Syllabus for Five Year (10 Semester) Bachelor of Architecture Degree Programme

AR – 111 Structural Design – I	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1:

a) Scalar quantity and vector quantity, characteristics of a force, Composition and resolution of forces, resultant force, Different system of forces, free body diagram, Moments and couples, Equilibrium of forces.

Unit 2:

a) Centre of gravity, Moment of inertia of composite and cut-out sections, Parallel and perpendicular axis theorem
b) Types of loads, supports and support reactions.

Unit 3:

a) Stress and type of stress, Strain and types of strain, Hooke's law, stress strain relationship for mild steel, Bars of varying sections, Bars of composite sections, Young's modulus, Poisons ratio, Bulk modulus, Modulus of rigidity.

Unit 4:

a) Types of frames, analysis of perfect frames (graphical & analytical method),friction, types of friction, Laws of motion, Work power andenergy, Virtual work and its application

Note:

1. Sessional shall be in form of assignments, class work, along with occasional visits to construction sites.

Textbooks:

1. Engineering Mechanics‖ by R K Bansal and Sanjay Bansal, published by Laxmi publications, New Delhi, 3rd Ed.2012.
2. Engineering Mechanics by R S Khurmi, S Chand & Company Pvt. Ltd, Revised Edition 2019.

Reference Books:

1. Structure in Architecture‖ by Mario Salvadori, Robert Heller, published by Pearson, 4th Edition 2016
2. Engineering Mechanics‖ by Ferdinand L Singer Harper, published by Collins publications, 3rd Edition.2006
3. Structural System‖ by Henry. J. Cowan, Forrest Wilson, published by Van Nostrand Reinhold Company, New York 2005

AR – 112 History of Architecture – I	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1:

a) Role of an Architect in an Architectural project and in society
b) Disciplines and skills to be learnt by an Architect
c) Factors influencing Architecture of a place
d) Introduction to Architectural Styles

Unit 2: Early History of Architecture

a) Global preview of prehistoric architecture – Paleolithic to Neolithic art and architecture

History of civilization

a) Development of civilizations — Chinese, Egyptian, Greek, Indus Valley, Mayan, Mesopotamian, Persian

Textbooks:

1. The Great ages of world Architecture‖ by G. K. Hiraskar, published by DhanpatRai Publications, 2018
2. From Prehistory to Post Modernism‖ by Trachtenberg and Hymen, published by Pearson Education (Singapore) (P) Ltd., 2002

Reference Books:

1. A handbook of Professional Practices‖ by Council of Architecture, published by Council Of Architecture
2. Introduction to Architecture‖ by F. D. K. Chings, published by Wiley, 2013

AR – 113 Commication Skills – I	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Vocabulary:

a) One word substitutes
b) Words often confused
c) Synonyms and Antonyms
d) Foreign Phrases
e) Phrasal verbs derived from the Dynamic verbs: Go, Put, Take, Look, Get, Hold, Give Run and Turn.
f) Idioms and Phrases

Grammar:

a) Tenses and Uses of Tenses
b) Verb
c) Spotting the errors in a sentence
d) Correction of errors in a given sentence – errors in the use of words – errors in constructing sentence – errors of Indianisms – use of slang – errors in punctuation.
e) Concord
f) Articles, Proposition and words followed by prepositions.

Unit 2: Reading:

a) Comprehension: Locating the topic sentence – main idea – subordinate idea, pick outdefinitions, factual information references and inferences.

Textbooks:

1. An Introduction to Professional English and Soft Skills‖, by B. K Das & K. Samantray, published by CUP, New Delhi, 2009
2. Business correspondence and Report writing‖ by R. Sharma & K. Mohan, published by Tata McGraw Hill, 6th Edition 2020

Reference Books:

1. Study reading – A course in reading skills for academic purpose‖, by Eric H. Glendinning& Beverly Holmstrom, published by Cambridge University Press, 2nd Edition 2004
2. Good style – writing for science and technology‖, by John Kirkman, E&FN Spon, published by Routledge, 2nd Edition 2005
3. College English and Communication‖ by Stewart, Zimmer & Camp., published by Glencoe; 6th Edition 1992
4. Learning to listen – tasks for developing listening Skills‖, by Alan Maley and Sandra Moulding, published by Cambridge University Press, 1981.
5. Better English Pronunciation‖, by J. D. O'Connor, published by CUP, London, 2006

AR – 114XX Elective I	L	S	Credits
01 Theory of Design	**2**	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction to Architecture, Definition of Architecture – elements of Architecture backed by need and followed by fulfillment of need. Scope of Architectural Design – An analysis – Integration of aesthetic and function.

Unit 2: Aesthetic components of Design Proportion, scale, balance, rhythm, symmetry, hierarchy, pattern and axis with building examples.

Unit 3: Architectural space and Mass and Space, Visual and Emotional effects of geometric forms and their derivatives – the sphere, the cube, the pyramid, the cylinder and cone.

Unit 4: Application of colour in Architecture Effect of colour in Architecture – colour symbolism.

Note:
Sessional work shall include assignments/tests on the above topics.

REFERENCE BOOKS:

1. Architecture – Form, Space and Order‖ F.D.K. Ching, Van Nostrand Reinhold Company, New York, 5th edition 2023.
2. An Initiation to design‖ by Helm Marie Evans and Caria David Dunneshil, Macmillan Publishing Co.Inc., New York, 1982.
3. Architecture Theory Since 1968 by K. Michael Hays 2000
4. The Theory of Architecture – Concepts and themes‖ by Paul Alan Johnson, Wiley India 2017

AR – 114XX Elective I	L	S	Credits
02 Vernacular Architecture	**2**	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Definition and Classification of Vernacular Architecture. Vernacular architecture as a process – Survey and Methods of study of vernacular architecture. Cultural and contextual responsiveness of vernacular architecture: an overview.

Unit 2: Different approaches and concepts to the study of vernacular architecture: an over view – Aesthetic, Architectural and anthropological studies in detail.

Unit 3 : Forms spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction technique of the vernacular architecture – Assam Type Houses of Meghalaya and Assam.

Unit 4 : Forms spatial planning, cultural aspects, symbolism, colour, art, materials of construction and construction technique of the vernacular architecture in the cases of North Eastern Region.

Reference Books:

1. Sustainable Vernacular Architecture, Sayigh 2019.
2. Sustainability and the Built-Environment Roots, Origins and Lessons Learned From The Vernacular Architecture of the Mediterranean Saif Al Kaabi, Eman Asaad 2012
3. Vernacular Architecture and Regional Design Cultural Process and Environmental Response Kingston Heath 2016
4. G.H.R. Tillotsum – The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.
5. Carmen Kagal, VISTARA-The Architecture of India, Pub:The Festival of India, 1986.
6. S. Muthiah and others: The Chettiar Heritage; Chettiar Heritage 4th Edition 2017
7. Weber (W) &Yannas (S); Lessons from Vernacular Architecture; Routledge; 2014.

AR – 115 Architectural Design-I	L	S	Credits
	0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/submissions and mid-term studio examination.

End-semester examination – Evaluation based on final portfolio submission and viva voce.

- Introduction to modern Arts and various other techniques. Points, Lines, Planes, Color theory and compositions. Developing sketching skills. Understanding different media for artwork viz. pencil, pen, color pencil, paint, digital media
- Principles of Aesthetics and introduction to aesthetical terms like form, balance, rhythm, harmony, texture, color, symmetry, contrast, discord, accentuation, monotony etc. Application of them in two and three- dimensional compositions, presented in form of scaled drawings, views, and freehand sketches to develop the skill and understanding of forms, proportions etc. in various media viz. pencil, pens, colors etc.
- Study through models of different materials viz. paper, clay, wax, soap, wires etc. The idea is mass and space handling with understanding the roles of form, color and texture.
- Art appreciation of various art forms throughout history
- Designing of an Arts and graphics portfolio

NOTE:

This Paper is designed to develop the skills of Basic design & Visual arts.
Sessional will be in the form of drawings and models. The evaluation shall be done in intermediate reviews consisting of internal and external

Reference Books:

1. Space Time and Architecture‖ by S. Gideon published by Harvard Univ. Press, 2009
2. Elements of Architecture from Form to place‖ by Pierre Von Meiss published by Taylor & Francis, 2nd Ed. 2013
3. The Four Elements of Architecture & Other Writings (Res Monographs in Anthropology & aesthetics)‖ by Gottfried Semper, published by cambridge Univ. press, Reissue edition 2011

4. Colour Decoration of Architecture, Treating on Colour and Decoration of Interior and Exteriors of Buildings‖ by James Ward, published by Lector House, 2022
5. Graphic Thinking For Architects and Designers‖ by Paul Laseau, published by John Wiley & Sons, 2002
6. Neufert Architects' Data‖, by P. Neufert& E. Neufert, published by Blackwell Publishers, 6th Edition 2023
7. Architecture – Form, Space and Order‖ F.D.K. Ching, Van Nostrand Reinhold Company, New York, 5th edition 2023
8. Time-saver Standards for Architectural Design: Technical Data for Professional Practice‖, by D. Watson, 8th Ed., published by McGraw-Hill. 2005.

AR – 116	**Building Construction & Materials-I**	L	S	Credits
		0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination =105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/submissions/attendance and mid-term examination.

End-semester examination – Evaluation based on Final Portfolio, end-semester studio examination and Viva.

Unit 1: Introduction to —Construction as a subject and its relevance to architectural design.

a) Construction and the logic of stability as its basis.
b) Concept of load bearing: Support and Supported building elements.
c) Concept of Span
d) Understanding the basic construction principles with respect to structural stability and its applications/ extensions /manifestations in terms structural systems and then building elements
e) Construction Principles- construction systems-building elements- building materials
f) Basic Structural systems such as load bearing and frame structure.

Unit 2: Brick:

a) Types of bricks, characteristics and classification of Bricks, quality of Bricks.
b) Bonds in brick masonry for various thicknesses of walls and various situations like ends,junctions, etc.

Unit 3: Stone:

a) Stone dressing of different types.
b) Stone masonry of different types for various thicknesses of walls.
c) Random rubble , Coursed Rubble, Ashlar
d) Jointing and pointing.

Unit 4: Foundation:

a) Types of simple foundations in Bricks & stones.

Arches and Lintels:

a) Brick Arches & Lintels
b) Stones Arches & lintels

Unit 5: Bricks

a) Bricks —various types of bricks, properties of good brick, use of bricks, classification of variousgrades of bricks.
b) Compressed mud blocks, hollow blocks
c) Stones — Buildings stones, types, properties of good stone, natural bed, use of stones.

Timber

a) Timber of various types of quality and properties,
b) Defects in timbers, decay of timbers
c) Preservation of timber, Methods of seasoning, sawing, planning and storage.
d) Use of timber in buildings.

Unit 6: Lime and Cement

a) Lime—quick lime, hydraulic lime, lime mortar mix and preparation, neeroo, efflorescence, peeling and flaking.
b) Cement — Composition, properties of cement, initial and final setting time, slow setting, quick setting and rapid hardening cement.

Concrete

a) Sand— Pit, river and sea sand, uses in mortar and concrete, properties of good sand, impurities of sand and their removal.
b) Aggregates — Types of aggregate for concrete work, classification, characteristics of good aggregates.
c) Mortar — various types of mortar, their mix and properties, application methods.
Concrete — various types of concrete, grade of concrete, their mix and properties, application methods.

Note:

1. There shall be regular site visits to buildings, under construction or Constructed, to explain the above topics. Use of audio-visuals should be stressed.
2. Sessional work shall be done as scaled drawings on drawing sheets and freehand drawings along with occasional visits to construction sites.
3. Course would be run through lectures, Audiovisuals and site visits to various laboratories and buildings.
4. Sessional shall be in the form of reports, seminars, and design solutions on different units.

Textbooks:

1. Building construction‖ by W.B. McKay –Vol. I, published by Pearson, 2013

2. Engineering materials‖ by S.C.Rangwala, published by AnandCharotar Publishing, 42nd Edition 2015
3. Construction of Buildings‖ by Barry – Vol. I, published byEast-West Press (P) Ltd., 1999, 6thEd.
4. Fundamentals of Building Construction: Materials and Methods‖ by E. Allen and J. Iano, Wiley. 7th Edition 2019

Reference Books:

1. Construction principles, Materials and Methods‖ by Harold B.Olin, published by John Wiley & Sons Canada, Limited , 2001
2. Building construction ‖ by Dr. B.C Punmia, published by Laxmi Publications, 11th Edition 2016
3. Construction Technology ‖ by R.Chudley, published by Pearson Publ. Oxford Heinemann, 2012
4. Building Construction: Principles, Materials and Systems‖, by M. Mehta, W. Scarborough, and Diane Armpriest, Pearson Prentice Hall. 2013.
5. Building Construction‖ by S.K Kumar, Standard Publishers Distributors , 2010
6. Building Materials‖ by Gurcharan Singh, Standard Book House, 17th Edition 2019

AR – 117 Architectural Graphics-I	L	S	Credits
	0	**4**	**4**

Contact hours per week : 4 *(4 studios per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/submissions and mid-term studio examination.

End-semester examination – Evaluation based on Final Portfolio submission and end-semester studio examination.

Unit 1: Graphical codes and symbols

a) Architectural lettering and dimensioning, and types of lines.
b) Symbolic representations of building parts and materials.

Unit 2: Scales

a) Plain scales
b) Diagonal Scales

Unit 3: Projections – I

a) Theory of projections – Methods of projection.
b) Projections of points, lines and planes.
c) Projections of various solid and hollow geometrical objects.

Unit 4: Projections – II

a) Orthographic projections – First and third angle projection methods.
b) Isometric projections.

Unit 5: Development of Surfaces

a) Development of surfaces with – Parallel and radial line method.
b) Development of surfaces without sections – Parallel and radial line method.

Unit 6: Interpenetrations and Sections

a) Interpenetration of various solid geometrical objects.
b) Introduction to sections of various solid and hollow geometrical objects.

Note:

1. Sessional work shall be done in the form of scaled drawings on drawing sheets and freehand sketches as studio assignments which shall be evaluated on a regular basis.

Textbooks:

1. Engineering Drawing by N D Bhatt, published by Charotar Publishing House Pvt. Ltd., 2014
2. Engineering Drawing with an introduction to AutoCAD‖ by Dhananjay A. Jolhe, published by McGraw Hill Education (India) Pvt. Ltd., 2017

Reference Books:

1. "Engineering Drawing and Graphics Technology", by T. E. French, C. Vierck, and R. Foster, published by TMH, 1993.
2. "Design drawing", by F. D. K. Ching& Steven P. Juroszek, published by John Wiley & Sons, USA, 2019.
3. "Engineering Drawing and Graphics", by K. Venugopal, published by New Age Publications, 2007.
4. "Text book of Engineering Drawing", by K. Venkata Reddy, published by B. S. Publications, 2008.

AR – 118 Workshop-I	L	S	Credits
	0	**2**	**2**

Contact hours per week : *2 (2 studios per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/model submissions and mid-term studio viva voce.

End-semester examination – Evaluation based on final model submission and end-semester studio viva voce.

Unit 1: Introduction to model making-I

a) Basic geometrical shapes using thermacol and paper as a material.
b) Basic geometrical shapes using soap and plaster of paris as a material.

Unit 2: Introduction to model making-II

a) Introduction to different carpentry tools and timber joinery details.
b) Introduction to bond work of bricks, mixing of mortar, use of stones and masonry tools for understanding the behavior of these materials and tools on a construction site.

Note:

1. Sessional work shall be done in the form of scaled models and freehand sketches as studio assignments which shall be evaluated on a regular basis.
2. Individual or group assignments shall be given on site or at the workshop using various tools and materials.

Reference Books:

1. "Designing with models: A studio guide to making and using Architectural Design Models", by Criss. B. Mills, published by John Wiley & Sons, 2010.
2. "Model Making", by Megan Werner, published by Princeton Architectural Press, 2011.

AR – 121 Structural Deign-II	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*

Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction to BMD & SFD for point load and UDL

a) Simply supported beam
b) Cantilever beam
c) overhanging beam
d) Fixed beam
    i. Advantages and disadvantages of fixed beam

Unit 2:

a) Theory of bending (simple and pure bending)
b) Neutral axis, Moment of resistance
c) Bending equation
d) Section modulus (rectangular, hollow rectangular, circular, hollow circularsection).

Unit 3:

a) Elastic constants and relationship between them
b) Shear stress distribution for a rectangular section
c) Stress strain behaviour of concrete and steel
d) Stress distribution diagrams for simple sections (rectangular, T section, Isection).

Unit 4:

a) Strain energy
b) Principal stress and strain
c) Mohr's circle
d) Maxwell law
e) Bette's law
f) First theorem of castigliano's theorem

Note:

1. Sessional shall be in form of assignments, class work, along with occasional visits to construction sites.

Textbooks:

1. Strength of Materials (Mechanics of Solids)‖, by Dr. R. K. Bansal, published by, Laxmi Publications, 2015, 5th Ed.
2. Mechanics of Materials‖ by E.P. Popov, published by Pearson Education India, 2nd edition 2015

Reference Books:

1. Structure‖ by D. L. Schodek& M. Bechthold, published by PHI Learning Private Limited , 2015
2. R.C.C Design and Practice‖ by N. Krishna Raju& R. N. Pranesh, published by New Age International (RS), 2007
3. Applied mechanics and strength of materials in S.I Units‖ by R.S. Khurmi, published by S. Chand and Co., 2006
4. Strength of Materials (SI units)‖ by R.S. Khurmi, published by S.Chand and Co., 2008

AR – 122 History of Architecture-II	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*

Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1:

Christian Architecture (Churches)

a) Early Christian and Byzantine

Romanesque and Gothic (Churches)

a) Study of various European styles with construction techniques, aesthetical principles, Architectural philosophy.

Unit 2: Renaissance Architecture

a) Italian
b) French
c) English
d) German

Note:

1. Course would be run through lectures, Audiovisuals and site visits to various buildings.
2. Sessional shall be in the form of small reports, seminars, Sketches on above-mentioned topics.
3. The discussions should be based on selected examples highlighting the aesthetical values, Architectural features, construction techniques, materials used and philosophy of construction.

Textbooks:

1. The Great ages of world Architecture‖ by G. K. Hiraskar, published by DhanpatRai Publications, 2018
2. From Prehistory to Post Modernism‖ by Trachtenberg and Hymen, published by Pearson Education (Singapore) (P) Ltd., 2002
3. Buddhist & Hindu Architecture in India‖ by Satish Grover, published by CBS Publisher, 2017
4. Islamic Architecture in India‖ by Satish Grover published by CBS Publisher, 2017

Reference Books:

1. A handbook of Professional Practices‖ by Council of Architecture, published by Council Of Architecture
2. Introduction to Architecture‖ by F. D. K. Chings, published by Wiley, 2013
3. Indian Architecture (Buddhist and Hindu period)‖ by Percy Brown, published by Tobey Press, 2010
4. Indian Architecture (Islamic Period)‖ by Percy Brown, published by Tobey Press, 2018

AR – 123 Communication Skills-II	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*

Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Writing:

Précis writing, Note – making and note taking, letter writing, technical report writing, resume writing, business correspondence, preparation of CV and project reports, understanding the difference between seminars, conference, convention, congress, panel discussion, etc

Unit 2: Presentation Skills:

Communication skills in Architecture through write up and graphic, graphs, sketches audio presentation, supplemented by drawings, transparencies, photographs, epidiascope, slides, video presentation, script writing dubbing, cue sheet, ending vision, mixing.

Textbooks:

1. "An Introduction to Professional English and Soft Skills", by B. K Das & K. Samantray, published by CUP, New Delhi, 2009
2. "Business correspondence and Report writing" by R. Sharma & K. Mohan, published by Tata McGraw Hill, 6th Edition 2020

Reference Books:

1. "Study reading – A course in reading skills for academic purpose", by Eric H. Glendinning& Beverly Holmstrom, published by Cambridge University Press, 2nd Edition 2004
2. "Good style – writing for science and technology", by John Kirkman, E&FN Spon, an Imprint of Chapman &Hall, 2nd Edition 2005
6. "College English and Communication" by Stewart, Zimmer & Camp., published by McGraw Hill, 6th Edition 1992
3. "Learning to listen – tasks for developing listening Skills", by Alan Maley and Sandra Moulding, published by Cambridge University Press, 1981.

4. "Better English Pronunciation", by J. D. O'Connor, published by CUP, London, 2006

AR – 124XX Elective II	L	S	Credits
01 Architecture Design with Glass	**2**	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Modern Architectural Requirements, Requirements as per Standards – NBC – Fire & Structural.

Unit 2: Manufacturing of glass: Types of Glass, Coating Technology – High-Performance Glass Innovative Applications – Electrochromic & Digital Printing

Unit 3: Glass as Building Envelope Material

- Glass Parameters
- Façade Fundamentals
- Façade Design & Testing
- How to Design Façade for Daylighting & Energy efficiency – Modeling
- Design Tools & Simulation Software's used for Design
- How to understand high-performance glass
- Glass for Acoustics, Fire & Interior applications
- Glass for Safety & Security

Unit 4: Case Studies

- On Design & Detailing
- Application Impact
- Building Measurements & its Impact

Reference Books:

1. Structural Glass Facades and Enclosures 2011
2. Mic Patterson; Glass in Architecture 2011
3. Michael Wigginton; Envelope Design for Buildings 2015
4. William Allen; JosephS Amstock's Glass in Construction; 2012.

AR – 124XX Elective II	L	S	Credits
02 Architecture Design with Steel	**2**	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Strength of Materials : Theory of Elasticity, Material properties, Shear and Bending moments,

Unit 2: Frame Structure Analysis and Design: Deflection of beams, Analysis of indeterminate structures, The application different types of structural frame in Architecture.

Unit 3: Truss and Space Frame: Concept and application of Truss and Space Frame, Advantages. **Tensile and Plate Structures**: Structural concept, Types,Materials for tensile structures, Application and advantages,Case study.

Unit 4: Special Structures: Pneumatic, Tensegrity and Temporary structures and structures for cost effective technology High rise Structural system, Foundation system, IS Code provisions.

Reference Books:

1. Andrew W. Charleson, Structure as Architecture, Architectural Press, Elsevier. 2018.
2. Victor E. Saouma, Structural Systems and Concepts for Architects, University of Colorado Press. 2021
3. Angus J. Macdonald, Structure and Architecture Architectural Press, Elsevier.2019
4. Jonathan Ochshorn, A.B., Structural Element for Architects and Builders, Architectural Press, Elsevier.2020
5. Hollee Hitchcock Becker, Structural Competency for Architects, Routledge.2015
6. Taranath. B. S., Structural Analysis and Design of Tall Building, Steel and Composite construction, CRC Press. 2017
7. Gunel M.H. and Ilgin H.E, Tall Buildings Structural Systems and Aerodynamics, Routledge.2014

AR – 125 Achitectural Design-II	L	S	Credits
	0	**4**	**4**

Contact hours per week : *4 (4 studios per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/submissions and mid-term studio examination.

End-semester examination – Evaluation based on final portfolio submission and viva voce.

Objective:

This Paper is designed to develop understanding of form and space.

The design exercise to be addressed includes:

a) Introduction of Architectural design with an approach of functional understanding and analysis of problems with studies of space requirement for different furniture (objects), activities and circulation, Relationship between occupied and unoccupied spaces. Introduction to modeling with paper, board, plastic sheets etc.
b) The design issues to be addressed include:-
c) Integration of Form and Space
d) Visual analysis of Built form
e) Principles of Perception – Proximity, Similarity.
f) Design of small shelters and study of multi units involving 3 to 4 functional spaces, Natural and manmade objects of functional and aesthetic value. Aspects of area determination in conjunction with relevant building Bye Laws and area relationship.
g) Case studies for measured drawing of small buildings and furniture. Introduction of presentation drawings. Small views (isometric and perspective) of the studied building.
h) Study and design of small structures like ceremonial gates, temporary exhibition stalls, kiosks, bus stop, small pavilions etc.
i) Anthropometric study and ergonomics of human figure, dimensions of furniture and relationship with human anthropometrics (like in kitchens, toilets, bedrooms, staircases etc.) with freehand drawing ofhuman figures, vehicles, trees, buildings etc. to have a better understanding of proportion

Note:

1. Sessional shall be in the form of drawings and models along with report.
2. Design exercise will be assigned by the Studio coordinator which will be discussed individually during studio hours by panel of teachers' assigned by the department. The students' work will be evaluated during a jury/viva- voce at the end of every week OR on a given date of submission which will be notified by the department.
3. A Design Jury/Viva-Voce shall be held at the end of the semester which shall be evaluated by an external examiner appointed by the department.
4. A time problem (as class tests) is to be conducted in class other than regular design problems.

Reference Books:

1. Design Drawing‖, by F.D.K. Ching, published by Wiley India pvt. Ltd. 2019
2. Architects Data‖ by P. Neufert, 3rd Ed., published by Blackwell Science. 2000
3. Form Defining Strategies: Experimental Architectural Design‖, published by ERNST WasmuthVerlag, 2012
4. Time-saver Standards for Architectural Design: Technical Data for Professional Practice‖, by D. Watson, 8th Ed., published by McGraw-Hill. 2005.

AR – 126 Building Constrution & Materials-II	L	S	Credits
	0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/submissions/attendance and mid-term examination.

End-semester examination – Evaluation based on Final Portfolio, end-semester studio examination and Viva.

Unit 1: Foundations: Shallow & Deep:

a) Shallow foundation: Types, Isolated, combined and raft foundations and their construction techniques.
b) Deep Foundation: Grillage foundations, Piles foundations, Caisson foundations, etc.

Unit 2: Construction systems and Elements of Buildings

a) Overview of method of construction of a simple two storied building
b) Plinth - filling – processes and techniques
c) Plinth protection, D.P.C.
d) Coping &Chajjas

Unit 3: Carpentry and Joinery:

a) Terms defined, mitring, ploughing, grooving, rebating, veneering, Various forms of joints in wood work, such as lengthening joints, bearing joints, halving, dovetailing, housing, notching, tusk and tenon etc., Doors, Definition of terms, types of doors, wooden, ledged, ledged and braced, panelled, flush door, Hinged, single and double shutters, sliding, folding, revolving, pivoted

Unit 4: Timber Doors and Windows

a) Ledged braced and battened door
b) Panel, Glazed and Flush door
c) Pivoted, Side hung and Top hung windows
d) Louvers and Ventilators
e) Fixed and openable fanlights
f) Composite window

Unit 5: Opening accessories:

a) Jamb casing
b) Architrave
c) Moldings and Skirting
d) Door and window fixtures and Palmate

Unit 6: Metal

a) Various types of Ferrous Metals- Wrought Iron, Cast Iron, Steel, their properties and uses in Architecture.
b) Various types of Non-Ferrous Metals- Aluminium, Copper, Tin, Brass, etc. their properties and uses in Architecture.

Glass:

a) Various types of glasses (plate glass, tinted, decorative, reinforced, laminated glass block, glass murals, partially coloured glass) and their properties.
b) Use of glass in Architecture
c) Fabrication techniques of glass
d) Working on glass such as etching, beveling, and stained glass work.

Unit 7: Flooring: along with fixing materials

a) Mud flooring, Brick flooring, Timber flooring
b) Natural Stone tiles, Stone slabs
c) Clay products for flooring-Clay tiles, Mosaic tiles, Terrazzo tiles, Vitrified tiles
d) Paving of different materials and pattern.

Roof coverings: along with materials, fittings and fixtures used in the construction.

a) Clay products for roofing- Terracotta tiles
b) Mangalore and other designed tiles.
c) Metal sheets, GI sheets/ steel corrugated sheets.
d) Structural glass.
e) Modern roof covering materials like acrylic sheets, fiber glass sheets, polycarbonate sheets, slate, shingles, etc.

Note:

1. There shall be regular site visits to buildings, under construction or Constructed, to explain the above topics. Use of audio-visuals should be stressed.
2. Sessional work shall be done as scaled drawings on drawing sheets and freehand drawings along with occasional visits to construction sites.
3. Sessional shall be in the form of self-study, market survey, sample and literature collection, reports and seminars/presentation.
4. The works of CBRI, BMTPC, SERC, HUDCO and other institutions be referred and discussed.

Textbooks:

1. Building construction‖ by W.B. McKay –Vol. 1 and 3, published by Pearson, 2013
2. The Construction of Buildings‖ by Barry, published by East-West Press, 6th Ed., 1999
3. Engineering materials‖ by S.C. Rangwala, published by Charotar Publishing House, , 42nd Edition 2015
4. Building Construction‖ by Sushil Kumar, published by Standard Publishers Distributors, 20th Ed., 2010
5. Building Materials: Products, Properties & Systems‖ by Neha Jamwal& M. L. Gambhir, published by Tata McGraw Hill, 2017

Reference Books:

1. Building Construction‖ by Sushil Kumar, published by Standard Publishers Distributors, 2010
2. Building construction‖ by Dr. B.C Punmia, published by Laxmi Publications, 11th Edition 2016
3. Advanced Construction Technology ‖ by R. Chudley, published by Pearson Publ. Oxford Heinemann, 2012
4. Construction Technology ‖ by R. Chudley, published by Pearson Publication Oxford Heinemann, 2012
5. Building Materials ‖ by S. Duggal, published by New Age Publications, 2017
6. Building Construction‖ by B. C. Punmia, published by Laxmi Publications Ltd. 11th Edition 2016

AR – 127 Architectural Graphics-II	L	S	Credits
	0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/submissions and mid-term studio examination.

End-semester examination – Evaluation based on final portfolio ubmission and end-semester studio examination.

Unit 1: Perspective Projections

a) Introduction to terminologies in perspective projections and concept of perspective projections.
b) Introduction to types of perspective projections – One pt., two pt., and three pt. projections.
c) Two-point perspective (Angular perspective) projections of simple and complex geometrical objects.
d) Three point perspective (Oblique perspective) projections of simple and complex geometrical objects.

Unit 2: One Point Perspective Projections

a) One-point perspective (Parallel perspective) projections of simple geometrical objects.
b) One-point perspective (Parallel perspective) projections of complex geometrical objects.

Unit 3: Two Point Perspective Projections

a) Two-point perspective (Angular perspective) projections of simple geometrical objects.
b) Two-point perspective (Angular perspective) projections of complex geometrical objects.

Unit 4: Three Point Perspective Projections

a) Three-point perspective (Angular perspective) projections of simple geometrical objects.
b) Three-point perspective (Angular perspective) projections of complex geometrical objects.

Unit 5: Sciography – I

a) Introduction to basic principles of Sciography and its application on two dimensional objects in plan and elevation.
b) Sciography of simple three dimensional objects in plan, elevation and isometric view.

Unit 6: Sciography - II

a) Sciography of building elements in plan, elevation and isometric view.

b) Sciography of building elements in plan, elevation and perspective view.

Note:

1. Sessional work shall be done in the form of scaled drawings on drawing sheets and freehand sketches as studio assignments which shall be evaluated on a regular basis.

Textbooks:

1. Engineering Drawing‖ by N D Bhatt, published by Charotar Publishing House Pvt. Ltd., 2014.
2. Engineering Drawing with an introduction to AutoCAD‖ by Dhananjay A. Jolhe, published by McGraw Hill Education (India) Pvt. Ltd., 2017.

Reference Books:

1. "Engineering Drawing and Graphics Technology", by T. E. French, C. Vierck, and R. Foster, published by TMH, 1987.
2. "Design drawing", by F. D. K. Ching& Steven P. Juroszek, published by John Wiley & Sons, USA, 2019.
3. "Engineering Drawing and Graphics", by K. Venugopal, published by New Age Publications, 2007.
4. "Text book of Engineering Drawing", by K. Venkata Reddy, published by B. S. Publications, 2008.

AR – 128 Workshop-II	L	S	Credits
	0	**2**	**2**

Contact hours per week : *2 (2 studios per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/model submissions and mid-term studio viva voce.

End-semester examination – Evaluation based on final model submission and end-semester studio viva-voce.

Unit 1: Model making – I

a) Geometrical Blocks and tiles with abstract composition using thermacol.
b) Geometrical Blocks and tiles with abstract composition using plaster of paris.

Unit 2: Model making – II

a) Making scaled models of the assignments of design studio.
b) Making scaled models of the assignments of building construction studio.

Note:

1. Sessional work shall be done in the form of scaled models and freehand sketches as studio assignments which shall be evaluated on a regular basis.
2. Individual or group assignments shall be given on site or at the workshop using various tools and materials.

Reference Books:

1. "Designing with models: A studio guide to making and using Architectural Design Models", by Criss. B. Mills, published by John Wiley & Sons, 2010.
2. "Model Making", by Megan Werner, published by Princeton Architectural Press, 2011.

AR – 211 Structural Design – III	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1:

a) Arches
b) Equation of parabolic and semi-circular arch
c) Three hinged arches
d) Two hinged arches
e) Temperature effects on arches

Unit 2:

a) Characteristics of columns and struts
b) Euler's theory of long column
c) Assumptions and limitations of Euler's formula
d) Rankine's formula

Unit 3:

a) Introduction to RCC
b) Basic analysis and design concepts of RCC
c) WSM and LSM
d) Balanced, unbalanced, under reinforced and over reinforced sections

Unit 4:

a) Introduction of pre-stressed concrete
b) Basic concept
c) Classification and Types of pre-stressing system
d) End anchorage
e) Advantages and disadvantages of pre-stressed concrete
f) Advantages of pre-stressed concrete over reinforced concrete construction.

Note:

1. Sessional shall be in form of assignments, class work, presentations, along with occasional visits to construction sites.

Textbooks:

1. Strength of Materials" by R. K. Bansal , published by Laxmi Publications, 2007
2. Treasure of R.C.C Design (S. I Units)‖ by Sushil Kumar, published by Standard Book House, 2016
3. Pre-Stressed Concepts‖ by N. Krishna Raju , published by tata McGraw Hill Publishing Co. Ltd., 2018

Reference Books:

1. Structure‖ by D. L. Schodek& M. Bechthold, published by Prentice Hall, 2015
2. E R.C.C Design and Practice‖ by N. Krishna Raju& R. N. Pranesh, published by New Age International (RS), 2007

AR – 212 History of Architecture - III	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Buddhist Architecture, and Brahmanical and Jain Architecture

a) Development at Asian level (China, Japan, SE Asia, Afghanistan etc.) Indian examples and influences.
b) Temples, public buildings, palaces in North and South India.

Unit 2: Early Islamic Architecture, and Indian Islamic Provincial Architecture

a) Development of ancient Islamic Architecture (global)
b) Development of Islamic Architecture (Indian) Pre-Mughal rule (Delhi Sultanate)

Unit 3: Indian Islamic Architecture during Mughal Rule

a) Pre Akbar period
b) Akbar –Jahangir period
c) Reign of Shah jahan Aurangzeb and after

Unit 4: Colonial Architecture in India

a) Introduction
b) Regional influence
c) Indo-saracenic style

Note:

1. Course would be run through lectures, Audiovisuals and site visits to various buildings.
2. Sessional shall be in the form of small reports, seminars, Sketches on above-mentioned topics.
3. The discussions should be based on selected examples highlighting the aesthetical values, Architectural features, construction techniques, materials used and philosophy of construction.

Textbooks:

1. The Great Ages of World Architecture‖ by G. K. Hiraskar, published by DhanpatRai Publications, 2018.
2. Islamic Architecture in India‖ by Satish Grover published by CBS Publisher, 2017

Reference Books:

1. From Prehistory to Post Modernism‖ by Trachtenberg and Hymen, published by Pearson Education (Singapore) Pte. Ltd., 2002.
2. A History of Architecture‖ by Sir Banister Fletcher, published by CBS Publishers, 2002, published by CBS Publishers, 2002
3. Buddhist & Hindu Architecture in India‖ by Satish Grover, published by CBS Publisher, 2017

AR – 213 Climatology – I	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on final portfolio submission the end-semester examination.

Unit 1: Elements of climate, and Climate conscious design

a) Constituents of climate (definitions, Measurement, Data collection and significance)
b) Global climate – classifications, regional variations and microclimate.
c) Climatic zones in India
d) Study of Microclimate and Macroclimate, and the effect of climate on man, shelter and environment
e) Respective traditional climate responsive architecture on Global and national level.
f) Climate responsive design strategies
g) Case studies of climate conscious designs.

Unit 2: Principles of thermal comfort, and Parameters of comfort conditions

a) Concept of heat exchange in buildings.
b) Theory and concept of thermal comfort, EffectofclimaticelementsonThermalcomfort, comfort indices and its application to architectural design.
c) Natural and artificial methods of achieving thermal comfort.
d) Ventilation and air movement
(Spatial organization in buildings, layout and orientation of buildings in housing).
e) Daylighting
(Natural Illumination and day lighting; Artificial *illumination and night lighting)*

Note:

1. Course would be run through lectures, Audiovisuals and site visits to various laboratories and buildings.
2. Sessional shall be in the form of reports, seminars, and design solutions on different units.

Textbooks:

1. Manual of Tropical Housing and Building by O. H. Koenigsberger, published by Univ. (India) press (P) Ltd., 2013.
2. Climate Responsive Architecture by Arvind Krishnan, Baker, Yannas&Szoklay, published by Tata McGraw Hill Education, 2017.

Reference Books:

1. Handbook on Climatology —, by Julius Von Han, published by Legare Street Press 2022.
2. Climatology: Atmospheric Science —, by Oliver, Published by Pearson, 2002.
3. Heat Islands: Understanding and mitigating heat in urban areas‖, by Lisa Gartland, published by earthscan publication, 2012.
4. The Art and Science of Lighting Protection, by Martin A Uman , published by Cambridge University press, 2014.
5. Climatology Fundamentals and application – John R Mather
6. Introduction to Climatology – Anthony Sealey.

AR –214	**Surveying and Leveling**	L	S	Credits
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Measurement of horizontal distances.

a) **Chain surveying**: Introduction, types of instruments and accessories, running survey lines, errors in chaining, offsets, field book
b) **Plane table surveying**: Types of instruments and accessories, setting up a plane table, methods of plane table surveying, errors in plane table surveying.

Unit 2: Measurement of vertical distances:Leveling.

a) Basic definitions,
b) Dumpy level,
c) Temporary adjustments,
d) Permanent adjustments,
e) Reciprocal leveling,
f) Principles of leveling
g) Rise and fall method and line of collimation method.

Unit 3: Institutions and Governance

a) Calculation of area, measurement of volume
b) Introduction to contouring
c) Aspect of surveying for an architect

Note:

1. Class work and fieldwork of the above subject should be oriented towards the layout of buildings and preparation of measured drawings. Students should also be taken to site visits for explaining the practical aspects of surveying.
2. Sessional work should include reports, drawings, and experiments etc. in assignment seminar form.

Textbooks:

1. Surveying and Leveling‖ by R. Subramaniam, published by Oxford Univ. press, 2012
2. Surveying and leveling (Volm. –I & II)‖ by S.S. Bhavikatti, published by I. K Int. Publishing House (P) Ltd., 2019

Reference Books:

1. Elements of Surveying and Leveling ‖ by Charles Davies, published by Legare Street Press 2022
2. Surveying and Leveling‖ by T. P. Kanetkar& S. V. Kulkarni, published by VidyarthiGrihaPrakashan, 2006
3. Surveying‖ by Dr. B. C. Punmia, published by Laxmi Publication Ltd., 2005, 16th Ed.

AR – 215XX Elective III	L	S	Credits
01 Art in Architecture	**2**	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Role of art in history of world architecture

Unit 2: Symbiotic relationship of folk art and architecture – Application of different art forms in architecture

Unit 3: Visual communication in architecture and way finding

Unit 4: Works of different artists and architcts that reflect the inter relationship

Reference Books:

1. Architectural Graphics by Francis D.K. Ching, Published by John Wiley & Sons 2015
2. The Elements of Style: An Encyclopedia of Domestic Architectural Detail by Stephen Calloway, Alan Powers and Elizabeth Cromley, Published by Firefly Books Ltd; New edition 2012
3. Mondrian and De Stijl by Hans Janssen, Michael White and Marek Wieczorek,Published by Museo Nacional Centro de Arte Reina Sofía, November 11, 2020
4. Mondrian and his Studios: Colour and Space, edited by Francesco Manacorda, Published by Tate Publishing, 2015

AR – 215XX Elective III	L	S	Credits
02 Furniture Design	**2**	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Principles and history of furniture design

Unit 2: Modern movements and the creation of ergonomic and functional furniture

Unit 3: Modular concepts in furniture design – Mass production and fabrication, codes and specifications

Unit 4: Eco Design – Considering all stages of the product development process, striving for products which make the lowest possible environmental impact throughout the product life cycle

Reference Books:

1. Illustrated History of Furniture: From the Earliest to the Present Time by Frederick Litchfield, Published by Benediction Classics, 2022
2. Furniture Making - Designs, Working Drawings, and Complete Details of 170 Pieces of Furniture, with Practical Information on Their Construction by R. S. Bowers, Published by White Press, 2017
3. Introduction To Automated Furniture Manufacturing by Sreeram T Veeraraghavan,Published by Notion Press Media Pvt Ltd, November 11, 2021
4. The Furniture Bible by Christophe Pourny, Martha Stewart and Jen Renzi, Published by Artisan Publishers, 2014

AR – 216 Architectural Design - III	L	S	Credits
	0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on final portfolio submission and viva voce

Objective:

This Paper is designed to understand the creative design synthesis for a single use, small span,single storey building. The design issues to be addressed include:

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

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

Kindergarten School, Primary Health Centre, Doctor's Clinic, Small Cafeteria, Highway Restaurant, Village Post Office, Bank(branch office). Police Station, Architect's Office, Department Store, School Gymkhana & Youth Club etc,.

Necessary theoretical inputs to be given to understand design issues. The topics not covered as design problems will have to be covered by the Studio faculty members through lecture/slide show sessions and site visits. At least One major exercises and two minor design/time problems should be given. The final submission shall necessarily include a model of the main problem.

Educational tours to the places of architectural interest shall be organized as per the programme approved by the department. The documentation shall be done in the form of photographs / slides and sketches presented in form of a seminar and written report immediately after the tour.

Note:

Sessional will be in the form of drawings and models along with project report for the design dealt. The evaluation shall be done in intermediate reviews consisting of internal and external experts. There should

be regular site visits / case studies of buildings, so as to document them with the help of photographs, slides, etc.

Reference Books:

1. A Visual Dictionary of Architecture‖, by F.D.K. Ching, John Wiley &Sons. 2012.
2. Architects Data‖ by P. Neufert, 3rd Ed., Blackwell Science. 2000.
3. Time-saver Standards for Architectural Design: Technical Data for Professional Practice‖, by D. Watson, (Editor), 8th Ed., McGraw-Hill. 2005.
4. Principles of Modern Architecture‖, by Norberg Schulz, C., Andreas Papadakis. 2000.

AR – 217	**Building Constructions & Materials - III**	L	S	Credits
		0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on final port folio submission,and end-semester examination and VIVA

Unit 1: Temporary Supporting Structures

Form work and shuttering for different types of RCC elements, trench timbering, scaffolding, shoring and underpinning.

Unit 2: Timber roofs:

Classification of roofs:

a) Single roofs; flat roofs, lean-to roofs, double lean-to, couple, close couple and collar roofs
b) Double or Purlin Roofs.
c) Trussed rafter roofs
d) Triple or framed roofs
e) Common roof coverings with its laying
    i. Waterproofing, rainwater gutter details.
    ii. King post and Queen post roof trusses

Unit 3: Timber Floors:

a) Timber floors: construction techniques, types of timber floors: single, double and triple joist timber floors,
b) Wooden ground and upper floors, Terms defined, bridging joists, binding joists, binders, beams and girders, solid and herring bone strutting, floor boards, ceiling joists, trimming floors to accommodate fire place, Details of fire place, Partition Walls, Brick partition, reinforced brick partition, brick nogged partition, lath and plaster partition, pre-cast concrete partition, glass block and glass create partition, common wooden partition, trussed partition.

Unit 4: Timber Partitions:

a) Types of timber partitions: Single, double and flushed timber partition

Unit 5: Surface finishes, Wall cladding, Wall paneling and ceiling

a) Lime wash, Colour clay wash, Distempers, Cement based color, Plaster of Paris, Putties along with the adhesives, thinners, solvents.

b) Primers, paints (oil, synthetic enamels, acrylic and other plastic emulsions and formulations, interiors and exterior grade paints).
c) Varnishes (natural and synthetic clear varnishes), Polishes along with adhesives, thinners, solvents.
d) (Preparation, application and defect correction on plastered surfaces, timber and metallic surface)
e) Wood and wood products: (Timber panels, Timber boards, Plywood, block board, particle board, hard board, MDF, HDF, HDPE), laminates & veneers in buildings, Manufacturing process in brief, their properties and applications
f) Gypsum boards, Glass wool boards
g) Modern wall paneling materials like Aluminum Composite Panel, glass paneling, glass blocks.

Unit 4: Precast unit

a) Brick jalis, cement jalis, etc.
b) Hollow and Panel walls: Economy and advantages over solid load bearing walls, practical consideration during construction hollow concrete block construction, different types of partition wall.
c) Waffle & Core unit and other pre-engineered units (as per CBRI), Ferro-cement, etc.

Unit 4: Methodicalapproachto Repairs

a) Cracks over openings,
b) Sinking and sagging balconies,
c) Repairs to decayed floors and floor joints, example, jack arch, madras roof terrace, foundation sinking, repairs to walls, Propping, strutting and under pinning.

Note:

1. There shall be regular site visits to buildings, under construction or Constructed, to explain the above topics. Use of audio-visuals should be stressed.
2. Sessional work shall be done as scaled drawings on drawing sheets and freehand drawings along with occasional visits to construction sites, market survey, sample and literature collection, reports and seminars/presentation.
3. The works of CBRI, BMTPC, SERC, HUDCO and other institutions be referred and discussed.

Textbooks:

1. Civil Engineering Materials‖ by Parbin Singh, published by S. K. kataria& Sons, 2013
2. Building Construction‖ by W. B. McKay, published by Pearson, 2013

Reference Books:

1. Building Construction‖ by B. C. Punmia, published by Laxmi Publications, 11th Edition 2016
2. The Construction of Buildings‖ by Barry, published by East-West Press, 6th Ed., 1999
3. Building Construction‖ by Sushil Kumar, published by Standard Publishers Distributors, 2010

AR – 218	**Architectural Graphic III (Computer Application)**	L	S	Credits
		0	**4**	**4**

Contact hours per week : 4 *(4 studios per week)*
Distribution of marks : *Sessional = 30 Marks, End Semester = 70 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on final port folio submission and Viva.

Objective:

To enable the students to learn the techniques of preparing presentations, architectural drawings and technical documents which are used for construction of buildings.

Outline:

The enlisted software shall be introduced and students shall give submissions in soft and hard copy format to display their skills in the same.

a) Introduction to basic applications of MS Office.
b) Introduction and application of document formatting in MS Excel.
c) Introduction and application of presentation techniques in Power Point.
d) Introduction and application of AutoCAD.
e) Architectural Drafting of two dimensional drawings in AutoCAD.
f) Rendering of two dimensional drawings in AutoCAD.

Note:

1. Sessional shall be in form of small exercises/ practical projects.

Textbooks:

1. AutoCAD Manual, Autodesk published by Autodesk 2013

AR – 221 Structural Design – IV	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = Sessional = 15 Marks, End semester examination = 35*
Marks Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1:

a) Statically determinate and indeterminate structures
b) Differences between statically determinate and indeterminate structures, redundancy for beams, articulate structures, rigidly jointed frames, general method of analysisEquation of parabolic and semi-circular arch

Unit 2:

a) Characteristics of columns and struts
b) Euler's theory of long column
c) Assumptions and limitations of Euler's formula
d) Rankine's formula

Unit 3:

a) Introduction to retrofitting structures
b) Retrofitting techniques
c) Classification of retrofitting technique
d) Seismic retrofitting

Unit 4: Industrial building

a) Introduction
b) Planning
c) Types
d) Roof and side covering
e) Element of Industrial building (no design)
f) Only design steps, for industrial building (no detail design).

Note:

1. Sessional shall be in form of assignments, class work, presentations, along with occasional visits to construction sites.

Textbooks:

1. Theory of structures by B C Punmia , published by Laxmi Publications, 2017
2. Seismic evaluation and retrofit of existing building by AlperIlki & Micheal N Fardis, Springer

Reference Books:

1. Structure‖ by D. L. Schodek& M. Bechthold, published by Prentice Hall, 2015

AR – 222 Climatology – II	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on final portfolio submission and end-semester examination.

Unit 1: Solar oriented architecture, and Wind oriented architecture

a) Introduction to solar oriented Architecture,
b) Study of solar radiation on earth surface through measurement, angles and analysis,
c) Orientation of building, with reference to solar radiation.
d) Active and Passive solar Architecture.

Unit 2: Energy systems

a) Types, availability and reserves of conventional and non-conventional energy sources.
b) Introduction to assessment methods of energy consumption in a building
c) Introduction to methods of energy conservation
d) Study of energy efficient building material and construction techniques. Case study national and international examples. Studio problem.
e) Introduction to climate oriented software and other analytical techniques.

Note:

1. Course would be run through lectures, Audiovisuals and site visits to various laboratories and buildings.
2. Sessional shall be in the form of reports, seminars, and design solutions on different units.

Textbooks:

1. Manual of Tropical Housing and Building by O. H. Koenigsberger, published by Univ. (India) press (P) Ltd., 2013.
2. Climate Responsive Architecture by Arvind Krishnan, Baker, Yannas&Szoklay, published by Tata McGraw Hill Education, 2017.

Reference Books:

1. Handbook on Climatology ―, by Julius Von Han, published by Rear Books Club.com 2022.
2. Climatology: Atmospheric Science ―, by Oliver, Published by Pearson, 2002.
3. Heat Islands: Understanding and mitigating heat in urban areas‖, by Lisa Gartland, published by earthscan publication, 2012.

4. The Art and Science of Lighting Protection, by Martin A Uman , published by Cambridge University press, 2014.
5. Sun, Wind and Light by G. Z. Brown.
6. Energy Efficient Housing by MiliMajumadar, Published by TERI.
7. Climatically Responsible Energy Efficient Architecture by Arvindkrishnan.
8. Climatologically & Solar data for India – T. N. Seshadry.

AR – 223 Building Services – I	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on final portfolio submission and end-semester examination.

Unit 1:

- Introduction to water supply and sanitation, Traditional sources of water supply and sanitation,Classification of water based on its usage, Elements of public/private water supply system, Differentsources of water supply such as wells, reservoirs, etc Water and its qualities, pumping and Distribution. Demand of water for domestic, commercial, industrial and public utility purposes as per BIS standards. Percapita demand, leakage and wastage of water and its preventive measures.
- Storage and Distribution of Water - Different methods of water distribution boosting water, gravity and pressure distribution by storage tanks of individual buildings.System of water supply: Continuous, intermittent, their advantages and disadvantages Service connections, types and sizes of pipes, water supply fixture and installations, special installation in multistoried buildings.

Unit 2:

- Types of fittings like taps, bathtubs, showers, jets, cocks, valves, electrical fixtures etc., Faucets forkitchens, bathrooms and toilets, Check valves, foot valves, sump pump check valves, and pressure testgauges., Building service connections, cold and hot water distribution systems in buildings and theirDesign, materials, joints, fittings and valves (gate, flap, ball, flush valves etc.), Direct and indirect systems, individual water supply, special installation on multi-storied buildings. Special emphasis on city level distribution of water

Unit 3:

- Principles of drainage, surface drainage combined and separate system of drainage, shape and sizes of drainsand sewers, storm water over flow chambers, methods of laying and construction of sewers. House drainage: traps – shapes, sizes, types, materials and function.
- Inspection chambers: sizes and construction.
- Ventilation of house drainage: Anti siphonage and vent pipes, single stack and double stack system Types of fixtures and materials: sinks, baths, water closets, flushing cisterns, urinals, sinks etc Septic tanks,Dispersion trench and soak pits.
- Waste-water disposal systems, septic tank and its design, soil adsorption system, alternatives, solidwastes collection and removal from buildings, On-site processing and disposal methods, Aerobic

andAnaerobic decomposition, purifying capacity of water bodies, Bio-chemical Oxygen Demand,Roads and Pavements, Different types, water bound macadam, tar bitumen, asphalt and Cement concrete roadssoil stabilization, types of paving-murram, brick and stone paving, Drainage of roads, sub- drains,culverts, ditches and gutters

Sanitation - I

- Basic principles of sanitation
- General introduction to various sanitary fitting & fixtures, their placement, functions and constructional details.
- Study of internal & external drainage system including study of duct for various buildings including small residences, apartments, block of houses, public buildings etc.
- Study of various types of sanitary pipes, construction of joints and laying of pipes.
- Study of Traps, Inspection chambers, Manholes, Septic tanks, Soak pits, and Public sewage line.
- Study of storm water disposal at site and settlement level.
- Properties of Solid Wastes: Physical and chemical composition of municipal solid wastes, waste generation rates.
- **Management of Solid Wastes in India: Prevalent SWM practices and deficiencies:** Storage of waste at source, segregation of wastes, primary collection of waste, transportation of waste, disposal of wastes.
- **Disposal of Wastes:** Sanitary landfilling, Composting, Incineration, Pyrolysis – advantages and limitations.

Note:

1. Sessional shall be in the form of sanitation schemes, water supply schemes and design of toilets of the given building or buildings..

Textbooks:

1. Water Supply & Sanitary Engineering‖ by S. C. Rangwala, published by Charotar Publishing House (P) ltd., 30th Ed. 2022
2. Text book of Water supply and sanitary engineering‖ - by S.K. Hussain, published by Oxford & IBH – Publications – New Delhi, 2017

Reference Books:

1. Water Supply and Sanitary engineering‖ by G. Birdie & J. Birdie, published by DhanpatRai Publications, 2010
2. Sanitary Engineering with respect to water supply & sewage disposal‖ by L. Francis & V. Harcourt, published by Legare Street Press 2022

3. Domestic Sanitary Engineering and Plumbing, Dealing with domestic water supplies, pumpǁ, by F. W. Raynes, published Legare Street Press 2022

AR – 224XX Elective IV	L	S	Credits
01 Architecture in South East Asia	**4**	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: History and the major settlements of SE Asian countries – Myanmar (Burma), Thailand, Laos, Cambodia, Vietnam, Malaysia, Singapore, Indonesia, and the Philippines.

Unit 2: Characteristic Classification of Architectural styles in SE Asia

Unit 3: Development of Architectural form – Technology, Style, Character

Unit 4: Contemporary Architecture in South East Asia

Reference Books:

1. History of South East Asia by D.G.E. Hall, Published by Bloomsbury USA 3PL, 1981
2. South Asia's Modern History by Michael Mann, Published by Routledge, 2014
3. Modern South Asia: History, Culture, Political Economy by Sugata Bose, Published by Taylor & Francis, 2017
4. Connected Histories of India and Southeast Asia: Icons, Narratives, Monuments by Parul Pandya Dhar, Published by SAGE Publications India Pvt Ltd, 2022
5. The Palaces of South-East Asia: Architecture and Customs by Jacques Dumarçay, Michael Smithies, Published by Oxford University Press, USA, 1991
6. The Living House: An Anthropology of Architecture in South-East Asia by Roxana Waterson, Published by Tuttle Publishing, 2014

AR – 224XX Elective IV	L	S	Credits
02 Appropriate Building Technologies	**4**	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Understanding Building in context

Unit 2: Appropriate technologies and cost effective technologies

Unit 3: Technologies as evolved from contexts through the practice of International architects and Indian architects

Unit 4: Systems and technique developed in research labs

Reference Books:

1. Building: 3,000 Years of Design, Engineering and Construction by Bill Addis, Published by Phaidon Press, 2015
2. Sustainability & Scarcity: A Handbook for Green Design and Construction in Developing Countries by Peter Ozolins, Published by Routledge, 2015
3. Dwelling in Resistance: Living with Alternative Technologies in America (Nature, Society, and Culture) by Chelsea Schelly, Published by Rutgers University Press, 2017
4. Smart Surfaces and their Application in Architecture and Design by Thorsten Klooster, Published by Birkhauser, 2009
5. Solar Pumping for Water Supply: Harnessing solar power in humanitarian and development contexts by Alberto Ibáñez Llario, Asenath W. Kiprono, Published by Practical Action Publishing, 2020
6. Automation Systems in Smart and Green Buildings (Modern Building Technology) by V K Jain, Published by Routledge, 2009

AR – 225 Architectural Design - IV	L	S	Credits
	0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on final portfolio submission and viva voce

Objective:

This course focuses on buildings of residential use. It aims to enhance the students understanding of the complexities of architectural design for residential needs and develop creative design solutions for good living environments.

Content:

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

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

Large guest house, students hostels, small hotel, holiday resort, motel, row housing, block of flats and residential complexes at an intermediate scale such as staff housing, housing for specific communities in urban and rural areas such as home for the aged, fishermen's housing etc.

Necessary theoretical inputs to be given highlighting the norms and design issues. The topics not covered, as design problems will have to be covered by the studio faculty members through lectures/slide shows and case studies.

Atleast One major exercises and two minor design/time problems should be given. The final submission shall necessarily include a model for at least one of the two main problems.

Module 1: Study tour

The class will undertake a study tour to visit a prominent institution of the studio exercise typology as a live case study and visit places of architectural interest in the vicinity of a city identified within the country.

Module 2:The following topics may be covered for the studio exercise:

a) Institution of learning and research institutes – *colleges with various departments such as medical, engineering, law, business, music and dance, vocational training, etc.*

b) Institutions of life support – *hospitals, reformatories, and rehabilitation institutes for people with disabilities.*

c) Administrative or legal institutions – *the high courts, secretariat, development authorities, directorates, etc*.

At least one major exercise and one minor design/time problem will be assigned in the studio. The final submission shall include a model for at least one of the two main problems.

Note:

1. 25% of the total credit will be assigned to a study tour, and 75% of the total credit will be assigned to the studio exercise.
2. Sessional will be in the form of drawings and models along with project report for the design dealt. The evaluation shall be done in intermediate reviews consisting of internal and external experts. There should be regular site visits / case studies of buildings, so as to document them with the help of photographs, slides, etc.

Textbooks:

1. Principles of Modern Architecture‖ by C. Norberg-Schulz, published by Andreas Papadakis. 2000
2. A Visual Dictionary of Architecture‖ by F.D.K. Ching, published by John Wiley &Sons. 2012

Reference Books:

1. Architects Data‖ by P. Neufert, 3rd Ed., published by Blackwell Science. 2000
2. Time-saver Standards for Architectural Design: Technical Data for Professional Practice‖ by D. Watson (Editor), 8th Ed., published by McGraw-Hill. 2005.
3. Time Saver Standards for Architectural Design‖ by Donald Watson, published by McGraw Hill Edu (India) Ltd., 2011

AR – 226 Building Constructions & Materials - IV	L	S	Credits
	0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination =105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on final port folio submission,and end-semester examination and VIVA

Unit 1: Special openings

a) Sliding, Folding , Hinged and Revolving doors,
b) Design and Constructional details of sliding,
c) Rolling shutters and types of Rolling shutters
d) Collapsible shutters
e) The installation, working and mechanism of such doors and shutters.

Unit 2: Metal Doors, Windows and Partitions

a) Doors and Windows in steel, aluminum along with technical terminology involved.
b) Types and varieties of available sections in steel and aluminum in market and their application in providing doors, windows and partitions.
c) Design considerations and construction details in congruence to IS codes and manuals provided by CPWD and other organizations.

Unit 3: Special entrances

a) Study of steel railing, jali, grills, and ladders.
b) Design and construction details of fixed glazing
c) Study of compound wall (including advance type) with security arrangement
d) Study of wicket gate and large entrance gates rolling on wheels.

Unit 4: Finishes and surface treatments

a) Study of expansion joints, waterproofing and roof light.
b) Study of details of various methods of common façade treatments.
c) Study of details of various methods of common interior finishes.

Unit 5: Materials For Specific Uses

a) Thermal insulation material
b) Waterproofing materials, its importance, stages, methods and techniques of waterproofing.

c) Fire resistant materials

d) Materials used in termite control

Unit 6: Synthetic Materials, Eco friendly Materials, By-product materials

a) Wallpapers

b) Plastics & Polymers

c) Soft Boards and Eco Boards

d) Materials from industrial, agricultural and mineral wastes e.g. fly ash, furnace slag, lime kiln rejects, red mud, rice husk ash, saw dust, wooden chips, fibres, wood wool, etc.

e) Bamboo as a building materials, preservation of bamboo, use of bamboo in buildings including techniques involved.

Note:

1. There shall be regular site visits to buildings, under construction or Constructed, to explain the above topics. Use of audio-visuals should be stressed.
2. Sessional work shall be done as scaled drawings on drawing sheets and freehand drawings along with occasional visits to construction sites.

Textbooks:

1. Building Construction Handbook‖ by Roy Chudley and Roger Greeno, published by taylor&francis; 2020
2. Engineering Materials: Properties and Selection‖ by Kenneth G. Budinski, Michael K. Budinski, Published by Prentice Hall; 9 edition (February 13, 2009)

AR – 227	**Architectural Graphic III (Computer Application)**	L	S	Credits
		0	**4**	**4**

Contact hours per week : 4 *(4 studios per week)*
Distribution of marks : *Sessional = 30 Marks, End Semester = 70 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on final port folio submission and Viva.

Objective:

To enable the students to learn the techniques of preparing presentations, architectural drawings and technicaldocuments which are used for construction of buildings.

Outline:

The enlisted software shall be introduced and students shall give submissions in soft and hard copy format to display their skills in the same.

a) Architectural Drafting of three dimensional drawings in AutoCAD.
b) Introduction to Autodesk Revit and its application in two dimensional architectural drafting.
c) Application of Autodesk Revit in three dimensional architectural drafting.
d) Introduction to Sketchup and its application in three dimensional views.
e) Rendering three dimensional views using V-Ray.
f) Introduction to advanced professional application of modelling, walkthrough, animation, rendering and presentation techniques in Autodesk 3DS Max.

Note:

1. Sessional shall be in form of small exercises/ practical projects.

Textbooks:

1. AutoCAD Manual, Autodesk published by Autodesk 2013

AR – 311 Structural Design - V	L	S	Credits
	2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Analysis and design of singly and doubly reinforced beam

Unit 2: Design of axially loaded column and isolated footing

Unit 3: Design of slab

Design of one-way and two-way slab, Design of waist slab *(For dog-legged and open well staircase)*

Note: *Use of I.S. code 456 is permitted during the examination*

Textbooks:

1. Arun K. Jain, Ashok K. Jain, and B. C. Punmia (2016). *Limit State Design of Reinforced Concrete*. Laxmi Publications.
2. R. N. Pranesh and N. Krishna Raju. (2018). *Reinforced Concrete Design: Principles and Practice*. New Age International Pvt. Ltd.
3. S. S. Bhavikatti. (2021). *Strength of Materials*. S Chand and Company Ltd. (Fifth Edition).

Reference Books:

1. Neelam Sharma. (2022). *R.C.C. Design & Drawing*. S.K. Kataria & Sons.
2. D. L. Schodek. and M. Bechthold. (2015). *Structures*. Pearson Education India. (Seventh Edition).
3. N Krishna Raju. (2019). *Design of Reinforced Concrete Structures I.S.: 456-2000.* C.B.S. Publishers & Distributors Pvt. Ltd.

AR – 312	**Environmental Studies**	L	S	Credits
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction to Ecosystems and Environment and Environmental Resources

Concept of environment, types of ecosystems, characteristic features, structure, and functions of Ecosystems – *Forest, Grassland, Desert, Aquatic (lakes, rivers, and estuaries), Land, Forest, Water, and Energy as environmental resources.*

Unit 2: Environment, Ecosystem, Biodiversity, and its conservation.

Value of bio-diversity – *consumptive and productive use, social, ethical, aesthetic values*; Bio-geographical classification of India – India as a mega diversity habitat; Threats to biodiversity hotspots, conservation of biodiversity – *in-situ and ex-situ conservation.*

Unit 3: Institutions and Governance

Introduction to Government regulations, Monitoring and enforcement of environmental laws, Introduction to Environmental Acts, viz., *Water (Prevention and Control of Pollution) Act, Air Prevention and Control of pollution act, Environmental protection act, Wildlife protection act, Forest conservation act, etc.*

Textbooks:

1. A. Kaushik and C. P. Kaushik (2010). *Basics of Environment and Ecology*. New Age International Publishers.
2. R. Rajagopalan. (2016). *Environmental Studies: From Crisis to Cure*. Oxford University Press. Third Edition
3. Shashi Chawla. (2017). *A Textbook of Environmental Studies*. McGraw Hill Education.

Reference Books:

1. K. C. Agarwal. (2008). *Environmental Biology*. Bikaner: Nidhi Publications Ltd.
2. E. Bharucha. (2021). *Textbook of environmental studies for undergraduate courses*. New Delhi: Universities Press, U.G.C.
3. J. Benny. (2009). *Environmental Studies*. New Delhi: Tata McGraw Hill.

AR – 313XX Elective - V	L	S	Credits
01 Interior design	**4**	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction to Interior Design

Understanding the process of interior design, and the role of an interior designer

Unit 2: Application of Interior Design

Historical background of interior design at a global level; Impact of Interior spaces on human behaviors and psychology.

Unit 3: Design schemes

Interior design schemes for various building typologies – *Reception halls, waiting-for lounges, restaurants, offices, residential spaces, hotels, theatres, assembly halls, etc.*

Unit 4: Material selection and services

Elements and components of interior design, Materials in interior design, and, Services in interior design.

Note: *Submissions for the Continuous internal assessment will be in the form of writeups, reports and sketches, schematic and scaled drawings, etc., on the above topics.*

Reference books:

1. Courtney Nystuen and Maureen Mitton. (2021). *Residential Interior Design: A Guide to Planning Spaces.* Wiley Publications.
2. Chris Grimley and Mimi Love. (2018). *The Interior Design Reference & Specification Book updated & revised: Everything Interior Designers Need to Know Every Day*. Rockport Publishers.
3. Tomris Tangaz. (2019). *The Interior Design Course: Principles, Practices, and Techniques for the Aspiring Designer*. Thames and Hudson Ltd.
4. Frida Ramstedt. (2020). *The Interior Design Handbook: Furnish, Decorate, and Style Your Space.* Clarkson Potter Publications.

AR – 313XX Elective - V	L	S	Credits
02 Art in architecture and the history of Meghalaya's art and culture	**4**	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction

Art vocabulary – *Natural, Realistic, Symbolic, Abstract, Modern, and Contemporary*; Geometry in art and architecture – *comprehending and applying the golden ratio*; Geometric shapes, patterns, and architectural volumes.

Unit 2: Ideologies of Aesthetics in Art

Understanding the ideologies of aesthetics in art; Vitruvius and Michael Angelo's proportions; Symbolism in Architecture;

Unit 3: Development of Art

Development of art over a period of time; Art as a form of social consciousness; Impact of Culture and Religion on art, Understanding the role of art in contemporary society; Art of façade measurement by trigonometry; Representation of modern art in Architecture.

Unit 4: Meghalaya's art and culture

Study of the tribes of Meghalaya; Vernacular architectural style of Meghalaya; Impact of socio-cultural beliefs and lifestyle on the settlements of these tribes.

Textbooks:

1. Anjali Singla. (2021). *Arte: An Architectural Anthology*. Notion Press.
2. Russell Sturgis. (2022). *The Appreciation of Architecture; How to Judge Architecture*. Legare Street Press.
3. Sonia Mehta. (2018). *Off to Meghalaya (Discover India)*. Puffin.

Reference books:

1. Stephen Hoban. (2013). *An Architectural Appreciation.* Guggenheim Museum Publications.
2. Jennifer Snyder (2016). *An Art Appreciation Primer: Elements and Principles of Design*. Cognella, Inc.

AR – 314	**Building Services - II**	**L**	**S**	**Credits**
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Lighting systems

Principles of electricity – *generation, transmission, and distribution of power; types of transformer and generators, and U.P.S.*; Types of wires and wiring layout for buildings, electrical symbols;

Unit 2: Lighting design

Building lighting systems – *artificial illumination, various types of lighting fixtures (concealed and surface fixtures), methods of lighting (direct/semi-direct/indirect, accent, focus, spot, floodlights, yard lighting, etc.),* lighting load (lux level) calculation; lighting automation systems.

Unit 3: Firefighting

Terminologies of Fire and Life Safety, Types of fire and fire extinguishers, causes of fire, fire safety standards, fire resistance in buildings, firefighting requirements, and installations for buildings of various occupancy types; N.B.C. guidelines for fire hazards – *design of emergency escape routes, access to fire-tenders, firefighting installations, fire detection, and alarm systems; human response,* etc.; Firefighting layout design for various occupancy types.

Unit 4: Electronic security and surveillance systems

Components of basic security and surveillance systems, understanding CCTV cameras – *pan, tilt, and zoom mechanisms*, Security lighting – *illumination types including infra-red lighting systems*, Recording systems – *analogue and digital recording systems*.

Textbooks:

1. V. K. Jain. (2009). *Automation Systems in Smart and Green Buildings (Modern Building Technology)*. Khanna Publishers.
2. David M. and McGrail. (2014). *Study guide for Firefighting Operations in High-Rise and Standpipe-Equipped Buildings*. Cram101.
3. Bureau of Indian Standards. (2016). Vol. -1. *National Building Code of India 2016*. Bureau of Indian Standards.
4. C. Spangler, J. R. Benya, and M. Karlen. (2017). *Lighting Design Basics*. Wiley.

Reference Books:

1. E. R. Ambrose. (n.d.). *Heat pumps and Electric Heating*. John and Wiley and Sons Inc, New York.
2. Bureau of Indian Standards. (n.d.). *Handbook for Building Engineers in Metric systems*. Bureau of Indian Standards.
3. R. G. Hopkinson and J. D. Kay. (n.d.). *The Lighting of Buildings*. Faber and Faber, London.

AR – 315	**Building Information Modelling**	**L**	**S**	**Credits**
		0	**4**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction to BIM

Global trends in the Digital Transformation journey, BIM Uses, BIM in project life cycle, Employer's information requirement, High strategy plan, BIM Execution Plan, Common Data Environment, Integrated Project Delivery,

Unit 2: BIM fundamentals

Level of Detail and Development, Soft-Landings of BIM Projects, Claims, Disputes, and Litigations in BIM Projects, ISO 19650 series, BIM Maturity levels, Integrating Lean and Green with BIM Projects, Return on Investment.

Textbooks:

1. D. Holzer. (2016). *The BIM Manager's Handbook: Guidance for Professionals in Architecture, Engineering, and Construction.* John Wiley & Sons.
2. Béda B. Júnior., and T. Zlatar. (2018). *Building Information Modelling*. Lambert Academic Publishing.

Reference books:

1. C. Eastman. (2018). *BIM Handbook: A Guide to Building Information Modeling for Owners, Managers, Designers, Engineers, and Contractors.* John Wiley & Sons.
2. Steve Race. (2019). *BIM Demystified: An Architect's Guide to Building Information Modelling/Management*. RIBA Publishing.

AR – 316	**Architectural Design - V**	**L**	**S**	**Credits**
		0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance and stage submissions.

End-semester examination – Evaluation based on the end-semester examination Viva-voce.

Course objective: The studio focuses on institutional design and detailing skills required to design institutions in urban contexts.

Outline:

Necessary theoretical inputs will be given, highlighting the norms and design issues. The following matters relating to institutional design will be addressed:

a) Nature of contemporary institution, correlation to urban structure.
b) Development control and urban infrastructure affecting design.
c) Various attitudes to building in an urban context.
d) Institutional character, integration to function and circulation, climate, structural system, and services into the group of buildings.
e) User behaviour and requirements for universal/barrier-free design.

Module 1: The following topics may be covered for the studio exercise:

a) Institution of learning and research institutes – *colleges with various departments such as medical, engineering, law, business, music and dance, vocational training, etc.*
b) Institutions of life support – *hospitals, reformatories, and rehabilitation institutes for people with disabilities.*
c) Administrative or legal institutions – *the high courts, secretariat, development authorities, directorates, etc*.

At least one major exercise and one minor design/time problem will be assigned in the studio. The final submission shall include a model for at least one of the two main problems.

Note:

1. Stage submissions for continuous internal assessments will include drawings and models.
2. The evaluation shall be done in intermediate reviews consisting of internal and external experts.
3. Site visits to the building typologies dealt in the studio problems should be encouraged for documenting them with the help of photographs, freehand sketches, etc.

Reference books:

1. F. D. K. Chings. (2013). *Introduction to Architecture*. Wiley.
2. Bureau of Indian Standards. (2016). Vol. -1 & 2. *National Building Code of India 2016*. Bureau of Indian Standards.
3. Ernst Neufert. (2019). *Architect's data.* Wiley-Blackwell. (Fifth edition).
4. Dept. of Urban Affairs. (2021). *Meghalaya Building Bye-Laws.* Government of Meghalaya.
5. K. Arora., N. Srivastav., and S. Srivastav. (2022). *Solutions Architect's Handbook*: *Kick-start your solutions architect career by learning architecture design principles and strategies.* Packt Publishing Limited.

AR – 317	**Building Constructions & Materials – V**	**L**	**S**	**Credits**
		0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional =45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance and stage submissions.
End-semester examination – Evaluation based on the end-semester examination Viva-voce.

Unit 1: Beams

Formwork for beams; Simply supported, continuous and cantilevered beams; Inverted beams, L & T beams, Details at odd junctions

Unit 2: Slabs

Formwork for slabs; One-way and two-way slabs, Continuous slabs, Flat slabs, Waffle slabs, and Reinforced brick slabs.

Unit 3: Foundation (Module 1)

Foundation for load bearing and R.C.C. framed structures; Types of foundations – *shallow and deep footing*; various types of pile foundations

Unit 4: Foundation (Module 2)

Formwork for different types of foundations; Brick foundations; R.C.C. column footings – *isolated and combined footings*; Raft foundations; Grillage foundations.

Unit 5: Staircases

Types of staircases; Formwork for R.C.C. waist slabs and folded plate staircases; details of R.C.C. and steel staircase; details of fixing handrail.

Unit 6: Ramps

Formwork for ramps and ramp gradient calculations; details of R.C.C ramps; details of fixing handrail.

Note:

1. Site visits to under-construction buildings should be encouraged to explain the topics listed above.
2. Stage submissions for continuous internal assessments will include scaled drawings and models.
3. The evaluation shall be done in intermediate reviews consisting of internal and external experts.

Textbooks:

1. W. B. McKay. (2013). *Building Construction.* Pearson Education India. (Fifth edition).
2. F. D. K. Ching. (2022). *Building Construction Illustrated*. Wiley.
3. R. S. Rangwala. (2022). *Building Construction.* Charotar Publishing House Pvt. Ltd.

Reference books:

1. R. Barry. (2010). *The Construction of Buildings – Vol. – 1.* East-West Press. (Sixth edition).
2. Stephen Emmitt. (2018). *Barry's Advanced Construction of Buildings.* Wiley-Blackwell. (Fourth edition).
3. Gurcharan Singh. (2019). *Building Construction and Materials*. Standard Book House (Since 1960).

AR – 321	**Structural Design - VI**	L	S	Credits
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Design and material specification of simple and eccentric bolted, riveted, and welded connections.

Unit 2: Design of axially loaded tension members, lug angle, and tension splice.

Unit 3: Design of compression members, lacing, and battening for built-up compression member, slab base, steel beam, built-up beams, and gantry girder.

Note: *Use of steel table and I.S. code 800 is permitted during the examination.*

Textbooks:

1. N. Subramaniam. (2018). *Design of steel structures: Limit state method.* Oxford University Press.
2. S. K. Duggal. (2019). *Limit state design of steel structures.* McGraw-Hill. (Third edition).
3. R. K. Bansal. (2020). *Strength of materials.* Rainbow book distributors. (Sixth edition).

Reference books:

1. D. Schodek., and M. Bechthold. (2015). *Structures.* Pearson Education India. (Seventh edition).
2. Arun K. Jain., Ashok K. Jain., and B. C. Punmia. (2016). *Limit state design of reinforced concrete.* Laxmi Publications.
3. Ramachandra., and V. Gehlot. (2018). *Limit state design of concrete structures.* Scientific publishers (India).

AR – 322	**Estimation, costing & specification**	L	S	Credits
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Specification

Importance and methods of drafting specification in buildings; methods of specification writing – *trade wise practice, items of works*, **s***tandard clauses/ instructions for various items of work; - Examples of specification for a structure from excavation up to finishing of the superstructure.*

Unit 2: Introduction to estimates

Types of estimates; methods of preparing estimates; data required for making an estimate; long wall & short wall methods of estimation**;** estimation of a single storey – *load bearing brick masonry building and R.C.C. framed building.*

Unit 3: Methods of estimation and rate analysis

Mensuration; general terms, standard modes of measurement, schedule of rates, commercial abbreviations, methods and procedure of taking off abstractions; rate analysis, cost of materials and labour for various works; measurement of work for interim and final certificates for payment to contractors; working up and billing – *Examples and exercises for the discussed topics (from excavations to completion).*

Textbooks:

1. S. C. Rangwala. (2017). *Estimating, costing, and valuation book.* Charotar publishing house Pvt. Ltd.
2. M. R. Rethaliya., and R. P. Rethaliya. (2018). *Estimating, costing, and valuation.* Atul Prakashan.
3. B. N. Dutta. (2022). *Estimating and costing in civil engineering (Theory and Practice).* C.B.S. Publishers & Distributors Pvt. Ltd. (Twenty-eighth edition).

Reference books:

1. CPWD. (2019). *Specification – Vol. 1 & 2.* CPWD., Govt. of India.
2. CPWD. (2021). *Plinth area rates.* CPWD., Govt. of India.
3. CPWD. (2021). *Delhi Schedule of Rates – Vol. 1 & 2.* CPWD., Govt. of India.
4. Meghalaya P.W.D. (Buildings). (2022). *Schedule of rates.* P.W.D. (Buildings), Govt. of Meghalaya.

AR – 323XX Elective - VI	L	S	Credits
i. Universal design for differently abled	**4**	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction to universal design

General terms, types of disabilities, mobility devices and controls; Display signages and design elements of barrier-free design for the differently abled; adherence to updated bye-laws for the design recommendations for universal design.

Unit 2: Design elements

Design elements for barrier-free design within buildings of various typologies – *approach to plinth levels, corridors, entrance and exit, windows, stairways, lifts, toilets, signage, guiding and warning systems, floor materials;* Design elements for barrier-free design at the site – *site planning and parking design, kerb at the footpath, road crossing, public toilet, bus stop, toilet booth, and signage*.

Unit 3: Design – Module I

Barrier-free design for building indoors – *for private, semi-public, and public buildings.*

Unit 4: Design – Module II

Barrier-free design for building outdoors – *for private, semi-public, and public buildings.*

Note: *Submissions for the Continuous internal assessment will be in the form of writeups, reports and sketches, schematic and scaled drawings, etc., on the above topics.*

Textbooks:

1. William Lidwell. (2018). *The Pocket Universal Principles of Design: 150 Essential Tools for Architects, Artists, Designers, Developers, Engineers, Inventors, and Makers*. Rockport Publishers.
2. B. Hanington., and B. Martin. (2022). *Universal methods of design: 125 ways to research complex problems, develop innovative ideas, and design effective solutions.* Rockport Publishers.

Reference books:

1. J. De Chiara. (2017). *Time-Saver Standards for Building Types*. McGraw Hill Education.
2. J. De Chiara., J. Panero., and M. Zelnik. (2017). *Time-Saver Standards for Interior Design and Space Planning*. McGraw Hill Education**.**
3. C. Harris., and N. Dines. (2017). *Time-Saver Standards for Landscape Architecture*. McGraw Hill Education**.**

AR – 323X	**Elective - VI**	L	S	Credits
ii.	***Sustainable Architecture***	**4**	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction to sustainability

Introduction to ideas and concepts of sustainable development and architecture, the global environment, and the built environment; Introduction to sustainability principles in architecture.

Unit 2: Study of sustainable practices

Study sustainable architecture through traditional practices; use of energy, materials, health, and global environment as related to the construction and operation of buildings.

Unit 3: Sustainable and Conservation Practices

Water management and conservation systems; Waste management systems – *solid and sewage waste management*; Energy conservation and management systems.

Unit 4: Sustainable energy systems

Introduction to low-energy designs and hybrid systems; Integration of photovoltaic panels, wind, and other renewable energy systems in the building; passive solar architecture for heating and cooling systems in buildings; use of design tools for utilizing natural daylight in buildings.

Textbooks:

1. David Bergman. (2013). *Sustainable Design*. Princeton Architectural Press.
2. The Plan. (2021). *Sustainable Architecture (Contemporary Architecture in Detail)*. Promo press.
3. Ryan Ludwig. (2021). *Beyond Sustainable: Architecture's Evolving Environments of Habitation*. Routledge.

Reference books:

1. Michele G Melaragno. (1982). *Wind In Architectural and Environmental Design.* Van Nostrand Reinhold Company.
2. Cathy Strongman. (2010). *The Sustainable Home: The Essential Guide to Eco Building, Renovation and Decoration*. Merrell Publishers.

AR – 324	**Building Services – III**	L	S	Credits
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction to acoustics

Definitions, terms related to acoustics; Theory of sound – *generation, propagation, transmission, reception of sound, sound waves, frequency, intensity, wavelength, sound pressure, measurement of sound*; Characteristics of speech – *distribution of energy in speech and music frequencies, intelligibility of speech, high fidelity reproduction of music*.

Room acoustics - *resonance, reverberation, echo, reverberation time, simple exercise using Sabine's formula*; Acoustical requirements of different types of building sound absorption – *absorption co-efficient and their measurements*, *Absorbing materials used and their choices, exercises involving reverberation time and absorption co-efficient, sound insulation, materials*.

Unit 2: Application of acoustics

Sources and types of noise in and around buildings, characteristics and effect of noise, impact on human beings/behaviour, noise curves, transmission of noise, noise control for buildings; Sound amplification and distribution, sound reinforcement of different rooms; noise reduction, sound isolation, transmission loss for walls, vibration isolation guidelines, characteristics of duct system, noise in AC ducts, vibration isolation of pumps and generators, speech privacy, annoyance, background noise, communication in open plans, electronic sound systems, load speaker's layout.

Design, construction details, and treatment for interior surface – *basic principles in designing open air theatres, cinemas, broadcasting studios, concert halls, class rooms, lecture halls, theatres, and auditorium.*

Textbooks:

1. T. R. Smith. (2022). *Acoustics in Relation to Architecture and Building: The Laws of Sound as Applied to the Arrangement of Buildings*. Forgotten Books.
2. M. A. Madhuvanthi. (2020). *A Study of Acoustics in Performance Spaces – With Special Reference to Indian Classical Music*. Vanamala Center for Art and Culture.
3. S. L. Garrett. (2020). *Understanding Acoustics: An Experimentalist's View of Sound and Vibration.* Springer. (Second edition).

Reference books:

1. S. M. Patil. (2014). *Building Services.* Standard Publishers Distributors.
2. Arpit Jain. (2019). *Acoustic Design of Recording Studios: Architecture & Building Design*. Arpit Jain (Independently published).
3. Robert Peters. (2022). *Uncertainty in Acoustics: Measurement, Prediction and Assessment*. CRC Press.

AR – 325	**Architectural Design -VI**	L	S	Credits
		0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance and stage submissions.
End-semester examination – Evaluation based on the end-semester examination Viva-voce.

Course objective: The studio focuses on multi-use building design and detailing skills required to design large-scale public complexes.

Outline:

Necessary theoretical inputs will be given, highlighting the norms and design issues. The following matters relating to institutional design will be addressed:

1. The site and climatic conditions
2. Socioeconomic conditions,
3. User behavior and requirements,
4. Space conservation in urban areas,
5. Form and function,
6. Horizontal and vertical circulation system,
7. Landscape and site planning,
8. Structure and services
9. Design details for the differently abled, etc.

Module 1: Study tour

The class will undertake a study tour to visit a prominent institution of the studio exercise typology as a live case study and visit places of architectural interest in the vicinity of a city identified within the country.

Module 2: The following topics may be covered for the studio exercise

Public building typology, i.e., *interstate or intercity bus terminals, multiplex, multipurpose halls, sports complexes, auditoriums, community centers, information centers, entertainment centers, museums, art galleries, etc.*

Note:

1. 25% of the total credit will be assigned to the study tour and 75% to the studio exercise.
2. Site visits to under-construction buildings should be encouraged to explain the topics listed above.
3. Stage submissions for continuous internal assessments will include scaled drawings and models.
4. The evaluation shall be done in intermediate reviews consisting of internal and external experts.

Reference books:

1. F. D. K. Chings. (2013). *Introduction to Architecture.* Wiley.
2. Bureau of Indian Standards. (2016). *National Building Code of India 2016 Vol. -1 & 2*. Bureau of Indian Standards.
3. Ernst Neufert. (2019). *Architect's data*. Wiley-Blackwell. (Fifth edition).
4. Dept. of Urban Affairs. (2021). *Meghalaya Building Bye-Laws*. Government of Meghalaya.
1. K. Arora., N. Srivastav., and S. Srivastav. (2022). *Solutions Architect's Handbook: Kick-start your solutions architect career by learning architecture design principles and strategies*. Packt Publishing Limited.

AR – 326	**Building Constructions & Materials – VI**	L	S	Credits
		0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance and stage submissions.
End-semester examination – Evaluation based on the end-semester examination Viva-voce

Unit 1: Structural steel frame

Functional requirements – *design methods, steel sections, structural steel frames, steel joinery details, etc.*

Unit 2: Structural Steelwork – Module I

Shapes of structural steel, rivets, beams, and steps to be followed to design a simply supported steel beam, compression members.

Unit 3: Structural Steelwork – Module II

Columns and stanchions, framing long spans, trusses, stanchion base, welding, types of weld joints, column and beam connections, plate girders, lattice or warren girder.

Unit 4: Advanced steel frames

Industrial structures in steel, multi-storied/tall structures/towers.

Unit 5: Steel roof structures for large spans

Large Span Construction-flat slabs-shell structures, folded plates, portal frames, space frame & trusses, tensile structures.

Unit 6: Pre-engineered structures

Pre-fabricated construction & Pre-engineered building. New Material in Construction. Cold form sections, FRP.

Note:

1. Site visits to under-construction buildings should be encouraged to explain the topics listed above.
2. Stage submissions for continuous internal assessments will include scaled drawings and models.
3. The evaluation shall be done in intermediate reviews consisting of internal and external experts.

Textbooks:

1. S. K. Duggal. (2013). *Earthquake Resistant Design of Structures*. Oxford. (Second edition).
2. M. Sarkisian. (2016). *Designing Tall Buildings: Structure as Architecture.* Routledge. (Second edition).
3. R. J. Kumar., S. Kalpanadevi., and V. S. Rajan., (2021). *Prefabricated structures.* ARS Publications, Chennai.
4. F. D. K. Ching. (2022). *Building Construction Illustrated.* Wiley.
5. R. S. Rangwala. *(2022). Building Construction.* Charotar Publishing House Pvt. Ltd.
6. Sushil Kumar. (n.d.). *Building Construction*. Standard Publishers Distributors.

Reference books:

1. R. Barry. (2010). *The Construction of Buildings – Vol. – 3, and 4.* East-West Press. (Sixth edition).
2. Stephen Emmitt. (2018). *Barry's Advanced Construction of Buildings*. Wiley-Blackwell. (Fourth edition).
3. Gurcharan Singh. (2019). *Building Construction and Materials*. Standard Book House (Since 1960).

AR – 327	**Working Drawing - I**	L	S	Credits
		0	**4**	**4**

Contact hours per week : *4 (4 studios per week)*

Distribution of marks : *Internal =45 Marks, End semester examination =105 Marks*

Questions to be set : *N.A.*

Questions to be answered : *N.A.*

Duration of end semester examination : *N.A. – Viva-Voce*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Course objective: To teach the students how to prepare detailed technical drawings for execution from inception to completion at the site during building construction.

Outline:

1. Conventional architectural drafting – Office format and standards (including sheet size and scale).
2. Drafting conventions, appropriate graphic symbols, and representations.
3. Preparation of permission drawings, floor and roof plans, site plans, elevations, sections, setting out, excavation plans, etc.
4. Preparation of detailed drawings for the schedule of openings, staircase, kitchen, toilets, electrical layout, water supply & sanitary layout, joinery (wood/ metal/ polymer, etc.), finishes, etc.

Note:

1. The above drawings will be prepared for one residential/commercial/industrial/public building.
2. Detailed drawings of an appropriate scale will be submitted for the continuous internal assessment and the end-semester portfolio on appropriate-sized drawing sheets.

Reference books:

1. Andrew Bichard., and Keith Styles. (n.d.). *Working Drawings Handbook.* Routledge, 2015
2. O. A. Wakita. (2017). *The Professional Practice of Architectural Working Drawings*. John Wiley & Sons Inc. (Fifth edition).
3. Peter Nicholson. (2022). *The Student's Instructor in Drawing and Working the Five Orders of Architecture.* Legare Street Press.

AR – 411	**Advanced Structural Design - I**	L	S	Credits
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Moment equation method

Unit 2: Slope deflection method

Unit 3: Moment distribution

Unit 4: Column analogy method

Note: *Sessional shall be in form of assignments, class work, presentations, along with occasional visits to construction sites.*

Textbooks:

1. Advanced Theory Of Structures And Matrix Method‖ by Vazarani and Ratwani, Published by Khanna Publishers (2008)
2. Theory Of Structures‖ by R. S. Khurmi, Published by S. Chand Publisher, 10th Edition 2010

Reference Books:

1. Theory Of Structures (Si Units)‖ by Ashok Kumar Jain, Laxmi Publications, 13th Edition 2017
2. Reinforced Concrete Beams, Columns and Frames‖ by Lanos, Christophe, Casandjian, Charles, Challamel, Hellesland, Jostein, Published by Wiley 2013

AR – 412	**Town Planning and Building Bye-Laws**	L	S	Credits
		4	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination =70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Principles of Planning – Types of planning, Elements of planning, Surveys, Landuses, Character, Densities.

Introduction to planning processes – Zoning, zoning regulations, Site planning, Types of plans- development plans, action plans, structure plans, Planning process, Master plan (Development plan) and its component

Planning techniques and theories – Approaches to physical planning, Internal structures of town. Inner city development, Various theories of planning like landuse theory, exploratory theories, speculative theories etc., Systems approach mixed scanning approach, choice theory.

Other aspects of Planning – Introduction to housing – typology, standards, infrastructure and policies, Introduction to transport planning – Network characteristics, Intersections, design of roads, survey methods, Legal aspects of planning –police power, eminent domain, development controls, Urban local bodies, specific Acts like Land Ceiling (and Regulation), Land acquisition act. Various policies and programs of State and Central Government.

Unit 2: Introduction to bye-laws and codes of practice – Building bye-laws – their need and importance, advantages. Introduction to important terms in the building bye-laws. Building bye-laws with respect to various plot sizes, building types and height restrictions.

Special Provisions in the building bye-laws – Building bye-laws for special zones viz. airports, hospitals, commercial, cinema theatres, SEZ etc., Norms and regulations for services as per NBC (Illumination, acoustics, HVAC, firefighting, parking etc.). Provisions for disaster mitigation (Earthquakes, floods, landslides etc.). Introduction to CRZ (Coastal regulation zone) norms.

Textbooks:

1. The Urban Pattern, City Planning and Design‖ by Gallion and Eisner, Published by John Wiley & Sons, 5th Ed. 2005

2. Urban Land Use Planning‖ by Philip R. Berke, David R Godschalk, Published by University of Illinois Press, 5th Ed. 2006

3. Principles of Urban Planning‖ by Lewis Keeble, Published by Estates Gazette, 24 September 2010

4. Meghalaya Building Bye Laws (MBBL 2011)‖, published by Meghalaya Government Printing Press, 2011.

5. Professional Practice‖, by S. C. Rangwala and K. K. Rangwala by Charotar Publishing House, 1990.

Reference Books:

1. Shelter, Settlements and Development‖ by Rodwin and Lloyd

2. Ekistics: An introduction to the science of Human Settlements‖ by Doxiadis

3. "National Building Codes (NBC) - 2005‖,published by Bureau of Indian Standards, 2005.

AR – 413XX Elective VII	L	S	Credits
i. Graphic and Product Design	**4**	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Graphic design – Typography, imagery, symbology, and art; Graphic design and its applications to architecture; Branding

Unit 2: Introduction to Product Design and Development – Design Definitions and Design Spectrum; Product Attributes – Function and Emotion; Product configurations and Component relationships; Understanding modularity and modular systems; Design of Modular System

Textbooks:

1. Design Methods: Seeds of human futures‖ by J. C. Jones, Published by Wiley Interscience, London, 1992
2. Introduction to Design‖ by Morris Asimow, Published by Prentice Hall, Englewood Cliffs, N.J.,1983
3. Product Design and Development‖ by Ulrich, T. Karl, Eppinger, D. Steven, Published by McGraw – Hill, 2004

Reference Books:

1. "Living by Design" by Peter Gorb, Published by Lund Humphries, London 1978
2. "Integrated Product Development" by M. M. Andereasen, Published by Institute for Product Development, 2000
3. "Product Design: Fundamentals and Methods" by Roozenburg and Eekels, Published by UMI Books on Demand 2002

AR – 413XX Elective VII	L	S	Credits
01 Intelligent Buildings	**4**	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction – Origins of the Intelligent Buildings Concept, Definition and characteristics of Intelligent Buildings with brief history and contemporary concept, Automated buildings, Responsive buildings. Facility Management

Study of Concepts of Management of facilities – Importance and study of planning and operational techniques for facility management, Various models of Building Intelligence, Services, Demands on building and services, Control systems, Study of development of Computer Integrated Building from single function systems to integrated solutions, Use of building intelligence in energy management

Unit 2: Key Issues for Intelligent Buildings – Multiple activity settings, Generic analysis of space utilization, Models for shared space use, The development of briefing process including design activity and building elements, life cycles, Coordination between life cycle, building technologies, Study of issues related to site, shell, skin, services and technology.

Intelligent design and construction – Effective Space utilisation, Expectations of user, effective communication of architectural concepts to user, Locating people and information, Introduction to building efficiency with respect to life cycle costs.

Textbooks:

1. “Intelligent Buildings An Introduction” by Derek Clements - Croome, Published by T&F, 2020

2. “Intelligent Building Dictionary: Terminology for Smart, Integrated, Green Building Desig, Construction, and Management” by Building Intelligence Group, Published by Hands-On-Guide, 2007

Reference Books:

1. “Intelligent Buildings and Building Automation” by Wang, Published by SponPr, 2010

2. “Intelligent Buildings” by Jong-jin Kim, Published by Butterworth – heinemann, 2009

3. “Low Voltage Wiring: Security/ Fire Alarm Systems” by Kennedy Traister, Published by Mcgraw – Hill Professional,2001

AR – 414	**Project Management I**	L	S	Credits
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Office organization and management – expense, structure, salaries and overheads. Role of design staff and supporting managerial staff; Personal management and training responsibilities.

Unit 2: Introduction to principles of business management – Planning; Oganising; Leading; Unity of Command; Unity of Direction; Collective Interest Over Individual Interest

Textbooks:

1. Principles of Management by PC Tripathi, Published by McGraw Hill, 2021
2. Principles And Practice Of Management by L. M. Prasad, Published by Sultan Chand, 2021

Reference Books:

1. The Architect in Practice by David Chappell, Michael H. Dunn, Published by Wiley, 2016
2. ASAE Handbook of Professional Practices in Association Management by John B. Cox, Published by Jossey-Bass, 2015

AR – 415	**Architectural Design - VII**	**L**	**S**	**Credits**
		0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance and stage submissions.
End-semester examination – Evaluation based on the end-semester examination Viva-voce.

Course objective: The studio focuses on the design of commercial and high rise structures and aims to develop skills required for evolving suitable designs.

Outline:

Necessary theoretical inputs will be given, highlighting the norms and design issues. The following matters relating to institutional design will be addressed:

a) Site Assessment & Alignment With Regulations
b) Structural Integrity
c) Mechanical, Electrical and Plumbing (MEP)
d) Energy Efficiency
e) Sustainability and Green Friendliness
f) Occupant Comfort
g) Aesthetic appeal

Note:

1. Stage submissions for continuous internal assessments will include drawings and models.
2. The evaluation shall be done in intermediate reviews consisting of internal and external experts.
3. Site visits to the building typologies dealt in the studio problems should be encouraged for documenting them with the help of photographs, freehand sketches, etc.

Reference books:

1. F. D. K. Chings. (2013). *Introduction to Architecture*. Wiley.
2. Bureau of Indian Standards. (2016). Vol. -1 & 2. *National Building Code of India 2016*. Bureau of Indian Standards.
3. Ernst Neufert. (2019). *Architect's data.* Wiley-Blackwell. (Fifth edition).

AR – 416	**Building Constructions & Materials – VII**	L	S	Credits
		0	**4**	**4**

Contact hours per week : 4 *(4 studios per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *Viva Voce*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Advanced methods of multistory building construction

Multi Storied Steel Framed Structures, Multi- storied steel frame structures connections and their components, Steel Monitor Trusses, Space Frames, Modern Factory Shed/ Large Span Construction, Introduction to a wide range of modern building construction systems incorporating the use of metals like steel, aluminum and composite materials, Modular, Pre-Fabricated Construction

Unit 2: Advanced construction methods in RCC

Pre-stressed concrete beam slabs frames, lift slab construction post tensioning, multi-storeyed building frames, circular slabs and beams, uses of rapid-hardening cement, ready mix concrete (RMC) light weight concrete surface finishes of cement, Folded plates like prismatic, V-type, through type, pyramidal, prismatic and RCC folded plate and geometrical staircases, shell structures, cyclonical shells, hyperbolic paraboloids.

Unit 3: Advanced Building Materials

Plastic, PVC, metals, synthetic boards, fire proof resistance boards/files, acoustic materials, glass, composite panels and their applications, non-load bearing system/blocks

Unit 4: Curtain walls

Introduction to curtain wall construction, its advantages, shading, structural glazing, etc., Metal and aluminium sectioned curtain wall, Curtain walls, types of curtain walls, components, structural solutions, construction and erection, glass wall system-glass, sheet metal wall systems, sheet metal cladding Special purpose curtain wall with reflective glazing, insulation.

Reference books:

1. "Sound Insulation: Theory into Practice" by Carl Hopkins, Published by Routledge, 2015
2. "Finish Carpentry: A complete Interior & Exterior Guide" by William P. Spence, Published by Sterling, December 31, 1995
3. "Building Envelope and Interior Finishes Databook" by Sidney M. Levy, Published by Mcgraw – Hill Professional, 2001

AR – 417 Working Drawing II	L	S	Credits
	0	**4**	**4**

Contact hours per week	: 4 *(4 studios per week)*
Distribution of marks	: *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set	: *NA*
Questions to be answered	: *NA*
Duration of end semester examination	: *Viva Voce*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Course objective: This course is intended to impart training in the preparation of working drawings for **Multi storied buildings** with specific reference to the code of practice for architectural and structural drawings as per IS CODE. NO.962 of 1969 and actual writing of detailed clause-by-clause specifications as complimentary to the working drawings

Outline:

The following matters relating to Working Drawing will be addressed:

a) Preparation of working drawings to suitable scales indicating clearly:

b) The method of giving dimensions: architectural and structural, on plans at various levels, elevations and sections.

c) The brief specification of materials of finishes on the drawings.

d) Architectural details to a large scale showing application of materials of finishes and other constructional details.

e) Location of built up areas in the site plan showing approach roads, paths and layouts of all services such as water supply, sewage disposal and electrical connections.

Reference books:

1. The Students Instructor in Drawing and Working the Five Orders of Architecture‖ by Peter Nicholson, Published by Creative Media Partners, LLC, 2018
2. The Professional Practice of Architectural Working Drawings‖ by Bakhoum, Nagy R., Wakita, Published by Wiley, 2017
3. Working Drawings Handbook‖ by Bichard, Andrew, Styles, Keith, Published by Routledge, 2015

AR – 421	**Advanced Structural Design - II**	L	S	Credits
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Design of combined footings (rectangular).Design of flat slab.

Unit 2: Design of column (Biaxial bending) (By using S.P.16).

Unit 3: Design of beam curved in plan.

Unit 4: Detailing of Earthquake Resistance construction

a) Introduction b) Cyclic behaviour of concrete and reinforcement c) Significance of ductility d) Ductility of beam e) Design for ductility f) Detailing for ductility

Note:

1. *I.S. code 456 and S.P. 16 shall be permitted in examination.*
2. *Computer aided design of structure (with SAP or other relevant software) could be taught in tutorial classes.*

Textbooks:

1.“Earthquake-Resistant Design of Masonry Buildings (Series on Innovations in Structures and Construction, Vol 1)” by MihaTomazevic, published by World Scientific Publishing Company (December 1998)

2. “Seismic Design of Reinforced Concrete and Masonry Buildings” by Wiley-Interscience; 1 edition (March 1992).

Reference Books:

1. Earthquake Resistant Building Construction PB‖ by Sharma N, Published by S.K. Kataria and Sons NewDelhi, Reprint edition, 1 January 2013
2. Fundamentals of Earthquake Resistant Construction (Wiley Series of Practical Construction Guides‖ by Ellis L. Krinitzsky, P. H. Edinger, J. P. Gould Published by Wiley Interscience, 2011.

AR – 422	**Project Introduction and Dissertation**	L	S	Credits
		4	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Definition –

a) What is research – formation of hypothesis?
b) Types of research.
c) Social research vis-à-vis architectural research.

Unit 2: Formation of research methodology –

Formation of goal, Formation of scope and limitation, Data collection – process and methods, Analysis – statistical and other, Output of research.

Unit 3: Various types of Architectural researches – Interpretive historical research, Qualitative research, Co-relational research, Experimental and quari-experimental research, Simulation and modeling research, Logical argumentation, Case studies and combined strategies.

Unit 4: Report writing – Styles, Salient features, Bibliography writing, Citation, etc

Note:

1. The topic shall be selected by the student must consultation with the coordinator and the guide.

2. The dissertation work will be evaluated at stages and the final report shall be submitted type written supplemented with photographs, Sketches etc.

Reference Books:

1. Essentials of Research design and methodology‖, by Geoffrey , R. Marczyk, published by wiley 2010.

2. The craft of research‖, by Wayne C Booth, published by University of Chicago Press 2016.

3. Research Methodology in Landscape Architecture‖, by Nick Ismail Azlan, published by Trafford Publishing 2013

AR – 423XX Elective VIII	L	S	Credits
01 Architectural Conservation	**4**	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: History and modes of architectural conservation – Definition, Importance & need of conservation, Various aspects of conservation of natural and manmade environment, Classification of conservation — cultural, historical, urban areas.

Process of Conservation – Listing and documentation, its importance and methods. Measures of conservation i.e.protection, maintenance, restoration, reconstruction, adoption and adaptation. Various methods applied for conservation of architectural buildings with examples.

Cultural Heritage – Concept of heritage structures, Various methods adopted for conservation of heritage structures in India and Abroad, Theories of identification and conservation of heritage structures

Unit 2: Conservation management – Methodologies to be adopted for conservation management, Case studies in conservation related to adoptive reuse, building in context, preservation, urban conservation.

Conservation legislations – Study of various charters, Acts relation to conservation of heritage structures, Role of INTACH, UNESCO, ICOMOS, ASI, and other organizations, Various methods/legislations adopted for encouraging conservation.

Textbooks:

1. Architectural Conservation: Principles and Practice by AylinOrbasli, Philip Grover, Published by John Wiley & Sons, 2008

2. Introduction to Urban Conservation by Abdel TawabAyman, Published by LAP Lambert Academic Publishing, 2013

Reference Books:

1. Architectural Conservation in Europe and The Americas by Stubbs, Published by D John Wiley & Sons, 2011

2. Conservation of Railway Heritage, By Peter Burman, Michael Stratton, Published by Taylor & Francis Group, 2016

3. Interior Finishes & Fittings for Historic Building Conservation by Forsyth, Published by Wiley, 2011

AR – 423XX Elective VIII	L	S	Credits
01 Housing	**4**	**0**	**4**

Contact hours per week : 4 *(4 lectures per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *Seven (At least One question from each unit)*
Questions to be answered : *Any Five*
Duration of end semester examination : *Three hours (3 Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Introduction – Introduction to housing, Housing terminology, standards, scope, Housing typology (construction and economic considerations), Housing Infrastructure, Housing at micro to macro level.

Housing Scenario – Need of housing in Indian and Global context, Housing scenario in Indian context, Housing shortage in urban and rural areas, Slums and squatters, Informal housing, Affordable housing, Core housing, Community housing, Industrial housing, Low-rise high density, High-rise low density, High-rise high density housing

Housing Strategies – Government housing strategies, Housing survey, methodologies and inferences, Study of housing density, legislation and byelaws.

Unit 2: Housing Policies – Framing housing policy for a proposed scheme with consideration to nature of development, National and State Housing policies, Systems approach to housing, Environmental consideration, housing for disaster prone areas.

Housing Finance – Role of financial institutions, Co-operative housing schemes, Gramin Bank Model, Government measures for slum up gradation and rehabilitation.

Textbooks:

1. Introduction to Urban Housing Design by Towers, Graham, Published by Taylor and Francis, 2015
2. Front to Back: A Design Agenda for Urban Housing by Sally Lewis, Published by Architectural Press, 2016

Reference Books:

1. Contemporary Housing by Littlehampton, Published by Randon House Inc, 2008
2. Housing...Density? by Institute of Architecture, Published by Springer Wien New York, 2012
3. Key Urban Housing of the Twentieth Century: Plans, Sections and Elevations, Key Architecture Series by Hillary French, Published by W. W. Norton & Company, 2008

AR – 424	**Project Management II**	L	S	Credits
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*
Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.

End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Human relation and personnel management; Brief idea about accounting and book keeping, business correspondence, information storage and retrieval systems

Unit 2: Site Management – Role of an architect in site management, Construction management, Communication and coordination

Reference Books:

1. Handbook of Professional Documents by Council Of Architecture, 2015
2. Construction Daily Site Log Book | Job Site Project Management Report: Record Workforce, Tasks, Schedules, Daily Activities by Useful books, Published by Independently published, 2019
3. Construction Management: From Project Concept to Completion by Paul Netscher, Published by CreateSpace Independent Publishing Platform, 2017
4. Modern Construction Management by Frank Harris, Published by Wiley – Blackwell, 2021
5. Residential Construction Management: Managing According to the Project Lifecycle by Joseph A. Griffin, Published by J. Ross Publishing, 2010

AR – 425	**Architectural Design VIII**	**L**	**S**	**Credits**
		0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination = 105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on class performance and stage submissions.
End-semester examination – Evaluation based on the end-semester examination Viva-voce.

Course objective: The studio focuses on the Urban design and to incorporate the various Urban Design elements after thorough understanding through the Urban Design theory subject which is a simultaneously process

Outline:

Necessary theoretical inputs will be given, highlighting the norms and Urban design issues. The following matters relating to institutional design will be addressed:

a) Issues of urban structure, urban space and form
b) Issues of conservation.
c) Issues in zoning, land use, density, development control.
d) Issues of building in context, urban infill.
e) Integration of diverse functional needs, access systems, parking, services etc.

Study tour

The class will undertake a study tour to visit a prominent institution of the studio exercise typology as a live case study and visit places of architectural interest in the vicinity of a city identified within the country.

Note:

1. 25% of the total credit will be assigned to a study tour, and 75% of the total credit will be assigned to the studio exercise.
2. Stage submissions for continuous internal assessments will include drawings and models.
3. The evaluation shall be done in intermediate reviews consisting of internal and external experts.
4. Site visits to the building typologies dealt in the studio problems should be encouraged for documenting them with the help of photographs, freehand sketches, etc.

Textbooks:

1. The image of the City‖ by Kevin Lynch, Published by The MIT Press Ltd., 1964

2. Finding Lost Space: Theories of Urban Design‖ by Roger Trancik, Trancik, Published by John Wiley & Sons, 1986

Reference books:

1. F. D. K. Chings. (2013). *Introduction to Architecture*. Wiley.
2. Bureau of Indian Standards. (2016). Vol. -1 & 2. *National Building Code of India 2016*. Bureau of Indian Standards.
3. Ernst Neufert. (2019). *Architect's data.* Wiley-Blackwell. (Fifth edition).

AR – 426	**Building Constructions & Materials – VIII**	L	S	Credits
		4	**0**	**4**

Contact hours per week : 4 *(4 studios per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *Viva Voce*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Non-Conventional Materials And Technologies In The Architecture – Renewable Energy Resources: Solar Energy, Biomass Energy, Hydro Power Energy, Wind Energy, Tidal Energy, Bio Fuel, Appropriate technology and rural development: with respect to government policies and initiatives, Participatory Planning, Education, Development Controversies

Unit 2: Walling Materials And Technologies – Types of non-conventional walling techniques: mud walls: adobe, wattle and daub, rammed earth, cob walls, compressed earth blocks, etc., Sun dried bricks, stabilized soil blocks, hollow concrete blocks, Ferro-cement and similar materials, Use of precast aesthetical materials: Bricks jaalis, cement jaalis, mouldings

Unit 3: Roofing materials and technologies – Alternative non-conventional materials and techniques used for roofing: Bamboo roofing, Composite material, Mangalore tiles, Types of other Roofs: Jack arch roof, Thatch roofing, Filler slab roofing with various filler material, Clay/micro-concrete tiled roofing

Unit 4: Region Specific Non – Conventional techniques – Use Of Bamboo As A Renewable Building Material, Importance and Potential of Bamboo, Uses of bamboo as a building material including the techniques involved.

Reference books:

1. Sustainability & Scarcity: A Handbook for Green Design and Construction in Developing Countries by Peter Ozolins, Published by Routledge, 2015
2. Dwelling in Resistance: Living with Alternative Technologies in America (Nature, Society, and Culture) by Chelsea Schelly, Published by Rutgers University Press, 2017

3. Solar Pumping for Water Supply: Harnessing solar power in humanitarian and development contexts by Alberto Ibáñez Llario, Asenath W. Kiprono, Published by Practical Action Publishing, 2020
4. Contemporary Bamboo Architecture in China by K. W. Liu, Q. F. Xu, G. Wang , F. M. Chen, Y. B. Leng, J. Yang, K. A. Harries, Published by Springer, 2023
5. Application of Bamboo in Building Envelope (Green Energy and Technology) by Zujian Huang, Published by Springer, 2020

AR – 427 Working Drawing III	L	S	Credits
	4	**0**	**4**

Contact hours per week : 4 *(4 studios per week)*
Distribution of marks : *Sessional = 30 Marks, End semester examination = 70 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *Viva Voce*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Course objective: This course is intended to impart training in the preparation of working drawings for interior design and every part of interior detailing (4 spaces to be detailed)

Outline:

The following matters relating to Working Drawing will be addressed:

a) Preparation of working drawings to suitable scales indicating clearly:

b) The method of giving dimensions: architectural and structural, on plans at various levels, elevations and sections.

c) The brief specification of materials of finishes on the drawings.

d) Architectural details to a large scale showing application of materials of finishes and other constructional details.

e) Location of built up areas in the site plan showing approach roads, paths and layouts of all services such as water supply, sewage disposal and electrical connections.

Reference books:

1. The Students Instructor in Drawing and Working the Five Orders of Architecture‖ by Peter Nicholson, Published by Toolemera Press, 2018
2. The Professional Practice of Architectural Working Drawings‖ by Bakhoum, Nagy R., Wakita, Published by Wiley, 2017
3. Working Drawings Handbook‖ by Bichard, Andrew, Styles, Keith, Published by Taylor and Francis, 2015

AR – 911	**Professional Traning**	L	S	Credits
		0	**26**	**26**

Contact hours per week : *26 (Min. 30 man hours in the office per week)*
Distribution of marks : *Internal = 195Marks, End semester examination = 455Marks*
Questions to be set : *N.A.*
Questions to be answered : *N.A.*
Duration of end semester examination : *N.A. – Viva-Voce*

Continuous internal assessment – Evaluation based on office performance report and portfolio.
End-semester examination – Evaluation based on the Viva-voce.

Course objective: To provide exposure to Architectural practice and its various associated activities, such as stage-wise on-site execution and project management.

Outline: A student has to attend practical training in an Architectural firm under the supervision of the Principal Architect(s) registered with the Council of Architecture. The minimum practical training duration will be at least 100 working days *(16 working weeks as instructed by the Minimum Standards of Architectural Education, 2020 – COA)*. (The supervising Architect(s) shall record the number of working hours the student has in a log sheet for various tasks assigned in the office. The Principal Architect(s) will sign the log book after the successful completion of practical training by the student under his/her supervision with remarks on the student's performance on the following parameters:

1. Performance in the various design tasks and duties assigned,
2. Presentation skills,
3. Eagerness to learn,
4. Leadership qualities and sense of responsibility shown, and
5. Punctuality and overall office conduct.

AR – 512	**Design Thesis**	L	S	Credits
		0	**18**	**18**

Contact hours per week : *18 (18 studios per week)*

Distribution of marks : *Internal = 135 Marks, End semester examination = 315 Marks*

Questions to be set : *N.A.*

Questions to be answered : *N.A.*

Duration of end semester examination : *N.A. – Viva-Voce*

Continuous internal assessment – Evaluation based on performance throughout the semester/duration of the thesis project.

End-semester examination – Evaluation based on the Viva-voce.

Course objective: To undertake a large-scale project of the student's choice with complexities of urban and architectural resolutions, which has social relevance, and demonstrate all the skills acquired in architecture.

Outline:

1. A student will choose a design problem and engage in literature study, documentation, analysis, and project design process to demonstrate his/her unique understanding of architectural theory, philosophy, and style. The particulars of schedule, content, presentation, formal, etc., as decided by the Department from time to time, will be strictly followed by the students.
2. At the end of the semester, each student will submit their proposals in the form of drawings (sheets and soft copies if applicable), scale models, and a thesis report (three copies) in a format as decided by the Department after obtaining approval from the respective thesis supervisors.
3. The Department will schedule the final presentation and viva-voce at the end of the semester after the submission of the thesis by a student. Students will submit a thesis log book to be filled in by the thesis supervisor while attending the Viva-voce to be conducted by an external and an internal examiner.

AR – 513	**Architectural Seminar**	L	S	Credits
		0	**6**	**6**

Contact hours per week : *6 (6 studios per week)*
Distribution of marks : *Sessional = 45 Marks, End semester examination =105 Marks*
Questions to be set : *NA*
Questions to be answered : *NA*
Duration of end semester examination : *NA*

Continuous internal assessment – Evaluation based on performance throughout the semester/duration of research and data collection for delivering the Architectural Seminar**.**

End-semester examination – Evaluation based on the final presentation of the Architectural Seminar by an expert panel of Architects (Academician and/or Professional) that the Department shall constitute.

Course objective: To address an issue directly or indirectly related to the design thesis and propose a solution.

Outline: A student will choose a topic to address an issue solved through Architectural intervention. The problem may be directly or indirectly related to the thesis project on which they will work. The students will indulge in extensive case studies of successful projects at national and international levels through literature study and/or site visits and present their findings through a seminar after thorough research on the topic of their choice. The seminar shall be evaluated by an expert panel of Architects (Academician and/or Professional) that the Department shall constitute.

AR – 514	**Professional Practice**	L	S	Credits
		2	**0**	**2**

Contact hours per week : 2 *(2 lectures per week)*
Distribution of marks : *Sessional = 15 Marks, End semester examination = 35 Marks*
Questions to be set : Five *(At least One question from each unit)*
Questions to be answered : *Any One from Section A and Any Two from Section B*

Duration of end semester examination : *Two hours (2Hrs.)*

Continuous internal assessment – Evaluation based on class performance/assignments and mid-term examination.
End-semester examination – Evaluation based on the end-semester examination.

Unit 1: Architectural Practice – Profession vocation, trade union vis-à-vis professional activities, social obligations of the profession, roles and responsibilities of professional associations of architecture. Architects Act 1972/87, Council of Architecture, its role and responsibilities, Code of professional conduct, condition of engagement and scale of professional fees, Copyright Act as applicable to architectural work, Architectural competitions.

Unit 2: Concept of Contract – Duties and liabilities of architects, duties and liabilities of contractors, Articles of agreement, execution of works and payments, Arbitration, the Act, its applications, and its scope, Laws pertaining to property matters like right of easements, passage, ancient light etc., Tenders types and the process of calling, security and selection system, Pre- Tender qualifications and registration of contracts. Introduction to valuation, role of Valuers, types, methods and importance of valuation

Reference Books:

1. Handbook of Professional Documents by Council Of Architecture, 2015