

BACHELOR OF ARCHITECTURE

SCHEME OF EXAMINATION

1 st YEAR - SEMESTER I												
Classification of Course	Code	Course	Hours/ Week	L	T	S	Credits	External Exam Type	Marks			Duration of (Theory) Exam
									Internal Assessment	External Examination	Total	
Design	AR1.01	Architectural Design 1	8	0	0	8	8	IEJ	250	150	400	-
	AR1.02	Visual Arts & Basic Design 1	5	0	0	5	5	IEJ	200	100	300	-
	AR1.03	Computer Application 1	2	0	0	2	2	IO	100	0	100	-
Technology	AR1.04	Building Construction 1	4	1	0	3	4	IEE	100	100	200	3 hrs.
	AR1.05	Theory of Structure 1	4	2	0	2	4	IEE	100	100	200	3 hrs.
	AR1.06	Environmental Studies (UGC)*	2	2	0	0	2	IEE	50	50	100	2 hrs.
	AR1.07	Model Making & Workshop	3	0	0	3	3	IO	100	0	100	-
Humanities	AR1.08	Human Settlement & Vernacular Architecture	2	2	0	0	2	IO	100	0	100	-
Research	AR1.09	Professional Communication 1*	3	0	3	0	NC	IO**	150	0	150	-
TOTAL			33				30		1000	500	1500	-

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1 st YEAR - SEMESTER II												
Classification of Course	Code	Course	Hours/ Week	L	T	S	Credits	External Exam Type	Marks			Duration of (Theory) Exam
									Internal Assessment	External Examination	Total	
Design	AR2.01	Architectural Design 2	8	0	0	8	8	IEJ	250	150	400	-
	AR2.02	Visual Arts & Basic Design 2	3	0	0	3	4	IEJ	100	100	200	-
	AR2.03	Computer Application 2	2	0	0	2	2	IO	100	0	100	-
Technology	AR2.04	Building Construction 2	4	1	0	3	4	IEE	100	100	200	3 hrs.
	AR2.05	Theory of Structure 2	4	2	0	2	4	IEE	100	100	200	3 hrs.
	AR2.06	Climate Responsive Design	2	2	0	0	2	IEE	50	50	100	2 hrs.
	AR2.07	Surveying & Levelling	3	0	3	0	2	IO*	100	0	100	-
Humanities	AR2.08	History of Architecture 1	2	2	0	0	2	IO	100	0	100	-
	AR2.09	Sociology & Culture	2	2	0	0	2	IO	100	0	100	-
Research	AR2.10	Professional Communication 2*	3	0	3	0	NC	IO**	150	0	150	-
TOTAL			33				30		1000	500	1500	-

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2 nd YEAR - SEMESTER III												
Classification of Course	Code	Course	Hours/ Week	L	T	S	Credits	External Exam Type	Marks			Duration of (Theory) Exam
									Internal Assessment	External Examination	Total	
Design	AR3.01	Architectural Design 3	8	0	0	8	8	IEJ	250	150	400	-
	AR3.02	Visual Arts & Basic Design 3	3	0	0	3	3	IEJ	100	50	150	-
	AR3.03	Computer Applications 3	3	0	0	3	3	IEJ	100	50	150	-
Technology	AR3.04	Building Construction 3	4	1	0	3	4	IEE	100	100	200	3 hrs.
	AR3.05	Theory of Structure 3	4	2	0	2	4	IEE	100	100	200	3 hrs.
	AR3.06	Water, Waste & Sanitation	2	2	0	0	2	IEE	50	50	100	2hrs.
	AR3.07	Site Planning & Landscape Studies	2	2	0	0	2	IO	100	0	100	-
Humanities	AR3.08	History of Architecture 2	2	2	0	0	2	IO	100	0	100	-
	AR3.09	Art & Architectural Appreciation 1*	3	0	3	0	NC	IO**	150	0	150	-
Research	AR3.10	Arch. Research- Elective 1*	2	2	0	0	2	IO	100	0	100	-
TOTAL			33				30		1000	500	1500	-

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2 nd YEAR - SEMESTER IV												
Classification of Course	Code	Course	Hours/ Week	L	T	S	Credits	External Exam Type	Marks			Duration of (Theory) Exam
									Internal Assessment	External Examination	Total	
Design	AR4.01	Architectural Design 4	8	0	0	8	8	IEJ	250	150	400	-
	AR4.02	Visual Arts & Basic Design 4	3	0	0	3	3	IEJ	100	50	150	-
	AR4.03	Computer Applications 4	3	0	0	3	3	IEJ	100	50	150	-
Technology	AR4.04	Building Construction 4	4	1	0	3	4	IEE	100	100	200	3 hrs.
	AR4.05	Theory of Structures 4	4	2	0	2	4	IEE	100	100	200	3 hrs.
	AR4.06	Electrification, Lighting & Acoustics	2	2	0	0	2	IEE	50	50	100	2 hrs.
	AR4.07	Solar Active & Passive Systems*	2	2	0	0	2	IO	100	0	100	-
Humanities	AR4.08	History of Architecture 3	2	2	0	0	2	IO	100	0	100	-
	AR4.09	Art & Architectural Appreciation 2*	3	0	3	0	NC	IO**	150	0	150	-
Research	AR4.10	Arch. Research- Elective 2*	2	2	0	0	2	IO	100	0	100	-
TOTAL			33				30		1000	500	1500	

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3 rd YEAR - SEMESTER V												
Classification of Course	Code	Course	Hours/ Week	L	T	S	Credits	External Exam Type	Marks			Duration of (Theory) Exam
									Internal Assessment	External Examination	Total	
Design	AR5.01	Architectural Design 5	9	0	1	8	9	IEJ	250	200	450	
Technology	AR5.02	Building Construction 5	4	1	0	3	4	IEE	100	100	200	3 hrs.
	AR5.03	Theory of Structures 5	4	2	0	2	4	IEE	100	100	200	3 hrs.
	AR5.04	HVAC, Mech. Mobility & Fire Safety	2	2	0	0	2	IEE	50	50	100	2 hrs.
	AR5.05	Energy System & Renewables*	2	2	0	0	2	IO	100	0	100	-
	AR5.06	Estimating & Costing	3	1	0	2	3	IEE	100	50	150	2 hrs.
Humanities	AR5.07	History of Architecture 4	2	2	0	0	2	IO	100	0	100	-
	AR5.08	Design Methodology	2	2	0	0	2	IO	100	0	100	-
	AR5.09	Art & Architectural Appreciation 3*	3	0	3	0	NC	IO**	150	0	150	-
Research	AR5.10	Arch. Research- Elective 3*	2	2	0	0	2	IO	100	0	100	-
TOTAL			33				30		1000	500	1500	-

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3 rd YEAR - SEMESTER VI												
Classification of Course	Code	Course	Hours/ Week	L	T	S	Credits	External Exam Type	Marks			Duration of (Theory) Exam
									Internal Assessment	External Examination	Total	
Design	AR6.01	Architectural Design 6	9	0	1	8	9	IEJ	250	200	450	-
Technology	AR6.02	Building Construction 6	4	1	0	3	4	IEE	100	100	200	3 hrs.
	AR6.03	Theory of Structures & Design 2	4	1	0	3	4	IEE	100	100	200	3 hrs.
	AR6.04	Green System Integration	2	2	0	0	2	IEE	50	50	100	2 hrs.
	AR6.05	Sustainable Urban Habitats	2	2	0	0	2	IO	100	0	100	-
	AR6.06	Specifications & Contracts	3	1	0	2	3	IEE	100	50	150	2 hrs.
Humanities	AR6.07	Contemporary Architecture*	2	2	0	0	2	IO	100	0	100	-
	AR6.08	Architectural Theories	2	2	0	0	2	IO	100	0	100	-
	AR6.09	Art & Architectural Appreciation 4*	3	0	3	0	NC	IO**	150	0	150	-
Research	AR6.10	Arch. Research- Elective 4*	2	2	0	0	2	IO	100	0	100	-
TOTAL			33				30		1000	500	1500	-

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4 th YEAR - SEMESTER VII												
Classification of Course	Code	Course	Hours/ Week	L	T	S	Credits	External Exam Type	Marks			Duration of (Theory) Exam
									Internal Assessment	External Examination	Total	
Design	AR7.01	Architectural Design 7	9	0	1	8	9	IEJ	250	200	450	-
Technology	AR7.02	Working Drawings	6	0	0	6	6	IEJ	200	100	300	-
	AR7.03	Project Management	3	1	0	2	3	IEE	100	50	150	2 hrs.
Humanities	AR7.04	Structure & Architectural Appreciation 4*	3	0	3	0	NC	IO**	150	0	0	-
Research	AR7.05	Arch. Research- Seminar*	5	1	4	0	5	IEJ	150	100	250	-
	AR7.06	Arch. Research- Elective 5*	2	2	0	0	2	IO	100	0	100	-
	AR7.07	Arch. Research- Elective 6* (Crossover)	2	2	0	0	2	IO	100	0	100	-
TOTAL			30				27		900	450	1350	-

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4 th YEAR - SEMESTER VIII												
Classification of Course	Code	Course	Hours/ Week	L	T	S	Credits	External Exam Type	Marks			Duration of (Theory) Exam
									Internal Assessment	External Examination	Total	
Design	AR8.01	Practical Training	16 Weeks				16	IEJ	600	200	800	-
TOTAL							16		600	200	800	-

5 th YEAR - SEMESTER IX												
Classification of Course	Code	Course	Hours/ Week	L	T	S	Credits	External Exam Type	Marks			Duration of (Theory) Exam
									Internal Assessment	External Examination	Total	
Design	AR9.01	Architectural Design 9	10	0	2	8	10	IEJ	250	250	500	-
Technology	AR9.02	Professional Practice*	3	1	0	2	3	IEE	100	50	150	2 hrs.
Humanities	AR9.03	Urban Design Studies*	2	2	0	0	2	IO	100	0	100	-
Research	AR9.04	Arch. Research- Dissertation/ Art Thesis*	5	1	0	4	5	IEJ	150	100	250	-
	AR9.05	Arch. Research- Elective 7*	2	2	0	0	2	IO	100	0	100	-
	AR9.06	Arch. Research- Elective 8* (Crossover)	2	2	0	0	2	IO	100	0	100	-
TOTAL			24				24		800	400	1200	-

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5 th YEAR - SEMESTER X												
Classification of Course	Code	Course	Hours/ Week	L	T	S	Credits	External Exam Type	Marks			Duration of (Theory) Exam
									Internal Assessment	External Examination	Total	
Design	AR10.01	Architectural Design Thesis	12	0	0	12	15	IEJ	300	300	750	-
Research	AR10.02	Thesis Design Research	3	0	0	3		IO	150	-		-
Technology	AR10.03	Professional Practice	3	1	0	2	3	IEE	100	50	150	2 hrs.
TOTAL			18				18		550	350	900	
GRAND TOTAL OF ALL SEMESTERS			270				265		8850	4400	13250	

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SYLLABUS

FIRST YEAR: SEMESTER I

AR1.01: Architectural Design 1

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
8	0	0	8	8	IEJ	250	150	400	-

THEME: SPATIAL EXPLORATION - I

Course Objectives

Introducing basic principles of design, space articulation and architecture and the use of drawing as a communication tool for design information.

Anticipated Learning Outcomes

Ability to assemble simple spatial elements in articulated constructs and visually represent them through hand-made 2D drawings and models.

Content

- Concept of space, form and enclosure; principles of design like harmony, symmetry, scale and proportion etc. and their application to endow a quality to spaces and forms.
- Exercises related to elements of design and perception of space.
- Parameters of design, anthropometrics, human activity and the use of space. iv. Visual and tactile understanding of inter-relationship of form, structure and materials.

- Understanding nature as a contextual setting.
- Design of a simple architectural form based on an understanding of anthropometrics.
- Surface development of solids; Orthographic projection, measuring and drawing to scale; Conventions of architectural drawing, practice of line-types, line-weights symbols, Lettering, rendering materials, textures, tones in pencil and pen-and-ink drawing, Model-making.

AR1.02: Visual Arts & Basic Design 1

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
5	0	0	5	5	IEJ	200	100	300	-

Course Objectives

Introducing free-hand drawing and Two-Dimensional graphic design as a way of understanding the place of art in architecture.

Anticipated Learning Outcomes

Ability to draw in various media and materials, to develop the power of drawing as a means of coordinating eye and hand in studio and field observation, to judge proportion, scale, and spatial relationships, understand principles of visual composition and experiment with them.

Content

- Indoor and outdoor sketching: An immersive experience of live drawing in various contexts to develop a professional level ability to draw existing objects, in pencil and pen/ink. ii.
- Free-hand perspective drawing and rendering of imagined objects, in pencil and pen/ink.
- Understanding principles of visual composition in historic architecture, art and design.

- An introduction to the basic formal concepts in the two-dimensional arts and the principles of aesthetic organization: line, shape, value, texture, harmony, balance, symmetry, etc., from observation of contemporary examples of design and their application by drawing in varied media.
- Using Line, plane and volume as a means to express objective and spatial concepts in various media to construct aesthetically pleasing compositions.

AR1.03: Computer Application 1

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	0	0	2	2	IO	100	0	100	-

Course Objectives

Introducing basic computer skills as relevant to the architectural profession and to bring all students from different backgrounds up to a common level of computer proficiency.

Anticipated Learning Outcomes

Ability to do word and image processing to make short reports and seminar presentations and make 2D orthographic projections in CAD.

Content

- Word processing: basic templates for creating text documents, editing, formatting, spelling/grammar check, dictionary and thesaurus, page layout, fonts, indentation, inserting tables and images, document review and annotation in software like MS Word.
- Image processing: basic image sourcing, editing and insertion for desktop publishing in Adobe Photoshop or similar software.

- Simple exercises in to 2D CAD software (AutoCAD/Revit) specifically for proficiency of, drawing/editing objects, text, dimensioning, making and inserting blocks, etc. and an understanding of unit's settings, scale, limits, line type, line weight, layers, colours, and print commands.

AR1.04: Building Construction 1

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	1	0	3	4	IEE	100	100	200	3 hrs.

Course Objectives

To introduce students to primary building materials and simple construction techniques as applicable to a low-rise building- three to four storied contemporary building.

Anticipated Learning Outcomes:

Develop an understanding of brick bonding, foundation details, external wall section with flat roof and parapet.

Content

- Lectures on historical evolution of building materials and construction methods.

Understanding properties and behaviour of materials such as brick, stone, sand, lime, cement, mortar and PCC.

- Introduction to primary building elements, walls, piers, foundations, roofs, bricks, arches, stone and block masonry their properties and manufacture. Introduction to basic and contemporary flooring and external paving.
- Understanding of traditional and contemporary waterproofing materials and techniques. Simple MS section gate design and details.

Suggested Pedagogical Approach

Studio exercises in brick bonding, foundation details, external wall section for flat roofs (DPC, sill, lintel, roof level, waterproofing, parapet). Introduction to sustainability and energy conservation using cavity walls, rattrap bond etc. Workshop in brick laying, setting-out, etc. Site visits for exposure to site practices. Measured drawing of stone construction (may be integrated with Arch. Design studio)

AR1.05: Theory of Structure - 1

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	2	0	2	4	IEE	100	100	200	3 hrs.

Course Objectives

Introducing simple structural concepts and behaviour of structural elements.

Anticipated Learning Outcomes

Understanding of concepts taught in the semester through simple numerical calculations and models.

Content

Concept of direct force mechanism in structures, tension and compression; Equilibrium of forces, concept of strut and

tie; composition and resolution of forces. Visualizing of loads as forces, response as deformation; Stress and Strain, Hooke's Law. Concept of Euler's load, phenomena

of buckling, short and long columns. Centre of Gravity and moment of inertia for various shapes and sections. Laboratory testing of Hooke's law, study of models using struts, ties

and membranes only. Studies of load-bearing construction through sketches and models.

AR1.06: Environmental Studies

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IEE	50	50	100	2 hrs.

Course Objectives

To bring about awareness of a variety of environmental concerns and to create a pro-environment attitude and behavioural pattern in society based on sustainable lifestyles.

Anticipated Learning Outcomes

Awareness of a wide range of environmental concerns and ability to act at their own level to protect the environment we all live in.

Content

- Unit 1: Multidisciplinary nature of environmental studies

- Unit 2: Natural Resources: Renewable and non-renewable resources
- Unit 3: Ecosystems
- Unit 4: Biodiversity and its conservation
- Unit 5: Environmental Pollution
- Unit 6: Social Issues and the Environment
- Unit 7: Human Population and the Environment
- Unit 8: Field work

Suggested References

Barucha, E., 2004. Text Book of Environmental

Studies for Undergraduate Courses. UGC Univ. Press

Joseph, Benny, 2005. Environmental Studies. Tata McGraw Hill

Kaushik, A. and Kaushik, C.P., 2010. Basics of Environment and Ecology. New Age Int. Publishers

Agarwal, K.C., 2001. Environmental Biology. Nidhi Publ. Ltd. Bikaner

Brunner, R.C., 1989. Hazardous Waste Incineration. McGraw Hill.

AR1.07: Model Making & Workshop

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	0	3	3	IO	100	0	100	-

Course Objectives

Introduce different techniques of model making in various materials and basic processes for fabrication and assembly of simple building components.

Anticipated Learning Outcomes

Ability to make true scale models of architectural designs, manually and mechanically and familiarity with carpentry, joinery, smithy and moulding with different materials and techniques.

Content

- Use of standard materials in model making- paper, box-board, thermocol, foam core board, wood, acrylic etc., use hand tools and hand-held power tools, innovative representational mimicry.
- Model making techniques like surface development, paper folding, origami, hand cutting laser cutting and 3D printing etc. Making of block models and detail models.
- Simple workshop practice with machines like circular saw, lathe, sander, jig, airbrush etc.

- To be coordinated with the Architectural Design, Basic Design & Visual Arts and Building Construction studios.

Suggested References

Practical exercises related to making models of simple buildings, furniture and everyday objects; fabrication of full-size mock-up or prototype of an actual building component such as a doorjamb, baluster, or luminaire.

AR1.08: Human Settlement & Vernacular Architecture

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

Introduce traditions of building structures for habitation, made without the intervention of professional architects.

Anticipated Learning Outcomes

Familiarity with simple ways of building and settling a community that related to local customs, social systems, climate, available materials and construction methods.

Content

- Vernacular architecture including primitive or aboriginal architecture; indigenous architecture; ancestral or traditional architecture; folk, popular, or rural architecture.
- Ethnic architecture or ethno-architecture; informal architecture; the so-called “anonymous architecture” or “architecture without architects;” and even “non-pedigree” architecture.

AR1.09: Professional Communication 1

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	3	0	NC	IO**	150	0	150	-

IO** = Marks not to be counted towards total

Course Objectives

Introduce basis language skills for oral professional communication that enables effective conversation in the classroom and courteous but forceful participation in conferences and seminars, both as audience and for diverse audiences.

Anticipated Learning Outcomes

Students should be able to speak and

understand spoken English to carry out a meaningful conversation on topics related to Architecture, particularly in the Studio.

Content

- Importance of conversation, definition, process and feedback in communication, cultural influences as barriers to effective communication, features of effective communication.

- Type of communication, Listening and responding, Live, Tele – and Videoconferencing as a media of modern communication, ethics related to various forms of communications.
- Planning and conducting conversations, interviews, preparation and rehearsal of oral statements for presentations, body language, effective listening, telephonic communication.

FIRST YEAR: SEMESTER II

AR2.01: Architectural Design 2

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
8	0	0	8	8	IEJ	250	150	400	-

THEME: SPATIAL EXPLORATION - II

Course Objectives

Introducing Architectural Design as the ideation of a functional space crafted by robust elements in an aesthetic manner and exploiting 3D drawings as a medium of near-realistic representation of architectural intent.

Anticipated Learning Outcomes

Ability to assimilate learning from Basic Design and Visual Arts, Building Construction and Structures and apply to an Architectural Design by weighing design choices, to draw insights from personal experience of surrounding

environment, extract programmatic requirements therefrom and translate into a Design Concept to be expressed through hand-made 3D drawings and models.

Content

- Looking at the immediate built environment and understanding its major components. Understanding human scale in context of the built environment of varied scales and experiencing spatial quality.
- Exercises relating personal experiences to behavioural needs and translating them into documented information that can be used as a basis for design.

- Introduction to Architectural elements and space standards.
- Design of a basic shelter, an architectural form with a specific function.
- Representation of ideas through sketches, diagrams and architectural drawings with application of line quality, thickness and intensity as appropriate to the intent.
- Isometric, axonometric, and oblique views.
- One- and multi-point perspectives, sectional perspectives.
- Light, Shade, Shadows and Scio-grapy.

AR2.02: Visual Arts & Basic Design 2

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	0	3	4	IEJ	100	100	200	-

Course Objectives

Introducing design elements in three-dimensional forms and space leading to classical methods of architectural form development, theory and application of colours.

Anticipated Learning Outcomes

Ability to identify and analyse the elements, principles and vocabulary of three-dimensional design; Identify and apply colour properties and concepts.

Content

- Understand colour vocabulary and terminology. Observing the basic historical and contemporary aspects of colour. Understanding the psychology of colour perception.
- Exercises in informed application of basic colour properties and harmonies, critical thinking and problem-solving skills as applies to the use of colour through visual and physical control of varied media. Rendering architectural drawings in colour

with the use of light and shade, material textures and tonal values.

- Basic components of 3-dimensional art, including subject, form, and content.
- Sculpture by casting, modelling, additive/subtractive techniques and fabrication. Materials used will include plaster, wire, clay, wood, paint, board, paper, etc.
- Discussions centred on 3-dimensional design and concepts.

AR2.03: Computer Application 2

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	0	0	2	2	IO	100	0	100	-

Course Objectives

Basic proficiency in architectural office software; transposing textual, numerical and graphic information across software platforms and devices to describe concepts holistically.

Anticipated Learning Outcomes

Ability to process numerical data, store, retrieve and present information appropriately for multiple usage across publication and presentation platforms and track editions over

a project period, Ability to visualize design concepts in the-round and make simple and complex 3D objects in CAD.

Content

- Numerical processing: preparing and editing spreadsheets in software like MS Excel. Collating raw data into numbers for analytical use. Presentation of data as tables, charts and graphs.

- Inserting tables, text and images in drawings for print and projection formats.
- Slide Presentations in software like MS PowerPoint, insertion of drawings, audio/video clips.
- 3D Visualization: Sketch Up software.
- Basic exercises in 3D CAD software (AutoCAD/Revit). Understanding the co-ordinate system, 3D primitives, solid modelling and surface modelling.

AR2.04: Building Construction 2

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	1	0	3	4	IEE	100	100	200	3 hrs.

Course Objectives

To introduce students to design elements, materials and methods of construction for simple buildings.

Anticipated Learning Outcomes

Understanding construction materials and techniques for simple building elements.

Content

Introduction to doors, windows, sliding and folding doors and windows in timber. Studio exercise on door and window details, fixing of frames. Introduction to sloping roof and roofing materials -tiles, roofing sheets. Timber and metal trusses and roofing materials and fixing details.

Suggested Pedagogical Approach

Working Drawing: Fabrication drawing of a door/ window with dimensions and specifications. Details of sloping roof with truss details and fixing details.

AR2.05: Theory of Structure - 2

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	2	0	2	4	IEE	100	100	200	3 hrs.

Course Objectives

To understand simple structural concepts and behaviour.

Anticipated Learning Outcomes

To demonstrate an understanding of concepts taught during the semester through simple calculation models.

Content

Concept of direct force and bending mechanism with the help of scale models. Concept of force applied as displaced from the point of support. Bending moment and shear force. Understanding the behaviour of homogeneous material under direct and bending forces. Theory of simple bending principles of super-

position, distribution of shear and bending stress. Beam as a structural element. Design of steel and timber beams. Compound Stress as response to a set of applied forces. Analysis and design of masonry structures.

AR2.06: Climate Responsive Design

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IEE	50	50	100	2 hrs.

Course Objectives

Understanding the elements of climate and how architecture responds to them architecture in order to develop bio-climatic design in buildings.

Anticipated Learning Outcomes

Ability to interpret climatic data for design, understanding sun path diagrams, shadow angles, daylight factors, read wind charts and assess volume of natural ventilation.

Content

- Climate factors: Elements of climate,

climatic types and patterns, climatic data, measurement and units; characteristic influences on vernacular buildings; climate analysis software.

- Solar control: Solar geometry and sun path; site planning and solar envelopes; building massing and open space exposure; types of shading devices for building fenestration; shading design software. Daylight design: Principles of day-lighting, architectural integration in different building types; daylight quality; sky view factor and daylight factor; daylight design software. Bio-climatic Design standards; Building byelaws related to day-lighting and natural ventilation.

Suggested References

Giovani, B., Man Climate and Architecture
 Krishan, A., Climate Responsive Architecture.
 Olgay & Olgay, Design with Climate.
 Konigsberg, Ingersoll, & Mayhew, Manual of Tropical Housing and Building.
 Lam, W., Sun lighting as Form giver for Architecture, Van Nostrand Reinhold Company
 Baker, N. & Stemmers, K., Daylight Design of Building.

AR2.07: Surveying & Levelling

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	3	0	2	IO*	100	0	100	-

Course Objectives

Introduce principles of topographical survey and their application.

Anticipated Learning Outcomes:

Working knowledge of manual and digital surveying techniques, ability of demarcating

features and setting out a simple building on site.

Content

- Importance of surveying, principles and types of surveying and levelling.
- Use of traditional surveying techniques and modern techniques like Total Station to measure distances and co-ordinate location of features like trees, cable lines, culverts, wells, benchmarks etc.
- Understanding topography, spot levels and contours and preparation of contour maps.

- Introduction to GIS and Differential Global Positioning System (DGPS). Site demarcation and setting out of a simple building on the site. To be coordinated with the Architectural Design studio exercise.

Suggested References

Punia, B.C. et.at.02005. Surveying Vol.01,2,3, Laxmi Publication (Pvt.) Ltd., New Delhi.

Duggal, S.K., 2004. Surveying Vol.01&2. Tata McGraw Hill Pub. Co. Ltd. New Delhi

Subramanian, R. 2012. Surveying and Levelling. Oxford Univ. Press, New Delhi.

Arror, K.R., 2004. Surveying Vol. 1,2,3. Standard Book House, N. Delhi.

Chandra, A.M., 2002. Plane Surveying. New Age International Pvt. Ltd., New Delhi.

AR2.08: History of Architecture 1

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objective

Introduce the evolution of architecture alongside the culture of early civilizations.

appreciate their architectural developments across a timeline.

Anticipated Learning Outcomes:

Understanding of the socio-cultural and religious characteristics of civilizations to

Content

- Cross-cultural understanding of factors influencing early settlement and built form, Indus Valley Civilization and the early Aryan architecture of the Ganga basin,

Vedic principles of planning. Architecture of Egypt, West Asia (Mesopotamia, Assyria, Neo-Babylon and Persia), China, Pre-Columbian America, Greece (Aegean to Hellenistic times) and Rome.

- Inception and development of Buddhist architecture in India and overview of developments in South East Asia, Japan, China and the Silk Route.

AR2.09: Sociology & Culture

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

Introduce the social dimension of architecture as an aspirational response to cultural and economic realities of a community.

Anticipated Learning Outcomes

Ability to understand basic sociological concepts and learn their applications in space planning and architectural design.

Content

- Sociology, Economics and Culture-sociology and its uses in human settlement studies, socio- cultural processes, socio economic parameters in community planning.

- Society and Architecture: relationship of sociology with architecture impact of house form and culture, socio cultural transformation through ages and impacts on built environment; social identity and architectural relevance. Contribution of society, social structure and culture on the development of vernacular architecture, design approaches with social perspective.
- Urbanization and Social Stratification-urbanization, rural urban continuum, urban growth, impact on society and urban area, social aspects of housing, territoriality and neighbourhood, impact of socio-economic parameters on built form, slum and squatter settlements.

Suggested Texts & References

Oliver, P., ed. 1997. Encyclopedia of Vernacular architecture of the World Vol. 1-3, CUP, Cambridge.

Rappaport, Amos, 1969. House Form & Culture. Prentice Hall Inc.

Brun skill, R.W., 1987. Illustrated Handbook on Vernacular Architecture.

Pamar, V.S, 1989. Haveli: Wooden Houses & Mansions of Gujarat. Mapin Pub. Ahmedabad.

Jain, Kul Bhushan 1992. Mud Architecture of the Indian Desert, Aadi Centre, Ahmedabad.

AR2.10: Professional Communication 2

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	3	0	NC	IO**	150	0	150	-

IO** = Marks not to be counted towards total

Course Objectives

Introduce the concept of tonality of the written word as a basic value for selection of terms and their composition in non-spoken forms of professional communication.

Anticipated Learning Outcomes

Students should be able to write and understand written English to facilitate

reading of Architectural texts and reference and composition of text to convey their ideas.

Content

- Dimensions of communication (Formal and Informal, upward, downward etc.)
- Types of professional communication, Letters, E-mail, Short messages, reports.

- Planning, composing, and writing, Guide to effective writing.

- Writing a short Research Paper. This exercise is to be followed up continually in all IO courses throughout the program wherein students are assigned to write a paper on a paper on a particular topic related to the course as decided by the subject teacher concerned. This may

include reportage of readings, site visits, field trips, conversations with experts and public, etc.

Suggested References

Raman, M. & Sharma, S., Technical

Communication: Principles and Practice, 2nd Ed.

Market, Mike, 2012. Technical Communication

Rizvi, M. Ashraf, Effective Technical Communication,

Anderson, Paul V., Technical Communication: A Reader- Centred Approach, 6 Ed.

SECOND YEAR: SEMESTER III

AR3.01: Architectural Design 3

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
8	0	0	8	8	IEJ	250	150	400	-

THEME: RESIDENTIAL & VERNACULAR ARCHITECTURE

Course Objectives

Introduction of issues related to design of the human habitat, its components and space standard, in both the urban and rural environments.

Anticipated Learning Outcomes

Ability to identify user needs and translate them into a program and thereafter use the program to manifest them in a design in

terms of space, materials and construction methodology that is appropriate in a particular context.

Content

- Exercises relating personal experiences to behavioural needs and translating them into architectural program requirements.
- Skiagraphy: understanding of shade and shadows and their depiction of shadows in plans and elevations, 3D projections. Interpreting shadows as response to climatic conditions.

- Design of a simple building for residential use in the immediate or observable environment.
- Study of vernacular architecture, based on the traditional way of life of a people. Understanding the impact of the social and physical environment, climate of the place, materials and methods of construction on buildings. This study could be a village or part of a small town and would involve measurement of existing buildings and a topographic survey.
- Design of a simple building / adaptive reuse in the context of the study.

AR3.02: Visual Arts & Basic Design 3

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	0	3	3	IEJ	100	50	150	-

Course Objectives

Proficiency in the composition of three-dimensional forms and space.

Anticipated Learning Outcomes

To explore experimental methods of life drawing; understanding the difference between

'machine perception' (i.e. Photography) and 'human perception understanding design and art styles.

Content

- Exercises aimed at developing a visually acute eye for detail and discrepancy in visual media.
 - Understanding of minimalist philosophies through simplification exercises.
 - Unique interpretations design theory in projects created by each student.
 - Exercises in the following painting mediums- watercolour, acrylic, oil and encaustic.
 - Discussions centered on 3-dimensional design and creative ideas to help foster artistic awareness
- Proportion and tonal value will be explored in the observational study of drapery, still life objects and live models.

AR3.03: Computer Application 3

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	0	3	3	IEJ	100	50	150	-

Course Objectives

Advanced proficiency in architectural office software; transposing textual, numerical and graphic information across software platforms and devices to describe concepts holistically.

Anticipated Learning Outcomes:

Ability to make photorealistic imagery of architectural objects with 3D CAD software through rendered perspective and walk-

through presentations. Basic programming and scripting for architectural applications will be introduced.

Content

- Isometric views, perspectives, manipulation of camera angles, viewpoints, etc.
- Rendering 3D views using material palettes, colours, textures, shades and shadows. Inserting objects from digital libraries and

other sources, using software such as 3DS Max

- 3D animation, walk-through sequences, superimposing animated videos over base images
- Data-base management: Information filing and profiling, Technical Record-keeping and document transmission.

AR3.04: Building Construction 3

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	1	0	3	4	IEE	100	100	200	3 hrs.

Course Objectives

To introduce materials and methods of construction for simple residential buildings both in urban and vernacular contexts.

Anticipated Learning Outcomes

Students should demonstrate their understanding through application in design and detailing of windows, sliding doors, staircases and mezzanines.

Content

- Vernacular building materials such as mud, timber, bamboo, thatch, terracotta tiles and their properties.
- Secondary elements such as doors and windows, staircases, mezzanines, show windows, built-in- furniture and cabinetry. Modern fixing devices: industrial fasteners, expandable bolts, chemical fasteners etc. Steel welding and forging, shuttering, bar bending and concreting, painting and laminating.

Suggested Pedagogical Approach

Working Drawing - Mezzanine and staircase complete with dimensions and specifications. Study tour/ site visit to understand vernacular architecture through investigation of materials, techniques and details. Workshops in alternative materials and construction techniques at various research institutions and building centres. Construction site visit for RCC work. Program to be integrated with Architectural Design studio as far as possible.

AR3.05: Theory of Structure - 3

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	2	0	2	4	IEE	100	100	200	3 hrs.

Course Objectives

Introducing complex structural concepts and behaviour.

Anticipated Learning Outcomes:

Understanding of concepts taught during the semester through simple calculations and models.

Content

- Introduction of wind and seismic forces as per IS: 1893, IS: 4326 and IS; 875. Understanding the behaviour of heterogeneous material under direct force and bending forces.
- Theory and application of working stress method and limit state design.

- Design of RCC beams, columns, slabs. Introduction to pre stressed concrete structures.
- Laboratory testing of concrete samples and RCC beams, study of structural behaviour with the help of scale models.

AR3.06: Water, Waste & Sanitation

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IEE	50	50	100	2hrs

Course Objectives

To acquaint students with the principles of water supply and drainage, standards and codes, and design considerations for plumbing systems in buildings.

Anticipated Learning Outcomes

Ability to estimate water demand and draw plumbing layouts, drainage and sewage networks for simple residential buildings.

Content

- Water Supply: Introduction to water resources; collection, processing,

distribution and storage of water; calculation of water demand and consumption; sizing of storage tanks and water quality standards for code compliance, importance of water conservation.

- Water Distribution: Service connections and systems of hot and cold-water supply; plumbing networks; sanitary fixtures, fittings, valves and pipes, dual-plumbing systems.
- Wastewater systems: Systems and components for sewage and stormwater drainage; wastewater treatment systems and septic tanks; building and site planning for water drainage and sewage disposal;

water harvesting and water recycling; solid waste collection, segregation and disposal.

Suggested References

Rangwala, P.B., Water Supply and Sanitary Engineering (Environmental Engineering)

Modi, P.N., Water Supply Engineering

Ratnayaka, D., Thwart, A. C., & Brandt, M. J., 1996. Water Supply.

Shah, C.S., Water Supply and Sanitation.

National Building Code, 2015, Bureau of Indian Standards.

AR3.07: Site Planning & Landscape Studies

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

Introducing the relationship between the built and the un-built environment and principles of sustainable site planning.

Anticipated Learning Outcomes

Ability to analyse ecological and geomorphological characteristics of a site; use site analysis information to propose

appropriate site planning and landscape design.

Content

- Site analysis: Site analysis with respect to topography and existing features; slopes, drainage; soil types and layers; sensitive areas and natural ecosystem; vegetation and tree survey etc.
- Landscape design: Landscape principles and design elements; historical overview of garden design; principles of landscape construction; Introduction to planting design and plant selection.
- Green Practices: Soil protection during and after construction; reduction of hard

paving and circulation areas; water efficient landscaping; design to include existing site features.

Suggested References

McHarg, Ian, Design with Nature.
 Laurie M., 1986. An Introduction to Landscape Architecture. Elsevier.
 Hubbard H.V., An Introduction to Landscape Design.
 Bose & Chowdhary, 1991 Tropical Garden Plants in Colour. H & A Publishers, Calcutta.

Clifford O, History of Garden Design.

Root, James 8., Fundamentals of Landscape and Site Planning

Lynch, Kevin, 1962. Site Planning. The MIT Press, Cambridge.

Krishan, Pradip.02006. Trees of Delhi.

Dorling Kindersley. GRIHA Manual Volumes 2-4. Adarsh.

AR3.08: History of Architecture -2

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

Introduce the historic evolution of a temporal building typology through the exhaustive study of a specific type, viz., religious architecture from across the world.

Anticipated Learning Outcomes

Understanding of the factors that influence the evolution of early forms of the Hindu temple, Christian church and Islamic mosque in India and abroad, and the architectural characteristics and features of each type.

Content

- Inception and development of the early Hindu temple form with reference to Vedic and Buddhist planning principles and design elements; Development of regional styles and manifestations thereof; Evolution of temple complexes and temple towns; Overview of Hindu architecture in Burma, Cambodia, Indonesia, Nepal, Sri Lanka and Thailand.
- Inception and development of the early Christian church form; Overview of

Christian Architecture of Europe during the Early Christian, Byzantine, Romanesque, and Gothic periods.

- Advent of Islam in the Middle East and the first mosque at Mecca. Overview of Islamic Architecture of Iran, Central Asia, Egypt and the Maghreb till 1200 AD through selected examples.

AR3.09: Art & Architectural Appreciation 1

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	3	0	NC	IO**	150	0	150	-

IO** = Marks not to be counted towards total

AR3.10: Arch. Research- Elective 1

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

SECOND YEAR: SEMESTER IV

AR4.01: Architectural Design 4

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
8	0	0	8	8	IEJ	250	150	400	-

THEME: SITE & CONTEXT

Course Objectives

Appreciation of the site and its context and their value as prime generators of design.

Anticipated Learning Outcomes

Ability to interpret site information as a decision-making aid for architectural choices, particularly in respect of groups of buildings.

Content

- Focus will be on the site and context and their relationship to the built environment.
- Activities, services and construction methods, phenomena of social utility, growth and change shall also be studied and analysed. Introduction to element of site planning and landscaping.

- Study of a historic precinct of buildings planned with a characteristic relationship to the importance of the locale.
- Design of a group of buildings set in the context of the study with a focus on site and surroundings.
- Design of the environment outside the building.

AR4.02: Visual Arts & Basic Design 4

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	0	3	3	IEJ	100	50	150	-

Course Objectives

Advanced proficiency in use of graphics for ideation, presentation and publication with emphasis on developing one's signature style for further design applications.

Anticipated Learning Outcomes

Ability to select types and fonts, source and insert graphic material in digital media considering visual organization as a key component of effective communication.

Content

- Typography and typographic application.
- Cut and paste methods, Reprographic technique and printmaking, publication in digital media; design idea generation,

problem solving and technical skills related to graphic design practice.

- Explore ideas, form, content and meaning through various modes of art and design-

photography, photomontage, video, film, audio-visual projections, animations etc.

AR4.03: Computer Application 4

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	0	3	3	IEJ	100	50	150	-

Course Objectives

Advanced proficiency in software for architectural design, presentation and building information management.

Anticipated Learning Outcomes

Ability to make professional presentations of architectural design concepts and drawings in both 2D and 3D format.

Content

- Isometric views, perspectives, manipulation of camera angles, viewpoints, etc.
- Rendering 3D views using material palettes, colours, textures, shades and shadows. Inserting objects from digital libraries and other sources, using software such as 3DS Max.

- 3D animation, walk-through sequences, superimposing animated videos over base images.
- Data-base management: Information filing and profiling, Technical Record-keeping and document transmission.

AR4.04: Building Construction 4

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	1	0	3	4	IEE	100	100	200	3 hrs.

Course Objectives

Introducing students to types of false ceilings and partitions in various materials and introduction to various External wall treatments.

Anticipated Learning Outcomes

Students should demonstrate their understanding through application in working drawings for an interior space.

Content

- Introduction to false ceilings and partitions in various materials e.g. Plaster of Paris, Gypsum board, Particle boards, glass, metal, fire rated fabric, and acoustic treatment.

To be integrated with the BS2 course on lighting and acoustics in the same semester. Introduction to laminated and toughened glass. Use of various stainless-steel grades for indoor/ outdoor building work.

- Introduction to External wall treatments- Dry cladding, Glass curtain walls and

structural glazing and the difference between the two. Studio exercise on external wall treatment, detailing curtain wall and structural glazing. To be integrated with Environmental Science-2 in the same semester.

Suggested Pedagogical Approach

Working Drawing - False ceilings and partitions for an interior space layout.

AR4.05: Theory of Structure - 4

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	2	0	2	4	IEE	100	100	200	3 hrs.

Course Objectives

To understand complex structural concepts and behaviour.

taught during the semester through simple calculations and models.

bolted joints. Laboratory studies in truss design and model formation. Where ever possible structural behaviour to be studied with the help of scale models.

Content

Anticipated Learning Outcomes

To demonstrate an understanding of concepts

Design and drawings of simple trusses, beams and columns in steel and timber, riveted and

AR4.06: Electrification, Lighting & Acoustics

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IEE	50	50	100	2 hrs.

Course Objectives

To familiarize students with the electrical, lighting, acoustic, systems of a building

including the design aspects associated with their performance. Anticipated Learning Outcomes. Ability to workout electrical

networks for a simple building, determine general lighting and acoustic requirements and performance for a space.

Content

- Electricity: Electrical distribution and safety systems in buildings; fixtures, equipment, and appliances; electrical circuitry and internal wiring; electrical loads, peak demand, operational costs; Communication: Intercoms, Wi-Fi, broadband data cabling, and CCTV systems.
- Lighting: Lighting principles, luminance and glare; lighting systems and types of luminaires; lighting design and layouts; architectural lighting and special effects; integration with daylighting and energy

conserving strategies; introduction to lighting design software.

- Acoustics: Basic concepts of sound and acoustics; sound insulation and transmission; absorption, reverberation, noise control and attenuation; acoustical requirements for different space types and design planning; site planning for noise control; exposure to acoustics design software.

Suggested References

National Building Code, 2015, Bureau of Indian Standards

Salvan, George S., Architectural Utilities 3: Lighting & Acoustics

Barron, M., Auditorium Acoustics and Architectural Design;

Taylor & Francis. Harold, B.M. & Lewis G.F, Acoustics for Architects;

Reinhold Sage, Russell. The Architecture of Light: Architectural Lighting Design Concepts & Techniques.

Koenigsberger, Ingersoll, & Mayhew. Manual of Tropical Housing and Building.

AR4.07: Solar Active & Passive Systems

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

To understand the operation of passive systems of environmental control in buildings and their impact on the performance of the interior space and comfort of the occupant.

Anticipated Learning Outcomes

Students should be able to: plot comfort parameters for a location on a psychrometric chart, estimate thermal performance of a building envelope, and propose a passive

design strategy for space conditioning of a building.

Content

- Human Comfort: Thermal comfort and heat balance; comfort scales and bio-climatic/psychrometric chart; thermal comfort standards; adaptive factors and clothing insulation, Natural ventilation.
- Building Insulation: Building heat exchange; u-values for wall, roofs, and fenestration;

envelope insulation and thermal mass performance; glazing solar heat gain coefficient and visible transmittance. Wind passage through the building skin, wind speed and temperature attenuation.

- Passive Strategies: Passive heating and cooling strategies; courtyards and placement of openings; stack and wind assisted natural ventilation; role of landscaping and water elements.

AR4.08: History of Architecture 3

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

Develop the understanding of evolution of a temporal building typology through the exhaustive study of a specific type, viz., religious architecture from across the world.

Anticipated Learning Outcomes:

Ability to distinguish place- and period-specific architectural styles of religious architecture in India, Europe, West Asia and the Far East.

Content

- The advent of Islamic Architecture into India and its impact on structural and construction systems; Influences of Islamic ideas on secular and religious architecture in India; Initiation and development of the mosque, tomb and fort typologies in the Sultanate period.
- Regional styles of Punjab, Jaunpur, Gujarat, Malwa, Bijapur, Golkonda, Bengal, and Kashmir; The Mughal period and the flowering of Indo-Islamic Architecture in the India sub-continent.
- Renaissance in Florence and the reasons thereof; Counter-reformation; the Baroque movement and its impact on Architecture and other Visual Arts. Renaissance and Baroque Architecture of Italy and in other parts of Europe.
- Islamic Architecture of Iran, Central Asia, Egypt and Turkey from 1200-1500 AD.
- Religious architecture of China, Japan and Korea from 1200-1500.

AR4.09: Art & Architectural Appreciation 2

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	3	0	NC	IO	150	0	150	-

AR4.10: Arch. Research - Elective 2

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

THIRD YEAR: SEMESTER V

AR5.01: Architectural Design 5

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
9	0	1	8	9	IEJ	250	200	450	-

THEME: SOLAR RESPONSIVE DESIGN

Course Objectives

Introduction of passive solar design concepts and techniques and their application in urban buildings in a given climatic zone, Universal Access and barrier-free design.

Anticipated Learning Outcomes

Students are expected to apply appropriate passive design strategies such as building orientation, shading devices and insulating

walls and roofs in the design of the given studio project.

Content

- Study of an urban environment in use, understanding the activities, social utility, provision of services, construction methods and possibility for change.
- Design of a multi-functional public building set in the context of the study. The engagement should help comprehension of program development and design

methodology, with articulation of a multi-use and multi-user program focusing on programmatic relationship, site and the context as a moderator of urban space.

- Introduction to development controls, codes and bye-laws, iii. Introduction and application of shading devices and energy simulation software. The building project should be of low services complexity largely relying on passive solar design strategies and natural systems of lighting and ventilation.

AR5.02: Building Construction 5

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	1	0	3	4	IEE	100	100	200	3 hrs.

Course Objectives

Introduction to single and multiple basements, advanced waterproofing detailing of atria,

skylights, roof gardens, vertical green walls and passive solar design features as related to the Architectural Design studio.

Anticipated Learning Outcomes

Students should demonstrate their understanding through application in working drawing of basements and roof gardens.

Content

Introduction to the detailing of medium scale commercial / institutional buildings. Introduction to single and multiple basements, advanced waterproofing techniques and

detailed section through basements. Detailing of atria, sky lights, roof gardens, vertical green walls and any passive solar design features used in architectural design.

Suggested Pedagogical Approach:

Working Drawing 5- Studio exercise in making working drawing of basement, roof gardens.

AR5.03: Theory of Structure - 5

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	2	0	2	4	IEE	100	100	200	3 hrs.

Course Objectives

To understand complex structural concepts and behaviour.

taught during the semester through simple calculations and models.

continuous beams in RCC and steel; retaining walls and forces. Soil mechanics and foundation engineering.

Anticipated Learning Outcomes

To demonstrate an understanding of concepts

Content

- Concept of structural indeterminacy and its application in structural system development; analysis and design of

- Soil exploration, soil classifications, soil bearing capacity, types of foundations (shallow and deep).

AR5.04: HVAC, Mechanical Mobility & Fire Safety

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IEE	50	50	100	2 hrs.

Course Objectives

To acquaint students with the systems for air-

conditioning, fire safety, and mobility, codes relevant to them, and incorporation of the systems in building design.

Anticipated Learning Outcomes

Ability to workout HVAC loads and space

requirements for equipment; interpret and depict fire safety requirements in design & drawings, estimate lift numbers and lobby sizes, incorporate parking systems in project planning.

Content

- Air-conditioning: Principles and components of mechanical ventilation and air-conditioning systems; calculation based on design conditions and system sizing, design considerations for chiller

rooms, cooling plants, AHUs; integration with natural ventilation, and other energy conserving technologies.

- Fire Safety: Fire sources, spreading, and growth decay curve; material fire response and fire-retardant materials; fire hydrants, fire escapes, refuge areas, fire tender access; smoke detector, alarm, and sprinkler systems; representation of fire considerations in drawings.
- Mobility Systems: Lifts, escalators, conveyors, and travellers; sizing of

space for lifts and other mobility systems; construction and installation; design and operation of automated parking systems.

Suggested References:

ASHRAE Fundamentals Handbook, 2013

National Building Code, 2015, Bureau of Indian Standards

Bangash, M.Y.H. & Bangash, T., 2007. Lifts, Elevators, Escalators and Moving Walkways / Travellers.

AR5.05: Energy System & Renewables

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

To understand global environmental concerns and how these can be addressed through building design and active systems integration for sustainability.

Anticipated Learning Outcomes

Ability to apply relevant codes for energy and environment, ascertain approximate renewable energy feasibility on projects, and configure systems integration for energy conservation.

Content

- Energy conservation: Energy crisis and global initiatives; India's climate change agenda and developmental plans; guidelines and regulatory mechanisms; embodied energy, carbon emissions.
- Renewables: Solar, wind, geothermal energy; biomass and waste to energy systems; combined heat and power and district cooling; architectural implications of renewable energy systems.

- Intelligent systems: Introduction to intelligent buildings; building automation, sensors and controllers; building management systems; introduction to smart grids.

Suggested References

National Action Plan for Climate Change, Prime Minister's Office, Govt. of India

Chapter 11, National Building Code by BIS Energy Conservation Building Code, 2007, BEE

Jenkins, Renewable Energy Systems.

AR5.06: Estimating & Costing

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	1	0	2	3	IEE	100	50	150	2 hrs.

Course Objectives

Introduce the concept of quantification of building materials and process to derive estimated costs of works as per standard procedures.

Anticipated Learning Outcomes

Ability to take off quantities from drawings for preliminary and detailed estimates, analyse rates and prepare cost estimates for a small building project.

Content

- Area Calculation: Calculation of plinth area, floor area, carpet area and circulation area.
- Types of estimates: Preliminary estimates- plinth area rates and cost indices, Detailed estimate- modes of measurement, taking off quantities from drawings manually and through BIM software, Bill of Quantities (BOQ) and Bill of Materials (BOM).
- Rate analysis: Deriving rates for items from labour and material costs based on CPWD

Schedule of Rates, scheduled and non-scheduled items, Establishing market rates.

Suggested References

Studio exercises related to Quantity Surveying for a small building project using Standard CPWD PAR methods, and compilation of a Preliminary Estimate.

AR5.07: History of Architecture 4

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

Introduce the impact of growing international trade, industrialization and colonization on the architecture of India, Europe and America and preface the Modern movement.

Anticipated Learning Outcomes

Ability to discern Western and Indian influences in Colonial architecture in India, the impact of the Industrial revolution on architecture and city planning leading up to

the establishment of trans-national paradigms of modern habitation.

Content

- Colonial Architecture in India; Early buildings

of the Dutch, Portuguese and the English in various parts of India; Inception and growth of Madras, Calcutta and Bombay. Growth and development of the bungalow, the hill station, the cantonment and the residency in response to the perceived needs of the

British in India; Indo-Saracenic Architecture of the Indian sub-continent; The making of New Delhi.

- The Industrial revolution and its impact on Europe; Initiation of modern architecture and town planning. Overview of the

Modern Movement, the International Style, Post-Modern Movement and Critical Regionalism with the help of selected examples of master-architects of the period.

AR5.08: Design Methodology

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Content

Design as a multi-variant problem-solving process. Synthesizing a Design Brief, Schedule

of area requirements, qualitative attributes of spatial components, carrying out case studies, comparing and analysing data, collating design

related insights in useable format, defining design goals, formulating design strategies.

AR5.09: Art & Architectural Appreciation 3

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	3	0	NC	IO	150	0	150	-

AR5.10: Arch. Research - Elective 3

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

THIRD YEAR: SEMESTER VI

AR6.01: Architectural Design 6

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
9	0	1	8	9	IEJ	250	200	450	-

THEME: ENERGY EFFICIENT DESIGN

Course Objectives

The objective of the course is to focus on energy efficiency as an important design determinant.

Anticipated Learning Outcomes

Students should be able to demonstrate through their design their understanding of energy efficient systems, structural systems, services and construction systems in the design of a modern medium to high-rise building in the urban context; understanding of developmental regulations and their application design studio work.

Content

- Design of a medium to high-rise building in a dense urban setting. The problem should attempt to bring out a comprehension of the framework that outlines a building interior, the structural system and the services core, and the relation of this interior with the exterior environment through the building skin.
- The project should be of high services complexity with mechanical systems for air-conditioning, parking and other services, and include the integration of active energy systems.
- The project should be seen as a culmination of understandings for conceptualization

and realization of individual building design including structural and construction systems.

- Introduction to National Building Codes, building byelaws and regulations, their need and relevance. Application of building byelaws for structural, earthquake and fire safety and universal accessibility, statutory provisions environment related services. General definitions like setbacks, ground coverage, FAR, building height. Statutory approvals for construction. Stipulations of NBC, EIA, ASI, AAI, DUAC. Easements, Fire norms, Traffic Management Agency, Electricity board, Jal board etc. statutory.

AR6.02: Building Construction 6

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	1	0	3	4	IEE	100	100	200	3 hrs.

Course Objectives

To comprehend the integration of the structural shell, the service core and building skin of a medium/ high-rise building using construction techniques relevant to large-scale projects in the urban context.

Anticipated Learning Outcomes

Ability to configure the service core and external building skin using appropriate materials and

building technologies available in the industry with an understanding of energy efficient, time-saving, precision-oriented approaches to quality construction.

Content

Working details of the service core and building skin of a mid-rise/ high-rise building. Detailing of Building Skin; innovative architectural detailing with new materials such as plastics, metals, synthetic boards, glass, composite

panels etc. Mass production; transportation, storage and handling of materials; Introduction to prestressing, prefabrication and systems building; Jointing, tolerances and modular coordination.

Suggested Pedagogical Approach:

Working Drawing 6 Studio exercise in making working drawing of service core, toilets, pantry, HVAC, firefighting and the building skin.

AR6.03: Theory of Structures & Design 2

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
4	1	0	3	4	IEE	100	100	200	3 hrs.

Course Objectives

To understand complex structural concepts and behaviour.

Anticipated Learning Outcomes

To demonstrate an understanding of concepts

taught during the semester through simple calculations and models.

Content

Principal considerations for structural analysis. Methods of analysis for frames, concept of

composite structures. Behaviour of structures under wind and seismic loads, concept of earthquake resistant design criteria and wind loads. Concept of long span Girders. Wherever possible structural behaviour to be studied with the help of scale models.

AR6.04: Green System Integration

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IEE	50	50	100	2 hrs.

Course Objectives

To develop an advanced understanding of sustainability through exposure to resource conservation strategies as well as and their integration and management at the building and large development level.

Anticipated Learning Outcomes

Students should be able to conduct preliminary resource audits, understand sustainable and resource efficient integration systems and services, prepare green rating checklists and relevant documentation for projects.

Content

- Resource Management: Energy, water, and waste audits; operations and maintenance; post occupancy surveys and reviews; building benchmarking.
- Sustainability: Social, economic and environmental impacts; sustainable systems and utilities; their integration and management at building and site levels, introduction to smart cities.
- Green Ratings: Sustainability rating criteria and checklists; documentation for design credits; tool- kits and compliance checks

and forms; concept stage energy modelling and simulation.

Suggested References

GRIHA Volume-1 Introduction to National Rating System

Adarsh GRIHA Manual Volumes 2-4

Adarsh GRIHA for Large Developments, Adarsh Chapter 11, National Building Code by BIS.

AR6.05: Sustainable Urban Habitats

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

Introduce urban housing problems, their causes and discover solutions thereof.

Anticipated Learning Outcomes

Ability to comprehend housing as a key component of urban habitat, closely linked to urban infrastructure and urban economy, to connect emerging concepts in environment studies with human needs towards more sustainable paradigms for mass housing.

Content

- Shelter, housing form, Census of India definitions, Housing policies, demand and supply, housing shortage, income and affordability, poverty and slums, green housing, green rating
- Social and Economic Dimensions- social security, role of housing in family and community well-being, status and prestige, safety, crime and insecurity, deprivation and social vulnerability, ghetto-ism, gender issues, housing and the elderly.

- Neighbourhood as a major constituent of the City Plan, Traditional and modern approaches to neighbourhood planning, planning and design standards for area distribution, density, development controls and building byelaws, UDPFI guidelines, NBC provisions.

- Sustainable Infrastructure for neighbourhoods, Transit-oriented development, Mass Solar Energy generation, Smart Energy and water conservation, Recycling of Waste. Net-Zero communities.

Suggested References

Introduction to Housing, HERA (Author)
Prentice Hall (2005)

Davis, Sam. The Architecture of Affordable Housing.

Marcus, C. C., Housing As if People Mattered: Site Design Guidelines for Medium density Housing

Clapham D., Clark, W.A.V., 2012. The Sage Handbook of Housing Studies. Sage, London.

Levitt, David & Levitt, Bernstein, 2010. The Housing Design Handbook. Routledge, New York.

Ferree, A. and Salij, T.H., .02010. Total housing: Alternatives to Urban Sprawl. Actar, New York.

AR6.06: Specifications & Contracts

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	1	0	2	3	IEE	100	50	150	2 hrs.

Course Objectives

Introduce the concept of material and performance specifications for describing works for effective building contracts.

Anticipated Learning Outcomes

Ability to prepare general and detailed specifications and a contract for a small building project.

Content

- Methods of specification writing, Accuracy of description of items of work, typical space for building works, implications of

variations and incomplete specification's impact on building costs.

- Types of contracts, tenders, relative merits, components of a contract, general conditions and special conditions, commercial terms.

Suggested Pedagogical Approach

Studio exercises related to specifications for a small building project using Standard CPWD methods, detailed specifications, general and special conditions and compilation of a tender document.

Suggested References

Birdie G.S., 2005, Text Book of Estimating and Costing (Civil Engineering) Dhanpat Rai Publishing

Chakraborty M., Estimating, Costing, Specification and Valuation

Dutta, B.N. 1998. Estimating and Costing in Civil Engineering. 24th edition, UBSPD Ltd. Rangwala

CPWD- Standard Schedule of Rates (latest edition)

CPWD- Specifications (latest edition)

CPWD- Rate Analysis (latest edition).

AR6.07: Contemporary Architecture

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

Introduce the initiation and development of Modern Architecture in the sub- continent and contemporary architecture in India and the world.

Anticipated Learning Outcomes

Ability to understand the role of societal developments as a predicator of change in architectural paradigms through the study of Modern Architecture in the sub-continent and contemporary architecture of India and the world.

Content

- The initiation and development of Modern Architecture in the sub-continent. Critical Regionalism revisited in the context of the sub-continent.
- Impact of globalization, energy crisis and climate change on architecture.
- Overview of post-independence architecture with the help of selected examples of master-architects of the period.
- Contemporary world architecture to include notions of the Post-modern City, De-construction, Globalization, Post-modern

Tradition, Revisiting of Tradition, Cradle to cradle Design, Post-modern Ecology etc. through selected examples.

Suggested References:

Asher, Catherine, 2001. Architecture of Mughal India. Cambridge Univ. Press

Bhatt, V. & Scriver, P., 1990. After the Masters: Contemporary Indian Architecture. Mapin Publishing

Brown, Percy, 2010. Indian Architecture: Buddhist and Hindu Period. DB Taraporevala & Sons

Brown, Percy, 1983. Indian architecture: Islamic period. DB Taraporevala & Sons

Chopra P.M., 2000. Monuments of the Raj. Arya Book Depot.

Copplestone, T. & Lloyd, S., 1971. World Architecture: An Illustrated History. Verona Printed, London

Crouch, Dora P., 1985 History of architecture: Stonehenge to Skyscrapers. McGraw Hill London.

Davis, Philips, 1985. British Architecture in India 1660-1947 Splendours of the Raj.

Murray Desai Madhavi, Lang Jon, 1997.

The Search for identity-India 1880-1980 Architecture and Independence. Oxford Univ. Press Fiske. & Edgell, G. H., 2012. A History of Architecture. Harper & Brothers, New York,

Fletcher, Sir Banister, 2012. A History of Architecture. Cruickshank, D., Ed. CBS Publishers, New Delhi

Frampton, Kenneth 1994. Modern Architecture: A Critical History. Thames & Hudson, London

Hd'ttstien, M & Delius, P., eds., 2000. Islam: Art and architecture. Konemann, Paris

Grover, Satish, 2003. Buddhist and Hindu Architecture in India 2nd edition. CBS Publishers, New Delhi.

Grover, Satish, 2002. Islamic Architecture in India. CBS Publishers, New Delhi

Juneja, Monica, ed. 2001. Architecture in Medieval India: Forms, Contexts, and Histories. Permanent Black, New Delhi.

Metcalfe, Thomas 1980. An Imperial Vision.

Faber & Faber Mitchell, G., 1978. Architecture of the Islamic World-its history & social meaning. Thames & Hudson, London

Pevsner, Nikolaus, 1960 Pioneers of Modern Design, Penguin Books

Tadgell, Christopher, 1994. *The History of Architecture in India*. Phaidon Press, London

Tillotson, G.H.R., ed. 2013. *Paradigms of Indian Architecture: Space and Time in Representation and Design* (SOAS Collected Papers on South

Asia, 13). Routledge Publishers, New York.

Tillotson, G.H.R., 1989. *The Tradition of Indian Architecture: Continuity, Change, and the Politics of Style since 1850*. Yale University Press

Unwin, Simon, 2010, *Twenty Buildings Every Architect Should Understand*. Routledge, New York

Watkin, David, 2005. *A History of Western Architecture*, 4th edition Laurence King, London.

AR6.08: Architectural Theories

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

The focus of the course will be on understanding the main theoretical concepts in modern architecture. Key theoretical paradigms, methodologies and modes of inquiries will be introduced.

Anticipated Learning Outcomes

Ability to comprehend some of the main theoretical moorings of 20th and 21st century in architecture, analyse built works and critically examine the ideas and view of practice they represent as a precursor to shaping one's own design approach.

Content

- Theory and criticism, theories in relation to practice, writing and theory as design tools in professional practice, Theory as a basis of the student's personal philosophy as an architect.

- Critical reading and writing skills form an important component of the course. Ideas of the late 20th century architects Henri Lefebvre, Robert Venturi, Aldo Rossi, Bernard Tschumi, Peter Eisenman, Martin Heidegger, Juhani Pallasma, Alvaro Siza, and Charles Correa.
- Themes that have informed 20th century architecture and urbanism: History and historicism, Type and typology, The nature of the site/ The constructed site, Tectonic and the Constructed object, Modernism, Structuralism, Deconstruction, Phenomenology, Post Modernism.

Suggested References:

Heidegger, M., 1993. *Building Dwelling thinking*. Basic Writings. Harper Collins

Mallgrave, H. F. & Goodman, D., (2011) *An Introduction to Architectural Theory: 1968 to the Present*. Wiley Blackwell.

Mallgrave, H. F., (ed.) 2005. *Architectural Theory Vol.1: An Anthology from Vitruvius to 1870*.

Mallgrave, H.F., (ed.) 2008. *Architectural Theory Vol.2: An Anthology from 1871 to 2005*.

Otis, Enn (2010) *Decoding Theory Speak: An Illustrated guide to Architectural Theory*. Routledge

Tschumi, Bernard (ed.), 2004. *The State of Architecture at the Beginning of the 21st Century*. Monacelli

Tschumi, Bernard 1994. *Architecture and Disjunction*. MIT Press. Cambridge Mass.

Venturi, Robert, 1966. *Complexity and Contradiction in Architecture*. MoMA, New York.

Lefebvre, H., 1991. *The Production of space*. Oxford, UK

Pallasma, Juhani, 2005. *The Eyes of the Skin: Architecture and the Senses*. Wiley Academy.

AR6.09: Art & Architectural Appreciation 4

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	3	0	NC	IO	150	0	150	-

AR6.10: Arch. Research - Elective 4

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

FOURTH YEAR: SEMESTER VII

AR7.01: Architectural Design 7

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
9	0	1	8	9	IEJ	250	200	450	-

THEME: SERVICE & STRUCTURE (Choice based Studio)

Course Objectives

Application of an understanding of structures and services in Architectural design.

Anticipated Learning Outcomes

Students should demonstrate their understanding of architectural structures and building services and the coordination thereof

through a comprehensive resolution of the design of a complex building in the urban context.

Content

- Design of a building involving a high level of services and advanced structural systems e.g. A hospital, hotel, housing, sports

facilities, long span structure etc. This will be a choice-based studio, with students opting for a studio of their interest. Besides Architectural Design, the choice may be Interior Design, Adaptive Re-use, Urban Design, Landscape Design, etc.

- The studio will emphasize sustainable design principles with exercises in simulation and conceptual modelling.

AR7.02: Working Drawings

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
6	0	0	6	6	IEJ	200	100	300	-

Course Objectives

To produce a complete set of working drawings for a mid-rise/ High-rise building showing an understanding of structural systems and building engineering services including electrical, PHE, HVAC, Lifts and escalators, Fire safety etc., Interior and Exterior finishes etc.

Anticipated Learning Outcomes

Ability to organize building design information in a working drawing format suitable for various purposes related to the execution of the project along with an ability to read building working drawings to extract specific information.

Content

- Type of Working Drawings: Schematic Drawings, General Arrangement Drawings, Detail Drawings, Drawings for Statutory Approval, Tender Drawings, Good-for-Construction Drawings, Shop Drawings, As-built Drawings, insertion of purpose-

specific information for each type of drawing.

- Classification of Drawings for identification coding, Location, Assembly and component drawing, order of precedence in case of discrepancy, legal standing, provenance and authority.
- Cross-referencing graphic details and schedules with other drawings including consultants' drawings and documents.
- Inserting dimensions, specifications and other working instructions.
- Checking of drawing before release. Archiving of drawing for future retrieval.

Suggested Text & Reference

National Building Code 2005 Delhi Building Byelaws, 1983 Delhi Master plan 2021.

AR7.03: Project Management

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	1	0	2	3	IEE	100	50	150	2 hrs.

Course Objectives

Introduce students to the construction industry practices and project management techniques needed for coordinating building projects professionally.

Anticipated Learning Outcomes

Ability to use project management software and quantitative methods in project definition, administration of contracts, billing and verification, monitoring quality at site and participating in preparation of Detailed Project Report.

Content

- Project planning, feasibility studies, project report, project financing,

project organization, process and structure, personnel selection, role and responsibilities of the project manager.

- Site investigations, layout, site organization, networking techniques, PERT/CPM, LOB, MS Project, time cost analysis.
- Resource management and value engineering-methods of material/ labour estimation, resource scheduling and levelling, construction equipment types and applications.
- Project monitoring and cost control, manpower management, safety and labour issues.

Suggested Pedagogical Approach

Studio exercises on preparing a project schedule; writing site inspection reports for

MIS, sample correspondence for notices to contractors, work-orders, presentations for review meetings etc.

Suggested Texts and References:

Obrien, J.J. and Plotnick, F.L., 2009. CPM in Construction Management. McGraw Hill Professional

Pumma, B.C. and Kandelwal, K.K., 2006. Project Planning and Control with PERT and CPM. Laxmi Publications (P) Ltd. New Delhi.

Chitkara, KK, 2004. Construction Project Management: Planning, scheduling and Controlling. Tata McGraw Hill Education.

Callahan, M.T., Quackenbush, D.G. and Rowings, J.E., 1992. Construction Project Scheduling. McGraw Hill.

AR7.04: Structure & Architectural Appreciation 4

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	0	3	0	NC	IO	150	0	150	-

AR7.05: Architecture Research Seminar

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
5	1	4	0	5	IEJ	150	100	250	

Course Objectives

Introduce through group research into a topic of architectural significance, a range of research methodologies and critical appraisal skills and enable students to present the conclusions drawn to an informed live audience.

within the research group synthesize research outcomes in a well-documented research paper and seminar presentation using multimedia techniques; Ability to effectively participate in seminars as a member of the audience.

in groups on the topic of their choice within the larger theme. The research may involve both secondary and primary data from field studies. The research will be presented in the form of a seminar presentation, followed by a paper of publishable quality. Overall supervision will be provided by the Seminar Coordinators from the internal faculty and each group will be guided for the research work by internal faculty/ external experts.

Anticipated Learning Outcomes

Ability to source information a chosen topic, clearly understand, collate, analyse, reflect upon it by means of a strategic discussion

Content

The Seminar Coordinators will select a theme for the semester relating to issues in architecture and planning. Students will conduct research

AR7.06: Architecture Research - Elective 5

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	

AR7.07: Architecture Research - Elective 6 (Crossover)

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	

FOURTH YEAR: SEMESTER VIII

AR8.01: Practical Training

Weeks	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
16	-	-	-	16	IEJ	600	200	800	-

PRACTICAL TRAINING SEMESTER

Course Objectives

- Structured work-based learning in the industry in order to enhance knowledge, attitudes and skills towards better practical employability in the profession.
- Understanding Office Management and Site Management practices.
- Learning interpersonal skills for interaction with co-workers, clients, consultants, contractors, service providers, industry representatives, etc.

Anticipated Learning Outcomes

Students must demonstrate an understanding of:

- The design philosophy, or vision of the architectural office and its implementation

- How the architectural design process evolves when structural and service issues are integrated to create the final product based on the projects handled by the student.
- How drawings are used at site and an insight into the relationship between the site and the office based on the projects handled by the student.

Content

Training shall be taken in the office of an architect registered with CoA with minimum five-year experience after CoA registration, and working in the field of architecture and allied disciplines. In case the student chooses to work in a firm where the principal is not an architect, he/she must be mentored by

an employee of the firm registered with CoA and with the necessary experience. Progress during training shall be certified by the mentor. Training anywhere in the world is permitted subject to conditions.

FIFTH YEAR: SEMESTER IX

AR9.01: Architectural Design 9

Hrs / Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
10	0	2	8	10	IEJ	250	250	500	-

THEME: URBAN INTERVENTIONS (Choice Based Studio)

Course Objectives

To understand the city under study, read the issues in a given area after a methodical analysis and propose housing /urban design/ campus design solutions.

Anticipated Learning Outcomes

Students will demonstrate through design their understanding of urban issues relating to the built environment.

Content

Issues related to the growing problems of urban areas in third world countries and their future development shall be explored. Emphasis shall be on the design with relation to the contextual environment, heritage, traffic, planning controls and impact analysis. An understanding of the architectural implications of such development scheme should lead to insights in the formulation of urban design controls and urban planning policy.

The studio exercise could involve the design of a group of buildings in the metropolitan context. This could be a greenfield/ brownfield development, redevelopment or revitalization project in the context of the city under study.

AR9.02: Professional Practice

Hrs / Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	1	0	2	3	IEE	100	50	150	2 hrs.

Course Objectives

Introduce the profession of architecture, the role of professional and statutory bodies, industry associations and guilds,

code of conduct, regulations for practicing architecture, running of an architect's office and applicable laws, rules and regulations, pitching for projects and applying for jobs.

Anticipated Learning Outcomes

Students should become familiar with legislations applicable to architects, procedures for engagement in architectural

services, aspects of setting up and being part of an architectural office, including proficiency in communication for conducting everyday business.

Content

- Architect's Act 1972, Role of Council of Architecture in registration of Architects, regulating standards of practice of architects.
- Role of an Architect in a multidisciplinary team: Code of Conduct, Scope of work

and services, Conditions of Engagement, Procedures for engagement of an architect by government agencies, Architectural competitions. CVC guidelines, MOF guidelines.

- Practicing Architecture: Setting up of an office and managing it, billing, accounting; Relationship with client, employees, associates, consultants, contractors, and supplier. Presentation, documentation, IT practice, project delivery methods, Supervision for ensuring compliance of

relevant laws by client and contractor, liability of an Architect, professional indemnity, Consumer Protection Act, Copyright Act.

- Business correspondence including letters, emails, job applications, interviews and discussions. Professional ethics related to different media, memorandums and office orders.

AR9.03: Urban Design Studies

Hrs / Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	-

Course Objectives

Introduce basic concepts of urban design, reading the city, understanding urban issues with the intent of resolving the interface of buildings with each other and with the urban space they help to define between them.

Anticipated Learning Outcomes

Ability to comprehend architecture at the urban scale, understand the problematic issues in a given urban area after a methodical analysis and contemplate possible urban design solutions that will guide built-form and open-space morphology.

Content

- Developing student consciousness to understand the urban scale.
- Developing an understanding of factors effecting built and open spaces at urban scale and methods to perceive, record and analyse them.
- Techniques to understand movement systems, activity patterns, visual and physical linkages. Studying land use, building uses, social, physical and perceptual context and behaviour. User patterns, perceptions and behaviour.

Suggested Texts & References

Jonathan Barnett, An Introduction to Urban Design

Larice & Macdonald (ed) 2013. The Urban Design Reader. 2nd Series, Routledge edition. The Routledge Urban Reader Watson et.al. 2003.

Time Saver standards for Urban Design. McGraw Hill, New York.

AR9.04: Architecture Research- Dissertation / Art Thesis

Hrs / Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
5	1	0	4	5	IEJ	150	100	250	-

Arch. Research Dissertation

Course Objectives

Develop through individual research into a topic of architectural significance, for proficiency in a range of research methodologies and critical appraisal skills enabling the student to write an original paper documenting the process and its conclusions.

Anticipated Learning Outcomes

The product is an illustrated essay of about 8000 10,000 words which demonstrates the students' ability to clearly understand, analyse, reflect upon, synthesize and discuss a chosen topic.

Content

The dissertation is a guided piece of research undertaken by the students individually on a subject of their choice, considered to be within the realm of Architecture and Planning. Students will demonstrate the ability of

systematic information gathering, analysis and synthesis of information in a clear and reflective way. Overall supervision will be provided by the Dissertation Coordinators from the internal faculty and individual guidance will be provided for the research work by internal faculty/ external experts.

Suggested Texts & References

- Andrews, Richard (2005), Research Questions, Continuum-Viva.
- Booth, W.C. (2008), The Craft of Research, 3rd edition, The University of Chicago Press.
- Crouch, C. & Pearce, J. (2012), Doing Research in Design, Berg Publishers: London, New York.
- Groat, Linda (2002), Architectural Research Methods, John Wiley & Sons Inc., New York
- Zeisel, John (2006), Inquiry by Design, W.W. Norton & Company, New York, London.

Art Thesis

Course Objectives

Creating a seminal work demonstrating a superior level of skills, technique and thought applied in a major art object fit for public exhibition.

Anticipated Learning Outcomes

Ability to independently harness cerebral faculties in producing an impactful expression of ideas to convey concerns of public interest. It is intended as an alternative to the written DISSERTATION course AR2.

Content

It should show the students' ability to clearly understand, analyse, reflect upon, synthesize and discuss a chosen topic. The artwork must be accompanied by a brief publication written by the student expressing their motivations and analyses.

AR9.05: Architecture Research - Elective 7

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	

AR9.06: Architecture Research - Elective 8 (Crossover)

Hrs/ Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	

FIFTH YEAR: SEMESTER X

AR10.01: Architectural Design Thesis & AR10.02 Thesis Design Research

Code	Hrs / Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
							Internal Assessment	External Examination	Total	
AR10.01	12	0	0	12	15	IEJ	300	300	750	-
AR10.02	3	0	0	3		IO	150	-		-

Course Objectives

To understand the city under study, read the issues in a given area after a methodical analysis and propose housing /urban design/ campus design solutions.

Anticipated Learning Outcomes

Ability to independently handle an Architectural Design Project, research the

requirements of a project, prepare a brief, try alternative approaches/ concepts, and evaluate them on way to make a final comprehensive proposition.

Content

The Architectural Thesis is the culmination of the development of the student's knowledge, attitudes and skills over the course of studies

in architecture. It is a demonstration of the best that a student can do to claim the title of Architect. It is an occasion for exercising conscious choices in the field based on the student's personal abilities and inclinations, and for testing out his commitment. The student, in consultation with the faculty, is expected to demonstrate through an imaginative approach, his expertise in effecting positive changes in our built environment.

AR10.03: Professional Practice

Hrs / Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
3	1	0	2	3	IEE	100	50	150	2 hrs.

Course Objectives

Introduce the architects' role in tendering for works, valuation, easement, arbitration and impact of WTO and GATT on professional practice, and to equip them for international architectural practice.

Anticipated Learning Outcomes

Familiarity with the procedures for tendering, arbitration, valuation of works and real estate and aspects of international practice. Proficiency in preparation of projects proposals and presentations for procuring projects.

Content

- Tendering procedure: Contracts and agreements, Tender, negotiations and award of work.
- Arbitration: Mediation, Reconciliation and Arbitration.

- International Practice: Conflict with Architects Act, NBC, State/LSG laws, Company law. Comparative study of Architects Act of other countries, other professional Acts. Foreigners practicing in India, opportunities for Indian Architects abroad, international collaboration, Mutual recognition of registration, qualification under Architects Act, GATT, WTO.
- Project proposals, project reports, presentations and conference papers.

Suggested Texts & References

- Apte, V.S. 2008. Architectural Practice and Procedure. Padmaja Bhide, Pune
- Piotrowski, A. and Williams, J., 2001. The Discipline of Architecture. Univ. of Minnesota Press.
- Nanavati, Roshan, 1984. Professional Practice. Lakhani Book Depot, Mumbai
- Scott, J.J., 1985. Architects Practice, Butterworth, London

COA 2013. Handbook of Professional Documents. Council of Architecture.

AIA - Guidelines for Professional Practice

RIBA - Handbook on Practice of Architecture

Eldred, G.W. 2008. The Beginner's Guide to Real Estate Investing. John Wiley & Sons.

Rangwala, S.C. Valuation of Real Properties. Charotrar Publications.

Raman, M., Sharma, S. Technical Communication: Principles and Practice, 2nd Edition.

EL1-8: ELECTIVES

Hrs / Week	Lecture	Tutorial	Studio	Credits	External Exam Type	Marks			Duration of (Theory) Exam
						Internal Assessment	External Examination	Total	
2	2	0	0	2	IO	100	0	100	

Students must select minimum one elective from each group and a total of eight electives through the entire course. The elective topics proposed are indicative only - more topics under each stream may be offered depending upon faculty expertise and availability. Students shall be allowed the option of Crossover Electives in Semester VII and IX.

Some subjects may be offered only to students of certain semesters and not to others, though the priority will be to offer the subjects to as many students of different semesters as possible, vertically. Electives will be a way to participate in ongoing Research and Consultancy projects in the school. The choice of electives for any student may depend on

certain minimum eligibility threshold that may be prescribed for certain subjects by the concerned faculty, such as a certain level proficiency in language, mathematics, graphic or computer skills, etc. Some subjects may be open to a student only upon having passed another qualifying elective or core subject.

Group 1- HUMANITIES

- Art Appreciation: Art consciousness, Aesthetic perception, symbolism, expression, style, fashion, appropriateness and values; Critical appraisal of examples from the visual and performing arts; Art through the ages, architecture as art.

- Theory of Settlements: The city as an architectural form and an expression of the vitality of a civilization; Comparative study of the origin and growth of settlements; Principles of settlement planning in ancient Greece, Rome and India; Medieval towns in Europe and India; Renaissance city planning; Colonial urbanization; The Industrial Revolution; planning theories of the 19'h century.

- New City Planning: On-the-spot study of an existing settlement; Contemporary problems of settlements; Current theories on physical planning of new towns and cities; Environmental impact of planned and unplanned growth, regional linkages.

- **Behavioural Studies:** Behavioural patterns and user experiences, physiological and psychological aspects, environmental perception and interaction, expression and symbolism, design and technology.
- **Architectural Photography:** Photographical equipment and instruments, old and new technology, colour and composition, special effects and use of software.
- **Architectural Journalism:** Media and publishing, writing for print and web, conferences and seminars, reporting and interviews, travel and networking. **Gender & Architecture:** Cultural anthropology, gender studies and evolutionary theories, feminism and space, analytical discourses in architecture and urban design, representation and interpretation.

Group 2- ENVIRONMENT STUDIES

- **Environmental Impact Assessment:** Environmental consequences of building projects, sensitive projects and large developments, impact areas and assessments, prediction and mitigation of negative impacts, administrative procedures and clearances.
- **Advanced Solar Design:** Sun path analysis, shading design and geometrical performance, software tools and modelling, materials and energy performance.
- **Renewable Energy Systems:** Building Energy performance and codes, Energy integration and management, renewable energy contribution and zero energy buildings, system types and calculations, cost and embodied energy considerations
- **Energy Simulation:** Building heat transfer, building envelope and design properties, internal gains and occupancy inputs, simulation software requirements and modelling.
- **Cities and Climate Change:** impact Of climate change and strategic standpoints, developmental considerations and visions, city planning and sustainability, social and environmental initiatives, carbon neutral planning for new and existing cities.

Group 3- TECHNOLOGY

- **Facade Engineering:** Types of facade systems, materials and cladding, design, structural, environmental, and construction considerations, facade materials and performance, methods of manufacturing and installation.
- **Disaster Management:** Natural and Man-made Disasters like cyclones and earthquakes, risk assessment and strategic planning, Emergency management and software systems, Shelter design, materials, transportation, assembly and disassembly.
- **Long Span Structures:** Long span roofs and cantilevers, efficient structural systems and calculations, building types and design expression.
- **Tall Buildings:** High-rise in the context of Urban Densification and social change, structural design, multi-use planning, fire and safety, vertical transportation, environmental systems, construction management, vertical landscaping.

Group 4-DESIGN SPECIALIZATIONS

- **Industrial Design**
- **Architectural Conservation:** History and Theory of Conservation, World Heritage, Building Analysis, Design Intervention, Conservation Technology and Building Repair and Preservation, Planning Regulations.
- **Ecology and Landscape:** Landscape Design History, Plants and Horticulture, Construction and Site Engineering, Drawing representation,
- **Urban Planning:** History/theory of urban planning, physical planning and design, urban statistics, land use and planning law, urban economics, and planning practice, urban transportation.
- **Hospital Design:** Healthcare facilities design and planning, hospital design standards and regulations, patient-centered healthcare environment, use of evidence-based research to improve a healthcare environment
- **Campus Planning:** Principles of campus design, master-plan design and preparation, accommodation and expansion site planning and landscaping, green rating

for campuses and large developments, transportation and parking.

- Interior Design: Anthropology and technology related to interior architecture and design, furniture, lighting, materials, and products, software techniques and professional practice.
- Furniture Design.
- User Interface for Smart Cities.
- Lighting of Historic Landscapes.

Group 5-EMERGING AREAS

- Digital Architecture: Introduction to emergent areas within architecture, utilization of computer as an explorative tool for design and manufacturing, contemporary digital systems and technique-based design propositions.

- Advanced Building Technology: Exploration of new building materials, design development with spatial, material, organizational and manufacturing considerations, physical and simulation models.
- Geographic Information Systems: Elements of Geographic Information Systems (GIS), analysis of spatial information, real-world applications, map creation and analysis.
- Real Estate Management: Fundamentals of Real Estate Business, Real Estate Law, Land Acquisition and Management Real Estate Entrepreneurship and marketing.
- Parametric Design: Introduction to Parametric Design, Generative modelling, application to product design, architecture, landscape, digital fabrication, creation of

physical and digital parametric models using as main tools Grasshopper for Rhino etc.

- Bio-mimicry In Design: introduction to natural forms (morphology) and processes (biomimicry) through observation, drawing, and research, application knowledge to designed products, spaces and architecture.
- Urban Resilience
- Disaster Risk Management

Group 6- PROFESSIONAL PRACTICE

- Management Information Systems.
 - Architectural Entrepreneurship.
 - Design Outreach Program.
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