



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

<b>AR-111</b>	<b>Structural Design – I</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Forces and Moments</b>                  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.</p>
<p><b>Unit 2: Section properties, loads and supports</b>                  Centre of gravity, Moment of inertia of composite and cut-out sections, Parallel and perpendicular axis theorem, Types of loads, supports and support reactions.</p>
<p><b>Unit 3: Introduction to stress concepts</b>                  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, Poissons ratio, Bulk modulus, Modulus of rigidity. Types of frames, analysis of perfect frames (graphical &amp; analytical method),friction, types of friction, Laws of motion, Work power and energy, Virtual work and its application</p>

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

**Textbooks:**

1. Engineering MechanicsI 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.
3. Engineering Mechanics by S Timoshenko, D H Young, J V Rao TATA McGraw-Hill Education, 5th edition, 2017

**Reference Books:**

1. Structure in ArchitectureI by Mario Salvadori, Robert Heller, published by Pearson, 4<sup>th</sup> Edition 2016
2. Engineering MechanicsI by Ferdinand L Singer Harper, published by Collins publications, 3rd Edition.2006
3. Structural SystemI by Henry. J. Cowan, Forrest Wilson, published by Van Nostrand Reinhold Company, New York 2005





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**AR-113          Communication Skills – I**

L      S      Credits  
**3      0      3**

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

**Unit 1: Vocabulary**

Introduction to Vocabulary: *using one word substitutes, words often confused, synonyms and antonyms*; Words often used by Architects; Idioms and Phrases; Common foreign phrases.

**Unit 2: Grammar**

Articles, Verbs, Prepositions, Phrasal verbs, Tenses, Concord; Spotting and correcting errors in a sentence: *errors in the use of words – errors in constructing sentences – errors of Indianisms – use of slang – errors in punctuation.*

**Unit 3: Reading and Composition**

Comprehension: *Identifying the main idea and subordinate ideas, factual information references and inferences*; Précis writing, Essay writing, Listening and reading skills.

**Textbooks:**

1. Business correspondence and Report writing by R. Sharma & K. Mohan, published by Tata McGraw Hill, 6<sup>th</sup> Edition 2020.
2. Communication Skills for Professionals by Nira Konar, published by PHI Learning Private Limited, Third Edition, 2022.
3. Oxford Guide to Effective Writing and Speaking by John Seely, Oxford University Press, Third edition, 2013.
4. Study reading – A course in reading skills for academic purposes, by Eric H. Glendinning & Beverly Holmstrom, published by Cambridge University Press, 2<sup>nd</sup> Edition 2004

**Reference Books:**

1. Good style – writing for science and technology, by John Kirkman, E&FN Spon, published by Routledge, 2<sup>nd</sup> Edition 2005
2. Better English Pronunciation, by J. D. O'Connor, published by CUP, London, 2006.



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

AR-114XX Elective – I L S Credits

01 Theory of Design 3 0 3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

**Unit 1: Introduction to Architecture and Design**

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: Principles and Elements of Design**

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

**Unit 3: Mass Space and Color in Design**

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. Application of colour in Architecture Effect of colour in Architecture – colour symbolism.

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

**Textbooks:**

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.

**Reference Books:**

1. Architecture Theory Since 1968 by K. Michael Hays 2000
2. The Theory of Architecture – Concepts and themes|| by Paul Alan Johnson, Wiley India 2017



<b>AR-114XX</b>	<b>Elective – I</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
	<b>02 Vernacular Architecture</b>	<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Definition and Classification</b> Vernacular architecture as a process – Survey and Methods of study of vernacular architecture. Cultural and contextual responsiveness of vernacular architecture: an overview.</p>
<p><b>Unit 2: An overview of different approaches and concepts to the study of vernacular architecture</b> Aesthetic, Architectural and anthropological studies in detail.</p>
<p><b>Unit 3 : Typology study</b> 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, Construction technique of the vernacular architecture in the cases of North Eastern Region.</p>

**Textbooks:**

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.

**Reference Books:**

5. Carmen Kagal, VISTARA-The Architecture of India, Pub:The Festival of India, 1986.
6. S. Muthiah and others: The Chettiar Heritage; Chettiar Heritage 4<sup>th</sup> Edition 2017
7. Weber (W) &Yannas (S); Lessons from Vernacular Architecture; Routledge; 2014.



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

**AR-115 Architectural Design – I**

L      S      Credits  
**0      6      9**

Contact hours per week	6 (6 studios per week)
Distribution of marks	Sessional = 112 Marks, End semester examination = 113 Marks
Questions to be set	NA
Questions to be answered	NA
Duration of end semester examination	NA
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on final portfolio submission, presentation and viva voce.

**Course Objective :** Introduction to aesthetical terms like form, balance, rhythm, harmony, texture, color, symmetry, contrast, discord, accentuation, monotony etc. and their application in two and three- dimensional compositions.

**Outline**

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:**

1. This Paper is designed to develop the skills of Basic design & Visual arts.
2. Sessional will be in the form of drawings and models.
3. 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, 2<sup>nd</sup> Ed. 2013



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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, 6<sup>th</sup> Edition 2023
7. Architecture – Form, Space and Order by F.D.K. Ching, Van Nostrand Reinhold Company, New York, 5<sup>th</sup> edition 2023
8. Time-saver Standards for Architectural Design: Technical Data for Professional Practice, by D. Watson, 8<sup>th</sup> Ed., published by McGraw-Hill. 2005.



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

AR-116	Building Construction & Materials – I	L	S	Credits
		1	4	3
Contact hours per week	3 (1 lecture & 4 studios per week)			
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks (Theory = 13, Portfolio & Viva = 25)			
Questions to be set	Three			
Questions to be answered	Two			
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)			
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.			
<b>End-semester examination</b>	Evaluation based on the end-semester examination.			

**Course objective:** The main objective is to introduce the students to the concept of construction and the techniques of using various materials to form a space or a building.

<p><b>Unit 1: Introduction to construction as a subject and its relevance to architectural design.</b> Understanding the basic construction principles with respect to structural stability and its applications/ extensions /manifestations in terms of structural systems and then building elements, construction principles, construction systems, basic Structural systems such as load bearing and frame structure.</p>
<p><b>Unit 2: Introduction to the basic building elements</b> Simple Foundation in stone, Wall and the method of erection using the various types of bond in bricks, Stone masonry of different types for various thicknesses. Understanding the concept of span by using Arches and Lintels in bricks and stone.</p>
<p><b>Unit 3: Introduction to primary building materials</b> Introduction to the various natural, traditional and synthetic materials used in construction and understanding the properties and composition of each material like timber, stone, cement, lime.</p>

**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 for Unit 1 & 2 and presentation / report for unit 3 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, 42<sup>nd</sup> Edition 2015
3. Construction of Buildings by Barry – Vol. I, published by East-West Press (P) Ltd., 1999, 6thEd.
4. Fundamentals of Building Construction: Materials and Methods by E. Allen and J. Iano, Wiley. 7<sup>th</sup> Edition 2019





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**Reference Books:**

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



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

**AR-117 Architectural Graphics – I** L    S    Credits  
1    4    3

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks (Theory = 13, Portfolio & Viva = 25)
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

**Unit 1: Graphical codes and symbols**

Introduction to architectural lettering and dimensioning, and types of lines. Understanding of symbolic representations of building parts and materials. Theory on Scales; Plain scales, Diagonal Scales

**Unit 2: Projections**

Theory of projections – Methods of projection; Projections of points, lines and planes, projections of various solid and hollow geometrical objects. Orthographic projections – First and third angle projection methods, Isometric projections.

**Unit 3: Development of Surfaces**

Development of surfaces with – Parallel and radial line method. Development of surfaces without sections – Parallel and radial line method. Interpenetrations and Sections: Interpenetration of various solid geometrical objects. Introduction to sections of various solid and hollow geometrical objects.

**Note:** 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.



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**AR-118          Workshop – I**

L          S          Credits  
**1          2          2**

Contact hours per week	2 (2 studios per week)
Distribution of marks	Sessional = 25 Marks, End semester examination = 25 Marks
Questions to be set	NA
Questions to be answered	NA
Duration of end semester examination	NA
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term viva voce.
<b>End-semester examination</b>	Evaluation based on the end-semester studio viva voce.

<p><b>Unit 1: Introduction to model making-I</b>                  Basic geometrical shapes using thermocol and paper as a material, basic geometrical shapes using soap and plaster of paris as a material.</p>
<p><b>Unit 2: Introduction to model making-II</b>                  Introduction to different carpentry tools and timber joinery details, creating a furniture piece out of timber</p>

**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.





<b>AR-122</b>	<b>History of Architecture – II</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<b>Unit 1: Christian Architecture (Churches)</b> Early Christian and Byzantine Art and Architecture
<b>Unit 2: Romanesque and Gothic (Churches)</b> Study of various European styles with construction techniques, aesthetical principles, Architectural philosophy.
<b>Unit 3: Renaissance Architecture</b> A study of Italian, French, English & German Renaissance architecture.

**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





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AR-124XX Elective – II L S Credits

01 Architecture Design with Glass 3 0 3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<b>Unit 1: Modern Architectural Requirements,</b> Requirements as per Standards – NBC – Fire & Structural
<b>Unit 2: Manufacturing of glass:</b> Types of Glass, Coating Technology – High-Performance Glass Innovative Applications – Electrochromic & Digital Printing
<b>Unit 3: Glass as Building Envelope Material and Case Studies.</b> 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, On Design & Detailing, Application Impact, Building Measurements & its Impact.

**Textbooks:**

1. Structural Glass Facades and Enclosures 2011
2. Mic Patterson; Glass in Architecture 2011

**Reference Books:**

1. Michael Wigginton; Envelope Design for Buildings 2015
2. William Allen; Joseph S Amstock's Glass in Construction; 2012.



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<b>AR-124XX</b>	<b>Elective – II</b>	L	S	Credits
	<b>02 Architecture Design with Steel</b>	<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Strength of Materials</b> Theory of Elasticity, Material properties, Shear and Bending moments,</p>
<p><b>Unit 2: Frame Structure</b> Analysis and Design: Deflection of beams, Analysis of indeterminate structures, The application different types of structural frame in Architecture.</p>
<p><b>Unit 3: Truss and Space Frame</b> 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. Special Structures: Pneumatic, Tensegrity and Temporary structures and structures for cost effective technology High rise Structural system, Foundation system, IS Code provisions.</p>

**Textbooks:**

1. S. Ramamrutham and R. Narayanan *Strength of Materials* 20th ed. Dhanpat Rai Publishing Company (P) Ltd, 1 January 2020.
2. N. Subramaniam. (2018). *Design of steel structures: Limit state method*. Oxford University Press.
3. S. K. Duggal. (2019). *Limit state design of steel structures*. McGraw-Hill. (Third edition)

**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







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**Note:**

1. Sessional shall be in the form of drawings and models.
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.



<b>AR-126</b>	<b>Building Construction &amp; Materials – II</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
		<b>1</b>	<b>4</b>	<b>3</b>

Contact hours per week	5 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 (Theory = 13, Portfolio & Viva = 25) Marks
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes (30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on written examination, final portfolio submission and viva.

**Course objective:** The main objective is to equip the students with the knowledge of the methods of construction for the various elements of a building.

<p><b>Unit 1: Building Elements</b> Understanding the types and construction techniques of Shallow foundation like Isolated, combined and raft foundations, Understanding the types and construction techniques of Deep Foundation like Grillage foundation, Piles foundations, Caisson foundations. Overview of method of construction of a simple two storied building, Processes and techniques of Plinth protection, D.P.C. Coping &amp; Chajjas. Terms definition of various forms of joints in wood work.</p>
<p><b>Unit 2: Openings in various materials</b> Definition of the various terms for a door and a detail construction method of the various types along with opening accessories. Types of Ferrous Metals, their properties and uses in Architecture. Various types of Non-Ferrous Metals, their properties and uses. Various types of glasses and their properties. Use of glass in Architecture. Fabrication techniques of glass, Working on glass such as etching, beveling, and stained glass work.</p>
<p><b>Unit 3: Flooring: along with fixing materials</b> Flooring techniques using different materials and the specifications of the materials. Roof coverings: along with materials, fittings and fixtures used in the construction and Modern roof covering materials.</p>

**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



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3. Engineering materials by S.C. Rangwala, published by Charotar Publishing House, , 42<sup>nd</sup> 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, 11<sup>th</sup> 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. 11<sup>th</sup> Edition 2016



AR-127	Architectural Graphics – II	L	S	Credits
		1	4	3
Contact hours per week	5 (1 lecture & 4 studios per week)			
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 (Theory = 13, Portfolio & Viva = 25))Marks			
Questions to be set	Three			
Questions to be answered	Two			
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)			
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.			
<b>End-semester examination</b>	Evaluation based on written examination, final portfolio submission and viva.			

**Course objective:**

The main objective is enable the students to identify the visual qualities of an object or architectural space and experience the visual qualities from a linear perspective.

**Course outcome:** At the end of the course, students will be able to:

1. Recognize the difference between a one-point perspective, and a two-point perspective drawing.
2. Represent their understanding of perspectives through a drawing.
3. Comprehend built mass and volume through sociography and represent the same through drawings.

<p><b>Unit 1: Introduction to Perspective Projections</b> Introduction to perspective projections - <i>concept and types of perspective projections</i>, One Point Perspective (Parallel perspective) projections of simple and complex geometrical objects.</p>
<p><b>Unit 2: Two Point Perspective Projections</b> Introduction to Two-point perspective (Angular perspective) projections of simple and complex geometrical objects. Introduction to Three Point Perspective Projections: Angular and Oblique three-point perspective projections of simple and complex geometrical objects.</p>
<p><b>Unit 3: Sciography</b> Introduction to basic principles of sciography and its application on two dimensional objects in plan and elevation. Sciography of simple three dimensional objects in plan, elevation and isometric view. Sciography of building elements in plan, elevation, isometric view, and perspective view.</p>

**Note:**

1. Sessional work will be done in the form of scaled drawings on drawing sheets and freehand sketches as studio assignments which will be evaluated on a regular basis.
2. Studio assignments will be covered from the topics mentioned in the units above.

**Textbooks:**

1. Engineering Drawing with an introduction to AutoCAD<sup>®</sup> by Dhananjay A. Jolhe, published by McGraw Hill Education (India) Pvt. Ltd., 2017.



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2. Engineering Drawing by N D Bhatt, published by Charotar Publishing House Pvt. Ltd., 2014.

**Reference Books:**

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





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<b>AR-211</b>	<b>Structural Design – III</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<b>Unit 1: Arches</b> Equation of parabolic and semi-circular arch, Three hinged arches, Two hinged arches, Temperature effects on arches
<b>Unit 2: Introduction to RCC,</b> Introduction to RCC, Basic analysis and design concepts of RCC, WSM and LSM, Balanced, unbalanced, under reinforced and over reinforced sections
<b>Unit 3: Introduction of pre-stressed concrete</b> Basic concept, Classification and Types of pre-stressing system, End anchorage, Advantages and disadvantages of pre-stressed concrete, Advantages of pre-stressed concrete over reinforced concrete construction.

**Note:** Sessional will 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 Practicel by N. Krishna Raju& R. N. Pranesh, published by New Age International (RS), 2007





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<b>AR-212</b>	<b>Climatology – I</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Elements of Climate</b>                  Global climate: <i>factors affecting global climate, classifications</i>; Constituents of climate: <i>definitions, measurement, data collection and significance</i>; Climatic zones in India; Study of Microclimate and Macroclimate, and the effect of climate on man, shelter and environment.</p>
<p><b>Unit 2: Climate Conscious Design</b>                  Respective traditional climate responsive architecture on global and national level, Climate responsive design strategies; Case studies of climate conscious designs.</p>
<p><b>Unit 3: Parameters of Comfort Conditions</b>                  Thermal Comfort: <i>theory and concept, Concept of heat exchange in buildings, Effect of climatic elements on thermal comfort, natural and artificial methods of achieving thermal comfort</i>. Natural ventilation and air movement, daylighting</p>

**Note:**

1. Course would be run through lectures, Audiovisuals and site visits to various laboratories and buildings.
2. Sessional work will 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. Heat Islands: Understanding and mitigating heat in urban areas, by Lisa Gartland, published by earthscan publication, 2012.
3. The Art and Science of Lighting Protection, by Martin A Uman, published by Cambridge University press, 2014.
4. Heating, Cooling Lighting - Sustainable Design Methods for Architects by Norbert Lechner, published by John Wiley & Sons, Inc. 2015.



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5. Technologies of Architecture Volume 2: Environment, Technology and Sustainability by Hocine Boughdah and Stephen Sharples with Peter F. Smith, published by Taylor and Francis, 2010.



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<b>AR-213</b>	<b>Surveying and Leveling</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Measurement of horizontal distances.</b>  <i>Chain surveying:</i> Introduction, types of instruments and accessories, running survey lines, errors in chaining, offsets, field book  <i>Plane table surveying:</i> Types of instruments and accessories, setting up a plane table, methods of plane table surveying, errors in plane table surveying.</p>
<p><b>Unit 2: Measurement of vertical distances:Leveling.</b>                  Basic definitions, Dumpy level, Temporary adjustments, Permanent adjustments, Reciprocal leveling, Principles of leveling Rise and fall method and line of collimation method.</p>
<p><b>Unit 3: Institutions and Governance</b>                  Calculation of area, measurement of volume, Introduction to contouring, Aspect of surveying for an architect</p>

**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 VidyanthiGrihaPrakashan, 2006
3. Surveying by Dr. B. C. Punmia, published by Laxmi Publication Ltd., 2005, 16th Ed.



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<b>AR-214XX</b>	<b>Elective – III</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
	<b>01 Art in Architecture</b>	<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (At least Two question from each unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Role of art in history of world architecture</b> Introduction to art and architecture. Definitions of art and architecture. Comparative study of artistic and architectural design elements.</p>
<p><b>Unit 2: Symbiotic relationship of folk art and architecture</b> Application of different art forms in architecture. Exploring cultural identity and expression in folk art, Study of decorative and ornamental features of folk art, craftsmanship and building techniques.</p>
<p><b>Unit 3: Visual communication in architecture and wayfinding,</b> Study of signages, graphic maps &amp; plans, colour coding, iconography, landmarks &amp; points of interest and digital wayfinding. Works of different artists and architects that reflect the inter relationship</p>

**Textbooks:**

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 Sofia, November 11, 2020

**Reference Books:**

1. Mondrian and his Studios: Colour and Space, edited by Francesco Manacorda, Published by Tate Publishing, 2015



AR-214XX	Elective – III	L	S	Credits
<b>02 Furniture Design</b>		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (At least Two question from each unit)
Questions to be answered	Any Two from Section A and Any Two from Section B
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

**Unit 1: Principles and history of furniture design**

An overview of the history of furniture design, Understanding the principles of design, which provide the criteria that describe the intended purpose of furniture, such as balance, continuity, unity, and variety, dynamism and stasis, hierarchy and emphasis, juxtaposition, rhythm and pattern, and scale and proportion

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

A look at the various modern movements: Art Deco, Post-modern, International Style, The Bauhaus Movement, Mid-century modern, and their contribution to the field of furniture design

**Unit 3: Modular concepts in furniture design**

Mass production and fabrication, codes and specifications, **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

**Textbooks:**

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 Veeraghavan, Published by Notion Press Media Pvt Ltd, November 11, 2021

**Reference Books:**

1. The Furniture Bible by Christophe Pourny, Martha Stewart and Jen Renzi, Published by Artisan Publishers, 2014



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AR-215	Architectural Design – III	L	S	Credits
		0	6	9
Contact hours per week	9 (6 studios per week)			
Distribution of marks	Sessional =112 Marks, End semester examination = 113 Marks			
Questions to be set	NA			
Questions to be answered	NA			
Duration of end semester examination	NA			
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.			
<b>End-semester examination</b>	Evaluation based on final portfolio submission, presentation and viva voce			

**Course 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:

Functions and their spatial implications; Maximum and optimum areas for various functions; Anthropometrics, furniture layout and horizontal circulation; Interior volumes and material qualities; Lighting and ventilation; 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 exercise and two minor design/time problems should be given. The final submission will necessarily include a model of the main problem.

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

**Course outcome:** At the end of the course, students will be able to:

1. Design a single use, small span, single storey building.
2. Handle time problem design exercise along with producing of drawings.
3. Be able to visit places of architectural interest and prepare documentation of the built environment.



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**Note:**

1. Sessional work will be in the form of drawings and models along with a project report for the design dealt.
2. The evaluation will be done in intermediate reviews consisting of internal and external experts.
3. 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.



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AR-216	Building Constructions & Materials – III	L	S	Credits
		1	4	3
Contact hours per week	3 (1 lecture & 4 studios per week)			
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 (Theory = 13, Portfolio & Viva = 25)Marks			
Questions to be set	Three			
Questions to be answered	Two			
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)			
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.			
<b>End-semester examination</b>	Evaluation based on written examination, final portfolio submission and viva.			

**Course objective:**

The main objective is to introduce the students to the construction techniques using timber and introduce them to modern techniques of construction and materials.

<p><b>Unit 1: Temporary Supporting Structures</b> Form work and shuttering for different types of RCC elements, trench timbering, scaffolding, shoring and underpinning. Classification of Timber roofs based on the types of trusses for various spans along with details of gutter and water proofing. Construction techniques and types of timber floors with detail construction method and definition of terms. Various materials and techniques of wall partition from traditional to modern systems.</p>
<p><b>Unit 2: Precast unit</b> Brick jalis, cement jalis, 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, Waffle &amp; Core unit and other pre-engineered units (as per CBRI), Ferro-cement, etc. Methodical approach to Repairs of Cracks over openings, Sinking and sagging balconies, decayed floors and floor joints</p>
<p><b>Unit 3: Surface finishes, Wall cladding, Wall paneling and ceiling</b> Manufacturing process in brief, their properties and applications, Preparation, application and defect correction for surface finishes, wall cladding and panelling units. Lime wash, Colour clay wash, Distempers, Cement based color, Plaster of Paris, Putties along with the adhesives, thinners, solvents, Primers, paints, Varnishes (natural and synthetic clear varnishes), Polishes along with adhesives, thinners, solvents, on plastered surfaces, timber and metallic surface, Wood and wood products: (Timber panels, Timber boards, Plywood, block board, particle board, hard board, MDF, HDF, HDPE), laminates &amp; veneers in buildings. Gypsum boards, Glass wool boards. Modern wall paneling materials like Aluminum Composite Panel, glass paneling, glass blocks.</p>

**Note:**

1. There will 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 will be done as scaled drawings on drawing sheets and freehand drawings for unit 1 & 2 and presentation/report for unit 3 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.





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**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, 11<sup>th</sup> 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





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

AR-221	Structural Design – IV	L	S	Credits
		3	0	3
Contact hours per week	3 (3 lectures per week)			
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks			
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)			
Questions to be answered	Any four			
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)			
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.			
<b>End-semester examination</b>	Evaluation based on the end-semester examination.			

<p><b>Unit 1: Introduction to Statically determinate and indeterminate structures</b> Statically determinate and indeterminate structures, Differences between statically determinate and indeterminate structures, redundancy for beams, articulate structures, rigidly jointed frames, general method of analysis</p>
<p><b>Unit 2: Columns and struts</b> Characteristics of columns and struts, Euler’s theory of long column, Assumptions and limitations of Euler’s formula, Rankine’s formula</p>
<p><b>Unit 3: Introduction to retrofitting structures</b> Retrofitting techniques, Classification of retrofitting technique, Seismic retrofitting; Industrial building - Introduction, Planning, Types, Roof and side covering, Element of Industrial building (no design), Only design steps for industrial building (no detail design).</p>

**Note:** Sessional will 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-223	Building Services – I	L	S	Credits
		3	0	3
Contact hours per week	3 (3 lectures per week)			
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks			
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)			
Questions to be answered	Any four			
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)			
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.			
<b>End-semester examination</b>	Evaluation based on final submission and end-semester examination.			

**Unit 1: Introduction to water supply and Basic principles of sanitation**

Sources of water supply and sanitation, Classification of water based on its usage, Elements of public/private water supply system, Demand of water for domestic, commercial, industrial and public utility purposes as per BIS standards.

**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 multi-storeyed buildings.

**Unit 2: Types of fixtures and fittings: water supply and sanitation**

Taps, bathtubs, showers, jets, cocks, valves, electrical fixtures etc., Faucets for kitchens, bathrooms and toilets, Check valves, foot valves, sump pump check valves, and pressure test gauges.

Building service connections, cold and hot water distribution systems in buildings and their Design, 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  
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.

**Inspection chambers:** sizes and construction. On-site processing and disposal methods, Aerobic and Anaerobic decomposition, purifying capacity of water bodies, Bio-chemical Oxygen Demand, Roads and Pavements.

**Unit 3: Properties of Solid Wastes: Physical and chemical composition of municipal solid wastes, waste generation rates.**

**Management of Solid Wastes in India: Prevalent 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 will be in the form of sanitation schemes, water supply schemes and design of toilets of the given building or buildings.



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**Textbooks:**

1. Water Supply & Sanitary Engineering by S. C. Rangwala, published by Charotar Publishing House (P) Ltd., 30<sup>th</sup> 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, pump, by F. W. Raynes, published Legare Street Press 2022



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

AR-224XX	Elective – IV	L	S	Credits
<b>01 Architecture in South East Asia</b>		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: History and the major settlements of SE Asian countries –</b> Study of the history of settlements in Myanmar (Burma), Thailand, Laos, Cambodia, Vietnam, Malaysia, Singapore, Indonesia, and the Philippines.</p>
<p><b>Unit 2: Characteristic Classification of Architectural styles in SE Asia with Case studies</b> A study of traditional house forms and key features of vernacular Architecture, Thai Architecture, Khmer Architecture(Cambodia), Indonesian Architecture, Malaysian Architecture, Vietnamese Architecture, Colonial Architecture.</p>
<p><b>Unit 3: Development of Architectural form</b> A study of the technology, style, character, indigenous traditions, cultural exchanges, belief systems and colonial history of the architectural styles in SouthEast Asia.</p>

**Textbooks:**

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

**Reference Books:**

1. The Palaces of South-East Asia: Architecture and Customs by Jacques Dumarçay, Michael Smithies, Published by Oxford University Press, USA, 1991
2. 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 3 0 3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Introduction to appropriate building technologies</b> Overview of sustainable building technologies, importance of building technologies in architectural design and historical context and evolution of building technologies.</p>
<p><b>Unit 2: Appropriate technologies and cost effective technologies</b> A study of traditional and indigenous building techniques, sustainable materials and construction, energy efficient systems and water management and conservation.</p>
<p><b>Unit 3: Technologies as evolved from contexts</b> A study of the practice of International architects and Indian architects. A study of systems and techniques developed in research labs. To study the emerging technologies and future trends of cutting edge technologies in architecture.</p>

**Textbooks:**

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

**Reference Books:**

1. 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
2. Automation Systems in Smart and Green Buildings (Modern Building Technology) by V K Jain, Published by Routledge, 2009.





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AR-225	Architectural Design – IV	L	S	Credits
		0	6	9
Contact hours per week	9 (6 studios per week)			
Distribution of marks	Sessional = 112 Marks, End semester examination = 113 Marks			
Questions to be set	NA			
Questions to be answered	NA			
Duration of end semester examination	NA			
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.			
<b>End-semester examination</b>	Evaluation based on final portfolio submission, presentation and viva voce			

**Course 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:**

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

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

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 will necessarily include a model for at least one of the two main problems.

**Course outcome:** At the end of the course, students will be able to:

Design and understand the process of designing projects such as 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.



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Students will be able to understand and apply design norms as per the design exercise and produce drawings and construction detailing accordingly

**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 will include a model for at least one of the two main problems.

**Note:**

1. Sessional will be in the form of drawings and models along with project report for the design dealt. The evaluation will 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



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<b>AR-226</b>	<b>Building Constructions &amp; Materials – IV</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
		<b>1</b>	<b>4</b>	<b>3</b>

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 (Theory = 13, Portfolio & Viva = 25)Marks
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on written Examination, final portfolio submission, and viva-voce.

<p><b>Unit 1: Special openings</b> Sliding, Folding , Hinged and Revolving doors, Design and Constructional details of sliding, Rolling shutters and types of Rolling shutters, Collapsible shutters, The installation, working and mechanism of such doors and shutters. Doors and Windows in steel, aluminum along with technical terminology involved. Types and varieties of available sections in steel and aluminum in market and their application in providing doors, windows and partitions. Design considerations and construction details in congruence to IS codes and manuals provided by CPWD and other organizations.</p>
<p><b>Unit 2: Special entrances</b> Study of steel railing, jali, grills, and ladders. Design and construction details of fixed glazing. Study of compound wall (including advance type) with security arrangement. Study of wicket gate and large entrance gates rolling on wheels. Study of expansion joints, waterproofing and roof light. Study of details of various methods of common façade treatments. Study of details of various methods of common interior finishes.</p>
<p><b>Unit 3: Materials For Specific Uses</b> Thermal insulation material, Waterproofing materials, its importance, stages, methods and techniques of waterproofing, Fire resistant materials, Materials used in termite control. Synthetic Materials, Eco friendly Materials, By-product materials like Wallpapers, Plastics &amp; Polymers, Soft Boards and Eco Boards, 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. Bamboo as a building materials, preservation of bamboo, use of bamboo in buildings including techniques involved.</p>

**Note:**

1. There will 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 will be done as scaled drawings on drawing sheets and freehand drawings for unit 1 & 2 and presentation/report for unit 3 along with occasional visits to construction sites.

**Textbooks:**

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



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**AR-227 Architectural Graphic – IV (Computer Application )** L S Credits  
**1 4 3**

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks (Theory = 13, Portfolio & Viva = 25)
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on written Examination, final portfolio submission, and viva-voce.

**Course objective:**

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

<p><b>Unit 1: Introduction to 3D softwares</b> Overview of the various 3D modelling softwares used in Architectural modelling; AutoCAD, Autodesk Revit, Sketch Up, V-Ray, Rhino, Grasshopper, Blender, Lumion. Architectural Drafting of three dimensional drawings in AutoCAD/Sketch Up/ Blender etc.</p>
<p><b>Unit 2: Basic 3D Modelling techniques</b> Introduction to Sketchup and its application in three dimensional views. Rendering three dimensional views using V-Ray. Introduction to advanced professional application of modelling, walkthrough, animation, rendering and presentation techniques in Sketch Up/V-Ray/Lumion etc.</p>
<p><b>Unit 3: Animation and Architectural Visualization</b> Applying materials to 3D models, texture mapping and exploring material libraries and customization. Setting up realistic lighting scenarios and rendering techniques for still images and animations.</p>

**Note:**

1. Sessional shall be in form of small exercises/ practical projects.
2. The enlisted software will be introduced and students will give submissions in soft and hard copy format to display their skills in the same.

**Textbooks:**

1. AutoCAD Manual, Autodesk published by Autodesk 2013



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AR-311	Structural Design – V	L	S	Credits
		3	0	3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<b>Unit 1: Beam design</b> Design and analysis of beam- Singly and doubly reinforced beam
<b>Unit 2: Column and footing</b> Design of axially loaded column and isolated footing
<b>Unit 3: Design of slab</b> One-way, two-way slab and waist slab (For dog-legged and open well staircase)

**Note:** Use of I.S. code 456 and SP-16 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.



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AR-312	Environmental Studies	L	S	Credits
		3	0	3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

**Course objective:** The objective of course is to create awareness about environmental problems among people, impart basic knowledge about the environment and its allied problems, and develop an attitude of concern for the environment.

**Course outcome:** After the successful completion of this course, students will demonstrate mastery of core ecological and physical science concepts and methods as they pertain to environmental problem-solving.

<p><b>Unit 1: Introduction to Ecosystems and Environment and Environmental Resources</b>                      Concept of environment, types of ecosystems, characteristic features, structure, and functions of Ecosystems – <i>Forest, Grassland, Desert, Aquatic (lakes, rivers, and estuaries), Land, Forest, Water, and Energy as environmental resources.</i></p>
<p><b>Unit 2: Environment, Ecosystem, Biodiversity, and its conservation.</b>                      Value of bio-diversity – <i>consumptive and productive use, social, ethical, aesthetic values</i>; Bio-geographical classification of India – India as a mega diversity habitat; Threats to biodiversity hotspots, conservation of biodiversity – <i>in-situ and ex-situ conservation.</i></p>
<p><b>Unit 3: Institutions and Governance</b>                      Introduction to Government regulations, Monitoring and enforcement of environmental laws, Introduction to Environmental Acts, viz., <i>Water (Prevention and Control of Pollution) Act, Air Prevention and Control of pollution act, Environmental protection act, Wildlife protection act, Forest conservation act, etc.</i></p>

**Textbooks:**

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

**Reference Books:**

1. E. Bharucha. (2021). *Textbook of environmental studies for undergraduate courses*. New Delhi: Universities Press, U.G.C.



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2. J. Benny. (2009). *Environmental Studies*. New Delhi: Tata McGraw Hill.
3. K. C. Agarwal. (2008). *Environmental Biology*. Bikaner: Nidhi Publications Ltd.



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AR-313	Building Services – II	L	S	Credits
		3	0	3
Contact hours per week	3 (3 lectures per week)			
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks			
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)			
Questions to be answered	Any four			
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)			
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.			
<b>End-semester examination</b>	Evaluation based on the end-semester examination.			

<p><b>Unit 1: Lighting systems</b> 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; <b>Lighting design</b> 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.</p>
<p><b>Unit 2: Firefighting</b> 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.</p>
<p><b>Unit 3: HVAC , Building Vertical Transport System and Electronic security and surveillance systems</b> Principles of air-conditioning, Types of Air conditioning systems. General methods of thermal insulation: Thermal insulation of roofs, exposed walls. Ventilation: Definition and necessity, system of ventilation. AC layout of any showing the air-conditioning system of an auditorium, multistoried hotel and office Buildings and Various methods of building automation, general overview. Study of building vertical Transport systems. Components of basic security and surveillance systems, understanding CCTV cameras Recording systems.</p>

**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.





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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.



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AR-314XX	Elective – V	L	S	Credits
	<b>01 Interior design</b>	<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Introduction to Interior Design</b> Historical background of interior design at a global level, and understanding the process of interior design</p>
<p><b>Unit 2: Application of Interior Design</b> The role of an interior designer, material selection and services: Elements and components of interior design, Materials in interior design, and, Services in interior design.</p>
<p><b>Unit 3: Design schemes</b> Interior design schemes for various building typologies – Reception halls, waiting-for lounges, restaurants, offices, residential spaces, hotels, theatres, assembly halls, etc.</p>

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

**Textbooks:**

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.

**Reference books:**

1. Tomris Tangaz. (2019). *The Interior Design Course: Principles, Practices, and Techniques for the Aspiring Designer*. Thames and Hudson Ltd.
2. Frida Ramstedt. (2020). *The Interior Design Handbook: Furnish, Decorate, and Style Your Space*. Clarkson Potter Publications.



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<b>AR-314XX</b>	<b>Elective – V</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
<b>02 Art in architecture and the history of Meghalaya's art and culture</b>		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Introduction</b>                  Art vocabulary – <i>Natural, Realistic, Symbolic, Abstract, Modern, and Contemporary</i>; Geometry in art and architecture – <i>comprehending and applying the golden ratio</i>; Geometric shapes, patterns, and architectural volumes.</p>
<p><b>Unit 2: Ideologies of Aesthetics in Art</b>                  Understanding the ideologies of aesthetics in art; Vitruvius and Michael Angelo's proportions; Symbolism in Architecture; 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.</p>
<p><b>Unit 3: Meghalaya's art and culture</b>                  Study of the tribes of Meghalaya; Vernacular architectural style of Meghalaya; Impact of socio-cultural beliefs and lifestyle on the settlements of these tribes.</p>

**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.



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AR-315	Architectural Design – V	L	S	Credits
		0	6	9
Contact hours per week	9 (6 studios per week)			
Distribution of marks	Sessional = 112 Marks, End semester examination = 113 Marks			
Questions to be set	NA			
Questions to be answered	NA			
Duration of end semester examination	NA			
<b>Continuous internal assessment</b>	Evaluation based on class performance and stage submissions			
<b>End-semester examination</b>	Evaluation based on final portfolio submission, presentation and 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.



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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.



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<b>AR-316</b>	<b>Building Constructions &amp; Materials – V</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
		<b>1</b>	<b>4</b>	<b>3</b>

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks (Theory = 13, Portfolio & Viva = 25)
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on written examination, final portfolio submission and viva.

**Course objective:** The main objective is to introduce the students to the structural elements of a building and the methods of its construction.

<p><b>Unit 1: Beams</b> Formwork for beams; Simply supported, continuous and cantilever beams; Inverted beams, L &amp; T beams, Details at odd junctions <b>Slabs:</b> Formwork for slabs; One-way and two-way slabs, Continuous slabs, Flat slabs, Waffle slabs, and Reinforced brick slabs.</p>
<p><b>Unit 2: Foundation (Module 1):</b> Foundation for load bearing and R.C.C. framed structures; Types of foundations – <i>shallow and deep footing</i>; various types of pile foundations <b>Foundation (Module 2):</b> Formwork for different types of foundations; Brick foundations; R.C.C. column footings – <i>isolated and combined footings</i>; Raft foundations; Grillage foundations.</p>
<p><b>Unit 3: Staircases:</b> 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. <b>Ramps:</b> Formwork for ramps and ramp gradient calculations; details of R.C.C ramps; details of fixing handrail.</p>

**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. – I*. East-West Press. (Sixth edition).
2. Stephen Emmitt. (2018). *Barry's Advanced Construction of Buildings*. Wiley-Blackwell. (Fourth edition).



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3. Gurcharan Singh. (2019). *Building Construction and Materials*. Standard Book House (Since 1960).



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AR-317	Building Information Modelling	L	S	Credits
		1	4	3

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks (Theory = 13, Portfolio & Viva = 25)
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on written examination, final portfolio submission and viva.

**Course objective:** The course is designed to offer an education programme on BIM integrated design, construction and operation processes.

**Course outcome:** After successful completion of the course, a student will gain competences to compete in a highly demanding market as a BIM Manager/Coordinator/Specialist.

<p><b>Unit 1: Introduction to Building Information Modelling</b> Introduction to the Digital Transformation journey, BIM Uses, BIM in project life cycle</p>
<p><b>Unit 2: Fundamentals of Building Information Modelling</b> Employer's information requirement, High strategy plan, BIM Execution Plan, Common Data Environment, Integrated Project Delivery</p>
<p><b>Unit 3: Applications of Building Information Modelling</b> 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.</p>

**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.





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AR-321	Structural Design – VI	L	S	Credits
		3	0	3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Design of connections</b> Design and material specification of simple and eccentric bolted, riveted, and welded connections.</p>
<p><b>Unit 2: Design of tension member</b> Design of axially loaded tension members, lug angle, and tension splice.</p>
<p><b>Unit 3: Design of compression members</b> Compression members, lacing, and battening for built-up compression member, slab base, steel beam, built-up beams, and gantry girder.</p>

**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).



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AR-322	Estimation, costing & specification	L	S	Credits
		3	0	3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

**Course objective:** To learn the skill of calculating the material required and the cost to be incurred before commencement of construction and the successful implementation of the project.

<p><b>Unit 1: Specification</b> Importance and methods of drafting specification in buildings; methods of specification writing – <i>trade wise practice, items of works, standard clauses/ instructions for various items of work</i>; - <i>Examples of specification for a structure from excavation up to finishing of the superstructure.</i></p>
<p><b>Unit 2: Introduction to estimates</b> Types of estimates; methods of preparing estimates; data required for making an estimate; long wall &amp; short wall methods of estimation; estimation of a single storey – <i>load bearing brick masonry building and R.C.C. framed building.</i></p>
<p><b>Unit 3: Methods of estimation and rate analysis</b> 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 – <i>Examples and exercises for the discussed topics (from excavations to completion).</i></p>

**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.



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AR-323	Building Services - III	L	S	Credits
		3	0	3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	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.*

**Unit 2: 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 3: 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. Madhuvanathi. (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.



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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.



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AR-324XX	Elective – VI	L	S	Credits
<b>01 Universal design for differently abled</b>		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

**Course objective:** The main objective is to introduce the students to the universal principles and practices for inclusive approach towards design for all members of the society.

<p><b>Unit 1: Introduction to universal design</b> 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.</p>
<p><b>Unit 2: Design elements</b> Design elements for barrier-free design within buildings of various typologies – <i>approach to plinth levels, corridors, entrance and exit, windows, stairways, lifts, toilets, signage, guiding and warning systems, floor materials</i>; Design elements for barrier-free design at the site – <i>site planning and parking design, kerb at the footpath, road crossing, public toilet, bus stop, toilet booth, and signage.</i></p>
<p><b>Unit 3: Design – Module I</b> Barrier-free design for building indoors – <i>for private, semi-public, and public buildings.</i></p>
<p><b>Design – Module II</b> Barrier-free design for building outdoors – <i>for private, semi-public, and public buildings.</i></p>

**Note:** Submissions for the Continuous internal assessment will be in the form of write ups, 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.



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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.



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AR-324XX	Elective VI	L	S	Credits
	<i>02 Sustainable Architecture</i>	<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

**Course objective:** The main objective is to introduce the students to the universal principles and practices for inclusive approach towards design for all members of the society.

<p><b>Unit 1: Introduction to sustainability</b> Introduction to ideas and concepts of sustainable development and architecture, the global environment, and the built environment; Introduction to sustainability principles in architecture. <b>Study of sustainable practices</b> Study sustainable architecture through traditional practices; use of energy, materials, health, and global environment as related to the construction and operation of buildings.</p>
<p><b>Unit 2: Sustainable and Conservation Practices</b> Water management and conservation systems; Waste management systems – <i>solid and sewage waste management</i>; Energy conservation and management systems.</p>
<p><b>Unit 3: Sustainable energy systems</b> 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.</p>

**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. Heating, Cooling Lighting - Sustainable Design Methods for Architects by Norbert Lechner, published by John Wiley & Sons, Inc. 2015.
2. Cathy Strongman. (2010). *The Sustainable Home: The Essential Guide to Eco Building, Renovation and Decoration*. Merrell Publishers.



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AR-325	Architectural Design – VI	L	S	Credits
		0	6	9

Contact hours per week	9 (6 studios per week)
Distribution of marks	Sessional = 112 Marks, End semester examination = 113 Marks
Questions to be set	NA
Questions to be answered	NA
Duration of end semester examination	NA
<b>Continuous internal assessment</b>	Evaluation based on class performance and stage submissions.
<b>End-semester examination</b>	Evaluation based on final portfolio submission, presentation and 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: 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. 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.

**Reference books:**

1. F. D. K. Chings. (2013). *Introduction to Architecture*. Wiley.





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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.



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<b>AR-326</b>	<b>Building Constructions &amp; Materials – VI</b>	L	S	Credits
		<b>1</b>	<b>4</b>	<b>3</b>

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 (Theory = 13, Portfolio & Viva = 25)Marks
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on written examination, final portfolio submission and viva.

**Course objective:** The main objective is to introduced the students to the construction techniques using Steel and introduce them to modern systems of construction and space frame.

<p><b>Unit 1: Structural steel frame</b> Functional requirements – <i>design methods, steel sections, structural steel frames, steel joinery details, etc.</i> <b>Structural Steelwork – Module I :</b> Shapes of structural steel, rivets, beams, and steps to be followed to design a simply supported steel beam, compression members.</p>
<p><b>Unit 2: Structural Steelwork – Module II</b> Columns and stanchions, framing long spans, trusses, stanchion base, welding, types of weld joints, column and beam connections, plate girders, lattice or warren girder. <b>Advanced steel frames -</b> Industrial structures in steel, multi-storied/tall structures/towers.</p>
<p><b>Unit 3: Steel roof structures for large spans</b> Large Span Construction-flat slabs-shell structures, folded plates, portal frames, space frame &amp; trusses, tensile structures. <b>Pre-engineered structures :</b> Pre-fabricated construction &amp; Pre-engineered building. New Material in Construction. Cold form sections, FRP.</p>

**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.



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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).



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<b>AR-327</b>	<b>Working Drawing – I</b>	L	S	Credits
		<b>1</b>	<b>4</b>	<b>3</b>

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 (Theory = 13, Portfolio & Viva = 25)Marks
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on written examination, final portfolio submission and viva.

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

<p><b>Unit 1: Standards of Architectural Working Drawings</b> Conventional architectural drafting – Office format and standards (including sheet size and scale). Drafting conventions, appropriate graphic symbols, and representations.</p>
<p><b>Unit 2: Sanction Drawings and Civil construction Drawings</b> Preparation of permission drawings, floor and roof plans, site plans, elevations, sections, setting out, excavation plans, etc.</p>
<p><b>Unit 3: Detailed Architectural drawings</b> Preparation of detailed drawings for the schedule of openings, staircase, kitchen, toilets, electrical layout, water supply &amp; sanitary layout, joinery (wood/ metal/ polymer, etc.), finishes, etc.</p>

**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.



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AR-411	Advanced Structural Design – I	L	S	Credits
		3	0	3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<b>Unit 1: Beam analysis</b> Analyse continuous beam using Three-Moment equation method
<b>Unit 2: Beam analysis</b> Analyse continuous beam using Slope deflection method
<b>Unit 3: Beam analysis</b> Analyse continuous beam using Moment distribution, Column analogy method

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

**Textbooks:**

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

**Reference Books:**

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



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<b>AR-412</b>	<b>Town Planning and Building Bye-Laws</b>	L	S	Credits
		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Principles of Planning</b> – Types of planning, Elements of planning, Surveys, Landuses, Character, Densities.  <i>Introduction to planning processes</i> – Zoning, zoning regulations, Site planning, Types of plans- development plans, action plans, structure plans, Planning process, Master plan (Development plan) and its component  <i>Planning techniques and theories</i> – 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.</p>
<p><b>Unit 2: Other aspects of Planning</b> – 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.</p>
<p><b>Unit 3: Introduction to bye-laws and codes of practice</b> – 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.  <i>Special Provisions in the building bye-laws</i> – 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.</p>

**Textbooks:**

1. The Urban Pattern, City Planning and Designl by Gallion and Eisner, Published by John Wiley & Sons, 5<sup>th</sup> Ed. 2005
2. Urban Land Use Planningl by Philip R. Berke, David R Godschalk, Published by University of Illinois Press, 5<sup>th</sup> Ed. 2006
3. Principles of Urban Planningl by Lewis Keeble, Published by Estates Gazette, 24 September 2010
4. Meghalaya Building Bye Laws (MBBL 2011)l, published by Meghalaya Government Printing Press, 2011.
5. Professional Practicell, by S. C. Rangwala and K. K. Rangwala by Charotar Publishing House, 1990.



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**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.



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AR-413	Project Management – I	L	S	Credits
		3	0	3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

**Unit 1: Introduction to Project Management**

The difference between a project manager and a project leader, The duties of a project manager/project leader, Project Life Cycle, Project Management process in to Project Management

**Unit 2: Basics of Project Management**

Types of project, Phase of project, project management and its relevance, stake holders of a project, structure of project organization, management levels, Failures and success of a project.

**Unit 3: Office organization and management** – expense, structure, salaries and overheads. Role of design staff and supporting managerial staff; Personal management and training responsibilities.

**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





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AR-414XX	Elective – VII	L	S	Credits
<b>01 Graphic and Product Design</b>		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<b>Unit 1: Graphic design</b> Typography, imagery, symbology, and art; Graphic design and its applications to architecture; Branding
<b>Unit 2: Introduction to Product Design</b> Historical global overview of Industrial design, Principles of Industrial design, Famous Industrial designers and their contribution to the field, Product design sketching
<b>Unit 3: Applications of Graphic and Product design</b> Product Attributes – Function and Emotion; Product configurations and Component relationships. Understanding modularity and modular systems; Design of Modular System Understanding the R AND D in Product design process

**Textbooks:**

1. Design Methods: Seeds of human futuresl by J. C. Jones, Published by Wiley Interscience, London, 1992
2. Introduction to Designll by Morris Asimow, Published by Prentice Hall, Englewood Cliffs, N.J.,1983
3. Product Design and Developmentll 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-414XX Elective – VII L S Credits

02 Intelligent Buildings 3 0 3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	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

**Unit 2: 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 3: 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, 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 Design, Construction, and Management by Building Intelligence Group, Published by Hands-On-Guide, 2007
3. Sustainability and Health in Intelligent Buildings by Riadh Habash, published by Woodhead Publishing, 2022

**Reference Books:**

1. Intelligent Buildings and Building Automation by Shengwei Wang, published by Spon Press, 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.





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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).



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<b>AR- 416</b>	<b>Building Constructions &amp; Materials – VII</b>	L	S	Credits
		<b>1</b>	<b>4</b>	<b>3</b>

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks (Theory = 13, Portfolio & Viva = 25)
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on written examination, final portfolio submission and viva.

**Course objective:** The main objective is to introduced the students to the advance systems and technique of construction with the aid of modern technology.

<p><b>Unit 1: Advanced methods of multistory building construction</b> 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</p>
<p><b>Unit 2: Advanced construction methods in RCC</b> 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.</p>
<p><b>Unit 3: Advanced Building Materials</b> Plastic, PVC, metals, synthetic boards, fire proof resistance boards/files, acoustic materials, glass, composite panels and their applications, non-load bearing system/blocks <b>Curtain walls:</b> 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.</p>

**Textbooks:**

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

**Reference books:**

1. “Building Envelope and Interior Finishes Databook” by Sidney M. Levy, Published by Mcgraw – Hill Professional, 2001



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

<b>AR- 417</b>	<b>Working Drawing – II</b>	L	S	Credits
		<b>1</b>	<b>4</b>	<b>3</b>

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 (Theory = 13, Portfolio & Viva = 25)Marks
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on written examination, final portfolio submission and viva.

**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 complementary to the working drawings

<p><b>Unit-1: Architectural Working Drawings</b> Preparation of Architectural working drawings to suitable scales for a multi-storied building indicating- the method of giving dimensions for architectural and structural, on plans at various levels, elevations and sections. Detailed drawings showing excavation, centre line and all structural details.</p>
<p><b>Unit-2: Services Drawings</b> Location of built up areas in the site plan showing approach roads, paths and parking areas etc. Layouts of all services such as water supply, sewage disposal and electrical connections. Fire exit, elevator, and interior detailed drawings.</p>
<p><b>Unit-3: Specification and Details</b> The brief specification of materials of finishes on the drawings. Architectural details to a large scale showing application of materials of finishes and other constructional details.</p>

**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 Bakhoun, Nagy R., Wakita, Published by Wiley, 2017
3. Working Drawings Handbook by Bichard, Andrew, Styles, Keith, Published by Routledge, 2015





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AR-422	Project Introduction and Dissertation	L	S	Credits
		3	0	3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Definition –</b></p> <p>a) What is research – formation of hypothesis?                      b) Types of research.                      c) Social research vis-à-vis architectural research.</p>
<p><b>Unit 2: Formation of research methodology –</b>                      Formation of goal, Formation of scope and limitation, Data collection – process and methods, Analysis – statistical and other, Output of research.</p>
<p><b>Unit 3: Various types of Architectural researches –</b> Interpretive historical research, Qualitative research, Co-relational research, Experimental and quasi-experimental research, Simulation and modeling research, Logical argumentation, Case studies and combined strategies, <b>Report writing</b> – Styles, Salient features, Bibliography writing, Citation, etc</p>

**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.

**Textbooks:**

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.

**Reference Books:**

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





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<b>AR-423</b>	<b>Project Management – II</b>	<b>L</b>	<b>S</b>	<b>Credits</b>
		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<b>Unit 1: Introduction to Personal Management</b> Human relation and personnel management; business correspondence, information storage and retrieval systems
<b>Unit 2: Site Management</b> Role of an architect in site management, Construction management, Communication and coordination
<b>Unit 3: Introduction to principles of business management</b> Planning; Organising; Leading; Unity of Command; Unity of Direction; Collective Interest Over Individual Interest

**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



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AR-424XX	Elective – VIII	L	S	Credits
<b>01 Architectural Conservation</b>		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: History and modes of architectural conservation</b>                      Definition, Importance &amp; need of conservation, Various aspects of conservation of natural and manmade environment, Classification of conservation — cultural, historical, urban areas.  <b>Process of Conservation</b> – 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.</p>
<p><b>Unit 2: Cultural Heritage</b>                      Concept of heritage structures, Various methods adopted for conservation of heritage structures in India and Abroad, Theories of identification and conservation of heritage structures</p>
<p><b>Unit 3: Conservation management</b>                      Methodologies to be adopted for conservation management, Case studies in conservation related to adoptive reuse, building in context, preservation, urban conservation.  <b>Conservation legislations</b> – 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.</p>

**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



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AR-424XX	Elective – VIII	L	S	Credits
	<b>02 Housing</b>	<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<p><b>Unit 1: Introduction to current Housing Scenario</b> Introduction to housing, Housing terminology, standards, scope, Housing typology (construction and economic considerations), Housing Infrastructure, Housing at micro to macro level. 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.</p>
<p><b>Unit 2: Housing Strategies</b> Government housing strategies, Housing survey, methodologies and inferences, Study of housing density, legislation and byelaws.</p>
<p><b>Unit 3: Housing Policies &amp; Housing Finance</b> 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. Role of financial institutions, Co-operative housing schemes, Gramin Bank Model, Government measures for slum upgradation and rehabilitation.</p>

**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



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**AR-425                  Architectural Design – VIII                                  L                  S                  Credits**  
**0                                  6                                  9**

Contact hours per week	9 (6 studios per week)
Distribution of marks	Sessional = 112 Marks, End semester examination = 113 Marks
Questions to be set	NA
Questions to be answered	NA
Duration of end semester examination	NA
<b>Continuous internal assessment</b>	Evaluation based on class performance and stage submissions.
<b>End-semester examination</b>	Evaluation based on final portfolio submission, presentation and 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:

Issues of urban structure, urban space and form

Issues of conservation.

Issues in zoning, land use, density, development control.

Issues of building in context, urban infill.

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

**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.

**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.



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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).



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AR-426	Building Constructions & Materials – VIII	L	S	Credits
		1	4	3

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks (Theory = 13, Portfolio & Viva = 25)
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on written examination, final portfolio submission and viva.

**Course objective:** The main objective is to establish a comparative approach to the conventional and non-conventional methods of construction and an introduction to controversies in development.

<p><b>Unit 1: Non-Conventional Materials And Technologies In The Architecture</b> 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</p>
<p><b>Unit 2: Walling Materials And Technologies</b> 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.</p>
<p><b>Unit 3: Roofing materials and technologies</b> 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 <b>Conventional techniques</b> – Use Of Bamboo As A Renewable Building Material, Importance and Potential of Bamboo, Uses of bamboo as a building material including the techniques involved.</p>

**.Textbooks:**

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

**Reference books:**

1. 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
2. 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



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3. Application of Bamboo in Building Envelope (Green Energy and Technology) by Zujian Huang, Published by Springer, 2020



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AR-427	Landscape Design & Site Planning	L	S	Credits
		1	4	3

Contact hours per week	3 (1 lecture & 4 studios per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 (Theory = 13, Portfolio & Viva = 25)Marks
Questions to be set	Three
Questions to be answered	Two
Duration of end semester examination	Two Hours – 30 Minutes ( 30mins for theory examination)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

**Course objective:** This course is intended to provide knowledge of landscape architecture design practices and processes, design terms, and techniques through discussions and studio work.

**Course outcome:** After successfully completing this course, students will be able to demonstrate knowledge of fundamental concepts and ideas in landscape architecture.

<p><b>Unit 1: Introduction to Landscape Architecture and Evolution of Modern Landscape</b> History of gardening (<i>Gardens of Paradise, Chinese, Japanese, and Renaissance</i>), Principles of composition, and Designing with plants, Designing gardens and parks and site selection criteria for gardens and parks. Eighteenth-century (<i>Western classicism, Chinese and English philosophy</i>), Nineteenth-century (<i>European mainland and British Isles</i>), and Twentieth-century (<i>Old World – Eastern Hemisphere to New World – Western Hemisphere</i>).</p>
<p><b>Unit 2: Studio (Module 1 - Minor project)</b> The studio exercise may cover landscape design schemes for small projects like courtyards and/or public plazas in residential projects, urban landscapes, institutional campuses, commercial spaces, hospitality projects, healthcare projects, etc.</p>
<p><b>Unit 3: Studio (Module 2 - Major project)</b> The studio exercise may cover landscape design schemes for significantly larger scale like master plans or site plans for residential campuses, housing schemes, public plazas, urban landscapes, institutional campuses, commercial spaces, hospitality projects, healthcare projects, etc. Necessary theoretical inputs will be discussed to highlight the design standards and construction details. The following matters relating to the proposed design typology will be addressed: a) Landscape design application for projects ranging from typologies like courtyards, small gardens, urban spaces, site plans for residential schemes, institutional campuses, etc. b) Design issues and details for the site context. c) Requirements for universal/barrier-free design.</p>

**Outline:**

- Preparation of landscape drawings (*plans, sections and sectional elevations*) to suitable scales.
- The method of giving architectural and structural dimensions on plans at various levels, elevations, and sections.





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- c) The brief specification of materials of finishes on the drawings.
- d) Design details to a large scale showing application of materials of finishes and other constructional details.

**Note:** Submission for the continuous internal assessment and end-semester portfolio shall be made on drawing sheets in the form of detailed scaled drawings (*plans, sections and sectional elevations*) and 3d views.

**Textbooks:**

1. G. K. Hiraskar. (2004). *The Great Ages of World Architecture*. Dhanpat Rai Publications (P) Ltd. Reprint 2018.
2. Geoffrey Jellicoe., and Susan Jellicoe. (1995). *The Landscape of Man – Shaping the environment from pre-history to the present day*. Thames & Hudson Ltd. Reprint 2012.

**Reference books:**

1. Michael Laurie. (1986). *An Introduction to Landscape Architecture*. Elsevier Science Ltd.
2. John L. Motloch (2000). *An Introduction to Landscape Design*. John Wiley & Sons. (Second edition).
3. J. Simonds., and B. Starke. (2013). *Landscape Architecture – A Manual of Environmental Planning and Design*. McGraw-Hill Education. (Fifth edition).
4. C. Harris., and N. Dines. (2017). *Time-Saver Standards for Landscape Architecture*. McGraw Hill Education.



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AR-511	Practical Training	L	S	Credits
		0	18	27

Contact hours per week	18 (Min. 30 man hours in the office per week)
Distribution of marks	Internal = 225 Marks, End semester examination = 225 Marks
Questions to be set	N.A.
Questions to be answered	N.A.
Duration of end semester examination	N.A. – Viva-Voce
<b>Continuous internal assessment</b>	Evaluation based on office performance report and portfolio.
<b>End-semester examination</b>	Evaluation based on the presentation and 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:** PRACTICAL TRAINING –(1) Practical Training shall be undergone during 8th/ 9th semester of the Architecture, Degree course for a period of six months or one semester in the office of an architect or an organization operating in an allied field of practice or research, duly approved by the institution, under mentorship of an architect having experience of at least 5 years.

(2) The practical training shall be supervised and evaluated through periodic assessment by the mentoring architect and end semester examination (viva voce) as part of curricular studies.

(3) Training in Foreign Country shall be done under the Registered Architect of that Country and to be approved and monitored by the Head of the University or Institution.



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AR-521	Design Thesis	L	S	Credits
		0	10	15

Contact hours per week	10 (10 studios per week)
Distribution of marks	Internal = 125 Marks, End semester examination = 125 Marks
Questions to be set	N.A.
Questions to be answered	N.A.
Duration of end semester examination	N.A. – Viva-Voce
<b>Continuous internal assessment</b>	Evaluation based on office performance report and portfolio.
<b>End-semester examination</b>	Evaluation based on the presentation and 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.
4. Practical Training shall be completed before the commencement of Architectural Design Thesis.



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<b>AR-522</b>	<b>Architectural Seminar</b>	L	S	Credits
		<b>3</b>	<b>0</b>	<b>3</b>

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on performance throughout the semester/ duration of research and data collection for delivering the Architectural Seminar.
<b>End-semester examination</b>	Evaluation based on the end semester examination and final presentation of the Architectural Seminar and 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.

<p><b>Unit 1: Emerging concepts in architecture</b> Changes in social, economic, and technological variables, Review of design projects related to real-world instances and relevant to the community at large, Review of projects of design complexity involving themes, sub-themes and architectural expression</p>
<p><b>Unit 2: Research in architecture</b> Tools and Methods required to handle a design project, Scientific methods of research with special emphasis on architectural research methods, architectural enquiry visual, observations, and questionnaire formats of enquiry, literature review and case studies, data analysis techniques interpretation of data</p>
<p><b>Unit 3: Report writing and presentations</b> Formats for the presentation of data, case studies and analysis, Formats for the presentation of thesis design- media approaches in the architectural profession such as two-dimensional drawing, physical models, three-dimensional computer models. Report writing: Techniques in report writing, presentation of contextual information relevant to Interpretation of the data collected and design, reporting the design development from concept to Design solution, explaining the relation of the design to existing knowledge on the topic in the form of coherently written thesis report</p>

**Note:** Stage submissions for continuous internal assessments will include presentations of data collected, every 2 weeks.

**Textbooks:**

1. Architectural Reserach Methods, Linda Groat and David Wang, published by Wiley and sons, Inc, Hoboken, New Jersy, 2nd Edition, 2013



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**Reference books:**

1. Ajla Aksamija, (2021). Research Methods for the Architectural Profession, Routledge.
2. Design Research in Architecture: An Overview, Murray Fraser, published by Routledge, United Kingdom, 1st Edition, 2013.



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AR-523	Professional Practice	L	S	Credits
		3	0	3

Contact hours per week	3 (3 lectures per week)
Distribution of marks	Sessional = 37 Marks, End semester examination = 38 Marks
Questions to be set	Six (One from each unit and remaining three from the combination of more than one unit)
Questions to be answered	Any four
Duration of end semester examination	Two Hours – 30 Minutes (2 ½ Hrs)
<b>Continuous internal assessment</b>	Evaluation based on class performance/assignments and mid-term examination.
<b>End-semester examination</b>	Evaluation based on the end-semester examination.

<b>Unit 1: Architectural Practice</b> – 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
<b>Unit 2: Council of Architecture</b> – 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.
<b>Unit 3: Concept of Contract</b> – 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