilitate differently abled user groups and universal design.

COURSE CONTENT

UNIT-I: Introduction to E-prime and design of simple experiments – design, execution and analysis of experiment

UNIT-II: Application of Cognitive Principles in Design Principles, Elements of Design

UNIT-III: Universal / Inclusive Design:

Application of Cognitive science in design of spaces for complex activities and or barrier free environment for different user groups

UNIT-IV: Analysis and presentation of data:

Analyze and synthesize information of the experiment with respect to behavioural factors to assess human comfort

Assignment:

After deliberation in classroom sessions, students select a topic of interest for a particular group of people viz. old-age, children, physically challenged, cognitive disorders, NCD etc. They design an experiment on E-prime to evaluate the behavioural aspects and architectural relevance to improve human performance for health and wellbeing.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted as per the university academic calendar and average of the both are to be taken for consideration for 20 and 10 Marks for assignment i.e. total marks will be (20M+10M)=30M.

Course Outcome:

- Develop Proficiency in E-Prime: Students will acquire the skills to proficiently use E-Prime for designing, executing, and analyzing experiments related to spatial cognition.
- Apply Cognitive Principles to Design: Students will be able to apply cognitive science principles to create effective and user-friendly architectural designs.
- Create Universal and Inclusive Designs: Students will demonstrate the ability to design spaces that cater to diverse user groups, ensuring accessibility and inclusivity.
- Data Analysis and Synthesis: Students will gain expertise in analyzing and synthesizing data from experiments, focusing on behavioral factors to enhance human comfort in architectural settings.
- Problem-Specific Experiment Design: Students will design and execute experiments on E-Prime tailored to specific user groups (e.g., elderly, children, individuals with cognitive disorders) to improve health and well-being.
- Effective Presentation of Architectural Findings: Students will learn to effectively present architectural information derived from experiments, offering insights into enhancing human performance, health, and well-being in architectural contexts.

References:

- 1) A Pattern Language, Christopher Alexander and Murray Silverstein
- 2) Image of the City, Kevin A. Lynch
- 3) Cognitive Psychology, E. Bruce Goldstein
- 4) E-prime Psychology software tools tutorials
- 5) MS Excel tutorials

Journals

- 1) Environment and Behaviour <http://eab.sagepub.com/>
- 2) Journal of Environmental Psychology <http://www.journals.elsevier.com/journal-of-environmental-psychology/>

Websites

- 1) <https://www.brikbases.org>
- 2) www.anfarch.org/research/recommended-reading
- 3) <https://architecturalpsychology.org>

AR 515: ARCHITECTURAL DISSERTATION

Credits	03	Duration of Exam	VIVA-VOCE
Lectures (Periods /week)	04	Internal Marks	50
Tutorials/ drawing(periods/week)	00	External Marks	50

Course objective

Dissertation is seen as a culmination of the development of the student's knowledge, attitudes and skills over the course of studies of Architecture. Ultimately, to make the students equip in and Data Collection, Analysis and Research of Architecture and Planning, Urban and Rural development and Socio-Economic conditions.

COURSE CONTENT**UNIT – I**

Scope for Design/ Dissertation: Topics / projects related to architecture and Planning

- Rural and Urban redevelopment projects
- Landscape projects

Contents of report

- Introduction
- Literature study and case study
- Analysis and Inferences
- Conclusion

NOTE

Design dissertation topics (project) shall be submitted to the department by each student soon after completion of Practical training viva-voce of previous semester. Projects may be based on ongoing, proposed development or new investigation in the related area.

Each student will be assigned a Thesis Guide (amongst the faculty), who will supervise the progress of the student's work on a regular basis. Students are required to proceed for Case studies and Data collection of their respective approved dissertation topics in consultation with their Guides.

Assessment:

Two assessment will be conducted by two presentations and one report i.e. each presentation carries 15 marks and 10 marks for report and 10 marks by the Guide i.e., of (30+10+10=50M). Student has to make a presentation for external Viva-voce conducted by external examiner.

VIVA-VOCE: Submission of report with oral and visual presentation of drawings, photographs, analysis of literature, case studies and conclusions.

Course Outcome:

- **Comprehensive Research Skills:** Develop the ability to identify, evaluate, and synthesize architectural and planning literature, applying critical thinking to support the dissertation topic .
- **Problem Analysis and Case Study Proficiency:** Acquire the skill to analyze real-world projects, both in rural and urban settings, and draw meaningful inferences for architectural planning and design .
- **Creative Design Synthesis:** Apply innovative design concepts to address rural and urban redevelopment projects and landscape developments, demonstrating a deep understanding of design principles .
- **Effective Communication:** Exhibit proficiency in presenting findings, analysis, and conclusions through oral and visual presentations, demonstrating effective communication skills with a focus on architectural terminology .
- **Project Management and Collaboration:** Develop the ability to manage a complex architectural project, working collaboratively with a faculty Thesis Guide, and effectively coordinate data collection and case studies.
- **Critical Evaluation and External Examination:** Prepare for external Viva-voce examination by external examiners, demonstrating critical evaluation skills in the oral and visual presentation of the dissertation's findings, literature analysis, and case studies.

AR 516: SEMINAR-II

Credits	02	Duration of Exam	VIVA-VOCE
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	00	External Marks	50

Course objective

To impart knowledge base design of energy efficient buildings and develop awareness on energy rating systems and performance evaluation. To build knowledge base on development of building systems and management.

COURSE CONTENT

Unit 1: Green Buildings and Rating Systems

Passive design considerations; active systems; design for energy efficient building- day lighting and natural ventilation; technologies for alternative sources of energy; Net Zero buildings; software tools for the design of a building and the performance evaluation of a building with respect to energy; Rating systems: IGBC, LEED, GRIHA.

Unit 2: Building Systems Integration and Management

System and Sub-systems in buildings, relationship and analysis of sub-systems; Building systems for different building typologies, Optimization and sub-system; Control systems for various buildings services, Types of controllers. Preparation of necessary drawings for installing control systems, Integrated building management system, remote monitoring and management, Home automation, Developments in service control systems.

Assessment

Two Continuous assessment will be conducted as per the syllabi by assigning two presentations and one report i.e. each presentation carries 20 marks and 10 marks for report i.e., of (20+20+10=50M). Student has to make a presentation for external Viva-voce conducted by external examiner.

Student has to make a presentation for external Viva-voce conducted by external examiner.

Course outcome

- Understand the principles of green building design and rating systems, enabling students to incorporate sustainable practices into their architectural projects.
- Analyze and integrate various building systems, optimizing their performance and enhancing the overall functionality of different building typologies.
- Demonstrate proficiency in designing for energy efficiency, including daylighting, natural ventilation, and alternative energy sources, to create environmentally responsible buildings.
- Evaluate and employ software tools for building design and performance assessment, facilitating data-driven decision-making in architectural projects.
- Compare and contrast prominent rating systems such as IGBC, LEED, and GRIHA, enabling students to choose the most suitable framework for sustainable building design.
- Gain hands-on experience in control systems and integrated building management, with the ability to prepare necessary drawings for control system installation and manage building services effectively.

AR 517: MOOCS-2

Credits (Non Credit Course)	00	Duration of Exam	VIVA-VOCE
Lectures (Periods /week)	00	Internal Marks	--
Tutorials/ drawing(periods/week)	00	External Marks	

This is non-credit course. At the starting of the semester a list of subjects offered by **SWAYAM/ NPTEL** shall be given by Head of Department.

Assessment:

This process will be looked by a committee of members with HOD, Chairman, BOS and an expert in the field to be nominated by the Principal on recommendation from the department shall examine and declare whether the student has completed/ not completed the course.

5TH YEAR 2nd SEMESTER

AR521: ARCHITECTURAL THESIS

Credits	25	Duration of Exam	VIVA_VOCE
Lectures (Periods /week)	02	Internal Marks	50
Tutorials/ drawing(periods/week)	23	External Marks	50

COURSE OBJECTIVE

To expose and to provide opportunity to the students to exercise full-fledged large scale Architectural Design with holistic approach including site investigation, programme formulation, and design demonstration.

COURSE CONTENT

Every candidate shall submit at the end of the Xth Semester a thesis on a subject approved by the Thesis Review Committee constituted by the Head of the department which shall comprise of the Head of the Department, Thesis Coordinator and one external architect (practicing).

The architectural project shall consist of: Design Demonstration i.e., Formulation of Design Programme, Site investigation, and selection, and culmination in a concrete design demonstration.

SUBMISSION WORK:

Architectural Project shall consist of a DESIGN SOLUTION:

Since the Architectural is the culmination of five years of learning in various aspects of Architecture, it is expected that students demonstrate an ability of holistic and comprehensive thinking in the areas of

Site Planning

- Structural considerations
- Interior space planning
- Environmental planning
- Building Services
- Climate responsive, Energy efficient and exhibiting qualities of sustainable architecture.
- Architectural Detailing through graphically presented Design solution in the form of sufficient number of architectural drawings, (manually drawn/computerized) with models etc.

ASSESSMENT

The Internal assessment of “Architectural Project” shall be carried out STAGE WISE as decided by the department. The thesis shall be evaluated by the Review Committee through continuous internal assessment with a minimum of 4 reviews out of 50 marks.

VIVA_VOCE for 50 marks shall be reserved for submission of project report, appropriate scaled model and for oral presentation assessed by External Examiner(s) in which the student will display his work on the space allotted to him and explain his work and

answer all the queries raised by the Examiners. The Time allotted per student shall be minimum 30 minutes to maximum 45 minutes.

Stage I (Synopsis): Introduction, Validity, Aims & Objective, Methodology, Site Conditions and tentative space requirement

Stage II : Synopsis, Case Studies, Data Analysis, Library study and Framing of the requirements, Design philosophy.

Stage III : Concept, Pre-Final design proposal and Block Model. Detailed working drawings showing any two of the following services: Air-conditioning, Landscape, Structure, Interior detailing, Water supply & Sanitation or any other detail. Hard Bound report.

Stage IV : Final design proposal along with model/views, to be evaluated by external examiner.

Note:

Teaching & Evaluation system

The thesis studio will be conducted under the overall coordination of the thesis coordinator. In addition, one members of the Visiting/Expert Faculty would also be associated throughout the duration of the studio. Each student will be assigned a Thesis Guide (amongst the faculty), who will supervise the progress of the student's work on a regular basis.

Course Outcome:

- **Comprehensive Design Proficiency:** Graduates will demonstrate the ability to develop holistic architectural designs, integrating site planning, structure, interior space, environment, and sustainable elements.
- **Effective Site Analysis:** Students will exhibit competence in conducting site investigations and selection, effectively considering site conditions for design proposals.
- **Architectural Detailing Skills:** Graduates will produce well-detailed architectural drawings and models, showcasing proficiency in design documentation, both manually and using computerized tools.
- **Sustainable Design Expertise:** Graduates will exhibit knowledge of climate-responsive, energy-efficient, and sustainable architecture, reflecting a commitment to environmentally conscious design.
- **Effective Communication and Presentation:** Students will master oral and written communication skills, presenting their architectural work convincingly during viva voce and in comprehensive project reports.
- **Collaborative and Critical Thinking:** Graduates will engage in collaborative design processes, drawing from case studies and research to develop well-framed design philosophies and solutions, fostering critical thinking in architecture.

AR522: PROFESSIONAL PRACTICE AND LEGISLATION

Credits	4	Duration of Exam	3HRS
Lectures (Periods /week)	04	Internal Marks	30
Tutorials/ drawing(periods/week)	0	External Marks	70

COURSE OBJECTIVE

To Communicating – the communication and documentation of designs for presentation to clients and other stakeholders, and for construction; the preparation of professional reports. To Managing – the management and operation of a design practice.

COURSE CONTENT

Unit 1: Introduction

Introduction to Architectural profession, Role of professional bodies, The Architect's registration act 1972. CODE PROFESSIONAL CONDUCT; COA rules; Scale of charges; units and mode of measurements clerk of work and his duties; inspection of work during construction; certificate of payment to contractor; skills of quantities; schedule of rates, tenders; public, limited and negotiated tender documents and allied formalities.

Unit 2: The Profession

Role of Architect in society; Architectural Profession as compared to others professions; difference between profession and Mode/business; architect's registration, COA, and other organisations related to architectural profession.

Unit 3: Agreements

The duties, liabilities and relationships of client, contractor and other technicians. Conditions of engagement of Architects. Scale of remuneration for Architectural services and mode of payments.

Unit 4: Contracts & Tendering

Contract: Definition - General principles of Indian Contract Act; Building contracts generally, Conditions and forms of contract, study of standard contract of the Indian Institute of Architects. Principle of Arbitration, Powers and duties of arbitrators, revoking authority.

Contract agreement & its necessity; Articles of Agreement, Terms and Conditions, Bills of Quantities and specifications, Appendix; Certification of Contractors Bills at various stages. New trends in project formulation and different types of execution (BOT, DBOT, BOLT, BOO, etc).

Tenders: Definition, Types of Tenders, Open and closed tenders, Conditions of tender, Tender Notice, Tender documents. Concept of EMD –Submission of tender; Tender scrutiny - Tender analysis Recommendations –Work order - E-tendering (advantages, procedure, conditions).

Unit 5: Administration

Accidents during progress of work and after completion, damage to persons and properties affected; scope of torts Act and workmen's compensation Act with regards to the affected persons and properties; Consumer protection Act and related acts on

Architects. Practice Architects Act 1972; Professional Practice Regulation and architectural education regulations under the Architects Act. Role of consultants and coordination between different consultations on a big project.

Unit 6: Starting a practice

Mode of engaging an architect – Comprehensive services, partial services and specialised services – Scope of work of an architect – Schedule of services – Scale of fees (Council of Architecture norms) – Mode of payment – Terms and conditions of engagement – Letter of appointment. Importance of Architectural competitions – Types of competitions. COA guidelines for competitions. Importance and type of presentation of designs and allied skill development.

Unit 7: Employment Law:

Important legal aspects and legislations which have a bearing on the practice of architectural profession with particular reference to WTO and GATS and equip them for international practice. Copy rights and Patenting such as provisions of copy right acts in India and abroad, copy right in architectural profession.

Note

Lectures by practicing architects are to be arranged to create awareness on basic knowledge of the nature of practice, and professional roles, organizational frameworks, management and legal procedures.

Assessment:

Two mid examinations (Maximum 20 Marks each) are to be conducted as per the university academic calendar and average of the both are to be taken for consideration for 20 and 10 Marks for continuous assessment i.e. total marks will be (20M+10M)=30M.

Course Outcomes

- **Comprehensive Design Proficiency:** Graduates will demonstrate the ability
Foundational Understanding: Gain a solid foundation in architectural practice, including the role of professional bodies and knowledge of the Architect's Registration Act, COA rules, and codes of professional conduct.
- **Architect's Role in Society:** Understand the architect's role in society and differentiate architectural practice from other professions, including knowledge of the legal and organizational aspects of the field.
- **Legal Framework:** Grasp the duties, liabilities, and relationships of key stakeholders in architectural projects. Be proficient in the conditions of engagement for architects and the remuneration models.
- **Contractual Expertise:** Acquire a comprehensive understanding of contracts and tendering, including the Indian Contract Act, principles of arbitration, and modern project execution methods (BOT, DBOT, BOLT, BOO, etc).
- **Tendering Skills:** Develop expertise in handling tenders, from notice to E-tendering. Learn the essentials of EMD, tender scrutiny, and compliance with legal requirements.
- **Professional Ethics:** Be well-versed in legal aspects impacting architectural practice, such as copyright and patenting. Understand the role of architects in international practice and equip for compliance with WTO and GATS.

References:

- 1) Theory and Practice of Valuation- Roshan Namavati
- 2) Professional Practice- Dr.RoshanH.Namavati
- 3) Principles and Practice of valuation- Mr.D.N.Banerjee
- 4) Land Law- By Patrick J.Dalton
- 5) Hand book on Professional Practice, COA Publication