Part D: SYLLABI

35. FIRST AND SECOND SEMESTER SYLLABUS

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Viva	Written	
I & II	I (a)	19AR12001	Architectural Design 1 & 2		10		10	250	250		500

Course Overview:

The course aims to deliver the fundamentals of Architecture and provide a brief introduction to the design process.

- To Introduce architectural and design vocabulary to familiarize students with the grammarof design
- To introduce the elements and principles of basicdesign
- To enable design thinking and basic principles of 2D and 3Dcomposition
- To develop an understanding of the methods of architecturaldrawing
- To develop the ability to translate abstract principles into designsolutions
- To familiarize students with design development methodology and the processinvolved

Course Outcomes:

Upon completion of the course, the student should have an:

- Understanding of definition of architecture
- Understanding of elements of space making, various design principles and itsapplication
- Understanding of architectural drawings and various techniques for visualrepresentation
- Understanding of design as a multidimensional creativeart
- Understanding nature as a contextualsetting
- Understanding of design development methodology and itsprocess.

Module 1: Orientation Course

Module Contents:

- Introduction to the fundamentals of architecturaleducation
- Introduction to how Architecture is connected to other realms ofknowledge
- Introduction to the multi-faceted role of anarchitect
- Exposure to the works of master architects and theirphilosophies
- Introduction to tools and mediums of visualrepresentation

Suggested exercises: Mind mapping, Story boards

Module 2: Fundamentals of Design and Drawing

Module Contents:

- Exploring Elements and Principles of Design by creating 2 dimensional and 3dimensional compositions
- Introduction to Principles of two-dimensional compositions- Balance, Movement, Scale, Proportion, Rhythmetc.
- Introduction to principles of three-dimensional composition - Form, Mass, Volume, Scaleetc.
- Introduction to ColorTheory
- Introduction to fundamentals of architectural drawing. Measured drawing exercise offamiliar objects &spaces
- Introduction to dimensioning systems and standard unitconversions

Suggested exercises: Poster Design, Product design, use of patterns to synthesize 2D and 3D models, Form making exercise, Application of colors in built form and objects, Measured drawing exercise etc.

Module 3:Art in Design &Space Articulation

Module Contents:

- Introduction to the evolution of Art andDesign
- Factors influencing the process of Art, Design andArchitecture.
- Relationship of art and design with space andenvironment
- Introduction to Perceptual bases for ArchitecturalDesign
- Introduction to theories of scale and proportion in Spacearticulation
- Introduction toanthropometry
- Observation and study on People-Spaceinteraction

Suggested exercises: Creative visual expressions representing culture and context, Simple activity mapping and space correlation, Space illustrations related exercises and models, Exercises to illustrate basic proportions and spatial concepts

Module 4: Introduction to Design Process

Module Content:

- Introduction to Concepts inDesign
- Introduction to Design in Nature andContext
- Introduction to methods of design in architecture through Generation of Circulationdiagram, Bubble Diagram and Activity Proximity Matrix to establish a functional relationship among variousspaces.
- Introduction to basic concepts of structures indesign
- Architectural study tour of spaces or buildings which has to be concluded with areport incorporating studies based on the aspects discussed in thesyllabus

Major project: Design of a simple structure (Not more than 50 sqm) illustrating the fundamentals of architecture discussed in the syllabus. The context may be hypothetical.

Time bound project: Design of a functional space to demonstrate the process of design development and fundamentals of architectural design representation

Reference:

- Broadbent, G. (1973). *Design in Architecture - Architecture and Human Science*. New York: John Wiley andSons.
- Ching, F. (2014). *Architecture: Form, Space, and Order, 4th Edition*. John Wiley &Sons.
- Ching, F. (2015). *Architectural Graphics*. Wiley & Sons Canada, Limited,John.
- Ching, F., Jarzombek, M. and Prakash, V. (2010). *A global history of architecture*. 2nd ed. John Wiley & Sons.
- Conway, H. and Roenisch, R. (2003). *Understanding architecture: an introduction to architecture and architectural history*. London:Routledge.
- Kleiner, F. (2009). *Art through the ages a Global History*. 3rd ed. ClarkBaxter.
- Pramar, V. (1973). *Design fundamentals in architecture*. Bombay: SomaiyaPublications.
- Roth, L. (n.d.). *Understanding architecture: Its Experience History andMeaning*.
- Snyder, J. and Catanese, A. (1979). *Introduction to architecture*. New York:MacGraw-Hill.
- Unwin, S. (2009). *Analysing architecture*. London:Routledge.

Notes:

- Studentsmaybeencouragedtoreadanddiscussbooks/journalsrelatedtothetopics discussed in the semester
- Discussions of the topics given above may include relevant contents from the othersubjects in the semester as well.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Viva	Written	
I & II	I (b)	19AR12002	Building Materials and Technology 1 & 2	1	3		4	100	100		200

Course Overview:

The subject primarily aims at developing understanding in the use of appropriate construction technique and material in building design based on feasibility of technology, physical properties (like density & specific gravity, strength, thermal properties), aesthetic value, socio-cultural impacts and relevance, socio-economic factors, Ecological footprint etc.

The course introduces the technological aspects of a building design from the perspective of functional building component where use of natural and artificial materials is discussed based on their application. Each material would be taught in a manner such that its application would be discussed in a sequential manner, starting from foundation level, followed by plinth & others (sill, lintel, sunshades, window/door openings, walling material, as a floor & flooring) and culminating at roof and parapet wall. Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples tocomplex.

Course Outcomes:

Upon completion of the course, the student should:

- The student should develop necessary decision-making skills in using appropriate construction technologies and materials while designing buildings, based on understanding of their potentials andproperties.
- The student should develop the skill to represent various construction techniques as well as materials through drawings supporting their buildingdesign.
- Three drawing sheets shall be drafted based on the contents of eachmodule.

Module 1: Introduction to Fundamental Components of a

Building Learning Strategies:

- Lecture on various building components and various techniques as well as materialsused.
- Demonstration at building construction sites, workshops etc. on various building components and various techniquesused.
- Market study onmaterials.
- Drawing studios on representation of different building components andmaterials.

Module Contents:

- Foundation: Function, Types based on structure, Techniques & materials used in construction.
- Building envelope: Function, Desirable properties, Types based onmaterials.
- Floor: Function, Types based on material and construction used, Techniques used in construction.
- Fenestrations: Function, Types based on application, Techniques & materials used in construction.
- Roof: Function, Types by shape and structure, Techniques & materials used inconstruction.
- Overview of load bearing and framed structures – related components – columns, beams, trussesetc.

Module 2: Soils and Foundations

Learning Strategies:

- Lecture on various soil types, various techniques of soil tests for different properties of soil and types of foundations for eachsituation.
- Demonstration at building construction sites, workshops etc. on various building foundations used for different types ofbuildings.
- Site visits to soil testingfacilities.
- Drawing studios on representation of different foundationtypes.

Module Contents:

- Soils – Their classification, physical properties and behaviour – Bearing capacity, safe bearing capacity, Determination of SBC, Standard Penetration test – Sand – fineness, bulking qualities - Methods of improving bearingcapacity.
- Shallow Foundations – Types- Pad, Strip, Raft-Method ofconstruction.
- Deep Foundations-Types- Piles, Piers, Caissons-Materials and method ofconstruction.
- Execution problems in loose and clayey soil, Shoring,Timbering.
- Vernacular construction methods of foundation – stone, rammed earth, bamboo, coconut etc.

Module 3: Construction Using Wood

Learning Strategies:

- Lecture on various building components using wood as constructionmaterial.
- Demonstration at timber yards, saw mills, carpentry workshopsetc.
- Market study on various wood and wood-basedmaterials.
- Drawing studios on representation of different wood constructiontechniques.

Module Contents:

- Timber/ wood as construction material: Properties, Types of timber, defects, seasoning and preservation of timber, ecological impact due to use of wood, joinery details & systems, BIS Specificationsetc.
- Wooden doors & windows - Wooden joinery &details.
- Structural members: application of wood as a structural member – framed structure, roof structure - King post truss, Queen posttruss.
- Timber Floors – Single, double and framed floors with joints between joists with wall plate, joist with beam and sub beam with main beam, strutting ofjoists.
- Roof & Ceiling: wooden ceiling systems – members of the system, detailing, wooden roof systems – members,detailing.

Module 4: Masonry

Learning Strategies:

- Lecture on various building components in elementary load bearing construction using concrete.
- Demonstration at construction sites on variousstages.
- Market study on cement, bricks, steel etc. used in elementary concrete load bearing constructions.
- Drawing studios on representation of different buildingcomponents.
- Hands on workshop on masonrytypes.

Module Content:

- Material Study- Burnt bricks and alternative building blocks: Mud Bricks, Stones, concrete blocks, mud blocks, rammed earth, their BISspecifications.
- Wall: Masonry techniques & tools, Types of masonry bonds – Stretcher, Header, English, Flemish, Stack, Dutch, Facing and rat trapbonds.
- Properties of cement concrete, preparation, cement, aggregates and other components of concrete, techniques andtools.
- Vernacular materials like mud, bamboo, lime, surkhi, clay products – applications, environmentalaspects.

List of drawings for viva (Minimum 7 sheets)

- Typical Wall section
- Stripfoundation
- Columnfooting
- Pile & Pilecap
- Wooden joinery
- Timberfloors
- King posttruss
- Queen post truss
- English bond – different thickness and Tjoint
- Flemish bond – different thickness and Tjoint

Reference:

- Barry, R. (1999). The Construction of Buildings Vol. 2. 5th Ed. New Delhi: East-WestPress.
- McKay, W. B. (2005). Building Construction Metric Vol, I – IV. 4th Ed. Mumbai: OrientLongman.
- Chudley, R. (2008). Building Construction Handbook. 7th Ed. London:Butterworth-Heinemann.
- Foster,J.andMitchell,S.(1963).BuildingConstruction:ElementaryandAdvanced,17thEd.London: B.T. Batsford Ltd.
- H Leslie Simmons, 'Construction – Principles, Material & Methods', 7th edition, John Wiley & Sons Inc., New York, 2001.
- Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi: StandardPublishers.
- P.C. Varghese, 'Building Materials', Prentice hall of India Pvt. Ltd, New Delhi,2005

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Viva	Written	Total
I & II	I (c)	19AR12003	Professional Skill Enhancement 1 & 2			4	2	50	50		100

Course Overview:

This course intends to provide/ enhance the soft skills in order that students perform well in their academics and beyond. These skills are intended to support the student to perform better in her/his core subjects and also build up robust performance through hands-on workshops and laboratory training. This course is subdivided into two categories – Mandatory and Optional. Mandatory courses help in preparations for respective semester subjects. The optional category helps students to take personal initiatives to develop in specific areas that can widen their horizon of their understanding of architecture and also initiate action at the society level. There are also options to work on competitive exercises alongside other similarinstitutions.

- The aim of this subject is to familiarise students with different types of materials and manufacturing techniques for creating art forms/models.
- Students will be able to use different kinds of tools and machinery for production of design models.
- The subject will be taught in congruence with subjects like Design and Graphics. Assignments for the subject will be linked to design exercises to achieve higher level of learning and understanding the practical application of thesame.
- Considering the significance of English language as a tool for global communication, the course aims to develop and enhance the linguistic and communicative competence of the students. The focus is on honing the skills of reading, writing, listening, and speaking. By providing suitable examples, the students will be exposed to various forms of personal and professional communication. The self-learning tasks designed will facilitate to enhance effective communication skills in a modern, globalisedcontext.

Course Outcomes:

Upon completion of the course, the student should:

- be given an exposure of varied skills that can bring in confidence in handling their core subjects such as workshops, communication skills, computer applicationsetc.
- be able to develop team spirit and interpersonal skills to manage complexsituations.
- be able to cope with stress and develop multi-taskingcapabilities.

Module 1: Architecture Model Making Workshop

Learning Strategies:

- Practical hands onsessions
- Model making lab andequipment
- Suggestive Materials: Paper, thermocol, clay, ceramic, plastic sheet, sheet metal, woodetc.

Module Contents:

- Training in translating ideas into three dimensionalforms.
- Training sessions using different materials and techniques pertaining to Architectural model making.
- Training in safe handling of equipment for production of designmodels.

Module 2: Communication Skills

Learning Strategies:

- Languagelab
- Group discussions and Interactivesessions

Module Contents:

- Scope and Importance of effectivecommunication.
- The Process of Communication: Levels of communication; Flow of communication; Use of language in communication; Communication networks; Significance of technical communication.
- Barriers to Communication: Types of barriers; Miscommunication; Noise; Overcoming measures.
- Listening Skills: Listening as an active skill; Types of Listeners; Listening for general content; Listening to fill up information; Intensive Listening; Listening for specific information; Developing effective listening skills; Barriers to effective listeningskills.
- Reading Skills: Previewing techniques; Skimming; Scanning; Understanding the gist of an argument; Identifying the topic sentence; Inferring lexical and contextual meaning; recognizing coherence and sequencing of sentences; Improving comprehensionskills.

Module 3: Co-curricular Activities

Learning Strategies:

- Technical and hands onworkshops
- Group discussions and Interactive sessions
- Self-initiatives

Module Contents:

- Optional content to be developed by each institution in order to help students to take part in activities that involve larger groups and facilitate peerlearning.
- The activities could be skill oriented like Photography or Crafts training or student initiated societal activities or participation in NASA or similar student led group initiatives which have an academic content aswell.

Reference:

- Dunn, N. (2014). *Architectural modelmaking*. Laurence KingPublishing.
- Kaplan Test Prep. (2018). *IELTS prep plus 2019-2020*. KaplanPub.
- Knoll, W. (2014). *Architectural models: Construction Techniques*. 1st ed. CengagePublications.
- Lougheed, L. (2010). *Barron's IELTS*. 2nd ed. Barrons EducationalSeries.
- Werner, M. (2011). *Model making*. Princeton ArchitecturalPress.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Viva	Written	Total
I & II	II	19AR12004	History of Architecture 1 & 2	2			2	50		100	150

Course Overview:

The subject principally aims at sensitizing the students towards understanding architecture as a product of historic evolution process of human kind along the timeline through socio cultural and political changes as well as technological advancements at different geographies around the planet earth. The subject intends to inculcate in the students a sense of curiosity to understand the origins and meanings of the various forms of architectural details, expressions as well as functional design elements or space standards used extensively in the practice.

Course Outcomes:

Upon completion of the course, the student should:

- Be able to relate and identify built forms through socio cultural, climatic, political, economic influences on them in respective geography andtimeline.
- Possess the skill to formally (visually and theoretically) analyse and appreciate architectural works.

Introduction to History of Architecture and its relevance in design (not part of evaluation)

Learning Strategies

- Lecture on chronological evolution of architecture in various geographicalcontexts.
- Drawing exercises on various significant architectural works in various eras/geographies.
- Lecture/ discussion on observation of changes in built form design acrosstimeline.
- Lecture on architectural history its relevance in modern day architecturedesign.
- Lecture/ discussions on human experience of architectural built forms and their appreciation based on the physical and metaphysical influences onarchitecture.
- Drawing exercises on applications of architectural history indesign.
- Lecture/discussion on Physical and metaphysical influences by architecture: Brief introduction to use of various principles of design such as Unity, Focal Point, Scale and Proportion, Rhythm and Balance using examples like Pyramid complex at Giza, Acropolis, Parthenon, Pantheon, etc. (cross-study with Theory ofDesign).
- Lecture/discussion on applications of architectural history: Analyzing buildings through historical perspectives, use of details, construction techniques, materials etc. in sensitive design projects with modern dayexamples.

Contents

Study of architectural history and its relevance in modern day architecture design

Brief Early History: A very brief introduction to landmark architectural works during different periods in different geographical regions- Early cultures (before 12,000 BCE) up to 1200 CE- Changes occurring to the built form design across timeline as well as geographies based on socio cultural, climatic, geographic, economic factors as well advancements in construction techniques (ref. Ching, Introduction to Architecture, Ch. 2)

Brief History from Renaissance to Contemporary: A very brief introduction to landmark architectural works during different periods in different geographical regions c. 1200 CE to 1950s- Changes occurring to the built form design across timeline as well as geographies based on socio cultural, climatic, geographic, economic factors as well advancements in construction techniques (ref. Ching, Introduction to Architecture, Ch. 3)

Module 1: Architecture in Pre-Historic and Ancient Times – 1

Learning Strategies:

- Unit wise lectures on how the built form in the region is a manifestation of its socio cultural, climatic, political, economiccontext.
- Drawing exercises on various significant architectural works in various eras/geographies.
- Lectures/ assignments on constructiontechniques.
- Lecture/ discussion on observation of periodical changes and cross influences between variousgeographies.
- Each lecture will have pre- requisite readings and each module will have to specify self-learning component in the lectureplans.

Module Contents:

- **Early cultures:** Paleolithic-Society, Culture & Settlements, Dolni Vestonice, Megdalenian tents, Ice age - Relevance of ice age, dwellings, Neolithic Age - Society, Culture & Settlements, JomonCulture.
- **Indus Valley:** Introduction to Bronze Age and its impact in the region, Geography, society and culture, Dholavira, Architecture and urban infrastructure of Mohenjodaro - Citadel, Dwellingunits.
- **Mesopotamia:** Sumerians- culture and social structure, City of Ur, Ziggurat atUr.
- **Egypt:** Culture and social structure, Pre-dynastic Egypt- royal tombs at Abydos, Old Kingdom- Mortuary complex of Zosur, Pyramid complex at Giza, New Kingdom - Temple complex at Karnak, Temple ofAmun.

Module 2: Architecture in Ancient Times – 2

Learning Strategies:

- Lecture on how built form is a manifestation of its socio cultural, climatic, political, economic context.
- Drawing exercises on various significant architectural works in various eras/geographies.
- Lectures/ assignments on constructiontechniques.
- Lecture/ discussion on observation of periodical changes and cross influences between variousgeographies.
- Each lecture will have pre- requisite readings and each module will have to specify self-learning component in the lectureplans.

Module Contents:

- **China**: Early Chinese cultures- Yangshao- Banpo (brief) | Shang Dynasty- rites and rituals, tombs | Zhou Dynasty- Mandate of Heaven, Ritual complex at Feng Chu (brief), Wangcheng, an ideal city (brief) | Qin Dynasty- Tomb of first emperors (brief) | Han Dynasty - Mingtang-Biyong ritual complex (brief) | Great Wall of China(detail)
- **Greece 1**: Mycenaean civilisation- Palace complex at Pylos | Geometric period- emergence of Greek temple form, Temple of Poseidon (brief) | Archaic period- architectural characteristics, Temple of Apollo at Delphi(brief)
- **Greece 2**: Classic - Athens' Acropolis(detail) | Hellenistic age- Temple of Apollo at Didyma (brief) | GreekOrders
- **Rome 1**: Founding and expansion of Rome (brief) | Engineering and constructiontechnology | Forums- Forum of Augustus, Imperial Forums (brief)
- **Rome 2**: Roman Urban Villa (brief) | Roman Baths (brief) | Colosseum and Pantheon(detail)
- **Vedic period and Buddhist architecture 1**: Aryan invasion, Vedic village, Aryan house | Origin and spread of Buddhism | Mauryan School of Art- Asoka pillar (brief), Sanchi Stupa (brief) | Sunga school of Art- Growth of Sanchi Stupa (detail), Viharas and Chaityahalls
- **Buddhist Architecture 2**: Satvahana School of Art- Amaravati Stupa (brief), Chaitya hall at Karle (details) | Kushana School of Art- Mahayana Buddhism and monastery at Takht-i-Bahi (brief) Gupta period- Ajantha caves(detail)

Module 3: Architecture in Kerala

Learning Strategies:

- Lecture/ Individual history of Kerala Architecture during the medievalera.
- Lecture/ discussion on observation of changes and influences on Kerala architecture during theera.
- Lecture/ Individual student assignments on significantbuildings.
- Drawing exercises on various significant architecturalworks.
- Model making exercises on significant architecture works in Kerala during theera.
- Lecture on theories such as planning principles, use of Vasthu Purusha Mandala, etc. can be added to understand its impact on the builtform.

Module Contents:

- **Pre-historic built structures of Kerala:** Megalithic structures- Dolmens, Umbrella stones, Burial caves, Cavetemples.
- **Influencing factors of indigenous architecture in Kerala:** Geography, Climate, Building materials, Social, Political, Religious and Traditional planningprinciples.
- **Indigenous residential architecture of Kerala-1:** Characteristics of sala typology of houses – Development of four types of sala house configuration, Evolution and expansion of ekasala, catusala and other complex courtyard based residential typology, example of ekasala (Thampuran, 2001 p. 143), example of catusala: (Thampuran, 2001 p. 154), example of complex sala: Pathinarukettu (Thampuran, 2001 p. 201), One example of Muslim and ChristianTharavadu.
- **IndigenousreligiousarchitectureofKerala:**CharacteristicsofKeralatemplearchitecture-

Types of Kerala 'Sreekovils'(Moola-prasada) Five types- with/without Antharala and

with/without Mukhamandapa.

- Schematic layout of a full-fledged Kerala temple with names of important structures. Sectional elevation of a typical Kerala Sreekovil(Moola-prasada).
- Architectural characteristics of Kerala type mosques and churches (Study of relevant examples).

Reference:

- Achuthan, A. and Prabhu, B. (1998). *Manushyalaychandrikabhasyam - An engineering commentary on manusyalayachandrika of Tirumangalat Nilakanthan Musat*. Calicut:Vastuvidyapratisthanam.
- Chandrashekara, U & Joseph, S.P. & Ashtamoorthy, Sreejith. (2002). Ecological and socio-cultural dimensions of sacred groves of Northern Kerala. Man in India. 82.323-340.
- Ching, F. (2013). *Introduction to architecture*. Hoboken, N.J: WileyPublishers.
- Ching, F., Jarzombek, M. and Prakash, V. (2010). *A global history of architecture*. Hoboken, NJ:Wiley.
- Fletcher, B. (1999). *A History of Architecture*. CBS Publication (IndianEdition).
- Jarzombek, M. (2013). *Architecture of first societies: A Global Perspective*. Hoboken, N.J.: Wiley Publishers.
- Jayashankar, S. (1997). *Temples of Kerala*. Census ofIndia.
- Koduveliparambil, J. (1997). *Construction practices in traditional dwellings of Kerala*. India: McGill University,Montreal.
- Kostof, S. (1985). *A history of architecture: Setting and Rituals*. London: Oxford UniversityPress.
- Nuttgens, P. (1983). *The Story of Architecture from Antiquity to the Present*. London: H. F. Ullmann Publishers.
- Prabhu, B. and Achuthan, A. (1996). *A text book of Vasthuvidya, Vasthuvidya Prathishtanam*.Calicut.
- Sarkar, H. (1978). *An Architectural survey of Temples of Kerala*. Archeological Survey ofIndia.
- Scully, V. (1991). *Architecture - The Natural and the Manmade*. New York: Harper CollinsPublisher.
- Thampuran, A. (2001). *Traditional architectural forms of Malabar Coast*. Vastuvidyapratishthanam AcademicCentre.
- Vatsyayan, K. (1997). *The square and the circle of the Indian arts*. New Delhi: AbhinavPublications.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Viva	Written	Total
I & II	II	19AR12005	Theory of Structures 1 & 2	2			2	50		100	150

Course Overview:

The course primarily aims at understanding importance of structures in Architecture. It focuses on making the students aware of the role of structural design as an integral part of Architecture design. It provides the fundamental understanding of various possibilities in exploring Architectural design with the help of different structural forms. It also acts as the orientation to basic structural design terms and fundamental governing principles. It also emphasizes on making students aware of different external loads and forces acting on the structural elements and giving a conceptual idea of the behavior of these elements.

Course Outcomes:

Upon completion of the course, the student should:

- be able to develop a habit of inclusive structural aspects in their Architecturaldesign.
- be able to visualize the flow of forces in their Architectural design elements to develop a stable and practicalstructure.
- be able to develop basic skill to choose appropriate structural form from various possibilities.
- be able to develop an intuitive understanding of how structures behave and thereby enhancing their skills in conceptual Architecturaldesign.

Module 1: Structural Design and its relevance in Architecture. Introduction to basic structural design and various structural forms and elements in Architecture.

Learning Strategies:

- Lectures on the below contents by presentation and discussion on Architectural projects and structural behavior diagrams to make students understand structures in the context of Architecture
- Lectures by using analogies and examples to explain structuralconcepts.

Module Contents:

- Introduction – Definition of Structure, Role of Structures inArchitecture
- Historical evolution of structures - Walls, Post and beams, Arches, Vaults, Domes, Suspended structures, Truss, Skyscraper
- Force types – Definition of force, Moment of a force, Bending & Buckling Force concepts - principle of transmissibility, principle of superposition.
- Resultant of co planar concurrent forces, parallelogram law of forces and numerical problems.
- Resolution and composition of forces, numericalproblems.
- Moment of force concept, Varignon's theorem, Couple and moment of a coupleconcept.

Numerical problems on coplanar non- concurrent force system.

Module 2: Principles of structural design.

Fundamental governing principle in behavior of the external loads (Statics) acting upon different structural elements.

Learning Strategies:

- Lectures on the below contents by presentation and discussion with relatively accessible mathematical equations andcalculations.
- Lectures by using analogies and examples to explain structuralconcepts.

Module Contents:

- Equilibrium concept and free body diagram. Condition of static equilibrium for different force system. Lami's Theorem. Numerical problems on equilibrium of coplanar concurrent force system.
- Types of supports and loads in statically determinate beams, equilibrium of coplanar non concurrent force system, to find the support reaction for statically determinatebeams.
- Loads on structure as a whole - Dead Load - Live Load - Seismic Load - WindLoad
- Tributary Load & load path. Basic concepts of Strength - Stiffness - Stability–
- Load tracing – Understanding load flow by tributary load and load path, Load paths – Pitched Roof systems, Wall systems, Roof and floor systems, and Foundationsystems.

Module 3: Principles of resistance of structural members to the various external forces acting upon them.
Importance of cross section in resisting the external loads. Truss analysis

Learning Strategies:

- Lectures on the below contents by presentation and discussion with relatively accessible mathematical equations andcalculations.
- Lectures by using analogies and examples to explain structuralconcepts.

Module Contents:

- Resistance of Structural Members – Material strength and cross-sectionalproperties.
- Centre of gravity and centroids, Locating the centroid of plane and compoundfigures.
- Moment of Inertia - of an area, Theorem of parallel and perpendicular axis- Principle axis and Principle moment ofinertia;
- Moment of inertia of composite areas. Radius ofGyration.
- Truss analysis: - Method of joints- cantilever and simply supportedtrusses

Reference:

- Ambrose, J. and Tripeny, P. (2013). *Building structures*. Hoboken, N.J.:Wiley.
- Babu, J. (n.d.). *Engineering Mechanics*. Pearson PrenticeHall.
- Bansal, R. and Bansal, S. (n.d.). *Engineeringmechanics*.
- Becker, H. (2015). *Structural competency for architects*. New York, N.Y:Routledge.
- Bedi, A. and Dabby, R. (2013). *Structure for architects*. Hoboken, N.J.:Wiley.
- Beer, F. and Johnston, E. (1984). *Vector mechanics for engineers*. New York:McGraw-Hill.
- Benjamin, J. (n.d.). *Engineering Mechanics*. Pentex Book Publishers andDistributors.
- Bhavikatti, S. (2010). *Mechanics of Solids*. New Age InternationalLimited.
- Bjorn, N., Arne, P. and Mark, R. (n.d.). *The Structural Basis ofArchitecture*.
- Garrison, P. (n.d.). *Basicstructures*.
- Garrison, P. (2005). *Basic structures for engineers and architects*. Oxford: Blackwell Publishingltd.
- Ji, T., Bell, A. and Ellis, B. (n.d.). *Understanding and using structuralconcepts*.
- Macdonald, A. (1997). *Structural design for architecture*. Oxford: ArchitecturalPress.
- Ochshorn, J. (n.d.). *Structural elements for architects andbuilders*.
- Onouye, B. and Kane, K. (2015). *Statics and Strength of Materials for Architecture and Building Construction*. Boston, MA:Pearson.
- Prasad I.B (n.d.). *Applied mechanics -Dynamics & Statics*. KhannaPublishers.
- Punmia, B. and Jain (n.d.). *Strength of Materials and Theory of Structures - Vol1*.
- Rajasekaran, S. and Sankarasubramanian, G. (n.d.). *Engineering Mechanics*. Vikas Publishing House PrivateLimited.
- Ramamrutham, S. (n.d.). *Strength of Materials*. Dhanpat Rai Publishing Company PvtLimited.
- Salvadori, M. (1975). *Structure in architecture; the building of buildings*. Englewood Cliffs: Prentice-Hall.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks				
								CA	University Exam			Total
				T	S	W/L			Viva	Written		
I & II	II	19AR12006	Theory of Design	2					2	50		100

Course Overview:

The course shall introduce the students to the basic theories of design as a cross disciplinary phenomenon. The course shall engage the students with various important design philosophies, their evolution and their major design directions. The course aims to supplement the broader understanding of design at the foundation level.

Course Outcomes:

Upon completion of the course, the student should:

- develop the vocabulary skills to effectively communicate design and itsprocess.
- be able to critically review design and analysethem.
- be able to develop and understanding of the various design philosophies and theirevolution.

Module 1: Elements of Design

Learning Strategies:

- Lecture
- GroupDiscussion
- Assignments

Module Contents:

- **Dot:** Illusion ofroundness;
- **Line:** Types, Direction, Gesture, Contour, Quality &Value.
- **Planes:** Depth, Thickness, Boundary,Levels.
- **Shape/Volume/Mass:** Positive & Negative, Naturalism, Idealism, Abstraction, Distortion & Illusion.
- **Operations:** Detached, Within, Overlapping,Intersecting.
- **Texture:** Tactile, Visual, Actual & Implied, Pattern,Homogeneity.
- **Colour:** Colour theory, Psychology, Characteristics, Schemes., Properties of Colour, Symbolism andPsychology.
- **Value:** Light & Dark, Variations: Movement, Pause, Control,Focus.
- **Motion:** Anticipated, Suggestive, Actual andIllusion.
- **Perception of spaces:** Elements of spatial definition, Depth, Density, Opening, Juxtaposition and interpenetration, Spatial Characteristics of elemental shapes, Perspectives and projections.

Module 2: Principles of Design

Learning Strategies:

- Lecture
- GroupDiscussion
- Assignments

ModuleContents:

- Unity: Gestalt Laws, Harmony, Variety, Factors of Coherence, Order in disorder,Gradation.
- Emphasis and Focal point: Axis, Datum, Hierarchy, Contrast, Complexity, Contradiction, Presence and Absence, Regularity andirregularity.
- Scale and proportion: The notion of scale,Ergonomics
- Anthropology and proxemics: Proxemics and Space bubbles, Commensurate and Incommensurate proportions, Vitruvian man, The modulor,Golden ratio and the Fibonacci series.
- Rhythm and Balance: Symmetry, Asymmetry, Interaction of design elements, Radial and crystallographicbalance.
- Rhythm: Movement and Sensation, Shapes and Repetition, Pattern and Sequence, Progressive Rhythm andGradation.

Module 3: Evolution of Design Discipline

Learning Strategies:

- Lecture
- GroupDiscussion
- Assignments

Module Contents:

- **Built Environment, human condition and Social Relevance of Design Solutions:** Abraham Maslow and built environment - needs vs wants and deficiency vs growth; Irvin Altman and behavioural concepts: Privacy, Territoriality, Crowding and Personal Space, understanding of different contexts to ascertain perception ofmeanings.
- **Evolution of design discipline:** Definition of design- physical, conceptual, Design since1700s
- **Design Process:** Different maps of design process: Analysis, Synthesis andEvaluation.
- **Design Thinking:** Different Types and styles of thinking, Design strategies, Tactics and Guiding principles, Design as acommunication.

Module 4: Nature as Primary Reference

Learning Strategies:

- Lecture
- GroupDiscussion
- Assignments

Module Contents:

- **Evolution of natural forms and Natural growth patterns:** Golden spiral,Fractals.
- **Emergent Designs:** Self -similarity, Self-organisation,Indeterminacy
- **Nature-inspired design:** Biomimicry, Janine Benyus and ideas from Biology, Contributions of MichaelPawlyn.
- **Bio-inspired Design:** Material ecology, Explorations of Nerioxman.
- **Works of Ross Lovegrove, Concept of Maximum with minimum:** Works of Buckminster fuller and Frei Otto.

Reference:

- Altman, I. and Chemers, M. (1980). *Culture and environment*.Brooks.
- Antonelli, P. and Lovegrove, R. (2004). *Supernatural - The Work of Ross Lovegrove*.Phaidon.
- Benyus, J. (2004). *Biomimicry - Innovation Inspired by Nature*. WilliamMorrow.
- Ching, F. (2007). *Form, space & order*. New York: Van NostrandReinhold.
- Cross, N. (2011). *Design Thinking: Understanding how designers think and work*. BergOxford.
- Darcy, W. (1992). *On Growth and Form*. John Tyler Bonner (editor): DoverPublication.
- Hall, E. (1966). *The hidden dimension*. AnchorBooks.
- Hannah, G. (2002). *Elements of design*. [United States]: Princeton ArchitecturalPress.
- Lauer, D. (1999). *Design Basics*. Wadsworth PubCo.
- LAWSON, B. (2014). *HOW DESIGNERS THINK - The Design Process Demystified*.ROUTLEDGE.
- Maslow, A. (2013). *A Theory of Human Motivation*. MartinoPublishing.
- PAPANEK, V. (2019). *DESIGN FOR THE REAL WORLD*. THAMES &HUDSON.
- Pearce, J. (1990). *Structures in nature as a strategy for design*. MITPress.
- Raizman, D. (2004). *History of modern design*. London: PrenticeHall.
- Steiner, R. (2001). *The fourth dimension - Sacred geometry, Alchemy and Mathematics*. Anchor Books.
- Von Meiss, P. (1990). *Elements of architecture*.Routledge.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L	Viva	Written			
I & II	II	19AR12007	Architectural Graphics		3		3	100		100	200

Course Overview:

This course is designed to generate comprehensive understanding of technical drawing techniques and architectural presentation. To introduce students to the fundamental concepts and techniques of graphical drawings, and multi-angle representations of built elements and built forms with applicable renderings.

Course Outcomes:

Upon completion of the course, the student should:

- develop visual communication through technicaldrawings.
- enhance 3Dvisualisation capability connecting to realworld.
- develop 2-D & 3-D perception through observation, interpretation and logical understanding.
- stimulate and expand the skill of observing, interpreting and representing spaces and objects.

Module 1: Introduction of the Architectural Design Language – technical drafting and presentation.

Learning Strategies:

- Lectures
- Studio

Module Contents:

- Introduction to visual communication through technical drawings, tools & techniques for visualcommunication.
- Graphical Annotations and Symbols – Line types, line weights, labelling, titlingetc.(T&S)
- Lettering -Introduction to Typography(T) – Free hand lettering – Block lettering(S)
- Dimensioning – Types of Dimensions with applications.(T&S)
- Scales- Plain Scale – Introduction to Graphical Scale – Diagonal Scale - Use and Applications. (T&S)

Module 2: Visual Representation

Learning Strategies:

- Lectures
- Studio
- StudyModels

Module Contents:

- Orthographic projection – Introduction, Theory of projection, Systems of projection, projectionofpoints,linesandplanes-(Withparticularemphasisoffirstangleprojection)(T)
- Orthographic Projection - Solids - Simple solid in simple position - top & front views, Auxiliary Projection-Axis inclined to one plane & parallel to other, Axis inclined to both planes –Altering the position method and Auxiliary plane method(T&S)
- Intersection of Solids - Method of drawing intersection between prism & prism, cylinder & cylinder, cone &cylinder. (Cases with mutually perpendicular axes only) - Applications(T&S)
- Section of Solids - (T&S) - True shape of section - Sectional views from the true shape of section
- Development of simple surfaces – Parallel Line Method- Triangulation Method – Radial Method – Approximate Method.(T&S)
- Conic Sections - Eccentricity, Types -Ellipse, parabola and hyperbola - Construction methods. Application ofconics(T&S)

Module 3: Advanced Visual Representation

Learning Strategies:

- Lectures
- Studio
- StudyModels
- Heliodon or related light & shadow castingequipment

Module Contents:

- Isometric and Axonometric Views (T&S)- types, construction methods, applications and advantages.
- Perspective View (T&S)– Visual Ray Method – Vanishing Point Method. Nomenclature of perspectives - Objects, study of picture plane, station point, vanishing point, eye level, ground level etc., its variation &effects.
- Application of Perspective in Architectural Drawings (T&S)– Interior and Exterior Views, Sectionalperspectives.
- Sciography of Solids (T&S)- Principles of shade & shadow, shadows of architectural elements, application of sciography on pictorialviews.
- Rendering Techniques (T&S)- using pen & ink, color, values, tones, and general approach to rendering.

Reference:

- Alexander, W. (2002). *The Elements of Graphic Design*. 1st ed. AllworthPress.
- Ching, F. (2015). *Architectural Graphics*. Wiley & Sons Canada, Limited,John.
- Couper, D. (1992). *Drawing and Perceiving*. Van NostrandReinhold.
- Evans, P. and Thomas, M. (2007). *Exploring Elements of Design*. 2nd ed. Thomson/DelmarLearning.
- Janson, H. (2002). *History of art, Prentice Hall*. Higher Education Division: PearsonEducation.
- Meggs, P. (1998). *A History of Graphic Design*. 3rded.
- Morris, I. (1941). *Geometrical drawing for art students*. London a.o: Longmans,Green.
- Perard, V. (2012). *Anatomy and Drawing*. DoverPublications.
- S H, M. (n.d.).*Perspective*.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Viva	Written	Total
I & II	II	19AR12008	Mathematics for Design	2			2	50		100	150

Course Overview:

- To equip the students with necessary mathematical background to comprehend the aspects of design elements and structuralstability.
- To recap students about the mathematical concepts of geometry, trigonometry, statistics and calculus; and make them understand the application of these concepts toarchitecture.
- Each of these core concepts will help students learn the skills associated with various subjects studied in B.Arch.course.

Course Outcomes:

Upon completion of the course, the student should:

- Be able to understand mathematical concepts applied in architecturaldrawing.
- Acquire mathematical skills for analyzing and effective understanding of architecturalworks.

Module 1: Geometry

Learning Strategies:

- Widen knowledge 3D and 2Dshapes

Module Contents:

- Basic two-dimensional shapes- curves, straight lines, triangles, quadrilaterals, rectangle, parallelogram, circles, ovals, squares, and spirals (Simple numerical problems on area, perimeter etc. and theoryonly)
- Basic Three-dimensional Shapes- Cube, Cylinder, Pyramid, Sphere (Simple numerical problems on Volume, Surface Area and theory only)
- Standard equation and problems based on properties ofConics
- Standard equation and problems based on properties ofParabola
- Standard equation and problems based on properties ofEllipse
- Standard equation and problems based on properties ofHyperbola
- Standard equation and problems based on properties of RectangularHyperbola

(Note: Problems involving foci, eccentricity, directrix, latus rectum, tangent, chord, normal- Chap: 7,8,9,10 of Coordinate Geometry)

Module 2: Trigonometry

Learning Strategies:

- To include angles and corners in architecturaldesign.
- Enables to draw properly load-bearing walls in the right places in thebuilding

Module Contents:

- Trigonometrical ratios for angles less than the rightangle
- Heights andDistances
- Trigonometric ratios of sum, difference and multiplication of twoangles
- Identities and Trigonometricalequations
- Pythagoras Theorem and simple problems using thetheorem
- Length of tangent to a circle – Simpleproblems

(Note: Problems involving Length of tangent to a circle from Chap: 2,3,7,8 of Plane Trigonometry)

Module 3: Calculus

Learning Strategies:

- To better define curves of a structure, in order to produce the right reverberations within thebuilding
- Enables to evaluate the physical forces a building must tolerate during and after construction

Module Contents:

- Differentiation; Maxima andMinima
- Successive differentiation – nth derivative using Leibnitzrule
- Radius of curvature (cartesian and parametricform)
- Evolute
- Area bounded by planecurve
- Arc Length of planecurves
- Volume of a solid ofrevolution

Module 4: Sequences & Statistics

Learning Strategies:

- To define and understandsequence
- To learn about important statistical measures essential for dataanalysis.

Module Contents:

- Arithmetic, GeometricProgression
- Golden Ratio- Its application inDesign
- Statistics - Measures of Central Tendency-Mean-median-mode
- Measures of Dispersion- Mean deviation-standarddeviation-variance.
- Covariance, Correlation – Karl Pearsoncoefficient
- Rank Correlation – Spearmen's coefficient for repeated and non-repeatedranks
- Regression coefficient–Lines of Regression-Fitting of straight line by method of leastsquare

Reference:

- Bali, N. (n.d.). *Co-ordinateGeometry*.
- Bali, N., Goyal, M. and Watkins, C. (n.d.). *Advanced EngineeringMathematics*.
- Greenberg, M. (n.d.). *Advanced EngineeringMathematics*.
- Grewal, B. (n.d.). *Elementary EngineeringMathematics*.
- Grewal, B. (n.d.). *Higher EngineeringMathematics*.
- Gupta, S. and Kapoor, V. (2017). *Fundamentals of mathematical statistics*. Mumbai: Himalaya PublishingHouse.
- Kandasamy, P., Thilagavathy, K. and Gunavathy, K. (n.d.). *Engineering Mathematics - Vol 1 &2*.
- Lauretta, J. (n.d.). *Geometric Shapes inArchitecture*.
- Loney, S. (n.d.). *PlaneTrigonometry*.
- Margaret, L., Barbara, B., Arnold, S. and Murphy, J. (n.d.). *Basic Geometry for CollegeStudents*.
- Merle, A. (n.d.). *The PythagoreanTheorem*.
- Miller, I., Freund, J. and Johnson, R. (2000). *Miller and Freund's Probability and statistics for engineers*. Upper Saddle River, NJ: PrenticeHall.
- Ramana, B. (n.d.). *Higher EngineeringMathematics*.
- Venkataraman, M. (n.d.). *Higher Mathematics for Engineering andScience*.

36. THIRD SEMESTER SYLLABUS

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
III	I (a)	19AR03001	Architectural Design 3		10		10	250	250		500

Course Overview:

Familiarizing the process of design, Space articulation and Development of form

- To equip students to conceptualize form and space emphasizing the importance of the process ofdesign
- To enable students to conduct Data collection, Case study and Analysis and to formulate their concepts andprogram
- To familiarize students with Development of Project Brief, Process of site analysis, Development of circulation diagram, form, function and theircorrelations
- To introduce students to basic structural systems and theirapplications
- To enhance the student's representation skills through 2D techniques and 3D modeling

Sustainable design objectives: Climatological influence on the design approach, natural materials, natural lighting and ventilation and passivetechnology.

Course Outcomes:

Upon completion of the course, the student should have:

- An exposure to architectural experience through the understanding of Elementary principles of Architectural Design on the basis of structure, function, context andaesthetics.
- An understanding of multi-space architectural unit and itsexpansion
- An understanding of the process and methodology ofdesign
- An understanding of materials, its properties and designapplication

Major Project

Conceptualization of space and form through process of design development and space planning, responsive to the given context. Suggested projects may be design of architectural spaces (Not exceeding 200 SQM) such as residence, weekend cottage, coffee shop etc.

Critical analysis of a suggested space for functionality, structural stability, aesthetics, contextual relationship etc.

Emphasis may be given on:

- Space perception and the underlyingconcept
- Functional aspect of the space, user needs, circulation, efficientprogramming
- Architectural Composition and built form, massing and volume ofspace
- Application of building materials – color, texture andcomposition
- Climate responsive design, Passive Architecturaltechniques
- Space Planning and layout of Interiorspaces

Minor Project

Documentation (Maximum of 3 days duration) of traditional Buildings and Portfolio preparation. This project may be carried out in association with settlement study of 19AR05001.

Time Bound Project

Short duration of (one day or less) Projects emphasizing on functionality of space to enhance student's imagination/innovation and decision-making skills.

Reference:

- Anderson, J. (2011). *Architectural design*. Lausanne: AVAAcademia.
- Arvind, K., Nick, B. and Steve, S. (2001). *Climate responsive architecture*. New Delhi: Tata McGraw-Hill Pub.Co.
- Bakshi, S. (2008). *Architecture in Indian sub-continent*. Delhi: Vista InternationalPublishing.
- Bawa, G. and Robson, D. (2002). *The complete works*. London: Thames &Hudson.
- Campos, C. (2008). *Living in small spaces*. Barcelona: LOFTPublications.
- De Chiara, J. and Crosbie, M. (2001). *Time-saver standards for building types*. New York:McGraw-Hill.
- De Chiara, J., Panero, J., Zelnik, M. and Michael, J. (2001). *Time-saver standards for interior design and space planning*. New York:McGraw-Hill.
- Panero, J. and Zelnik, M. (n.d.). *Human dimension & interiorspace*.
- Powell, R. (2001). *The tropical Asian house*. Singapore:Select.
- Ramsey, E. (2007). *Architectural graphic standards*. Hoboken, N.J.: John Wiley &Sons.
- Rapoport, A. (1969). *House form and culture*. Englewood Cliffs (N.J.):Prentice-Hall.
- Yatin, P. (n.d.). *Elements of SpaceMaking*.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
III	I (b)	19AR03002	Building Materials and Technology 3	1	3		4	100	100		200

Course Overview:

- Understanding of building materials like Steel &Aluminum products andpaints.
- Understanding different type of doors andwindows.
- Understanding about the modern construction materials like glass and glass products, plastics, products and its application in constructionindustry
- The student should develop the skill to represent various construction techniques as well as materials through drawings supporting their buildingdesign.

Course Outcomes:

Upon completion of the course, the student should:

- Develop necessary decision-making skills in using appropriate construction technologies and materials while designing buildings, based on understanding of their potentials and properties.

Module 1: Steel, Doors, Windows

Learning Strategies:

- Lecture on steel, types of door and window fittings and surfacefinishes.
- Market study on types of fittings used for differentpurposes

Module Contents:

- Types-pig iron, cast iron, wroughtiron
- Steel –mild steel, medium carbon steel, high carbon steel, manufacturing, composition, properties
- Anti-corrosive measures, Market forms of steel with particular emphasis on angles, sections and channels.
- Aluminum and its properties,UPVC
- Doors –Functional requirements, Types of doors – based on movement, materials and function
- Doors and design considerations: effective clear width of door openings, minimum width of passage way for certain door sizesetc.
- Windows –functional requirements, Types of windows- fixed light and openinglight
- Air changes, Quality of daylight
- Strength stability and air tightness, Resistance to passage of heat, Window Uvalues

Market survey and presentation for Jury

- Door and window hinges like butt hinges, pin hinges, parliament hinges, garnet hinges, counter flap hinges, strap hinges, piano hinges, auto-closing hinges - Door and window bolts likeslidingdoorbolt,towerbolt,flushbolt–doorhandles-doorlocks-otherfasteningsto

  door and windows like hook and eyes, window stays, door stoppers, door closers, caster wheels, floor springs, pivots, magnetic catchers for wooden cupboard.

Module 2: Plastics

Learning Strategies:

- Lecture on plastics, type of glasses &finishes
- Market survey for understanding about thetopic.

Module Contents:

- Thermoplastics and thermosets: Thermosetting and thermoplastics, resins, fabrication of plastics, polymerization and condensation - Application of plastic in buildingconstruction.
- Properties and architectural uses of plastics: structural plastics – reinforced plastics and decorative laminates - plastic coatings, fabrications of plastics – FRP, plumbing applications – PVC, PPR, CPVCetc.
- Composition, types of glass: wired glass, laminated glass, double glazing, glass building blocks, their properties (including thermal and acoustics) and uses in buildings–
- Application of glass in construction – Structural glazing, curtain wall glazing-toughening,

  Insulation,applicationsinthebuildingIndustrywithemphasisonenergyefficiency.Natural and manufactured flooring materials, properties, uses. Applications

Module 3: Surface Finishes

Learning Strategies:

- Lecture on architectural finishes & their selectioncriteria
- Market study on different types ofpractices
- Site visits of various finishes at different stages till the finalfinishes.

Module Contents:

- Construction of ground floor and upper floorflooring
- Criteria for selection of flooring materials: -Appearance, resistance to abrasion &slipness, smoothness, durability, damp resistance, thermal insulation, fire resistanceetc.
- Different types of floor finishes – natural & artificial - Natural stone, wood, ceramic, vitrified, oxides, vinyl, epoxy, terracottaetc.
- Inherent finish and appliedfinish
- Paints, distempers & varnishes – types –composition – properties – environmental, climatological and durability spects - application– Uses –BIS specifications- Covering capacity, method of distempering wall surfaces, and painting of timber and iron. Externalfinishes, Different types offinishes.
- Pre cast concrete cladding panels, GRC cladding panel, Sheet metalcladding
- Rain screens, Suspended glazing systemsetc.

List of drawings for Jury (Minimum 7 sheets)

- Types ofwindows
- woodenwindows-
- Steelwindows
- Aluminumwindows
- Types of doors: hinged, sliding, sliding and foldingdoors
- Timberdoors
- UPVC doors &windows
- Structural glazing

Materials collected from the market survey shall be presented for the jury

Reference:

- Don, W. (1972). *Construction Materials and Process*. McGraw HillCo.
- Emmitt, S., Gorse, C. and Meaden, A. (n.d.). *Barry's introduction to construction ofbuildings*.
- Jack, L. (1986). *Construction Materials and Methods*. Careers, South Holland, Illinois: Wilcox Co.Ltd.
- Rangwala S. C. (1997). *Engineering materials*. Charotar Publishing House,India.
- Shetty, M. (2007). *Concrete technology*. Ram Nagar, New Delhi: S.Chand.
- Varghese, P. (2005). *Building materials*. Prentice-Hall ofIndia.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
III	I (c)	19AR13003	Professional Skill Enhancement 3			4	2	50	50		100

Course Overview:

This course intends to provide/ enhance the soft skills in order that students perform well in their academics and beyond. These skills are intended to support the student to perform better in her/his core subjects and also build up robust performance through hands-on workshops and laboratory training. This course is subdivided into two categories – Mandatory and Optional. Mandatory courses help in preparations for respective semester subjects. The optional category helps students to take personal initiatives to develop in specific areas that can widen their horizon of their understanding of architecture and also initiate action at the society level. There are also options to work on competitive exercises alongside other similar institutions.

Course Outcomes:

Upon completion of the course, the student should:

- be given an exposure of varied skills that can bring in confidence in handling their core subjects such as workshops, communication skills, computer applicationsetc.
- be able to develop team spirit and interpersonal skills to manage complexsituations.
- be able to cope with stress and develop multi-taskingcapabilities.

Module 1: Communication Skills 2

Learning Strategies:

- Languagelab
- Group discussions and Interactivesessions

Module Contents:

- Training in oral and written communication skills to effectively communicateideas.
- InterpersonalCommunication.
- Verbal & Non-verbal communication, Body language,Persuasion.
- Individual Presentations (Audience Awareness, Delivery and Content ofPresentation)
    - Writing Skills: Sentence formation; Use of appropriate diction; Paragraph and Essay Writing; Coherence andCohesion.
    - Letter Writing: Formal, informal and demi-official letters; businessletters.
    - Technical Writing: Differences between technical and literary style, Elements of style; Common Errors.
    - Report Writing: Basics of Report Writing; Structure of a report; Types ofreports.
    - Presentation Skills: Oral presentation and public speaking skills; business presentations.
    - Group Discussion: Differences between group discussion and debate; Ensuringsuccess in groupdiscussions.
    - Non-verbal Communication and Body Language: Forms of non-verbal communication; Interpreting body language cues; Kinesics; Proxemics; Chronemics; Effective useof body language.
    - Technology-based Communication: Netiquettes: effective e-mail messages; power-point presentation; enhancing editing skills using computer software.

Module 2: Computer Application 1

Learning Strategies:

- Computer lab sessions guided byexperts
- Group discussions and Interactivesessions
- Develop theoretical understanding of AutoCAD and its relevance in Architecture. Students would develop skills of 2D drafting using various tools andtechniques.

Module Contents:

- Introduction to computer aideddrafting
- To develop and understand tools and basic set up for computer aideddrafting
- Theoretical understanding ofCAD
- Develops and draws various architectural plans, elevations and sections through 2 DCad
- Manipulate and alter through various tools and techniques existing architectural drawings in 2DCad

Module 3: Theatre/Music/any other co-curricular activities

Learning Strategies:

- Technical and hands onworkshops
- Group discussions and Interactivesessions
- Self-initiatives

Module Contents:

- Optional content to be developed by each institution in order to help students to take part in activities that involve larger groups and facilitate peerlearning.
- The activities could be skill oriented like Theatre/ Music training or student initiated societal activities or participation in NASA or similar student led group initiatives which has an academic content aswell.

Reference:

- Cadfolks (2018). *AutoCAD 2019 for Beginners*. 1st ed.Kishore.
- Omura, G. and Benton, B. (2018). *Mastering AutoCAD 2019 and AutoCAD LT 2019*. 1st ed.Sybex.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
III	II	19AR03004	History of Architecture 3	2			2	50		100	150

Course Overview:

The subject aims at imparting knowledge about the development of architecture during medieval era in Europe, India and Kerala as a response to socio-cultural, geographical and political changes as well as technological advancements. The course also intends to expose the students to detailed studies on national as well as regional architectural history to prepare them well for contextual design applications.

Course Outcomes:

Upon completion of the course, the student should:

- Be able to relate and identify built forms through socio cultural, climatic, political, economic influences on them in respective geography andtimeline
- Be able to identify and compare elements of architecture, styles and intricate details across differentregions
- Be able to use a theoretical base developed from architectural history in their designprocess

Module 1: European Architecture in medieval times

Learning Strategies:

- Unit wise lectures on how the built form in the region is a manifestation of its socio, cultural, climatic, political, economiccontext
- Drawing exercises on various significant architectural works in various eras/geographies
- Lectures/ assignments on constructiontechniques
- Lecture/ discussion on observation of periodical changes and cross influences between variousgeographies
- Each lecture will have Pre- requisite readings and each module will have to specify self-learning component in the lectureplans

Module Contents:

- **Early Christian and Byzantine Empire 1**: Emergence and spread of Christianity | Old St. Peter's, Rome the evolution of early Christian Church form from the Roman basilica- St. Clemente
- **Byzantine Empire 2**: Centralized plan concept- St. San Vitale, Ravenna (brief) | The creation of eastern and western roman empire | Byzantine architectural character with study of Hagia Sophia (detail)
- **Romanesque Architecture**: Romanesque period: Monastic orders & development of Craft and merchant guilds, Influences & architectural character of Romanesque churches in Italy (Pisa complex), France (Abbey Aux Hommes) and England (Tower ofLondon)
- **Gothic Architecture in France**: Development of Gothic architecture in France (Religious and social influences) - Evolution of vaulting and development of structural systems - Outline of Architectural characters - Examples: Notre Dame atParis.
- **Gothic Architecture in Italy & England**: Development of English gothic vaulting - Outlineof

Architectural character in England -Examples: Westminster Abbey and Hampton Court Palace at London | Development of gothic architecture in Italy - Outline of Architectural characters - Examples: Doges Palace at Venice, MilanCathedral

- **Renaissance Architecture in Europe 1**: Italian Renaissance - The idea of rebirth and reJuryl of art – Factors influencing renaissance architecture -Outline of Architectural character during the early Renaissance, High Renaissance and Baroque Periods (brief) -Features of a typical Renaissance palace - Examples. Palazzo Ricardi. | Study of the contributions of the following architects: Brunelleschi, Michelangelo and Andrea Palladio - Examples - St. Peters basilica at Rome, Villa Capra inVicenza
- **Renaissance Architecture in Europe 2**: Factors influencing French renaissance - Architectural character during the classical & Rococo periods (brief) - Examples - Chateau de Chambord and the Louvre at Paris. | Factors influencing English renaissance – Introduction to domestic architecture in Britain during the Elizabethan, Jacobean, Baroque and Georgianperiods (brief) - Study of the works Sir Christopher Wren &Inigo Jones, Examples - St. Paul's Cathedral at London and Banqueting House atWhitehall.

Module 2: Indian Architecture in medieval times - Hindu

Temple Learning Strategies:

- Unit wise lectures on how the built form in the region is a manifestation of its socio cultural, climatic, political, economiccontext
- Drawing exercises on various significant architectural works in various eras/geographies
- Lectures/ assignments on constructiontechniques
- Lecture/ discussion on observation of periodical changes and cross influences between variousgeographies
- Each lecture will have Pre- requisite readings and each module will have to specify self-learning component in the lectureplans

Module Contents:

- **Evolution of Hindu Temple**: Early shrines of the Gupta and Chalukyan periods - Tigawa temple and Ladh Khan temple | Introduction to the development of the Indo-Aryan & Dravidian style - Examples - Papanatha and Virupaksha temple atPattadakal
- **Dravidian Style Temples 1**: Dravidian style – Definition / explanation of Mandapas&Rathas. Masonry temples & Rock cut architecture of Pallavas - Shore temple and five rathas at Mahabalipuram Dravidian Orders – Evolution of Dravidian orders under pallavas, Chola's and Pandya's.(brief)
- **Dravidian Style Temples 2**: Example of Chola style - Brihadeeswara temple at Tanjore. | Evolution of Gopuram& temple complexes – Example of Pandyan style - Meenakshiamman temple,Madurai
- **Indo-Aryan Style of Temples**: Classification of Indo-aryan temples Salient features of an Indo Aryan Temple - Examples at Orissa - Lingaraja temple at Bhuvaneshwar& Sun temple at Konarak-ExampleincentralIndia-KhandaryaMahadevtempleatKhajuraho-Examplein Gujarat - Surya Temple at Modhera

Module 3: Indian Architecture in medieval times - Islamic Architecture

Learning Strategies:

- Unit wise lectures on how the built form in the region is a manifestation of its socio cultural, climatic, political, economiccontext
- Drawing exercises on various significant architectural works in various eras/geographies
- Lectures/ assignments on constructiontechniques
- Lecture/ discussion on observation of periodical changes and cross influences between variousgeographies
- Each lecture will have Pre- requisite readings and each module will have to specify self-learning component in the lectureplans

Module Contents:

- **Islamic Architecture - Imperial style 1**: Classification of Islamic architecture in Indian, religious and secular typologies of Islamic architecture | Examples under imperial style; slave dynasty - Qutb Complex, Quwwat –ul-islam mosque, Qutbminar. | Khalji dynasty -Alai Darwaza at Delhi (concept of squincharches)
- **Islamic Architecture - Imperial style 2**: Tughlaq dynasty - Tomb of GhiasuddinTughlaq, Khirki masjid | Sayyid dynasty – Tomb of Mubarak Sayyid | Lodi dynasty – Tomb of Sikanderlodi | Suri dynasty – Tomb of Sher Shah Suri,Bihar)
- **Islamic Architecture - Provincial style 1**: Characteristics of the provincial styles in different regions through examples (brief) - Punjab style - Tomb of shah RukniAlam - Bengal style - Chotasona masjid at Gaur–
- **Islamic Architecture - Provincial style 2**: Gujarat style - Jami masjid at Ahmadabad - Deccan style – Golgumbaz at Bijapur and Charminar atHyderabad
- **Islamic Architecture - Mughal Style 1**: Characteristics of Mughal architecture, planning, materials and architectural elements. Development of the Mughal style under different rulers - Humayun- Humayuns Tomb atDelhi
- **Islamic Architecture - Mughal Style 2**: Akbar- examples -FatehpurSikhri (planning, Bulanddarwaza, DiwaniKhas, Tomb of SalimChisti) and Akbars Tomb at Sikandara.Shahjahan - examples - The TajMahal, at Agra - Red Fort at Delhi (Diwan-i- Aam, Diwanikhas, Mumtazmahal and Rang mahal)

Reference:

- An Architectural survey of Temples of Kerala. (1978). Published byASI.
- Brown, P. (1983). *Indian architecture (Islamic Period*. Bombay: Taraporevala andSons.
- Ching, F., Jarzombek, M. and Prakash, V. (2010). *A global history of architecture*. Hoboken, NJ:Wiley.
- Fletcher, B. (1999). *A history of architecture*. CBS Publication (IndianEdition).
- Grover, S. (1991). *The architecture of India (Islamic Period)*. New Delhi: Vikas Pub.House.
- Guruswamy, V. (2003). *Gateway to Indian Architecture*. EdificePublication.
- Hillenbrand, R. (1994). *Islamic architecture Form, Function and Meaning*. EdinburghUniversity.
- Lloyd, S., MarRn, R. and Müller, H. (1986). *History of World Architecture – Series*. London: Faber and Faber Ltd.
- Michell, G. (2009). *Architecture of the Islamic world*. Farnborough: Thames etHudson.
- Michell, G. and Davies, P. (1990). *Monuments of India, Vol I, Buddhist, Jain*. London, England:Viking.
- Nuttgens, P. (1983). *The story of architecture from antiquity to the present*. H F UllmannPublishers.
- Pier Luigi, N. (1972). *General Editor – History of World Architecture – Series*. New York: Harry N. Abrams, Inc.Pub.
- Tadgell, C. (1990). *The history of architecture in India*. London:Phaidon.
- Volwahsen, A. (1969). *Living Architecture – India (Buddhist and Hindu)*. London: Oxford andIBM.
- Webb, C., Schaeffer, P. and Palm, F. (1962). *Western civilization Volume 1*. New York: VanNostrand.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
III	II	19AR03005	Theory of Structures 3	2			2	50		100	150

Course Overview:

The course primarily aims at providing the concepts of strength of materials and its importance in structural design. It focuses on the conceptual study of behavior and deformation of structural members upon flexure, compression and torsion.

Course Outcomes:

Upon completion of the course, the student should:

- be able to figure out the importance of engineering properties in selection ofmaterial.
- be able to develop basic skill to choose appropriate material for their project based on structural capability along with othercriteria.
- be able to visualize the behaviour of flexure, compression and torsion in structural members to develop their design for a stable and practicalstructure.

Module 1: Strength of materials, Stress, Strain and Elastic constants.

Learning Strategies:

- Lectures on the below contents by presentation and discussion with relatively accessible mathematical equations andcalculations.
- Lectures by using analogies and examples to explain structuralconcepts.

Module Contents:

- Introduction to strength of materials- Relevance of material strength in structuraldesign.
- Stresses, Strains and Deformation – Concept, Normal stress (Compressive and tensile stress), shear stress, bending stress, Bearing stress and Torsionalstress.
- Elasticity, strength and deformation – Relationship between stress and strain, Stress strain curve of mild steel and salient points. Ductile and brittle material. Elastic and plastic deformation.
- Elastic Constants – Significance of elastic constants, Modulus of elasticity, Modulus of Rigidity, Poisson's Ratio, Bulk Modulous. Comparative study of different structural materials based on elasticconstants.
- Concept of Axial stresses - Bars of varying cross section, Deformation due to self-weight, Stress in compositebar.
- Temperature stresses – Concept, Temperature stress in compositebar.
- Principle of superposition and concept of strain energy.

Module 2: Behaviour of beams, Shear and Bending stress, Indeterminate structures

Learning Strategies:

- Lectures on the below contents by presentation and discussion with relatively accessible mathematical equations andcalculations.
- Lectures by using analogies and examples to explain structuralconcepts.

Module Contents:

- Beams: Classification beams- simply supported Cantilever, Fixed, and overhang. Type of loads – Point load, uniformly distributed load, uniformly varying load, Concentrated Moment. Types of supports- Fixed, Hinged, Roller.
- Shear and bending moment –Analysis of simply supported, cantilever, overhanging beams Shear force and bending moment diagrams –only analyticalmethod
- Bending (Flexural) stresses in beams- Theory of simple bending, Assumptions and derivation of bending equation. Bending rigidity/stiffness. Bending stress in symmetrical beams, Section modulus, Moment carryingcapacity.
- Shear stresses in beams – Concepts, distribution of shear stresses in simplesections
- Indeterminate structures- static and kinematic indeterminacy. Determination of degree of static indeterminacy for beams and frames – (NoProblems)

Module 3: Behaviour of Columns, Deflection of Beams, Concept of

Torsion Learning Strategies:

- Lectures on the below contents by presentation and discussion with relatively accessible mathematical equations andcalculations.
- Lectures by using analogies and examples to explain structuralconcepts.

Module Contents:

- Columns and Struts – Concept of Long and short columns, Modes of failure - Effective length based on end conditions, critical load, slendernessratio.
- Euler'sequationfordifferentendconditions(noderivation).Combinedbendingor eccentricity and direct stresses in short columns.
- Elastic bending of straight beams: Concept of Slope and deflections. Computations of slope and deflection of standard cases - Cantilever, simply supported and overhang beam for different load conditions using Double Integrationmethod.
- Torsion – Concepts of torsion in beams, Assumptions in theory of pure torsion and torsion equation. PolarModulus.
- Power transmitted, torsional rigidity/stiffness. Concept of shearcentre.

Reference:

- Timoshenko.S.P,StrengthofMaterials,Part-1,D.VanNostrandcompany, Inc.Newyork.
- Nag&Chanda, Fundamentals of Strength of Materials, Wiley IndiaPvt.Ltd.
- Bansal R.K., Strength of Materials, Lakshmi Publications, NewDelhi.
- Bhavikatti S.S , Strength of Materials, Vikas Publishing House(P)Ltd.
- D.S.PrakashRao,StrengthofMaterials,Vol.I,UniversityPress(India)Ltd.
- PopovE.P.,EngineeringMechanicsofsolids,PrenticeHallofIndia,NewDelhi.
- PunmiaB.C,StrengthofMaterialsandMechanicsofstructures,Vol.1,Lakshmi Publications, NewDelhi.
- VaziraniV.N.,RatwaniN.M.,AnalysisofStructures,Vol.1,KhannaPublishers, NewDelhi.
- Kazimi S.M.A., Solid Mechanics, Tata Mc GrawHill.
- Singh, Mechanics of Solids, , Prentice Hall of India, NewDelhi.
- ArthurMorley,StrengthofMaterials,ELBS,Longman'sGreen&Company.
- Devdas Menon, Structural Analysis, Vol.1, Narosa,Chennai.
- Bhavikatti S.S , Structural Analysis Vol. I, Vikas Publishing House (P)Ltd.
- Smith J.C. Structural Analysis, MacmillianPub.Co.1985.
- Wang C.K.& Solomon C.G., Introductory Structural Analysis, McGrawHill.1968.
- Norris & Wilbur, Elementary Structural Analysis, McGrawHill.
- Timoshenko S.P, Young D.H., Theory of structures, McGrawHill
- PunmiaB.C., Strengthofmaterials andtheoryof structures, Vol.II,Laxmipublications.
- Onouye, B. and Kane, K. (2015). *Statics and Strength of Materials for Architecture and Building Construction*. Boston, MA:Pearson.
- Prasad, I. (n.d.). *Applied mechanics -Dynamics & Statics*. KhannaPublishers.
- Punmia, B. and Jain (n.d.). *Strength of Materials and Theory of Structures - Vol1*.
- Rajasekaran, S. and Sankarasubramanian, G. (n.d.). *Engineering Mechanics*. Vikas Publishing House PrivateLimited.
- Ramamrutham, S. (n.d.). *Strength of Materials*. DhanpatRai Publishing Company PvtLimited.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	

III	**II**	**19AR03006**	**Climatology**	**2**			**2**	**50**		**100**	**150**

Course Overview:

The subject primarily aims to provide a holistic understanding of climate in global, national and local contexts including a study of basic terminology used and various methods of classification and measurement of climatic data. The course also introduces the concept of human comfort and its relationship with climate and the built environment. Further, design strategies for built in the tropical region are stressed upon and concepts of lighting, ventilation and shading devices introduced.

Each concept shall be taught through an active use of the Climatological laboratory and using relevant traditional and contemporary buildings as case studies in both the International and Indian scenarios. In order to expose the students to the various design strategies for buildings in the tropical region, climate responsive strategies in shading, lighting and ventilation shall also be worked out in the architectural designstudio.

Course Outcomes:

Upon completion of the course, the student should:

- learn how to analyze climatic factors in relation to the humancomfort
- learn how to implement climatic factors in architecturaldesign

Module 1: Introduction to Climate

Learning Strategies:

- Lecturenotes
- Climatologylab
- Groupdiscussion
- Debates
- Case studies
- Analysis
- E-resource

Module Contents:

- Climate & weather - Components and elements of climate, measurements and representations of climatic data.
- Climatic factors -Solar geometry the coordinates, earth's rotation, seasonalvariations azimuth angles & altitude.
- Sun path diagram & solar envelope, earth's thermal balance, globalwinds.
- Climate classification -Global climate classifications (Koppen).
- Tropical climate, Indian climate classification (SP 41), characteristics, Design strategies for various climatic zones in India, Vernacular examples of architecture evolved from climate, Climate of Kerala. Analysis of a traditional building in Keralacontext.
- Scales of climate - Macro, Meso& Microclimate, Urban and rural climate, Siteclimate.
- Factors affecting site Climate-Effect of landscape elements on site/micro climate, Siteanalysis concepts.

Module 2: Climate and Human Comfort

Learning Strategies:

- Lecturenotes
- Climatologylab
- Hands-on Workshop
- Analyzing examples from books andjournals
- E-resource

Module Contents:

- Thermal comfort factors - Physiological aspects, Body heatbalance.
- Thermal Comfort indices, Thermal comfort chart - psychometric chart, Bioclimatic chart, ET chart, CETchart.
- Principles of heat transfer- transfer of heat through buildingenvelope.
- Terminology - conduction, convection, radiation, Resistivity, Specific heat, and Thermal capacity. Performance of different materials with respect to its thermal gradient and periodic heatflow.
- Application of heat exchange in building- Passive design techniques in built fabric and un-built environment.
- Building orientation and design of openings to regulate heat gain by using solar chart in climaticdesign.
- Design of solar shading devices-movement of sun, locating position of sun, overheated period, shading devices, solar shading & shadow angles and their performanceevaluation.

Module 3: Daylighting and Natural Ventilation

Learning Strategies:

- Lecturenotes
- Climatologylab
- Hands-on Workshop
- Analyzing examples from books andjournals
- E-resource

Module Contents:

- Day lighting: Climate & natural lighting, its transmission, reflection, diffusion and glare, Daylight parameters, Daylight factor, Advantages and limitations in different climatic zones, Daylight systems, strategies & devices. Daylight design for various occupancies using tables and graphs as given in SP41.
- Natural ventilation: Functions of natural ventilation, Thermally induced air current - Stack effect &Venturi effect, Passive ventilation techniques, ventilationducts.
- Air movements around and through the buildings- Air flow around the building, Wind shadows.
- Air flow through the building, Designconsiderations

Reference:

- Arvind, K., Baker and Szokolay (2002). *Climate responsive architecture*. New Delhi: Tata McGraw-Hill Pub.Co.
- DeKay, M., Bennett, S. and Brown, G. (1985). *Sun, wind & light*. John Wiley andSons.
- Evans, M. (1980). *Housing, climate, and comfort*. London: ArchitecturalPress.
- Givoni, B. (1982). *Man, climate and architecture*. London: Applied SciencePublishers.
- Joseph, B. (2006). *Environmental science and engineering*. New Delhi: TataMcGraw-Hill.
- Koenigsberger, O. (1996). *Manual of tropical housing and building*. Bombay: OrientLongman.
- Konya, A. (1984). *Design Primer for Hot Climates*. London: The ArchitecturalPress.
- Masters, G. (2004). *Introduction to environmental science and technology*. 2nd ed. PierceEducation.
- SP 41: Handbook on Functional Requirements of Buildings. (1987). Bureau of IndianStandards.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
III	**II**	**19AR03007**	**Humanities**	**2**			**2**	**50**		**100**	**150**

Course Overview:

Architecture serves as an ultimate embodiment of the human condition; it is shaped by the cultural, religious, socio-economic, and environmental forces of a people – among many other considerations that extend beyond simply aesthetics. How civilization shapes its space, and determines the shape of the built environment in relation to the natural world can speak volumes about what its core essence is, particularly as it transforms over time. Studying the philosophical meaning of shaping and reshaping the world throughout time offers the student a gestalt understanding of a physical and spatial exploration of the human condition and how they themselves fitwithin.

Students will be exposed to and asked to form an opinion about the myriad forces that shape the built environment and how it (architecture and urban form) contributes to the cultural identity of people, period, and place. At the beginning, through the semester, and at the conclusion students will reflect upon their personal definitions of architecture + humanity, and the inclusion of key concepts and considerations of the course will be assessed.

Course Outcomes:

Upon completion of the course, the student should:

- Comprehend what have been the major issues in the development of architectural design in socio- culturalcontext
- Illustrate the place specific nature of architecturaldesign
- Appraise about architecture and its relationship to its historical, political, social, economic, technologicalcontexts
- Develop an appreciation for space, and be able to discuss the role of design in enhancing life in the 21st century andbefore

Module 1: Sociology and Its Relation to Architecture

Learning Strategies:

- Lectures and writtenassignments

Module Contents:

- Definition of Sociology; nature, scope and utility of Sociology; branches ofsociology
- Different social processes - cooperation, conflict, competition, accommodation, assimilation, progress andevolution
- Forms of social organization: society, community, family,culture
- Different family structures and architectural responses to different family types and housing typologies (traditional andcontemporary)
- Relationship of social, economic and political systems to the built environment, relevance in Architecture.

Module 2: Man, Environment and Society

Learning Strategies:

- Lectures and writtenassignments

Module Contents:

- Journey of man from ancient through medieval to contemporary; formation of group living, settlements and beginning of community living as rural &urban
- Concepts of society, culture, traditions & civilization and their progressive development through different ages from Paleolithic tocontemporary
- Culture and society, cultural lag, Deviant subculture, Culture andcivilization.
- Different theories about culture and social identity with reference to architecture, social construction of space.
- Relation between culture and built form (exploration of architectural examples) based on design practices followed across India and theworld
- Social development for Sustainable development, Sustainable Indigenous communities with caseexamples.

Module 3: Indigenization and Cultural Change

Learning Strategies:

- Lectures and written assignments

Module Contents:

- Society and environment, Social change, Factors of social change, Social stratification, Rural & Urban, class &caste
- Social and cultural aspects of building practices; Architecture as an identity; Loss of architectural identity and role of culture.
- Social changes in Kerala (structural, occupational, rural, religious and housing) including renaissance and social reformmovement.
- Kerala Model Social development - characteristics, advantages anddisadvantages.
- Urban Sociology focusing on study of life and interaction in cities and metropolitan areas, the economic, cultural and social changes of urbanisation leading to production or disintegration ofidentities.
- Study of demography, migration Social aspects of migration, gentrification, ghettoization, housing& slums and its effect on urbanisation andarchitecture.

Reference:

- An Introduction to Sociology. (n.d.).VidyaBhushan.
- Bart, P. and Frankel, L. (n.d.). *The student's sociologicalhandbook*.
- Brinkerhoff, D. and White, L. (1998). *Sociology*. St. Paul, MN [etc.]: WestPubl.
- Chitambar, J. (n.d.). *Introductory ruralsociology*.
- Dr. Kumar, K. (n.d.). *RuralSociology*.
- Dr. Valsyayan (n.d.). *UrbanSociology*.
- McCurdy, D., Shandy, D. and Spradley, J. (n.d.). *Conformity and conflict: Readings in Cultural Anthropology*.
- Philipchalk, R. and McConnell, J. (1994). *Understanding human behavior*. Fort Worth: Harcourt Brace Jovanovich CollegePublishers.
- Rapoport, A. (1969). *House form and culture*. Englewood Cliffs (N.J.):Prentice-Hall.
- Saile, D. (1986). *Architecture in cultural change: Essays in Built Form and Culture Research*. [Lawrence, KS]: School of Architecture and Urban Design, University ofKansas.
- Singh, K. (1973). *Principles of sociology*. Aminabad: PrakashanKendra.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
III	**I (c)**	**19AR03008(A)**	**Elective Workshop I: Architectural Photography**	**1**		**2**	**2**	**50**	**50**		**100**

Course Overview:

This course aims at equipping students with the creation of successful images of exterior and interior architecture, as well as architectural models. The course discusses equipment, processes, and procedures necessary for the photography of built and unbuilt spaces, dusk/night architectural landscapes, and construction progress. Students will learn to use Digital SLR camera, lighting techniques, software and to create output. Students will be able to use High Dynamic Range (HDR): multiple exposures to create dramatic architecture/interior images without additional professional lighting.

Course Outcomes:

Upon completion of the course, the student will:

- impart the skills of capturing aesthetically appealing and creative architectural photographs through the use of appropriate cameras/ lenses and lightingconditions.

Module 1: Introduction to Photography

Learning Strategies:

- Lectures on relevanttopics.
- Appraisal of famous photographs on the basis of principles and elements ofphotography.
- **Suggestive Exercises**: Task that would enable students to understand and explain the basic concepts ofphotograph.

Module Contents:

- General introduction to the art of photography; Origin and development of photography, Principles of design and its application inphotography,
- Types of camera: DSLR, Mirrorless, Point and Shoot etc., Parts of camera, Basic Modes, Types of lenses and Application, Filters, CameraAccessories
- Basic Concepts: Exposure- Shutter speed, Aperture, ISO, Metering, Pixels, Resolution, Sensor size
- Lighting- Direction of lighting - front, side, back; shadows, texture, and effects of clouds; Types of artificial lighting, combined daylight and flash, Low lightphotography
- Color balance, Reading histogram, White balance and Colortemperature.
- Perceptual Control, Effect of camera to subject distance, oblique angles, Depth of field and circle of confusion, ParallaxError
- Framing Views, Distortions, Composition, Applying the law ofthirds
- Origins of architectural photography, Review of architectural photographs, Light andShades

Module 2: Creativity in Shooting

Learning Strategies:

- Lectures andDiscussions
- Introducing Digital Photo editingtools
- **Suggested Exercises**: Photography Exhibition on a theme that is related to the B.Arch. Degree Course- Object photography, Architectural Photography, UrbanPhotography

Module Contents:

- Understanding light and photography, External lighting- Direction of lighting - front, side, back, shadows, texture, and effects ofclouds,
- Light modification, psychological effects, and types of artificial lighting, combined daylight andflash.
- Architectural photography- Interiors and Exteriors, Object photography, Photo documentation of architecturalmodels.
- Communicating ideas through photography, Experimental manipulation. Photographic illustration. Double Exposure, Various trends inphotography
- Overview of architectural photography, Color balance, Reading histogram, White balance and Colortemperature.
- Finding Forms and Shapes, Elements and Principles of framing, Rules of composition, Aesthetic of framing andcomposition
- Perceptual Control, Depth of field and center ofconfusion

Module 3: Post production

Learning Strategies:

- Lectures andDiscussions
- Workshops
- Labs

Module Contents:

- Introduction to software, RAW file editing, HDR Imaging, Adobe Photoshop and Lightroom, Retouching and color correction, PrintingPreparation
- Framing Views- Single point and two point perspective- examples, distortions, emphasizing architecturalelements,
- Effect of camera to subject distance, oblique angles, three point perspective- applications in interiors and exteriors -composition, symmetric composition, applying the law of thirds - examples, image capture topublication.

Module 4: Film Production

Learning Strategies:

- Discussions on Film as cultural texts to better understand the history and cultural manifestations.
- **Suggestive exercises**: Group work - Short film/ Video documentary on themes related to the subjects discussed in B.Arch. Degreecourse

Module Contents:

- Introduction to film theory and design for the dynamic media; creation of plan and scripting of a storyboard; Basic movie camera shooting, traditional analog and digital methods, Understanding video Camera andtypes
- Cinematography as an Artform, Framing, Composition, Camera Movements, Types of Shots, Lightingtechniques
- Recording Sound, basic concepts andtechniques
- Elementary film editing – video and audio, merging, morphing, transitionsetc.
- File Formats and Conversion, memory manipulation and softwarecompatibility.

Reference:

- Harris, M. G., & Harris, M. G. (1998). Professional architectural photography. Oxford: FocalPress.
- Rosa, J., & McCoy, E. (1994). A constructed view: The architectural photography of juliusshulman. Rizzoli IntlPubns.
- Siskin, J. (2012). Photographing architecture: lighting, composition, post-production, and marketing techniques. Buffalo, NY: AmherstMedia.
- Schulz A., Architectural Photography: Composition, Capture, and Digital Image Processing, O'Reilly Media Inc.,2010
- Michael Heinrich, Architectural photography, Birkhauser,2009
- Michael G. Harris, Professional Architectural Photography, Taylor & Francis,2002
- Kopelow A., Architectural Photography the Digital Way, Princeton Architectural Press,2007
- Ken Dancyger, Technique of film and video editing, Theory & Practice,Routledge,2010
- S.E Browne, Video editing: A post production, Focal Press,1996
- Roy, Thompson, Grammer of edit, Focal Press,2013
- Reisz and miller, the techniques of film editing,Routledge,2010

Subject Sem Group	Course Code	Subject	Hours/week			Credits	Marks			
								University Exam		
			T	S	W/L		CA	Jury	Written	Total

III	**I (c)**	**19AR03008(B)**	**Elective Workshop I: Carpentry and Welding**	**1**		**2**	**2**	**50**	**50**		**100**

Course Overview:

This course provides students with an opportunity to learn carpentry and welding skills in repair and fabrication. Woodworking and welding workshop practice is a course designed to introduce students to general woodworking and welding practices. Students will expand their knowledge and experience through various projects, lessons, and vocabulary. Students will be expected to learn about and safely use hand tools, power tools, woodworking and welding machineries. The projects are designed to give students as much experience as possible by using many different machines and tools. The projects will also cover as many aspects of the building and woodworking industries as is possible in an entry levelcourse.

Course Outcomes:

Upon completion of the course, the student will:

- have woodworking and welding skills that will be useful in any aspect of the construction industry.
- have a broader understanding of construction processes as well as more in-depth problem-solving skills

Module 1: Introduction to Carpentry

Learning Strategies:

- Workshops andlabs

Module Contents:

- Need for the Work, Training, Relationship between timber, Tools andCarpentry
- Timber: Origin Structure of Timber, Types of wood conversion of timber, Types of sawing, Timbersections,
- Defects in wood: Seasoning of timber, Preservation, Types of preservatives, Other types of timber.
- Carpentry Tools: Classification of Tools, Measuring and Marking, Holding, Cutting, Grooving, Planning, Striking, Boring and Miscellaneous Tools, Care and maintenance of Tools, Precautions to be taken while using carpentry tools, sharpening tools, Wood working machines, Wood working lathe, Wood sawing machine,etc.
- Types of carpentry Work and Working Procedure: Marking, Sawing, Planning, Chiseling, Boring, Striking, Checking,Sharpening.
- Joints in Carpentry work: Classification, some associated terms, Lengthening/Widening Joints, Corner Joints, Framing Joints, Preparation of timber and making joint, Precautions in making ajoint.
- Nails, Screws, Dowels, Bolts and Nuts, Adhesivesetc.

Module 2: Introduction to Welding

Learning Strategies:

- Students may be encouraged to do Assembling projects that let them use theircreativity.
- Students may design and make basic objects like a small shelf or a box, using wood and metal.
- The finished product shall be based on a design drawing meticulouslyprepared.
- They may estimate material requirements, create material lists and cutlists.
- The use of safety measures when working with tools may beensured.

Module Contents:

- Define the welding process, welding terminology, and history ofwelding.
- Mechanical Properties of metal: Explain the mechanical properties of metals and their importance in weldingprocesses.
- Welding Joints: Identify the five basic welding joints and weldingsymbols.
- Safety Demonstrate safe setup, operation, and shutdown of an oxy-fuel torch. Demonstrate safe setup, operation and breakdown of basic plasma arc cutting equipment. Explain the importance and use ofventilation
- Welding Work and working procedure: Welding Joints and Position, Basic Oxyacetylene Cutting, Basic SMAW/GMAW, Plasma Cutting

Reference:

- Engel, A. (n.d.). *Carpentry complete*. [Place of publication not identified]: TauntonPress.
- Finch, R. (n.d.). *Welder'shandbook*.
- Hayward, C. (2009). *Carpentry for beginners*. Mansfield Centre, CT: MartinoPub.
- Ruth, K. (2004). *Welding basics*. Chanhassen, Minn.: Creative PublishingInternational.

Sem	Subject Group	Course Code	Subject	Hours/week T	S	W/L	Credits	Marks CA	University Exam Jury	Written	Total
III	I (c)	19AR03008(C)	Elective Workshop I: Sculpture	1		2	2	50	50		100

Course Overview:

The course aims at introducing the art of sculpture, the associated skill sets and basic technical knowledge. This may be carried out as a studio-based course giving maximum freedom for creative exploration of the three-dimensional form. Students may create works of art as part of the studio, individually and in group, and the process may be considered as important as the product. They may present/ exhibit their work in a public platform and may be given opportunity to verbally express theirwork.

Course Outcomes:

Upon completion of the course, the student will:

- be enabled to express their idea of complex forms as three dimensionalmodels
- be familiarized with properties of various materials and associated tools and processes involved.
- be creative freedom in the sculpture studio will help in explorations in architecturaldesign
- develop team work skills and involvement in thecommunity/society

Module 1: Introductory Discussions and Exercises

Learning Strategies:

- Lectures,workshops

Module Contents:

- Sculpture as an Art form, what isArt?
- Sculpture in history, Sculpturetoday
- Discussion on relationship between Sculpture and Architecture, 'Building assculpture'
- Discussion using examples on how sculpture interacts with Building Interior, Nature landscape, Urbanlandscape
- Types of sculpture- based on materials, style, process etc. Additive and Subtractive processes, Carving, Moulding, Casting; Relief sculpture, Kinetic sculpture etc.Armature.
- Task 1: Basic form making exercises using Clay, Plaster of Paris, Wire mesh, Paper pulp, Foam board, Styrofoam, Wax, Woodetc.

Module 2: Exploring Materials and Techniques

Learning Strategies:

- Workshops andlabs

Module Contents:

- Any of the 2 materials (minimum) given below shall be explored in thestudio
- Terracotta: Theoretical understanding on Mixing of clay, Properties, Tools used, Possibilities and limitations, Methods in Pottery, working of a Kiln, understanding Ceramic and Porcelain, Finishes. Practical exercises to get familiarized with thematerial.
- Cementconcrete:TheoreticalunderstandingofCementconcrete,Properties,Typesof reinforcements used, Possibilities and limitations, Tools used, Methods, Safety aids, Finishes. Practical exercises to get familiarized with the material.
- Fiber Glass: Theoretical understanding of the admixtures involved, Properties, Possibilities and limitations, Tools used, Making mould, Methods, Safety aids, Finishes. Practical exercises to get familiarized with thematerial.
- Metal- Steel/ Copper/ Bronze/ Tin: Theoretical understanding of the admixtures involved, Properties, Possibilities and limitations, Tools used, Methods, Welding, Soldering, Brazing, Safety aids, Finishes. Practical exercises to get familiarized with thematerial.
- Task 2: Making a Relief Sculpture / a table top sculpture individually. The final product shall be completed to a stage so that it can be exhibited in a Gallery. Terracotta, Cement concrete, Fiber glass, Metals etc. shall be used. The process shall bedocumented.

Module 3: Artistic Expression and Team Work

Learning Strategies:

- Workshops andlabs

Module Content:

- Task 3: Making a Kinetic Sculpture in group/ Making an Assemblage in group. The final product shall be completed to a stage so that it can be exhibited in a Gallery. The process shall be documented.
- Task 4: Making an outdoor sculpture/ Installation (in the campus or outside the campus) and documenting the process. Any material shall be used. Upcycling shall beencouraged.

Reference:

- Rudolf Wittkower, “Sculpture: Processes and Principles”, Penguin Books,1991
- Karin Hessenberg, “Sculpting Basics: Everything You Need to Know to Create Fantastic Three-Dimensional Art”, Barron's Educational Series,2005
- Hal Foster and Richard Serra, “Conversations on Sculpture”, Yale University Press,2018
- Frederick Hartt, “Art: A History of Painting, Sculpture, Architecture”, Harry N Abrams Inc,1989
- NancyAdajania...[etal.],“Vitamin3-D:newperspectivesinsculptureandinstallation”,Phaidon, 2009
- Tristan Manco,” Raw + material = art: found, scavenged, and upcycled’, Thames & Hudson,2012

37. FOURTH SEMESTER SYLLABUS

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
IV	I (a)	19AR04001	Architectural Design 4		10		10	250	250		500

Course Overview:

Contextual response, Understanding site topography and emphasis on Design detailing

- To encourage students to study the context and elements of built and un- built spaces in an observable setting to develop a holistic understanding of the aspects that influence the built environment.
- To equip students to design multi space/ multi-functional spaces up to two storeys of moderately complex nature emphasizing the process of design through developing concepts, project briefs, Site analysis, Circulation diagram, Function, Form, Structural system. To familiarize with a systematic approach in designprocess
- To create an understanding of architecture on slopingsites
- To create an awareness of Building rules/National Building code of India / Universal design standards /otherregulations.
- Special emphasis on architectural design detailing and constructability of the designintent.
- **Sustainable design objectives:** To create an awareness of the sustainable design principles considering Climate, Materials, Natural Lighting, ventilation and its influence on building envelope

Course Outcomes:

Upon completion of the course, the student should have:

- An understanding of functional aspects of built environment and formulating appropriate response
- An understanding the site context and reciprocate in a sustainable and environment friendly approach.
- An understanding of design outcomes with an emphasis on architectural designdetailing

Major Project

Design of a built environment (Built up area not exceeding 1000 SQM) where different user groups interact such as school, day care center, primary health center, nursing home, hostel, motel etc. through a systematic design approach with a focus on design development process. The design possibility on a sloping site may be explored.

Emphasis may be given on:

- Response to the Site, context and socioculturalaspects
- Analysis of relationship between thespaces
- Analysis of interactions among usergroups
- Analysis of site topography and formulation of appropriate response based on siteslope
- Structural Systems in the builtforms
- SustainableapproachessuchasRainwaterharvesting,passivecoolingtechniques,useof

low embodied energy materials etc.

- Climatic responsivedesign

Minor Project

Architectural appraisal/ appreciation of architectural elements/ building. Preparation of a report incorporating analysis, documentation, inferences and conclusion.

Time bound project

- Short duration of (one week) projects to boost the imagination/innovation and speedy decision making- such as Design of kiosk/bus shelter/exhibition pavilion/, saloon, internet cafe or other buildings/ spaces of similarnature
- Site visit to buildings under construction/completed (Detailed site visit reportpreparation)

Reference:

- Cross, N. (1984). *Developments in design methodology*. John Wiley &Sons.
- De Chiara, J. and Crosbie, M. (2001). *Time-saver standards for building types*. New York:McGraw-Hill.
- Heath, T. (1984). *Method in architecture*. Chichester: John Wiley &Sons.
- Johnston, D. and Gibson, S. (2008). *Green from the ground up*. Newtown (CT): TauntonPress.
- Lynch, K. (1962). *Site planning*. Cambridge, Mass.: The MITPress.
- Miller, S. (1995). *Design Process: A Primer for Architectural and Interior Design*. New York: Van NostrandReinhold.
- Roth, L. (1993). *Understanding Architecture: Its Elements- History, and Meaning*. IconEditions.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
IV	I (b)	19AR04002	Building Materials and Technology 4	1	3		4		100	100	

Course Overview:

The subject primarily aims at developing understanding in use of appropriate construction technique and material in building design based on feasibility of technology, physical properties (like density & specific gravity, strength, thermal properties), aesthetic value, socio-cultural impacts and relevance, socio-economic factors, Ecological footprint etc.

The course introduces the technological aspects of a building design from the perspective of functional building component where use of natural and artificial materials is discussed based on their application. Each material would be taught in a manner such that its application would be discussed in a sequential manner, starting from foundation level, followed by plinth & others (sill, lintel, sunshades, window/door openings, walling material, as a floor & flooring) and culminating at roof and parapet wall. Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples to complex.

Course Outcomes:

Upon completion of the course, the student should:

- develop necessary decision-making skills in using appropriate construction technologies and materials while designing buildings, based on understanding of their potentials and properties.
- develop the skill to represent various construction techniques as well as materials through drawings supporting their buildingdesign.

Module 1: RCC Structures I

Learning Strategies:

- Lecture on RCC and framedstructures
- Site visits to understand framedstructures
- Detailed drawings of RCC slabs anddetails

Module Contents:

- Introduction to framed structures. - Concrete floors, walls, beams andcolumns.
- Types of Concrete constructions – Plain Concrete, Reinforced Concrete, High density concrete, polymer concrete, High strength concrete, light weight Concrete, Ready mix concrete, Shotcrete, Vacuum concrete, Limecrete, Glass concrete, Asphaltconcrete,
- Reinforced cement concrete: Reinforcements used in RCC – Suitability & performance - Reinforcement details of RCC elements like column, beam, lintel, slab, waist slab etc. BIS specification. Details of construction joints, expansion joints in buildings – Method of construction – Filling of joints – Waterproofing.
- Steel Reinforcement: Hot rolled bars, CTD bars, TMT bars, Welded wire fabrics; Steel for Pre-stressed Concrete; Structural steel; Stainless steel and steelalloys
- RCC Shuttering, Scaffolding – advances inpractice.

Module 2: RCC Structures II

Learning Strategies:

- Lecture on various types RCC slabs & Structuralmembers
- Site visits to construction sites during variousstages
- Drawing studios on representation of different RCCSlabs

Module Contents:

- RCCone-wayslabandone-waycontinuousslabs:Principlesandmethodsofconstruction.
- RCCtwo-wayslabandtwo-waycontinuousslabs:Principlesandmethodsofconstruction.
- RCC cantilever slabs, sloping slab and waist slabs: Principles and methods ofconstruction.
- Waffle slabs and coffer slabs -Principles.
- Post tensioned and Pre-Cast concrete – Principles and methods of construction - floors, slabs, structural members.

Module 3: Vertical transportation

Learning Strategies:

- Lecture on various types lifts and theirapplications
- Site visits to construction sites during variousstages
- Drawing studios on lifts and other relatedsystems.

Module Contents:

- Lifts – Calculation of requirements and number of lifts considering quality and quantity of services
- Details of construction of lift shaft, lift pit, lift car – machine room etc. Standard sizes – Lifts of various types such as machine room less, passenger, goods, hospitaletc.
- Modern development in the field of vertical transportation – sky lobby concept, double decker lifts etc.
- Escalator – Different types – provision to be made during construction – installation of escalator. Escalatordetails.
- Travellator – Functions andtypes

Module 4: Roofing

Learning Strategies:

- Lecture on different types of roofing materials, application andrelevance.
- Site visits to construction sites during variousstages
- Drawing studios to understand fixingsystems.

Module Contents:

- Introduction to roofing materials, desirable properties and climate relatedaspects.
- Roofing Tiles – clay and cement tiles, different types - properties and method offixing.
- Light roofing materials - Galvanised iron sheets, asbestos cement sheets, corrugated aluminum sheets,
- Sandwiched aluminum panels, PVC sheets and other light roofs like glass fiber reinforced plastic sheets, bituminous sheets with accessories, shingles etc. and method of theirfixing.
- Tensile membraneroofing.

List of drawings for Jury (Minimum 7 sheets)

- Beam with reinforcementdetails
- Cantilevered beam with reinforcementdetails
- Waist slab with reinforcementdetails
- Expansion joints and construction joints with water proofingdetails
- One way and two-wayslabs
- Cantileveredslab
- Lifts – with machine room and without machineroom
- Roofing with fixing details – tiles, shingles, light roofing materialsetc.
- Tensile roofing – fittings anddetails

Reference:

- Ching, F. (1975). *Building construction illustrated*.VNR.
- Lyons, A. (1997). *Materials for architects and builders: an introduction*. London: Edward Arnold (Publishers)Ltd.
- McKay, W. (1981). *Building construction*. London:Longman.
- Ramchandra, S. (1984). *Design of steel structures*. Delhi: Standard BookHouse.
- Rangwala S. C. (1997). *Engineering materials*. Charotar Publishing House,India.
- Shetty, M. (2007). *Concrete technology*. Ram Nagar, New Delhi: S.Chand.
- Varghese, P. (2005). *Building materials*. New Delhi: Prentice-Hall of India Pvt.Ltd.
- Relevant BIS Code Pertaining to Materials ofConstruction

Sem	Subject Group	Course Code	Subject	Hours/week T	S	W/L	Credits	Marks CA	University Exam Jury	Written	Total
IV	I (c)	19AR04003	Professional Skill Enhancement 4			4	2	50	50		100

Course Overview:

This course intends to provide/ enhance the soft skills in order that students perform well in their academics and beyond. These skills are intended to support the student to perform better in her/his core subjects and also build up robust performance through hands-on workshops and laboratory training. This course is subdivided into two categories – Mandatory and Optional. Mandatory courses help in preparations for respective semester subjects. The optional category helps students to take personal initiatives to develop in specific areas that can widen their horizon of their understanding of architecture and also initiate action at the society level. There are also options to work on competitive exercises alongside other similar institutions.

Course Outcomes:

Upon completion of the course, the student should:

- be given an exposure of varied skills that can bring in confidence in handling their core subjects such as workshops, communication skills, computer applicationsetc.
- be able to develop team spirit and interpersonal skills to manage complexsituations.
- be able to cope with stress and develop multi-taskingcapabilities.

Module 1: Computer Applications 2

Learning Strategies:

- Computer lab sessions guided byexperts
- Group discussions and Interactivesessions
- Prepare presentation drawings, generating 3D and renderedviews.

Module Contents:

- To comprehend tools and systems for 3d modelling inCAD
- Develops and draws various architectural volumes, forms and surfaces through 2DCad
- Convert and draw 2D architectural drawings to 3Dforms

Module 2: Social Initiatives or any other co-curricular activities

Learning Strategies:

- student initiatedactivities
- hands on workshops, competitionsetc.

Module Contents:

- Optional content to be developed by each institution in order to help students to take part in activities that involve larger groups and facilitate peerlearning.
- The activities could be student initiated societal activities or participation in NASA or similar student led group initiatives which has an academic content aswell.

Reference:

- Cadfolks (2018). *AutoCAD 2019 for Beginners*. 1st ed.Kishore.
- Omura, G. and Benton, B. (2018). *Mastering AutoCAD 2019 and AutoCAD LT 2019*. 1st ed.Sybex.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
IV	II	19AR04004	History of Architecture 4	2			2	50		100	150

Course Overview:

The subject principally aims at sensitizing the students towards understanding architecture as a product of historic evolution along the timeline through socio cultural and political changes as well as technological advancements. This course also intends to expose the students to detailed studies on how ideological and technological advancements drastically influenced the transformation of architecture in the modern times till contemporary era around the world andIndia.

Course Outcomes:

Upon completion of the course, the student should:

- Be able to relate and identify built forms through socio cultural, climatic, political, economic influences in respective geography andtimeline
- Possess skill to formally (visually and theoretically) analyse and appreciate architectural works
- Be able to use a theoretical base developed from architectural history in their designprocess
- Be exposed to plethora of contemporary architecture practices inIndia

Module 1: World Architecture in modern times

Learning Strategies:

- Lecture on evolution of architecture in various geographies around the World (industrial and post-industrialtime)
- Lecture/ discussion on major changes and influences during industrialera
- Model making/ Drawing exercises on significant architecture works around the World during theera
- Create theoretical and philosophical understanding of modernism, structuralism and industrialization in relation to people-built forms and way oflife.
- Each lecture will have Pre- requisite readings and each module will have to specify self-learning component in the lectureplans.
- This module requires a minimum of four one-hour lectures to be included in the lectureplan.

Module Contents:

- Introduction to industrialization and industrial era, mode of production, use of technology and resultant changes in built forms, its design, material andquality
- Prominent art/ architectural movements during industrial era, modern movements, art and craft movement Avant grademovements
- Major 'isms' in industrial and post-industrial era, modernism, structuralism, cubism, minimalism, brutalism, tropicalModernism
- Analyzing works of major architects- Louis Sullivan, Peter Behrens, Antoni Gaudi, Victor Horta,
- Analyzing works of major architects- Adolf Loos, Walter Gropius, Mies van der Rohe, Frank Lloyd Wright
- Analyzing works of major architects- Le Corbusier, Alvar Aalto, Louis Kahn, GeoffreyBawa

Module 2: Post Modern and Contemporary

Architecture Learning Strategies:

- Lecture/ discussions on Post Modern and ContemporaryArchitecture
- Create theoretical and philosophical understanding of Post-modernism, Post-structuralism and Contemporary trends in architecture in relation to people-built forms and way oflife
- Each lecture will have Pre- requisite readings and each module will have to specify self-learning component in the lectureplans
- This module requires a minimum of four one-hour lectures to be included in the lectureplan
- Drawing/ Model making exercises on various significant architecturalworks

Module Contents:

- Introduction to postmodernism, post-structuralism, postmodernism inarchitecture
- Biomimetics / Biomimicry, discussing works/ideas of Michael Pawlyn, Antonio Gaudí, SantiagoCalatrava
- Introduction to Contemporary Architecture andtrends
- Discussing works of Robert Venturi, Peter Eisenman, Frank Gehry, ZahaHadid
- Discussing works of Rem Koolhaas, Daniel Libeskind, Bernard Tschumi, ShigeruBan

Module 3: Indian Architecture in modern times

Learning Strategies:

- Lecture on chronological evolution of modern architecture in various geographies within India
- Lecture/ discussion on observation of changes andinfluences
- Drawing exercises on various significant architecturalworks
- Each lecture will have pre-requisite readings and each module will have to specify self-learning component in the lectureplans
- Note for Unit 1: Emergence of new typologies examples considered are Clock towers, Town halls, Hill stations, Civil lines, Clubs, Gymkhanas, Hotels, Parks, Gardens, Bungalows, etc. Also, introduction to building regulations (Building laws, ASI, PWD,MES)
- Reference for Unit 2 and 3 Terminology- Jon Lang, A Concise History of Modern Architecture in India

Module Contents:

- **Colonial Architecture 1**: Introduction to Colonialism and its impact on built form in different regions | Emergence of New Typologies | Colonial style in India under Portuguese - Goa - Goan Houses, The Basilica of Bom Jesus. | Dutch - Malabar Coast Kochi - Mattancherry Palace/Dutch Palace
- **Colonial Architecture 2**: French - Pondicherry – characteristics of buildings in French Colony | English - Calcutta (The Victoria Memorial), Mumbai (Chattrapathi Shivaji Terminus/Victoria terminus) and Delhi (Rashtrapathi Bhavan/ Old Viceroy'sHouse)
- **Evolution of Modern Architecture in India post- Independence 1**: First- and Second-generation Modernist architects (1947-80) | Modernist Architecture or that influenced by Modernisme.g.Golconde
- **EvolutionofModernArchitectureinIndiapost-Independence2**:workandinfluenceofLe Corbusier and Louis Kahn | Habib Rahman, Hasmukh Patel, Anant Raje, Achyut Kanvinde, Otto Koenigsberger, Joseph AllenStein
- **Evolution of Modern Architecture in India post- Independence 3**: Evolution of Post-Modernist Architecture (1975-1995): Alternate practices and Critical regionalism- works by Laurie Baker, Nari Gandhi, etc.|
- **Evolution of Modern Architecture in India post- Independence 4**: Early and later works by Charles Correa, BV Doshi and Raj Rewal | Changes in practice PostLiberalization

Reference:

- Curtis, W. (1987). *Modern architecture since 1900*. London: Prentice HallPTR.
- Frampton, K. (1980). *Modern architecture*. London: Thames &Hudson.
- Ghirardo, D. (1996). *Architecture after modernism*. London: Thames andHudson.
- Jencks, C. (2012). *The Story of Post-Modernism*. Hoboken: John Wiley &Sons.
- Lang, J. (2010). *A concise history of modern architecture in India*. Ranikhet: PermanentBlack.
- Lang, J., Desai, M. and Desai, M. (2000). *Architecture and independence*. Delhi: Oxford University Press.
- Mehrotra, R. (2011). *Architecture in India*. Mubai:Pictor.
- Nuttgens, P. (1983). *The Story of Architecture from antiquity to the present*. H.F. UllmannPublishers.
- Pawlyn, M. (2011). *Biomimicry inarchitecture*.

Sem	Subject Group	Course Code	Subject	Hours/week T	S	W/L	Credits	Marks CA	University Exam Jury	Written	Total
IV	II	19AR04005	Theory of Structures 4	2			2	50		100	150

Course Overview:

The course primarily aims at giving an overview of possibilities of Concrete as structural material and its applications in Architectural design. It focuses on understanding of the various structural systems, designs and theory of RCC structuralmembers.

Course Outcomes:

Upon completion of the course, the student should:

- Be able to develop basic skill to choose an appropriate structural system and technique in RCC from variouspossibilities.
- Be able to determine an approximate determination of member sizes of structural members to enhance their Architecturaldesign.
- Be able to understand the possibilities and limitations ofRCC.
- Be able design a single storey RCC framed and load bearingstructures.

Module 1: Basic design concepts of RCC, Structural planning, Limit state method, Design of beam.

Learning Strategies:

- Lectures on the below contents by presentation and discussion on Architectural projects to make students understand structures in the context ofArchitecture.
- Lectures by using analogies and case study on failures to explain structural designconcepts.

Module Contents:

- Introduction to Concrete: Brief history, Advantageous and disadvantageous. Overview, concept and its application of Plain cement concrete, Reinforced cement concrete, important properties of concrete andsteel.
- Pre stressed concrete, Precast concrete, Fiber reinforced concrete and Ferrocement concrete.
- Basic design concepts of RCC – Steps involved in construction, Roles and responsibilities of designers, Design considerations, Concept of Analysis and design, Overview of Design philosophies – Working stress method, Ultimate load method, Limit state method, Codes and specifications, Loads and load combinations. Permissible stresses-factor of safety-assumptions.
- Limit state method: Concepts-assumptions –characteristic strength and load, partial safety factors- limit states-limit state of collapse –limit state of serviceability. Code recommendations for limitstates.
- Introduction to R.C.C beams, behavior of R.C.C beams, types of beams, effective span, size of beam, covers toreinforcement.
- General design procedure, Design of Singly reinforced beams, Doubly reinforcedbeams.

Module 2: Design of slabs and Design of staircase

Learning Strategies:

- Lectures by using analogies and case study on failures to explain structural designconcepts.

Module Contents:

- Slabs: Introduction to slabs, Behavior ofslabs
- General design procedure, Design of one-wayslabs.
- Design of two-wayslabs
- Design of Flat slab (conceptonly).
- Staircase:Classificationandbehaviorofstaircasebasedonspanning–spanningtransversely – (slab cantilevered from spandrel beam or wall, doubly cantilevered from central spine beam, supported between two stringer beams), spanning longitudinally. (Theory only).
- Design of Staircase, straight singleflight.

Module 3: Structural patterns, approximate load calculations. Design of foundation and columns.

Learning Strategies:

- Lectures on the below contents by presentation and discussion of a single or double bay single storeybuilding.
- Lectures by using analogies and case study on failures to explain structural designconcepts.

Module Contents:

- Structural patterns: – Introduction, Defining the structural grids – Orthogonal and radial grids, Complex or irregular grids, Integration of Structural, spatial and contextualpatterns
- Approximate load calculation: - Contributory area method, Dead load and live load calculations at the base ofcolumn.
- Soils and Foundations: -Bearing capacity of soil, Criteria for selection of foundation. Types of foundation and its behavior – Shallow foundation – Isolated, Combined, Strip, and Raft. Deep foundation – Pile. (Theoryonly)
- Design of isolated footing subjected to axial compressiveloads.
- Compression members: - Proportioning of columns, effective length of the column, loads on columns, slendernesslimits.
- Design of short column subjected to axialloads.

Reference:

- Relevant IS codes. (I.S 456, I.S 875, SP16)
- ParkRandPauloyT,Reinforcedconcretestructures,JohnWiely&sonsInc.
- PurushothamanP,Reinforcedconcretestructuralelements-Behaviour,Analysis and Design, Tata McGraw Hill publishing companyLtd.
- UnnikrishnaPillaiS.&D.Menon,Reinforcedconcretedesign,TataMcGrawHill Publishing companyLtd.
- Mallick S.K., Reinforced concrete, Oxford & IBHPublishingcompany.
- VargheseP.C.,LimitstatedesignofReinforcedconcrete,PrenticeHallofIndiaPvt Ltd.
- Ashok.K.Jain,Reinforcedconcrete-Limitstatedesign,NewChand&Bose.
- S.S Bhavikatti, Design of Reinforced concrete structures, I.K.International Publishinghouse Pvt.Ltd
- Prestressed Concrete Structures by P.Dayaratnam
- Precast concrete, Materials, Manufacture, Properties and Usage,M.levitt
- Structural Competency for Architects, Hollee HitchcockBecker
- Dr. Shah, V. and Dr. Karve, S. (n.d.). *Illustrated design of Reinforced Concretestructures*.
- Subramanian, N. (n.d.). *Design of Reinforced concretestructures*.

Sem	Subject Group	Course Code	Subject	Hours/week T	S	W/L	Credits	Marks CA	University Exam Jury	University Exam Written	Total
IV	**II**	**19AR04006**	**Building Services 1**	**2**			**2**	**50**		**100**	**150**

Course Overview:

Services are the lifeline systems of any built form making it functionally habitable. They also make them efficient, comfortable and safe. Building services essentially include fluid systems, electrical & energy systems, lighting systems, HVAC systems, security systems etc.

This course as the first of the 3 courses in Building services is intended to give the students an overview of the plumbing systems at various levels, their architectural considerations and their coordination with other services.

Course Outcomes:

Upon completion of the course, the student should:

- develop an understanding about the importance of services in buildings and its coordination in the builtenvironment.
- be able to critically understand various water supply, sewerage and drainage systems in our built environment.
- be able to conceptualise and integrate such services into small scale buildings. (up to G+2) and produce a schematic drawing for thesame.

Module 1: Importance of Building Services - Water supply & Sanitation

Learning Strategies:

- Lectures on the history and relevance of Building services and broad overview of different systems.
- National and International study reports on the topic – Based on Literature studies from LEED, IGBC,GRIHA.

Module Contents:

- Introduction to building services, Historical overview of development of water/ sewerage systems - (Mesopotamia, Indus, Roman,Egyptian)
- Importance of water supply and sewerage. - History of Sanitation with respect to human civilization, Importance of Health, Hygiene, Cleanliness, Waterborne, Water-related, and Water based Epidemic diseases, Conservancy system to water carriage system – importance of conserving water carriage system (watershed management, groundwater recharge, reservoir formation, means of conserving river, streams, canals, aqueductsetc.)
- Urban sanitation – Load on system, types of waste management system, Government schemes related to thetopic
- Rural sanitation - Load on system, types of waste management system, Government schemes related to thetopic

Module 2: Water Supply for Urban Area

Learning Strategies:

- Lectures on different aspects of Water supplysystems.
- Site visits to understand the systems on water treatmentplants.
- Market surveys to familiarize materials, fittings and equipment.

Module Contents:

- Sources and Quality of water, impurities in water and its treatment. - Quality of supply for different uses as per national and international standards, Water treatment plant, Treatment of water for different uses, filtration, softening, disinfectionetc.
- Water demand calculations; norms and standards, Quantity of water for differentusages,
- Water storage – private and public, overhead tank, andsump.
- Water distribution system (Gravity, pumping, combined) and Distribution networking (Dead-end, radial, grid iron, ring at city/ neighborhood overview, Guidelines for laying of water mains,distribution.)
- Water distribution systems- gravity system, hydro-pneumatic systemetc.
- Water pipe materials, apparatus, joints, fixtures and valves - Material of construction like GI, PPR, PB, CPVC, Composite pipes, Copper, Flow control Valves – Gate valve, Globe valves, butterfly valves, Pressure Reducing valves &station. (at an urbanscale)

Module 3: Domestic Water Supply

Learning Strategies:

- Lectures on different aspects of Water supplysystems.
- Case studies to understand the buildingsystems
- Market surveys to familiarize materials, fittings andequipment.
- Applications of knowledge water supply and sewage design
- Preparation of drawings excluding hydraulicdesign

Module Contents:

- Principles of water supply in domestic buildings. - Basic considerations in supply ofwater
- Water supply in low-rise and multi-storeyed buildings - basic considerations - design of storage tanks, fire demand, head loss, direct and indirect supply, design considerations for plumbingshafts.
- Hot-cold water supply network and connections, solar water heatingsystems
- Pipe materials, fixtures, joints, equipment - Water supply piping – hot, cold, flushing water, piping in sunken areas, false ceiling areas. (at a domesticscale)
- Roof top water drainage, Storm Water treatment, disposal systems and Rain water harvestingsystems.

Module 4: Domestic Sewage System

Learning Strategies:

- Lectures on different aspects of Sewagesystems.
- Case studies to understand the buildingsystems
- Market surveys to familiarize materials, fittings andequipment.

Module Contents:

- Principles of domestic sewer systems norms and standards - Basic considerations in disposal of waste water (hygienic considerations, head loss, networking/pipe system (domestic and public)etc.)
- Components of sewer conveyance network, Calculation for Gradient and slope in sewage disposal.
- Connection of house drainage to public sewer - Inspection chamber, intercepting trap, man holesetc.
- Various sanitary fixtures and its connections, Sewage disposal to septic tank, cess pool, soak pit, design of septictank.
- Types of traps used and waterseal.

Reference:

- Plumbing Engineering by Dr. SubhashPatil
- International Plumbing Code by Indian CodeCouncil
- Modern Plumbing by E. KeithBlankerbaker
- Plumbing Basics by Dr. RickPeters
- Building Construction Illustrated by Dr. F.D.KChing
- Building Construction by SushilKumar
- Building Construction by B.CPunmia
- Building Construction byRangwala
- Mechanical and Electrical Equipment for Building by Walter T.Gondzik
- Birdie, G. S. and Birdie J. S. Water Supply and Sanitary Engineering, Dhanpat Rai Publications,2010

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
IV	I (c)	19AR04007	Site Planning & Landscape Design	1	2		3	75	75		150

Course Overview:

- The subject primarily aims to introduce the students about site planning and landscape architecture and to imbibe the importance of integration of landscape design with architecturaldesign.
- The course introduces the natural and man-made components of landscape that generate the decisions in the planning of any site, and the role of landscape architecture for the judicious co-existence of man with nature and its patterns and systems. This course shall have a direct application in the design studio of the same semester as well as subsequent semesters for site planning and landscape design of the respective designassignments.

Course Outcomes:

Upon completion of the course, the student should:

- be equipped to site planning process and its significance; establishing relationship between site characteristics and designrequirements.
- Understand the elements of landscape, principles of landscape design and its application in the landscape design of unbuilt environment of thesite.
- Understand road layout and grading in slopingsites
- Understand of environmental issues and application of site planning and landscape design in addressing thesame.

Module 1: Elements of landscape and Site Analysis

Learning Strategies:

- Lectures
- Studio exercise: Site analysis (of the site dealt in Architectural Design studio-IV) leading to site suitability/zoning

Module Contents:

- Introduction of landscape architecture and need for integration of landscape design with architecturaldesign
- Natural elements of landscape: land, water,vegetation
- Landform studies: Contours, ridges, valleys, watershedetc.
- Man-made elements of landscape: Built elements, Services,etc.
- Other aspects like cultural, historic, social, environmental, visualetc.
- Study of natural systems: topography, hydrology, geology, wind patternsetc.
- Slopeanalysis
- Study of co-existence of natural systems with man-madeelements
- Influence of natural manmade and other elements on site leading to site analysis & site suitability.
- Landform modifications like cutting, filling, terracingetc.
- Basics of grading, road layout in sloping site and roadgrading.

Module 2: Hardscape and Softscape design

Learning Strategies:

- Lecture on principles of landscapedesign
- Design studio using elements and principles of Landscape Architecture – minorproject
- Market study of hardscape materials andsystems

Module Contents:

- Principles of landscapearchitecture
- Study of hardscapematerials
- Study of vegetation: trees, groundcovers, shrubsetc.
- Different types of plants used in tropical landscape, its purpose and appropriate usage in relevant context (avenues, shading, borders, focal pointetc.)
- Association of hardscape and softscapeelements
- Vertical gardens and terracelandscaping
- Minor design project applying principles of landscape design, hardscape and softscape elements. Eg: plazadesign

Module 3: Site specific planning and Planting design

Learning Strategies:

- Lecture on site planning based on site analysis andsuitability
- Lecture on Hierarchies of openspaces
- Group discussion on current environmental issues and application of site planning and landscaping in addressing thesame
- Presentation on landscape design projects to enable students do site planning anddetailing

Module Contents:

- Site planning based on site analysis andsuitability
- Hierarchy of openspaces
- Preparation of plantingplan
- Major project: Landscape design (Preferably S4 AD project) with site plan and plantingplan.
- Study of relevant landscape design projects necessary forstudio.

Jury requirements

1. Any relevant market study (may be individual/ group on hardscape materials, plantingetc.)
2. List ofdrawings(minimum):
   - Minor project: Landscape layout plan, sections, views etc. Emphasis to be given on application of principles of landscape design, appropriate usage of hardscape materials &planting.
   - Majorproject:
     - Site analysis andsynthesis
     - Landscape layout plan (an understanding of hardscape materials used in design is required)
     - Sections, views etc. necessary to explain thedesign
     - Plantingplan

Reference:

- Bose, T.K. and Choudhary, K. Tropical Garden Plants in Colour. Horticulture and Allied Publishers. 1991.
- Dee, C. Form and Fabric in Landscape Architecture: A visual introduction, UK: SponPress.2001.
- Grant.W. Reid, Landscape Graphics: From concept sketch to presentation rendering: Watson-Guptill,1987
- Hackette Brian, Planting Design, NY: McGraw Hill Book Co. Inc.1979
- Jellicoe, G. & Jellicoe, S. The Landscape of Man, London: Thames andHudson.1991.
- Laurie, M. An Introduction to Landscape Architecture, NY: American Elsevier Pub.CoInc.1975.
- Lyall S. Designing the New Landscape. UK: Thames & Hudson.1998.
- Lynch, K. Site Planning, Cambridge: The MIT Press.1962
- McHarg I. Design with Nature. NY: John Wiley & Co.1978.
- Motloch, J. L. Introduction to Landscape Design, US: John Wiley andsons.
- Simonds, J.O. Landscape Architecture: The Shaping of Man's NaturalEnvironment
- Steven Storm, Kurt Nathan, Jake Woland; Site Engineering for Landscape Architects: John Wiley & Sons Ltd,2009
- Charles Harris, NicholasTimesaver standards for landscape architecture: McGraw Hill Book Co. Inc.1998
- Grant.W. Reid. From concept to form in landscape design; John Wiley & Sons,2007

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
IV	II	19AR04008(A)	Elective Theory I: Applied Ergonomics	2			2	50		100	150

Course Overview:

- To expose the students to the requirements of designing for the human comfort in accordance withanthropometry.
- The students will have knowledge of ergonomics and its applications in design including designing for the physically challenged and theelderly.

Course Outcomes:

Upon completion of the course, the student should:

- Be capable of designing inclusivespaces.

Module 1: Introduction to Human Function, Ergonomics and

Design Learning Strategies:

- Assignment based on activities of students in a collegecampus

Module Contents:

- Human being in the manmade world and importance of ergonomics, Gross humananatomy.
- Introduction to Anthropometrics, static and dynamicanthropometrics.
- Ergonomics of the physical environment - for spaces in residence andworkplace.
- Muscles and work physiology, Static and Dynamic work including maximumcapacity.

Module 2:Disability, Ageing and Inclusive Design

Learning Strategies:

- Case studies of child and old age friendly spaces

Module Contents:

- Built environment for the physically handicapped, Ramp, toilets and corridor design, Spatial Requirements for wheelchairmovement.
- Public spaces for differentlyabled.
- Design issues in the design of old age homes and publicplaces.
- Criteria to be considered when designing for the visuallyimpaired.
- Designing for children – school, home,play.

Module 3:Environmental Ergonomics

Learning Strategies:

- Case studies on inclusive design of workenvironments.

Module Contents:

- Problems of maintaining human comfort, activity and health in stressfulenvironments.
- Biomechanics. Bio transducers and nervous system including theirlimitations
- Environmental Condition including, thermal, illumination, noise andvibration.
- Environmental stressors- Controls and Displays, hot and coldstress
- Occupational hazards in work environment, Visual stress, Postural Stress, Stress due to commuting.

Reference:

- Chaira, J. D. and Callender, J. H. (1987). *Time Savers Standards for Building Types*. Singapore: McGraw-Hill.
- Crosbie, M. J. and Watson, D. (2005). *Time Savers Standards for Architectural Design: Technical data for Professional Practice.* 8th Ed. The McGraw-HillCompany
- Yutaka TochiharaTadakatsuOhnaka. *Environmental Ergonomics - The Ergonomics of Human Comfort, Health, and Performance in the ThermalEnvironment*

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
IV	II	19AR04008(B)	Elective Theory I: Art Appreciation	2			2	50		100	150

Course Overview:

- To introduce art as a fundamental human activity, its characteristics and ways in which it can beunderstood.
- To introduce the vocabulary of art and to enable the appreciation ofart.
- To understand different productions of art as manifestations within particularcontexts

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding and appreciation of art as basic and varied human creation related to cognition andexperience.
- Be aware of important art productions in the West andIndia.
- Be Sensitive towards collective and individual cultural productions as unique expressions of historical and geographiccontext.

Module 1: Introduction to Art and Vocabulary of art

Learning Strategies:

- Art appreciation of a selected work on the basis of elements and principles of design, cultural and regionalcontext.

Module Contents:

- Definition, need and role of art. Art, reality, perception, representation, Concept of beauty andaesthetics.
- Categories of art in terms of media andtechnique.
- Introduction to the vocabulary of art constituted by elements (line, shape, form, space, colour, light, value,texture).
- Principles of design (unity, variety, harmony, rhythm, balance, proportion, emphasis, contrast,movement)
- Introduction to theories: Golden proportion, Theories of scale and proportion, Vitruvian theory, Modular man.
- Art evaluation andcriticism

Module 2: Art timeline

Learning Strategies:

- Lectures and discussions.

Module Contents:

- Timeline of art from the beginning of western art to the birth of modernart.
- Important works from the following movements will be understood and appreciated in terms of their form, content and context: Modern art – Impressionism, Post Impressionism, Fauvism, andExpressionism.
- Abstract/ Non Objective art, Cubism,Dadaism,
- Surrealism, Futurism, Constructivism, Suprematism, DeStijl,
- Abstract Expressionism, Pop art, Opart.
- An introduction to Contemporaryart

Module 3: Indian Art

Learning Strategies:

- Examining a selected traditional art piece on a differentmedium.

Module Contents:

- Outline of art in India over history. Important works from the following art traditions and movements will be understood and appreciated in terms of their form, content and context: Indus Valley art, Hindu, Buddhist and Jainart.
- Mughal and Rajput miniature art, art during the colonialperiod.
- Indian folk arts – Warli, Madhubani, Kalamkari,Tanjore.
- Kalighat, Patachitra, Gond,Phad.
- Modern Indian art and contemporary directions inIndia

Reference:

- Fred, S. Kleiner, 'Gardener's Art through Ages', Wadsworth Publishing,2012.
- Bernard S. Myers, 'Understanding the Arts', Holt Rinehart and Winston Inc,1964.
- H.H. Arnason, 'History of Modern Art', Thames and Hudson,1977.
- ParthaMitter, 'Indian Art', Oxford University Press,2001.
- Edith Tomory, 'A History of Fine Arts in India and the West', Orient Blackswan,1989.
- Peter and Linda Murray, 'The Penguin Dictionary of Art and Artists', Penguin,1989.
- E.H. Gombrich, 'The Story of Art', Phaidon,2002.
- E.H. Gombrich, 'Art and Illusion', Phaidon,2002.
- 'Indian Art since the early 1940s- A Search for Identity', Artists Handicrafts Association of Cholamandal Artists Village,Madras,1974.
- A.K.Coomaraswamy, Fundamentals of Indian Art, Historical Research Documentation Programme, Jaipur,1985.

Subject Sem Group	Course Code	Subject	Hours/week			Credits	Marks			
								University Exam		
			T	S	W/L		CA	Jury	Written	Total

IV	**II**	**19AR04008(C)**	**Elective Theory I: Traditional Architecture of Kerala**	**2**			**2**	**50**		**100**	**150**

Course Overview:

- To inculcate an appreciation of ancient principles used in Architecture and planning, their development over a period of time and its evolution under changing Socio-cultural environment ofKerala.

Course Outcomes:

Upon completion of the course, the student should:

- develop an understanding of the influence of planning principles in traditional Kerala architecture.
- impart an understanding about temple architecture and town planning inKerala.

Module 1: Introduction to Kerala traditional Architecture principles- Vastu

Learning Strategies:

- Introduction to Kerala traditional Architecture through understanding the principles of Vastushastra

Module Contents:

- Philosophy of Brahmanda andPindanda
- Basic concepts of Vastu shastra – Universe, Prakrithi and Purusha, Vastupurusha, Mandala, Padams, Padavinyasam, Sutrams and Marmams their significance in physicalplanning
- Selection of Sites, Sectors and their significance in planning – fixing cardinal direction– planning principles
- Ayadi formula, concept of veethi – 4 veethi and 9 veethi concept in planning – minimum width of veethi and its relation to Habitable space -
- Measurements basic Unit- Anthropometrics - Matrangulam – Horizontal and vertical measurements - Manangulam or Standard Angulam – Its significance in physical aspect – Actual measurement based on modernscales

Module 2: Evolution and study of traditional building typologies in Kerala

Learning Strategies:

- Case study and analysis of residential building typologies inKerala

Module Contents:

- Design of Buildings- concept ofAaroodham
- Unit house - kettu, Sala- Naming of Salas – Design ofSalas
- Different proportions - Gunavistaram, Ishtadeergham –Concept of Pariantham and its relation with Ayadiformula
- Introduction to Dvisala and Trisala- Nalukettus- Itscharacteristics

- Positioning of Nalukettu in Kshetrakhandam - size of Nalukettu w.r.to Kshetrathandam and vice versa in 4 veethis and 9veethis
- Difference between kettu and Koottikkettu - Higher forms of residences - Ettukettu, Pathinarukettu

Module 3: Influence of traditional principles in temple and town planning

Learning Strategies:

- Through Site visits and lectures imparting planning principles of design of temples andtowns

Module Contents:

- Planning of Temples –Talamanan and its use in Iconography- Basic module and its relation to the temple planning – Anthahara, Madhydhara and Bahirhara oftemples
- Design of Mahakshetram – Panchaprakarams and its relation to the module. Design of Sanctum, Gopuram and other ancillaryunits
- Planning of towns and villages with respect to thetemple
- Basic principles of Padavinyasam and veethi nirnayam and the adaptation in town planning - System planning principles followed in townplanning
- Locational aspects of planning – Characteristics of towns with respect to location, activity, roadpattern
- Villages planning in Ekakudumbaka Gramam and BahukudumbaGramam.

Reference:

- Dr. Balagopal T.S. Prabhu, 'A Text Book ofVastuvidya'
- Dr. Aashaltha Thampuran, 'Traditional Residential Architecture of MalabarCoast'
- Dr. Balagopal T.S. Prabhu,'Manushyalayachandrika'
- Chennasa Narayanan Namboodirippad, 'TantrasamuchayamSilpabhagam'

38. FIFTH SEMESTER SYLLABUS

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
V	I (a)	19AR05001	Architectural Design 5		10		10	250	250		500

Course Overview:

Spatial planning of a multistoried built form with an emphasis on services

- To instill the importance of service integration in spatial planning and Detailing in multi-storied buildingDesign.
- To understand the complexities involved in the design of multi-storied building. The design parameters shall include climatic response, structural system, appropriate material, universal design standards and services such as sanitary and water supply, lighting and ventilation, firefighting, lifts, escalators,etc.
- To understand the derivation of structural grid and functional grid. To create an awareness of Building rules/National Building code of India /other regulations such as cinemas regulation act, CRZ, firefightingetc.
- **Sustainable design objectives**: To equip the students to adopt sustainable design techniques considering climate, building envelope, HVAC, Natural and green certified materials, natural lighting and fresh air ventilation such as Rainwater harvesting, passive cooling techniques, use of low embodied energy materials etc. To introduce students to green building rating systems – IGBC/GRIHA/LEEDetc.

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding of efficient service integration in builtenvironment
- Develop a design approach considering the sustainability principles and resource savings through efficient serviceincorporation.
- Learn about efficient integration of vertical and horizontal circulation in abuilding

Major Project

Design of a single multi storied building (built up area not exceeding 2500 SQM distributed in different levels, preferably high-rise) in a specific context to learn the complexities of service integrated design of a complex built environment. Projects such as hospital, hotel, high rise residential, long span structure etc. may be considered

Emphasis may be given on:

- Structural and functionalgrid
- Service integration
- Universal access
- Fire fighting requirements
- Facades
- Parkingefficiency
- Site services

Minor Project

Settlement study of an area to understand the influence of culture on architecture and preparation of necessary study reports, videos, power point presentations etc. of the same. Possibility of a vertical studio with 19AR03001 may be explored. (Maximum of 7 days duration)

Time bound project

Design detailing of any part of the Major project (E.g.: Canteen/ restaurant, operation theatre), calculation of service requirements and design of appropriate systems for the same (E.g. Water requirement for the building and design of storage tanks/vertical circulation and services). Design of basement parking and optimum usage of structural grid for parking and other utilities.

Reference:

- Francis D.K Ching "Building Construction" illustrated, John Willey & Sons,2008.
- Sam F. Miller, "Design Process: A Primer for Architectural and Interior Design", VanNostrand Reinhold, 1995.
- Manual of water supply and treatment, Second edition, CPHEEO, Ministry of works and housing, New Delhi,1977
- AFEWise,JASwaffiedWater,"Sanitary&WasteServicesinbuildings",VEdition,MitchellPublishing,
- Renewable energy, basics and technology, supplement volume on integrated energy systems, Auroville,1998.
- Elevators, Escalators, "Moving Walkways", Manufactures catalogues, John Wiley,1967.
- National Building Code, Kerala Building Rules (KPBR/KMBR)
- "Time saver standards", Callender Etal., Mc GrawHill

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
V	I (b)	19AR05002	Building Materials and Technology 5	1	3		4	100	100		200

Course Overview:

The subject primarily aims at developing understanding in use of appropriate construction technique and material in building design based on feasibility of technology, physical properties (like density & specific gravity, strength, thermal properties), aesthetic value, socio-cultural impacts and relevance, socio-economic factors, Ecological footprint etc.

The course introduces the technological aspects of a building design from the perspective of functional building component where use of natural and artificial materials is discussed based on their application. Each material would be taught in a manner such that its application would be discussed in a sequential manner, starting from foundation level, followed by plinth & others (sill, lintel, sunshades, window/door openings, walling material, as a floor & flooring) and culminating at roof and parapet wall. Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples to complicated examples.

Course Outcomes:

Upon completion of the course, the student should:

- Understand about different systems inconstruction.
- Understand the possibilities available and developing modern trends inarchitecture.

Module 1: Composite Materials and Timber products in construction

Learning Strategies:

- Lectures on the syllabuscontent
- Case studies of material applications
- Marketsurvey

Module Contents:

- Plastic based materials: Applications of Polycarbonates - poly urethane, epoxy flooring and tile/ stone joint filler, Polycarbonate panels for curtainwalls.
- Engineered wood products &applications: Timber board – Veneers, Plywood, Block Boards, Particles, MDF, HDF, Mica Laminated boards, WPC, flush doorapplications
- Metal based applications – Aluminum Composite Paneling systems, Zinc cladding systems, weathering steel (COR-TEN Steel), for curtain wall or facade works, Gypsum board, cement fiber board, calcium silicate board, false ceiling systems with steel and aluminum framework systems, insulated / sandwiched panel or puff board for wall and roofapplications.
- Paper, fibers and organic based materials – wall papers, leather tiles and cladding, paper structural systems,
- Recycled materials – Reducing carbon footprints using recycled or up cycled materials, Application of recycled or up cycled paper, metal, glass, cloth, plastics as construction materials for various components of a building – wall, roof, fenestrations, flooretc.

Module 2: Construction detailing

Learning Strategies:

- Lectures on the syllabuscontent
- Case studies of material applications
- Site visits to observe constructionprocess
- Marketsurvey

Module Contents:

- Floor finishing – Tiles, natural stone, vinyl, parquet, carpet finishes – laying process, substrates used, spacers, grout, thresholds,trims
- Wall finishing – Installation process of Dry and wet cladding, textured finish, wall papers, wall trims
- Ceiling finishing – types, components – process of grid system, gypsum, metalceilings.
- Staircase details – rise and tread details with tiles, natural stone & vinyl finishes, Types of balusters and balustrades – fixing details of wooden, steel, aluminum& glassbalustrades.
- Roof details – application of water proofing details, torch on membrane, flashing, expansion joint details, green roof details,insulation.

Module 3: Large span structures

Learning Strategies:

- Site visits and documentation of constructionmethods
- Market study of current trends andsystems

Module Contents:

- Lattice truss –Its functional Requirements, Types of latticetrusses
- Steel portal frames, Long span steel portal frame and short span portalframe
- Folded plates and shell roof
- Types of shell roof, Advantages and disadvantages of shellroof
- Introduction to tensile structures, Type ofmembranes
- Cable structures, Pneumaticstructures

List of drawings for Jury (Minimum 7 sheets)

- Gypsum boardceiling
- Column base plate and Gusseted Baseplate
- Single bay symmetrical pitch lattice steel roof, two bay symmetrical pitch lattice steelroof.
- Single bay north light lattice steel roof on steelcolumns.
- Prismatic lattice steelroof.
- Tensile roof -connections
- Lightweight roofs.
- Light deflecting facade foroffices.
- Reinforced concrete barrelvaults
- Presentation of collected materials from market survey and case study presentation for the jury.

Reference:

- Barry's advance construction of buildings –Stephen Emmit &Christopher AGorse
- Helmut koster, dynamic daylightingarchitecture.
- M.S. Shetty, 'Concrete Technology', S. Chand & Co.ltd, New Delhi,1986.
- S.C. Rangwala, 'Engineering Materials', Charotar Publishing House, India,1997.
- P.C. Varghese, 'Building Materials', Prentice hall of India Pvt Ltd, New Delhi,2005.
- Don A. Watson, 'Construction Materials and Process', McGraw Hill Co.,1972.
- Jack M. Launders, 'Construction Materials and Methods', Careers, South Holland, Illinois,Wilcox Co.Ltd., 1986.
- Chudley, Construction Technology, ELBS,1993
- Barry, Construction of Buildings, East West Press,1999

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
V	I (c)	19AR05003	Professional Skill Enhancement 5			4	2	50	50		100

Course Overview:

This course intends to provide/ enhance the soft skills in order that students perform well in their academics and beyond. These skills are intended to support the student to perform better in her/his core subjects and also build up robust performance through hands-on workshops and laboratory training. This course is subdivided into two categories – Mandatory and Optional. Mandatory courses help in preparations for respective semester subjects. The optional category helps students to take personal initiatives to develop in specific areas that can widen their horizon of their understanding of architecture and also initiate action at the society level. There are also options to work on competitive exercises alongside other similar institutions.

Course Outcomes:

Upon completion of the course, the student should:

- be given an exposure of varied skills that can bring in confidence in handling their core subjects such as workshops, communication skills, computer applicationsetc.
- be able to develop team spirit and interpersonal skills to manage complexsituations.
- be able to cope with stress and develop multi-taskingcapabilities.

Module 1: Building Information Modelling

Learning Strategies:

- Computer lab
- Group discussions and Interactivesessions

Module Contents:

- Concepts of modeling, understand computer modeling through various basic shapes and its composition
- To develop solid and surface models with architectural scale, proportion andelements
- To understand Camera, movement, shades and shadows, daylighting and lighting conditions, setting up a scene throughmodeling
- To edit and develop materials, surfaces and computer aided photo realistic rendering and understanding itsadjustments
- Using predesigned materials/maps from various sources 3-DModels
- To develop animation and photo realistic animations and shortmovies

Module 2: Presentation skills

Learning Strategies:

- Computer lab
- Group discussions and Interactivesessions

Module Contents:

- Composition and presentation though different vector based and page settingtools
- Combining photo editing modelling and rendering and presentation methods to produce photo realistic brochures anddocuments
- Development of concepts to real proposed scenarios through computer aidedsoftware

Module 3: Social Initiatives or any other co-curricular activities

Learning Strategies:

- Participations in symposiums andworkshops

Module Contents:

- Optional content to be developed by each institution in order to help students to take part in activities that involve larger groups and facilitate peerlearning.
- The activities could be student initiated societal activities or participation in NASA or similar student led group initiatives which has an academic content aswell.

Reference:

- Cadfolks (2018). *AutoCAD 2019 for Beginners*. 1st ed.Kishore.
- Faulkner, A. and Chavez, C. (n.d.). *Adobe Photoshop CC Classroom in a Book 2019release*.
- Omura, G. and Benton, B. (2018). *Mastering AutoCAD 2019 and AutoCAD LT 2019*. 1st ed.Sybex.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
V	II	19AR05004	Human Settlement Planning	2			2	50		100	150

Course Overview:

To give an insight to the students on the evolution of settlements through various stages of human history. The course tries to lay a foundation for a general understanding of Human Settlements through analysing the fundamental elements that has moulded the very existence of human race made possible by a habitat. This course also aims to familiarize the students with evolution of cities and to give an over view of Planning concepts and process in Urban and Regional Planning.

Course Outcomes:

Upon completion of the course, the student should:

- Acquire a basic understanding of the spatial quality, the modifying factors and perception to express habitat as a basic element of humanlife.
- Understand the history, development and concepts of planning in India and abroad and its relevance and application along with an understanding ofsettlements.
- Familiarize the students with the process of evolution of cities, concepts related to humanitarian planning processes and skill development to identify planning issues in existing areas and develop solutions at basiclevels.

Module 1: History and Theory of Planning

Learning Strategies:

- Lecture notes, literature-based case examples through books, journal e-resource, documentaries
- Overview of Origin and evolution of Human settlements through introductorylecture.

Module Contents:

- Characteristics of Settlement planning in ancient, medieval, renaissance, industrial & postindustrialage.
- Characteristics of Settlement planning in India – Town planning in ancient, medieval, colonial and modern cities.
- Theories of Town planning – central place theory, concentric zone theory, sector theory, multiple nucleitheory
- Evolution of planning concepts: Garden cities, Radburn city, neighborhood concept, Planning concepts by LeCorbusier.
- Contributions to modern town planning thoughts by-Patric Geddes, Constantino A. Doxiadis, LewisMumford

Module 2: Concepts of Town planning

Learning Strategies:

- Lecture notes, through books, journal e-resource, case studies,documentaries

Module Contents:

- Definition of town. Classification ofTowns.
- Terminologies – Urban Outgrowth, Urban Agglomeration, Conurbation, Satellite Town, Suburb, Green belts, Peri urban development, Ribbon Development, Urban Ruralcontinuum.
- Urban Planning process - survey techniques and data collectionmethods
- Different Types of plans- Structural plan, Perspective Plan, Development Plan, Annual Plan, Plan Schemes andProjects.
- Concept of master plan, its elements- Land usePlan

Module 3: Present Planning Scenario

Learning Strategies:

- Lecture notes, through books, e-resource, case studies, analysis anddocumentaries

Module Contents:

- Need for town planning legislation. Town planning acts- Kerala Town Planning Act, 2016, Rehabilitation and Resettlement Act (LARR), Coastal Regulation Zones and its relevance, URDPFIGuidelines
- Town Planning Agencies - National, State & Local levels – NITI Ayog, Town Planning Authorities, Development Authorities, and ULB's. Role of these agencies in plan implementation
- Contemporary urban problems, growth andchallenges.
- Need of sustainable city planning with illustrative casestudies
- Modern Town Planning concepts – Transit Oriented Development (TOD), Smartcities.

Reference:

- Arthur B. Gallion, “UrbanPattern”,
- Keeble Lewis,Principles and Practice of TownPlanning
- Kevin Lynch, Image of thecity
- AEJ Morris, History of UrbanForm
- C.L. Doxiadis, Ekistics: An Introduction to town and Countryplanning
- Peter Hall, Urban and RegionalPlanning
- Peter Hall &Ulrich Pfeiffer, Urban Future21
- Ministry of Urban Affairs Govt. of India- Urban Development Plans Formulation and Implementation Guidelines
- John Ratcliffe Introduction to Town and CountryPlanning
- An Introduction to the Science of Human Settlements by C.L. Doxiadis; Ekistics Hutchinson, London, 1968.
- Housing and Urban Renewal by Andrew D. Thomas, George Allen and Unwin; Sydney,1986.
- Ministry of Urban Affairs and Employment; Government of India, NewDelhi,1999
- Urban Development Plans: Formulation & Implementation; Guidelines,1996.
- Sustainable Human Settlements by R. S. Sandhu; Asian Experience, Rawat publications,2001.
- Living Plans: New concepts for advanced housing by P. Gastek; Brikhauser publications,2005
- URDPFI Guidelines Vol I-2014(http://moud.gov.in/URDPFI)
- URDPFI Guidelines II A-IIB-2014(http://moud.gov.in/URDPFI)

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
V	II	19AR05005	Theory of Structures 5	2			2	50		100	150

Course Overview:

The course primarily aims at giving an overview of possibilities of Steel as structural material and its applications in Architectural design. It focuses on understanding various structural systems, designs and theory of steel members.

The course aims to impart knowledge & develop understanding about the structural behavior of various types of steel structural systems that are commonly employed in the building construction industry presently.

It also exposes the student to the methods that are used to design a steel structural system for a specific condition & loading. Interpretation of structural detail drawings in the site is also intended.

Course Outcomes:

Upon completion of the course, the student should:

- Get an introduction to the design concepts of Steelstructures.
- Get confidence to correctly choose structuralsystems
- Be equipped to design simple steelstructures.

Module 1: Introduction to steel, Connections, Design of tension member (tie)

Learning Strategies:

- Lectures on the below contents by presentation and discussion on Architectural projects to make students understand structures in the context ofArchitecture
- Lectures by using analogies and case study on failures to explain structural designconcepts.

ModuleContents:

- Introduction to Steel structures, common Steel structures, Types of Steel. Loading standards- I.S structural sections - I.S specifications –Design Philosophies- Limit state method. - Assumptions.
- Connections: Welded and bolted connections- Types and classification, Types of failure in connections.
- Design of bolted connections for members subjected to axialforces.
- Design oftruss
- Design of tension member (tie) – plate, single angledmember.
- Tension member splice (conceptonly)

Module 2: Design of beams

Learning Strategies:

- Lectures on the below contents by presentation and discussion on Architectural projects to make students understand structures in the context ofArchitecture
- Lectures by using analogies and case study on failures to explain structural designconcepts.

Module Contents:

- Beams- classification of cross section, plastic moment carrying capacity of asection.
- Design procedure, bending strength and shear strength of a laterally supported beam. Deflection limits, web buckling, webcrippling,
- Design of built upbeam.
- Design strength of laterally unsupportedbeam
- Effective length of lateral torsionalbuckling.

Module 3: Design of columns

Learning Strategies:

- Lectures on the below contents by presentation and discussion on Architectural projects to make students understand structures in the context ofArchitecture
- Lectures by using analogies and case study on failures to explain structural designconcepts

Module Contents:

- Compression members -- Short and Long columns –buckling class of cross section. Slendernessratio.
- Design of Strut-normal sections, single angledsection.
- Behaviour of different column sections under axial and eccentricloading
- Design of compression members, Built up columns -Design
- Laced and battend column (concept only)
- Column base -Slab base: - Design of slab base.
- Gusseted base, column splice. (concept only), Types of failure incolumn.

Reference:

- Bhavikatti, S. (n.d.). *Design of steel structures*. I.K. International Publishing housePvt.Ltd.
- Duggal, S. (n.d.). *Design of steel structures*. Tata McGraw-Hill.
- Pillai, S. and Menon, D. (n.d.). *Reinforced concretedesign*.
- Punima, B. (n.d.). *Design of steel structures*. Laxmipublications.
- Ramchandra (n.d.). *Design of steel structures Vol. I & II*. Delhi: Standard bookhouse.
- Relevant IS Codes. (IS 800-2007, IS 875, IS 805, IS 801, IS 811, IS 6533 Part 1, Part 2, Steel Tables). (n.d.).
- Subramanian, N. (n.d.). *Design of steel structures*. Oxford UniversityPress.

Sem	Subject Group	Course Code	Subject	Hours/week T	S	W/L	Credits	Marks CA	University Exam Jury	Written	Total
V	II	19AR05006	Building Services 2	2			2	50		100	150

Course Overview:

- Services are the lifeline systems of any built form making it functionally habitable. They also make them efficient, comfortable and safe. Building services essentially include fluid systems, electrical & energy systems, lighting systems, HVAC systems, security systemsetc.
- This course as the second of the 3 courses in Building services is intended to give the students an overview of the Electrical services, Firefighting and Illumination at various levels, their architectural considerations and their coordination with otherservices.
- This course is designed to enable students to understand various systems of Electrical services, Firefighting and Illumination, its design application for a small and largebuilding.

Course Outcomes:

Upon completion of the course, the student should:

- develop an understanding about the importance of services in buildings and its coordination in the builtenvironment.
- be able to critically understand various electrical, lighting and firefighting in our built environment.
- be able to choose from different systems available within each service component to suit any specific built environmentdesign.

Module 1: Electrical Services

Learning Strategies:

- Lectures on the history and relevance of Building services and broad overview of different systems.
- National and International study reports on thetopic.
- Market survey on various products and services related to electricalservices.
- Schematic electrical layout of small-scale buildings.(G+2)

Module Contents:

- Basic principles of electricity and macro level distribution; norms andstandards
- Site level -High side electrical system - Transformers and switch gears – Layout of substations, Electrical distribution system at site level overview, Types of distribution networks at site level.
- Micro level-Planning electrical wiring for building – Main and distribution boards, Types of wires, wiring systems and conduit, Fixing of electrical fixtures andswitches
- Electrical safety: Necessity of earthing, pipe and plate earthing, lightning protection in buildings.
- Materials, apparatus, joints, fixtures and breakers –Marketsurvey

Module 2: Lighting

Learning Strategies:

- Lectures on Illumination systems involved at domestic level and theirdesign.
- Case studies to critically understand the differentsystems.
- Market survey to familiarize the fixtures and materialsapplication.

Module Contents:

- Basic principles and definitions of Illumination: units of lighting, light in the electromagnetic spectrum, optical performance, color temperature, color rendering index, efficacy, Utilisation factor, Depreciation factor,LLF.
- Types of lamps and luminaries, Architectural lightingfixtures.
- Different types of lighting arrangements and distributionsystems.
- Design consideration of good lighting scheme – Quantity, quality and energy - cost efficient systems. Basic design technique- determination of quantity: point by point method, lumen method. Calculating the layout (number and spacing) of light fixtures in a room using Lumen method.
- Determination of quality: visual comfort probability – Glare, types and methods to reduce glare.
- General illumination design: residential lighting, street lighting, industrial lighting, office lighting, departmental stores lighting, indoor stadium lighting, theater lighting, street lighting and lighting fordisplays.

Module 3: Fire Fighting System

Learning Strategies:

- Lectures on firefighting systems and theirdesign.
- Case studies to critically understand the differentsystems.
- Market survey to familiarize the fixtures and materialsapplication.

Module Contents:

- Causes and spread of fire, Combustibility of materials, safety norms, fire rating and assessment.
- Passive Fire ProtectionStrategies.
- Active Fire ProtectionSystems.
  - Fire Detection Systems. ○ Alarm Systems.
  - ○ Fire Extinguishing Systems. ○ Smoke Control.
- Designing Fire Escapes for LifeSafety.
- Code Provisions- occupancy, building heights &areas

Module 4: Sustainable aspects in Electrical & Lighting services

Learning Strategies:

- Lectures on vertical transportation system and theirdesign.
- Case studies to critically understand the differentsystems.

Module Contents:

- Alternative sources of energy including solar, bio based, wind, micro hydel sources and other innovationsetc.
- Solar energy harvesting - types, components & design - on grid & off gridsystems
- Energy efficient lighting practices - natural/passive lighting, lighting automation, devices and equipment.

Reference:

- Basic electrical engineering by D.P Kothari, I.JNagrath
- Introduction to the design and analysis of building electrical system by JohnMathew
- Electrical design guide for commercial buildings by William H.Clark
- Handbook of electrical design details by NeilSclater
- Building construction illustrated by Dr. D.K.Ching
- Mechanical and electrical equipment for building by Walter T.Gondzik

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
V	I (c)	19AR05007	Interior Design & Detailing	1	2		3	75	75		150

Course Overview:

The subject primarily aims at familiarising the students with the planning, layout and design of interior spaces. The course deals with the creation and evolution of objects, structures and systems at human scale that aim to improve the quality of life in the immediate living and working environment, while looking at sustainable and innovative use of diverse materials and processes.

Course Outcomes:

Upon completion of the course, the student should:

- Be equipped with the theoretical, conceptual, creative and practical aspects of Interior Design along with its alliedfields.
- Improve on their detailing skills and identify construction methods and techniques in interior design.
- Apply aspects from building services like lighting, electrical,plumbing.

Module 1: Principles of Interior Design

Learning Strategies:

- Lecture on the elements and principles of design with reference to Interiordesign.
- Documentation of existing site, office spaces/residences.
- Group discussion and case studyanalysis.

Module Contents:

- Development of interior design concepts- A historic review (History of interiordesign)
- Spatial analysis and themeanalysis.
- Basic components of interiorspaces
- A sitevisits.
- Group discussion and case studyanalysis.
- Design/Drawing Hours: The major project- Design a space of 100sq.m.-200sq.m which may be a retail space, work space orhospitality.

Module 2: Ergonomics and Anthropometry

Learning Strategies:

- To enable the students to understand the importance of ergonomics and anthropometry in architecture with the help of an introductory lecture, group exercises andsketches.

Module Contents:

- Principles ofErgonomics
- Anthropometry
- Furniture-Basics of furnituredetails

Module 3: Colour and Lighting

Learning Strategies:

- To enable students to learn the concepts of colour and lighting through case studies and site visits.

Module Contents:

- Concept of colour - significance of colour in the interiors and exteriors-Dimensions ofcolour
- Hue, value, intensity, Effects of Hue, value andIntensity.
- Application of colour harmonies in the interiors and exteriors –Effects of light oncolour,
- Psychology of colour, effect of colour on eachother.
- Importance of lighting – Lighting in interiors – importance, classification based on sources, uses,
- illumination, factors to be considered in lighting for different areas ofhouse.
- Natural lighting and Artificial lighting-
- Types and uses of light, specific factors inlighting.
- Basic of Acoustics.

Design/Drawing Hours: Minor Project- A one day time problem of a room/space in the AD project maybe designed and detailed.

Module 4: Materials and Detailing

Learning Strategies:

- To learn the different types of materials and to use them effectively andinnovatively.
- Students will apply their learning from BMC and come up with good detaileddrawings.
- Students will also apply their learning from building services classes and do the relevant service drawings.

Module Contents:

- Design/DrawingHours: Working drawings of the major project and the relevant service drawings.
- Model making of major project/3d models/physicalmodel.

Reference:

- Pile, John.F, “Interior Design”, Pearson; 4 editions(2007)
- Ching, Francis D.K., “Interior Design Illustrated”, John Wiley & Sons; 3 editions(2012)
- Panero, Julius and Zelnik, Martin, “Human Dimension and Interior Space: A Source Book of Design Reference Standards”, Watson-Guptill; New edition(1979)
- DeChiara, Joseph, Panero, Julius and Zelnik, Martin “Time Saver’s Standards forInterior
- Design”, McGraw-Hill Professional(2001)
- Rengel, Roberto J, “The Interior Plan: Concepts and Exercises”, BloomsburyAcademic
- USA; 2nd Revised edition(2016)
- Mitton, Maureen, “Interior Design Visual Presentation: A Guide to Graphics, Modelsand
- Presentation Techniques”, John Wiley & Sons; 4 editions(2012)
- Pile, John.F, “A History of Interior Design Hardcover”, John Wiley & Sons Inc(2000)
- Kurtich, John & Eakin, Garret, “Interior Architecture”, John Wiley & Sons(1995)

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
V	II	19AR05008(A)	Elective Theory 2: Advanced landscaping	2			2	50		100	150

Course Overview:

The course aims to provide the knowledge base regarding history of landscape architecture with the various theories that has guided the landscape design through the ages till present. It also introduces the criteria for selection, type and function of planting to be adopted in landscape design in detail. The course discusses about water as an element in landscape design and the different forms in which it is used in design. This course shall have a direct application in the design studio of the ongoing as well as subsequent semesters for site planning and landscape design.

Course Outcomes:

Upon completion of the course, the student should:

- Learn the History of landscape architecture from past tillpresent
- Learn the Role of vegetation and plantingdesign
- Use Water as an element of landscape and forms of usage indesign

Module 1: History of landscape

Learning Strategies:

- Presentation on landscapegardens
- Lectures on relevanttopics

Module Contents:

- Significance of Time in Landscape Design Landscape Development in historical perspective, chronological evolution of landscape development; Ancient: Mesopotamia, Egypt, Greece, Rome
- Western: Europe, Italy, France,England
- Middle-east: Persian traditions, Eastern: China and Japan, Ancient and medieval period in India; Mughal and Rajputlandscapes.
- Parks movement in America; Contribution of IanMcharg
- Contemporaryworks
- Culturallandscapes

Module 2: Planting design

Learning Strategies:

- Lecture/ presentation on plantingtypes
- Visit to botanical garden/nursery for familiarizing with plantspecies

Module Contents:

- Study of vegetation: trees, shrubs, ground cover, climbers; Physical characteristics and habit; Plant selection criteria - Functional, visual, ecological, economic and microclimaticaspects.

- Species used in dry and arid regions, coastal areas, shelter breaks controlling soil &wind erosion, and air pollution, noise pollution,etc.
- Species used for specific colour, season of flowering, size, mass planting, afforestation, focal point, barriers, edging,etc.
- Salt and drought resistant species, wetland species, fast growing, air quality improving speciesetc.
- Horticulture: planting and transplanting, planting techniques, techniques of propagation, cutting, pruning, grafting etc. Lawns, preparation andmaintenance.
- Hydroponics, Bonsai, Indoor landscaping: Functions and behavior of indoor plants, light, air and water requirements, plant materials, Terrace gardens, vertical landscapeetc.
- Conservation of flora and fauna- Botanical gardens, Arboretums, Sanctuaries, National parks, eco-reserves,etc.

Module 3: Water in landscape

Learning Strategies:

- Lecture/ presentations in relevanttopics
- Site visits

Module Contents:

- Purpose of water in landscape, effects created by water-bodies, types: pools, freefall, flowing, cascade, spouts andjets
- Waterproofing, drainage and operation of designedwater-bodies
- Natural pond habitat and design of ponds, supporting flora andfauna
- Swimming pools, reflecting poolsetc.

Module 4:

Learning Strategies:

- Lectures andworkshops

Module Contents:

- Environmental remediation through landscapedesign
- Revitalization
- Ground water Retention, Recharging,etc.

Reference:

- Appleton J., The Experience of Landscape, John Wiley & Sons,1996.
- Bose, T.K. and Choudhary, K. Tropical Garden Plants in Colour. Horticulture and Allied Publishers. 1991.
- Charles W Harris. Nicholas.T. Stane, Timesaver Standards for Landscape Architecture: McGraw Hill Book Co. Inc.1998
- Dee, C. Form and Fabric in Landscape Architecture: A visual introduction, UK: SponPress.2001.
- Gopalaswamiengar, K. S., Complete Gardening in India, 4/e, Gopalswamy Parthasarathy,1991.
- Hackette Brian. Planting Design, NY: McGraw Hill Book Co. Inc.1979
- 2001Jellicoe, G. & Jellicoe, S. The Landscape of Man, London: Thames and Hudson.1991.
- Laurie, M. An Introduction to Landscape Architecture, NY: American ElsevierPub.CoInc.1975.
- Lyall S. Designing the New Landscape. UK: Thames & Hudson.1998.
- McHarg I. Design with Nature. NY: John Wiley & Co.1978.
- Motloch, J. L. Introduction to Landscape Design, US: John Wiley andsons.
- Randhawa M.S., Flowering Trees, National Book Trust,1998.
- CPWD; A handbook of landscape,2013

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
V	II	19AR05008(B)	Elective Theory 2: Behavioural Architecture	2			2	50		100	150

Course Overview:

- To impart knowledge about this relatively new field, born out of the synthesis between architecture and behavioral psychology.
- To expose the students to the importance of understanding people and their perception of environment in architectural design andplanning
- To enable them to understand the various psychological aspects that can be incorporated in the design of builtenvironment

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding of the multiplicity of living patterns, activities, geometric patterns in space and designing for thesame.
- Get knowledge about the behavioral design process, techniques and designcontexts.

Module 1: Introduction to Environmental Psychology and Behavioral

Architecture Learning Strategies:

- Lectures and groupdiscussions
- Mapping of human behavior in varied environments through differentexercises

Module Contents:

- Introduction to Environmental Psychology; Origin, principles and relevance of environment psychology, its difference from other branches of psychology; Theories and approaches in environmentalpsychology.
- Relation between human psychology and design of built environment; Elements of design (point, line, shape, etc.), Principles of architecture (rhythm, balance, contrast, etc.) and its role in evokingemotions.
- Concept of perception; Visual perception; Theories on environmental perception, Environmental perception anddesign;
- Designing for pattern and activities,
- Archetypal activities/Archetypal spaces: planning of public spaces with reference to age groups andactivities.
- Room use, geometry & meaning, hidden behavioral assumptions, adjacencies, vertical bypass & horizontal bypass, various stages in the design of buildingsubsystems.
- Geometry of spaces, their meaning & connotations, Social organization of buildings, Behavioral assumptions in the planning of new towns and neighborhoods, borrowedspace.

Module 2: Behavioral Design

Learning Strategies:

- Lectures, group discussions anddebate
- Analyzing behavior of an individual in different spaces and representing it insketches.

Module Contents:

- Traditional observation and mapping methods- Setting data and interview method to study user; surveys, cognitive mapping, visualmapping
- Digital observation Methods for Human tracking and interaction detection – Visual sensors and radio frequency sensors; Comparison of digital versus traditional observationmethods.
- Process organization chart, affinity matrices, pictograms: behavioral design process model, design context, activity/adjacency relationship, evaluation chart, Area use frequency program, simultaneous use, community utilization map, occupancy load profile, defensible space, EDRAetc.

Module 3: Urban Environment

Learning Strategies:

- Lectures, group discussions anddebate

Module Contents:

- Different environments - Educational (class room design, ambient noise, attention), Workplace (types of office design), Health care, Commercial, Recreational, Public, Domestic, Urban, etc.; Multi-sensory spaces; Casestudies.
- Residential environment- Concept of Home. Neighborhood concept & Neighborhood satisfaction. Place attachment theory, Work place environment and behavior; Application of the knowledge in design of a residence, neighborhood and other builtenvironments.
- Patterns of activity in time and space, the ecology of a neighborhood park and playground, cross-cultural issues, social & psychological issues in the planning of new towns, environmental perceptions and migration, awareness and sensitivity to open spaces, environmentalcognition.

Reference:

- Burnette, C. (1971). *Architecture for human behaviour*. Philadelphia Chapter:AIA.
- Canter, D. and Lee, T. (1974). *Psychology and the built environment*. New York: HalsteadPress.
- Christopher, A. et al. (1977). *A Pattern Language*. New York: Oxford UniversityPress.
- Clovis, H. (1977). *Behavioural Architecture.* McGrawHill.
- Lynch, K. (1973). *The image of a city.*Cambridge:MIT.
- Sanoff, H. (1991). *Visual Research Methods in Design*. New York: John Wiley &Sons.
- Zeisel, J. (1984). *Enquiry by design: Tools for Environment-Behaviour Research*. Cambridge: Cambridge UniversityPress.
- Zeisel, J. and Eberhard, J. P. (2006). *Inquiry by Design - Environment/Behaviour/Neuroscience in Architecture, Interiors, Landscape and Planning.* New York: W. W. Norton &Company.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	

V	**II**	**19AR05008(C)**	**Elective Theory 2: Inclusive Design**	**2**			**2**	**50**		**100**	**150**

Course Overview:

Inclusive design is an introduction to the concepts of accessibility and universal design with a particular focus on the implications of ability and dis-ability on usability of the built environment; spaces, buildings, infrastructure and interfaces. The student will learn how to apply this knowledge in architecture, landscape architecture, interior design and planning. The interdisciplinary collaboration with disability studies, rehabilitation studies and social science research will provide students with an opportunity to learn and develop wider understanding about thesubject.

Course Outcomes:

Upon completion of the course, the student should:

- Define inclusive design with a particular focus on the implications of ability and dis-ability on usability of the built environment; spaces, buildings, infrastructure andinterfaces.
- Describe the standards, theories, legislation and principles of accessibility and universal design.
- Critique interdisciplinary connect with disability studies, rehabilitation studies and social science research.
- Distinguish between different concepts of accessibility and universal design. Review the condition of existing environment for universal access and suggest measures to address those. Apply this knowledge in architecture, landscape architecture, interior design and planning.

Module 1: Evolution of concepts of accessibility and universal design

Learning Strategies:

- Lectures, seminars andworkshops

Module Contents:

- Knowledge of human ability relevant to design problems at home, workplace, infrastructure and community environments.
- An understanding of the evolution and limitations of AccessibleDesign
- Differences between Accessible and UniversalDesign.
- Understanding Principles of Universal Design that enable usability and inclusion across the spectrum of age, size, gender, ability and conditions, and contextual derivation of Universal Design Principles in India.
- Understanding legislative framework for practice in India; Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act 1995 andAmendments.
- United Nations Convention for Rights of Persons with Disabilities(UNCRPD).

Module 2: Accessibility Standards

Learning Strategies:

- Lectures, seminars andworkshops

Module Contents:

- Types of disability, Devices and Controls, Defining Architectural design requirements, Classification of Buildings and Accessprovisions.
- Design Elements within the buildings; Site planning, parking, approach to plinth levels, corridors, entrance and exit, windows, ramps, stairways, lifts, toilets, signage, guiding and warning systems, floor finishes andmaterials.
- Design Elements Outside the building; kerb at footpath, road crossing, public toilet, bus stop, telephone booth,signage.

Module 3: Accessibility Considerations

Learning Strategies:

- Lectures, seminars andworkshops

Module Contents:

- Provisions in residential buildings, auditorium, parks, restaurants, railway stations etc. Best examples and case studies in Universal Designpractice.
- Access Audit; definition, purpose andmethod
- Retrofitting techniques for barrier freeenvironment.
- Hands-on practice in assessing needs and developing design solutions; a project based on field research and design to learn how to design for all individuals, regardless ofability.

Reference:

- Mullick, A., Ostroff, E., Sanford, J., Steinfeld, E., Story, M. And Vanderheiden, G., Center for Universal Design. North Carolina State University, Raleigh, NC. Available athttps://www.ncsu.edu/ncsu/design/cud/about_ud/udprinciples.htm
- Universal Design by Goldsmith, S. -(2000) Architectural Press. Guidelines and Space Standards for Barrier Free Built Environment for Disabled and Elderly (1998),CPWD,
- Ministry of Urban Affairs and Employment, India. Persons with Disabilities Act. (1995). Government of India. Available at disabilityaffairs.gov.in/upload/uploadfiles/files/PWD_Act.pdf.
- Universal Design Handbook by Preiser, Wolfgang, Editor in Chief; Elaine Ostroff, Senior Editor– McGraw Hill, 2000.
- Enabling Environments by Steinfeld, E., Danford, G. Scott. (1999). Plenum Press, NewYork.
- Creating Universal Environment by Steinfeld, E., Maisel, J. (2012). John Wiley and Sons INC, Hoboken, New Jersey.
- The universal design file: Designing for people of all ages and abilities by Story, M. F. (1998). Available athttp://design-dev.ncsu.edu/openjournal/index.php/redlab/article/viewFile/102/56.
- UNCRPD. (2006). Convention on the Rights of Persons with Disabilities at the United Nations and the Optional Protocol. Available at http://www.un.org/disabilities/documents/convention/convoptprot-e.pdf

39. SIXTH SEMESTER SYLLABUS

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
VI	I (a)	19AR06001	Architectural Design 6		10		10	250	250		500

Course Overview:

Course familiarize the students with campus planning principles

- Design of built environment of complex nature in a campus incorporating campus planning, urban design and sustainable design principles with detailed site analysis and sitesuitability.
- Development of zoning and site planning incorporating function, climatic response, structural system, materials, universal design, services,etc.
- To understand planning principles suitable for the topography and appropriate landscaping strategies to learn design detailing of an Assembly buildings with emphasis on angle of vision, raking design, acousticsetc.
- To create an awareness of Building rules/National Building Code of India / Universal design standards /other regulations such as cinemas regulation act, CRZetc.
- **Sustainable design objectives**: To equip students with sustainable campus design principles considering climate, building envelope, site preservation, HVAC, green materials, renewable energy, natural lighting, fresh air ventilation, efficient landscape etc. To equip the students to adopt sustainable building techniques in campus design such as usage of renewable energy, Rain water harvesting, passive cooling techniques, use of low embodied energy materials, water and waste management etc. To familiarize the students with the concepts of Indian Green building standards such as IGBC, GRIHA, ECOHOUSING and other relevant rating systems.

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding of campus planning principles, importance of site planning and built form/open space relationship
- Understand the relationship between built and un-built and the aesthetics of 3dimentional composition of builtform
- Understand the sustainable approaches in campus planning through efficient utilization of energy, water andmaterials

Major Project

Design of an urban or rural campus by developing a master layout plan and designing of various built and un-built spaces that constitute the campus. Architectural design and detailing of at least two major built components (Built up area up to 4000 SQM) and open space design and detail.

Emphasis may be given on:

- Campus planningprinciples
- Hierarchy of built and un-builtspaces
- Detailing of pathways and roadnetwork
- Suitable response to sitetopography

- Appropriate Structural System in the builtforms
- Climatic responsive planningapproach
- Alternative energysystems
- Water conservation techniques and waste management strategies

Time bound project

Design and detailing of an Assembly building incorporating applicable regulations and standards. with reference to applicable norms andstandards.

Minor project (Maximum up to 2 weeks)

Design and detailing of urban design elements incorporating principles of campus planning. (Design of gateway structures, landmark spaces or built forms, open spaces, Pathways, Road network and suitable sections incorporating service layout). Application of sustainable urban design principles (water management, energy efficiency, sustainable materials etc.) demonstrated in the campus layout

Reference:

- Urban design: a typology of procedures and products. Lang, JonT
- Richard P. Dober, "Campus Planning" - Society for College and University Planning,1996.
- Campus Design in India by AchyutKanvinde
- Kevin Lynch, "Site planning", MIT Press, Cambridge,1967
- National Building Code/ Kerala BuildingRules
- Joseph De Chiara, Michael J Crosbie, "Time Saver Standards for Building Types", McGraw-Hill Professional,2001.
- Ernst Neuferts, "Architects Data," Blackwell,2002.
- Joseph De Chiara, Julius Panero, Martin Zelnik, "Time Saver Standards for Interior Design and Space Planning", McGraw Hill,2001.

Sem	Subject Group	Course Code	Subject	Hours/week T	S	W/L	Credits	Marks CA	University Exam Jury	Written	Total
VI	I (c)	19AR06002	Working Drawings 1		4		4	100	100		200

Course Overview:

The subject primarily aims to introduce the concept of Working Drawings and Details; Coordination between Architectural, Structural, Services and other disciplines; Preparation of Architectural Working Drawings for a design project.

Course Outcomes:

Upon completion of the course, the student should:

- Be able to familiarize the students to learn the techniques of preparing drawings which are used for construction of buildings and working details of project execution onsite.
- Understand the organization of various building services inside the layout of abuilding
- Be familiarized with the networking and coordination skills among various disciplines to put together a workingdrawing
- Be taught in congruence with the previous year designprojects.

Module 1: Introduction to Working Drawings

Learning Strategies:

- Lecture on various working drawingpractices
- Workshops to learn specifications andstandards

Module Contents:

- Overview of Working Drawings; It's importance; historical perspective; consultants involved in preparation of working drawings, their role and scope; reading, error checking, sequencing of drawings for construction, problems in workingdrawings.
- Drafting Conventions: Representation of materials, graphic symbols, line type conventions, grid lines, dimensioning, lettering, color codes, paper sizes, title blocks, office practices, standardization ofdetails.

Module 2: CAD Drawings/BIM

Learning Strategies:

- CAD Workshops to familiarize drafting methods with emphasis on multidisciplinary working environment.

Module Contents:

- CAD Drawings/ BIM: Working within a disciplined and systematic software environment using layers, blocks, templates, assemblies, libraries, layouts, plot styles, error checking, editing, xref, annotationsetc.

Module 3: Project work

Learning Strategies:

- Drafting Studios to design a workingdrawing
- Manual drafting may be encouraged for thorough understanding ofdetails
- Workshops to design custom drafting styles, blocks, and assimilation for draftinglibrary

Module Contents:

- Project work: Preparation of Architectural Working drawings and details for a Design project from previous semesters- G+1 structurer (Residence, Primary Health Center or School etc.). Preparation of Site Layout, Setting out and centre line drawings, Plans at all levels, Roof/Terrace Plan; all Elevations; two Cross Sections (minimum) passing through staircase & lift shaft; Profile Sections; Details to include: Toilet, Kitchen, Staircase, Door, Window, Grills/ Jali works, Handrails, Compound walls, Gates,Sky-light.

Reference:

- Architectural Graphics by Francis D. K.Ching
- Building construction illustrated by Francis D.K.Ching
- Building construction metric Vol 1-5 by W.B.Mckay
- Detail in Contemporary Residential Architecture by Virginia McLeod

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total

VI	**I (c)**	**19AR06003**	**Professional Skill Enhancement 6**			**4**	**2**	**50**	**50**		**100**

Course Overview:

This course intends to provide/ enhance the soft skills in order that students perform well in their academics and beyond. These skills are intended to support the student to perform better in her/his core subjects and also build up robust performance through hands-on workshops and laboratory training. This course is subdivided into two categories – Mandatory and Optional. Mandatory courses help in preparations for respective semester subjects. The optional category helps students to take personal initiatives to develop in specific areas that can widen their horizon of their understanding of architecture and also initiate action at the society level. There are also options to work on competitive exercises alongside other similar institutions.

Course Outcomes:

Upon completion of the course, the student should:

- be given an exposure of varied skills that can bring in confidence in handling their core subjects such as workshops, communication skills, computer applicationsetc.
- be able to develop team spirit and interpersonal skills to manage complexsituations.
- be able to cope with stress and develop multi-taskingcapabilities.

Module 1: Portfolio workshop

Learning Strategies:

- Workshop
- Presentations anddiscussions

Module Contents:

- Portfolio content anddesign
- Compiling and presentingtechniques
- Personalizing

Module 2: Innovations

Learning Strategies:

- Computer lab,workshop
- Group discussions and Interactivesessions

Module Contents:

- Learn how to utilise sustainablematerials.
- Work on a live project with a focus on social engagement and innovative greenagenda.
- Collaborate with a local collective of artists orcraftsmen.
- Get hands-on experience using cutting edge facilities in custom built studios andworkshops

Module 3: Social Initiatives or any other co-curricular activities

Learning Strategies:

- Technical and hands onworkshops
- Group discussions and Interactivesessions
- Self-initiatives

Module Contents:

- Optional content to be developed by each institution in order to help students to take part in activities that involve larger groups and facilitate peerlearning.
- The activities could be skill oriented like Photography or Crafts training or student initiated societal activities or participation in NASA or similar student led group initiatives which has an academic content aswell.

Reference:

- Uday Kumar Haldar, (2010), *Leadership and Team Building*, 1st edition, Oxford UniversityPress
- John J. Murphy, (2017), *How to Unleash the Power of Your Subconscious Mind: A 52-week Guide*, 1st edition, HarperCollins
- Ace McCloud, (2017), *Team Building: Discover How to Easily Build & Manage Winning Teams (Strategies for Building and Leading Powerful Teams)*, Pro MasteryPublishing
- Alvarado & Anthony, (2015), *DIY Magic*.Perigee
- Damon Jones, (2019), *Shipping Container Homes: The best guide to building a shipping container home and tiny house living, including plans, tips, FAQs, and more!* 1st edition, IngramPublishing

Sem	Subject Group	Course Code	Subject	Hours/week T	S	W/L	Credits	Marks CA	University Exam Jury	Written	Total
VI	II	19AR06004	Housing	2			2	50		100	150

Course Overview:

To introduce the students into the field of housing-to make them understand its significance in the context of both global and national scenario, and thereby to make them sensitive to the critical social and economic issues related to housing especially in developing countries like India and Kerala in particular, with emphasis on the analytical study of relevant housing initiatives. To introducethem to the diverse factors in designing a composite housing layout.

Course Outcomes:

Upon completion of the course, the student should:

- Understand the importance of housing and its relation withpoverty.
- Recognize housing issues at national and international context in terms of magnitude of problems, outcomes of initiatives and related factors.
- Understand the issues related to slums and affordable housing to poor and innovative approaches towards mitigatingit.
- Be equipped to have a comprehensive understanding of the complexities of a housing project.

Module 1: Introduction to Housing

Learning Strategies:

- Lecture notes, literature-based case examples through books, journale-resource

Module Contents:

- Concept of housing-Shelter as a basic requirement, Determinants ofhousing
- Housing shortage, housing need and demand. Affordability – House hold size, household income.
- Housing and its impact on national economy. Economics of Housing as anindustry.
- Global Housing scenario,Challenges.
- United Nations Policies relevant to Housing and Planning - Habitat Agenda, Millennium Development Goals. International casestudies.
- Urbanization and Poverty issues -Housing Shortage as a result of PopulationExplosion.
- Study of Slums as a consequence of rapid urbanization and industrialization, and its impact on the urban housing scenario in India andabroad.

Module 2: Housing Scenario in India

Learning Strategies:

- Lecture notes, through books, journal e-resource, case studies, dataanalysis.

Module Contents:

- Nature and magnitude of the housing problem in India. History of Housing and Planning Policies in India, Five YearPlans.
- Study on the changing priorities in the housing policies and the major housing programs carried out in the various five-year plans inIndia.
- National Housing and Habitat Policy and its need, objectives and role in the field of housing in the present-daycontext.
- Housing design and standards conforming to the local climatic andsocio-economic conditions.
- Literature case studies of the some of the major Slum clearance and Slum Improvement Schemes successfully carried out inIndia.
- Important earlier & prevailing Housing Schemes in India for various categories like HIG, MIG, LIG, EWSetc.
- Innovative approaches to social housing. International, National & state level Casesstudies.

Module 3: Housing Finance

Learning Strategies:

- Lecture notes, through books, e-resource, case studies, analysis of prevailing housing concepts &schemes.

Module Contents:

- Factor affecting demand and supply of housing. Housing Finance & Landeconomics.
- Housing Finance, Sources of Housing Finance and its essentialcharacteristics.
- Different Finance agencies involved in Housing - Formal & Informal housing finance agencies, National and Statelevel
- Role of the informal housing finance system as a major source of housing finance for the urban and ruralpoor
- Illustrative case studies of relevant and innovative housing schemes or projects in India and Kerala inparticular.

Workshop/Group Assignment.

- Design for a composite Housing Layout of around 2acres.
- Deliverable: Basic sketches & Block

model Intension of theexercise:

1. Introduction to Planning & Designprinciples.
2. Understanding categories, Densities, Land use, Circulation, Infrastructure, Openspaces
3. Interpreting FAR, Coverage and other regulatoryprinciples.

Reference:

- K. Thomas Poulose- 'Innovative Approaches to Housing for thepoor'
- Dr. Misra and Dr.B.S. Bhooshan-'HabitatAsia'
- Dr. Misra and Dr.B.S. Bhooshan- 'HabitatIndia'
- Arthur Gallion- 'UrbanPattern'
- Reading Material in Housing -Compiled by K. Thomas Poulose for ITPIstudents
- Five Year Plans-Government of IndiaPublications
- Shadow cities by RobertNeuwirth
- The economics of urban property market by Paschalis A.Arvanitidis
- The modern economics of Housing by RandallJohnston
- Urbanization and urban systems in India by R.Ramchandran
- Urbanization in India Ed. by R.S.Sandhu
- Planning sustainable cities-UNHabitat

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
VI	II	19AR06005	Specification and Cost Estimation	2			2	50		100	150

Course Overview:

Specification is an integral part in the design process through which the quality of our built environment could be upheld. The course shall cover the aspects of specification, the related aspects of cost estimation and the strategies of realizing them. The students will be introduced and familiarized with the various techniques and processes of preparing an estimate, tender documents and the process of tendering. The exercises taken shall be based on the design exercise done by them in the previous semester. Another important role an Architect plays is of a Valuer for immovable properties. The students will be introduced and made aware of the various methods and techniques for doing the valuation of a property. The subject will be taught is congruence with the Design studio, and assignments for the subject will be linked to the design exercises to achieve higher level of learning and understanding the practical application of thesame.

Course Outcomes:

Upon completion of the course, the student should:

- Be able to technically specify aspects of the built environment and validate them as per quality standards approved nationally orinternationally.
- Be able to understand estimates and prepare them for small scaleprojects.
- Be able to understand valuation and the related aspects to critically use them in the design process.

Module 1: Quantity surveying

Learning Strategies:

- Lectures
- Case studies of projects and their contractdocuments

Module Contents:

- Introduction to the basic terms used inEstimation
- Important considerations while preparing anEstimate
- Introduction to various types ofEstimates
- Various Techniques of Preparing the Estimates andBOQ's

Module 2: Specifications

Learning Strategies:

- Lectures
- Visiting a QS office to understand the process andprocedures

Module Contents:

- Introduction tospecifications
- Important considerations while writing thespecifications
- Specifications as per CPWD, PWD etc., and how to readthem
- Writing specifications for buildingworks
- Writing specifications for Interior finishing and furnishingWorks

Module 3: Analysis of Rates

Learning Strategies:

- Lecturenotes
- Through books &E-resource
- Case studies
- Analysis and prevailing concept in real estate housingdesign.

Module Contents:

- Introduction to Schedule ofRates
- Importance of RateAnalysis
- Considerations done while doing the RateAnalysis
- Calculations for basic building materials like RCC, Brick work Calculating the various quantities of materials required perunit
- Introduction toValuation
- Process of valuation

Reference:

- Estimating, costing and valuation: professional practice and quantity surveying byRangwala
- Estimating and costing in civil engineering: theory and practice by B.N.Dutta
- Estimating costing and building economics for architects by Prof. HarbhajanSingh
- Estimating, costing, specification and valuation in civil engineering: principles and applications by Manojit Chakraborti
- Quantity Surveying and Valuation (Estimation, Costing and Contracting) by S.P Mahajan and Sanjay Mahajan
- CPWD Specifications by Central Public WorksDepartment
- Delhi Schedule of Rates byCPWD
- Valuation of real properties byRangawala

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
VI	II	19AR06006	Building Services 3: Mechanical Services & Acoustics	2			2	50		100	150

Course Overview:

- Services are the lifeline systems of any built form making it functionally habitable. They also make them efficient, comfortable and safe. Building services essentially include fluid systems, electrical & energy systems, lighting systems, HVAC systems, security systemsetc.
- This course as last of the 3 courses in Building services is intended to give the students an overview of the HVAC systems and Acoustic systems employed in our builtenvironment.

Course Outcomes:

Upon completion of the course, the student should:

- Develop an understanding about the importance of services in buildings and its coordination in the builtenvironment.
- Be able to critically understand various HVAC systems and the determinants in choosing between suchsystems.
- Develop an understanding on the acoustic design with respect to spaces and materials and be able to propose acousticalsolutions.

Module 1: Fundamentals of Heating, Ventilation and Air Conditioning

Learning Strategies:

- Lectures on the fundamentals of thermodynamics andHVAC
- National and International professional handbooks onHVAC.

Module Contents:

- Introduction to HVAC - basic concepts, standards - national andinternational
- Terminologies related to humidity and temperature – Dry bulb and wet bulb temperature, Dew point temperature, Absolute humidity, Relative humidity, Specific humidity, sensible heat gain, Evaporative cooling and condensation. Application of psychrometricchart.
- Heat load and types, External Factors contributing to heat load in an enclosed space, internal parameters contributing to heatload.
- Methods of reduction of internal / enclosed heat load - Natural (Active and passive cooling) and artificialventilation.
- Thermal conductivity. Building materials with low thermalconductivity.
- An outline on HVAC related energy efficient ratingsystems.

Module 2: Types of HVAC Systems

Learning Strategies:

- Lectures on HVAC system types and their applicationcriteria.
- Case studies on various HVAC systems
- Guest lectures by specialists.

Module Contents:

- Artificial ventilation - Refrigeration Cycle and types (Vapour Compression System & Vapour Absorption system). Basic components of an Air conditioning System- Evaporator, Compressor, Condenser.
- Types of AC - Window Air Conditioners, Split Air Conditioners, Packaged Air Conditioners, Direct Expansion Air Conditioning Systems, Central or All-water Air ConditioningSystems.
- Components - Plant Room, AHU room, FCU, VRV, VRF, terminalunit.
- BasicAirDuctDesign&Principles,Ductsystem,AirDuctRoutingConceptofreturnair–
- Inlets and outlets (Grills, registers and diffusers), dampers and filters in duct system and their location.
- Standard Refrigerants & Properties, CFC freerefrigerants.

Module 3: Introduction to Basics of Acoustics

Learning Strategies:

- Introduction toacoustics
- Lab experiments to understand acousticalproperties
- Market studies on Acoustical materials

Module Contents:

- Basic laws and terminologies related toAcoustics.
- Sound Intensity, Sound Intensity Level, and sound level meter. (Classroomexercise)
- Behavior of sound in rooms- Sound Absorption, Transmission, Reflection, Diffusion and Diffraction, Room shapes, roomresonance.
- Free field conditions and Inverse Square Law for noise reduction withdistance.
- Acoustic Materials –characteristics andapplications

Module 4: Acoustics in Buildings

Learning Strategies:

- Case studies on acoustically treatedspaces.
- Understanding behavior of sound in various enclosedspaces.
- Understanding impact of sound in builtenvironment.
- Acoustical design project of an existingspace.

Module Contents:

- Requirement for good acoustics – Reverberation Time and its importance for acoustical performance of an enclosure, Sabin's Equation and Eyring's formula
- Acoustical defects and design of auditorium and other acoustically sensitive enclosures meant for speech, music, lecture, etc. (Class rooms, room for music, recording studios, open air theatre, multi-purposerooms)
- Brief introduction to Sound AmplificationSystems.
- Noise- types, its transmission and itseffects.
- Sound Insulation, Transmission Loss, control of mechanical noise andvibrations.

Reference:

- National Building Code2005
- Mechanical and Electrical Equipment for Buildings by Walter T. Grondzik, Alison G. Kwok, Benjamin Stein.
- Basic Refrigeration and Air Conditioning by A.Ananthanarayana.
- Building Construction byRangwala.
- Architectural Acoustics by M. DavidEgan.
- Room Acoustics, HeinrichKuttruff
- Architectural Acoustics, Bruel &Kjaer
- Principles and Applications of Room Acoustics - Volume 1 and 2, Lothar Cremer (Author), Helmut A. Muller (Author), Theodore J. Schultz(Translator)

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
VI	I (c)	19AR06007(A)	Elective Workshop 2: Cost Effective Technology in Building Construction	1		2	2	50	50		100

Course Overview:

- To familiarize and understand the materials and techniques in cost effectiveconstruction.

Course Outcomes:

Upon completion of the course, the student should:

- Be able to incorporate cost effective techniques indesign.
- Be able to develop and understanding about the concepts of ecosystem carrying capacity, carbon footprint, sustainability and sustainabledevelopment.
- Be able to aware about the consequences of the emerging vulnerabilities of global warming and climate change and to understand the contribution of building industry to thesame.

Module 1: Introduction to Cost Effective

Techniques Learning Strategies:

- The course would be conducted through research andseminars.

Module Contents:

- Cost effective techniques: Need, Planning aspects, construction aspects, maintenance and longevity
- Aspects.

Module 2: Methodology

Learning Strategies:

- The course would be conducted through live case studies, field works andworkshops.

Module Contents:

- Choice of materials in India/Kerala conditions, indigenous building materials, organic and inorganic building materials, alternative building materials, use of industrial and agricultural wastes - Survey of such materials development by research organizations like CBRI, SERC, IITs etc.
- Significance of cost-effective construction technology: Relevance of improving of traditional technology, relevance of innovative technology/alternate technology, survey of such technologies by various researchinstitutes.

Module 3: Critical Analysis

Learning Strategies:

- The course would be conducted through worksheets and criticalwriting.

Module Contents:

- Critical analysis (in terms of initial investment, maintenance cost and longevity of buildings) of the local adaptation of the innovative technologies by variousagencies.

Reference:

- A.G. Madhav Rao, D.S. Ramachandra Murthy – Appropriate technologies for Low Cost Housing– Oxford & IBH Publishing, 1996.
- G.C. Mathur – Low cost Housing in DevelopingCountries.
- Proceedings of International Seminar on Low cost Housing and Alternative Building Materials (1988), CBRIRoorkee.
- Jagdish and Singh – Better Houses withMud
- CBRI – Live Better with Mud and Thatch, SERC AND NBO, Baker Laurie (1988) – Mud, Publications of COSTFORD.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
VI	I (c)	19AR06007(B)	Elective Workshop 2: Geographic Information System	1		2	2	50	50		100

Course Overview:

The course is intended to provide students with a foundation for basic GIS techniques which are relevant to architectural analysis and Presentation. The elective is intended to establish a bridge between the conceptual realms - Architecture /Site -Terrain Analysis/ Landscape architecture/Urban planning.

Course Outcomes:

Upon completion of the course, the student should:

- Be introduced to the basic concepts of Geographic Information System(GIS)
- Get introduced to geospatial data acquisition and itsprocess.
- Will be equipped to produce digital and printedmaps.

Module 1: Introduction to GIS

Learning Strategies:

- Lectures, workshops andlabs

Module Contents:

- Introduction to Geospatialtechnology
- Overview of remote sensing,Applications
- Fundamentals of GIS, GIS as a Hardware/software, Components ofGIS
- Map projections- methods, Coordinate systems-Geographic and Projected coordinate systems, Data Types- Spatial and attribute data, Raster and vector data representation-Data Input methods- Data capture & methods, Coordinate referencesystems
- AnoverviewofGoogleEarth&KML,GoogleObjects,DescriptiveHTMLinPlacemarks,

Ground overlays, Screen overlays, Paths, manipulating a path Polygon, taking profiles of site, creating KML files and exporting to GIS format.

Module 2: Raster and Vector Data

Learning Strategies:

- Lectures, workshops andlabs

Module Contents:

- Overview of Global Positioning System,Application
- Capturing survey data through GPS device or mobile application. Traversing boundary of site, bringing routes and way point data intoGIS.
- Spatial data, loading raster files, Mosaic raster, Geo referencing raster and vector files, Loading data from OGC web services,databases.
- Creating vector data layers, joining tabular data, Topology errors & tools, analyzing raster data, combining raster and vector data, Raster surface through interpolation, leveraging the power of Spatial database, Vector and raster analysis, Vector Spatial analysis (Buffers),Spatial analysis (interpolation).

Module 3: Spatial Analysis

Learning Strategies:

- Lectures, workshops andlabs

Module Contents:

- Terrain Analysis & scientific computing of Raster data set: Creating Digital elevation model (DEM) from point data, Hill shade, Slope,Aspect
- Creating & Composing maps: Vector styling, Labelling, using appropriate software for composing multiple vector layers of maps, Designing print maps, Publishing GIS 2D maps on theweb

Reference:

- Anita Graser, "Learning QGIS" PAKT open source,2016.
- John Van Hoesen, Luigi Pirelli, Richard Smith Jr., Kurt Menke, " A refreshing look at QGIS: Mastering QGIS", PACKT Pub.,2016.
- Carson, Tom, Baker, Donna L., "Adobe® Acrobat® and PDF for Architecture, Engineering, and Construction", Springer publication,2006
- Kang-Tsung Chang, “Introduction to GIS”, Tata McGraw-Hill Publishing Co. Ltd, 8e,2016
- https://sites.duke.edu/envgis/tutorials/introduction-to-google-earth/
- CBSE Textbooks on GeospatialTechnology

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
VI	I (c)	19AR06007(C)	Elective Workshop 2: Vernacular Architecture	1		2	2	50	50		100

Course Overview:

To inculcate an appreciation of vernacular architecture; as an expression of local identity and indigenous traditions of the culture.

Course Outcomes:

Upon completion of the course, the student should:

- Develop an understanding of vernacular architecture as a process and not a product and explore the concepts of culture and civilization and their impact on these architectural products.
- Develop an understanding of vernacular architecture as an outcome of various social, political and economic influences and as a response to the cultural and climateconditions.
- Develop an understanding of the physical experience of buildings in order to appreciate the complexity of the physical and metaphysical influences bearing onarchitecture.

Module 1: Introduction to Vernacular

Architecture Learning Strategies:

- The course would be conducted through seminars and fieldwork.

Module Contents:

- Introduction to the approaches and concepts to the study of vernaculararchitecture,
- History and organization of vernacular buildings of different regions in the Indian context; with an understanding of forms, spatial planning, cultural aspects, symbolism, colour, art, materials of construction and constructiontechniques.
- Study of factors that shape the architectural character and render the regional variations of vernacular architecture - geographic, climatic, social, economic, political and religious aspects, local materials and skills available in the region,etc.

Module 2: Methodology

Learning Strategies:

- The course would be conducted through field work and casestudies.

Module Contents:

- Methods of observation, recording, documenting and representing vernacular architecture with examples.
- Study and documentation of vernacular architecture of selected buildingtypologies.
- Rigorous documentation, accuracy in measuring, collating the recorded information and drawing them up in specified formats andscales.

Module 3: Critical Review

Learning Strategies:

- The course would be conducted through method seminar andresearch.

Module Contents:

- A critical review of the relevance and application of vernacular ideas in contemporarytimes.
- An appraisal of architects who have creatively innovated and negotiated the boundaries of 'tradition' while dynamically responding to the changing aspirations and lifestyles of the worldaround.

Reference:

- Carter, T., & Cromley, E. C. Invitation to Vernacular Architecture: A Guide to the Study of Ordinary Buildings and Landscapes. Knoxville: The University of Tennessee Press.2005
- Cooper, I. Traditional buildings of India. Thames and Hudson Ltd, London,1998
- Oliver, P. Encyclopedia of Vernacular Architecture of the World, Cambridge University Press,1997

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
VI	II	19AR06008(A)	Elective Theory3: FacilitiesPlanning	2			2	50		100	150

Course Overview:

- To make students familiar with different buildingtypologies.
- The rules and regulations for thebuilding.
- Exposing students to the basics of planning and design of special service-oriented spaces in relation to types of spaces, services, standards and managementsystems.

Course Outcomes:

Upon completion of the course, the student should:

- Be able to do literature case studies and live case studies preferable for better understanding on hospital planning andservices.
- Be able to perform research and critical analysis for the respective selected case study and implementation of innovative technologies andsolutions

Module 1: Healthcare

Learning Strategies:

- Lectures andSeminars

Module Contents:

- Hospital project- planning considerations, composition of designteam.
- Site selection criteria- Accessibility, Soil type, availability of public utilities such as fresh water, power, good drainage, sanitation, waste disposal etc. Consideration of detrimental factors like pollution, possibility for future expansion, total feasibilityconsiderations
- Various Design approaches- the Indian healthcare architectural process, the American healthcare architectureprocess.
- Rules and regulations- American Association of hospitalstandards.
- Zoning andCirculation
- Emergency services, Outpatient services, IP services, Diagnostic services, surgical facility, ICU, CSSD, Mortuary, Supportservices.
- NBC, KBR, Fire norms forhospital.

Module 2: Hospitality

Learning Strategies:

- Lectures andSeminars

Module Contents:

- Site selectioncriteria
- Checklist of Facilities for Classification / Re-Classification of operational Hotels (starrating).
- Guidelines for classification of heritagehotels.
- Guidelines for classification of tented accommodation.
- Standards in TSS and Neuferts for hotel, Kitchen design, restaurant and Bars-Front of house, Back of House, Store
- Laundry, Housekeeping, Electrical, Plumbing HVAC, Lift maintenance, Janitors room, security, surveillance.
- NBC/ KBR Regulations for Hotelproject

Module 3: Theatres, Convention centres, Educational buildings

Learning Strategies:

- Lectures andSeminars

Module Contents:

- The Kerala Cinemas (Regulation) Rules, 1988 - building, health and sanitation, fire precautions,
- electrical system, seating, etc.
- Guidelines for convention centres, Solid Waste Treatment, Crowd management, Security and surveillance Interior andExterior
- Establishment and maintenance of school by government of KeralaGuidelines.

Reference:

- G.D. Gunders, Hospital facilities planning andmanagement.
- NBC, KBR, Time saverstandards.
- Guidelines by ministry of tourism, Government ofIndia.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
VI	II	19AR06008(B)	Elective Theory 3: Services in High Rise Buildings	2			2	50		100	150

Course Overview:

- The course shall develop on the students basic understanding of services acquired during earlier semesters.
- To familiarise students with the particular requirements of High-risebuildings
- The course shall have up to date content regarding development in the field of High-rise services.

Course Outcomes:

Upon completion of the course, the student should:

- Upon completion of the course the studentshould
- Have a basic understanding of high-rise buildings and associated servicerequirements.
- Develop an awareness of relevant codes and regulations governing services in high rise buildings.
- Have an understanding of spatial implications with regard to the servicerequirements.

Module 1: Introduction to Services in High rise buildings

Learning Strategies:

- Lectures on the subjectcontent
- Case studies of relevantprojects
- Site visits to observe and understand the functioning ofservices.

Module Contents:

- Introduction to High rise buildings, definition as per various national and international codes andnorms.
- Overview of services in High Rise Buildings - plumbing, drainage, sewerage, electricand lighting, HVAC, life safety, vertical circulation, service floors.
- Integration of services – IBMS, requirements, possibilities of integration, handshake systems, 3rd party integration,advantages
- Concepts of Intelligent Architecture- Building Service Automation particular to Highrise

Module 2: Water supply, drainage and fire safety for High rise buildings

Learning Strategies:

- Lectures on the subjectcontent
- Case studies of relevantprojects
- Site visits to observe and understand the functioning ofservices.

Module Contents:

- Water Supply & Drainage -Water Supply and waste water system planning, collection, systems
- Water storage and distribution systems, Pressure zone, Pressure reducing valve, Pumps, Rain waterharvesting
- Sanitary drainage systems – stack systems, terminal velocity and terminal length, hydraulic jump, suds pressure zones, sewage treatment, recycling and reuse ofwater.
- Waste management, collection and disposalsystems
- Fire Safety in high rise buildings- Planning and design for fire safety, refuge areas, fire detection and fire alarm systems, fire hydrant systems, smoke managementsystems.
- Provisions in the National building code, International fire Code pertaining to High rise buildings.

Module 3: Electrical, Lighting, HVAC, Vertical circulation and other services

Learning Strategies:

- Lectures on the subjectcontent
- Case studies of relevantprojects
- Site visits to observe and understand the functioning ofservices.

Module Contents:

- Electrical & Lighting - Natural lighting systems, Energy efficiency in lighting systems, Load and Distribution, Planning for intelligent lightingsystem.
- Alternative energy sources in high risebuildings
- HVAC - Natural and Mechanical Ventilation Systems – Air-conditioning systems types for high rise, Air distribution systems, Planning and Design, Automation and energyManagement.
- Planning of vertical transportation in tall buildings- planning concepts, sky lobby concept, double decker lifts, innovativeconcepts
- Planning of surveillance system, security managementsystems
- Façade engineering, façade maintenance systems

Reference:

- 'National Building Code of India'2005– Bureau of Indian Standards,2005.
- International Fire Code, (2018), International CodeCouncil
- Manual on Water Supply and Treatment (1991) third Edition, Central Public Health and Environmental Engineering Organization, Ministry of Urban Development, NewDelhi.
- W.G. McGuiness and B. Stein 'Mechanical and Electrical equipment for buildings, John Wiley andsons Inc.,N.Y.
- RileyShuttleworth,(1983)'MechanicalandelectricalSystemsforConstruction',McGrawHillBook Co. U.S.
- A. K. Mittal, (2009), Electrical and Mechanical Services in High Rise Building: Design and Estimation Manual, CBS
- ASHRAE: Handbook–HVAC Systems and Equipment (1992), HVAC Applications (1991) ASHRAE, Inc. Atlanta.
- Energy Conservation building code-2007-Bureau of Energy Efficiency-Govt. ofIndia.
- ISHRAE the Hand Book on GreenPractices.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
VI	II	19AR06008(C)	Elective Theory 3: Indian Thoughts and Traditions	2			2	50		100	150

Course Overview:

The subject gives a basic introduction to the philosophies and inherent principles that generated the Art and Architecture of India. It also gives a glimpse of various schools of Indian thought and expression. The presentation of the subject may aim at developing a better appreciation and understanding of not only the Indian thoughts and traditions but also of many contemporary questions and issues that they handle in related disciplines.

Course Outcomes:

Upon completion of the course, the student should:

- Be made aware of the rich knowledge systems and traditions ofIndia
- Be introduced to the underlying concepts in Indian Art andArchitecture
- Have discussions on Indian Identity and Cultural Continuity areencouraged
- Have discussions on Ancient Indian wisdom and contemporary challenges aregenerated

Module 1: Overview of Indian Thought

Learning Strategies:

- Lectures anddiscussions

Module Contents:

- Historical origins of Indian thoughts and traditions- Pre-vedic, Vedic – Sources- Shruti and Smriti
- Concepts of Indian philosophy- Purusharthas, Varnasrama Dharma, Karma and Rebirth,Time
- Astika and Nastika schools- Understanding of Brahman, Atman, Samsara, Moksha-Implications
- Thoughts of Aurobindo, Tagore andGandhi

Module 2: Indian Thought and Ecology

Learning Strategies:

- Lectures anddiscussions

Module Contents:

- Nature as Sacred,Panchabhutas
- Flora and fauna, Sacred Geography- Sacred Groves and SacredPonds
- *Vasudhaiva Kutumbakam*, 'Deep ecological'implications

Module 3: Indian Thought and Visual Arts

Learning Strategies:

- Lectures anddiscussions

Module Contents:

- Introduction to Indian Art, Shadaṅga -The six limbs of Indianart
- Symbols and Iconography, Rasa theory of IndianAesthetics
- Sculpture and Painting- Cave Murals, Mughal, Pahari, Rajput, Tanjore,etc.
- Folk and tribal art forms- Kalamezhuthu, Madhubani, Warli, Pattachitra, Kalamkari, Gondetc.
- Mural traditions of Kerala- Study of style, Form andtechnique

Module 4: Indian Thought and Architectural

Expression Learning Strategies:

- Lectures anddiscussions

Module Contents:

- Underlying Philosophy ofVastusastra
- Sacred Geometry- Mandala,Bindu
- Stupa- The underlying philosophy and ArchitecturalExpression
- Temple- The underlying philosophy and ArchitecturalExpression

Reference:

- M. Hiriyanna, The Essentials of Indian Philosophy,1995
- Meera Baindur, Nature in Indian Philosophy and Cultural Traditions,2015
- S. Radhakrishnan, A Source Book in Indian Philosophy, Princeton University Press,1957
- S. Radhakrishnan, J. H. Muirhead, Contemporary Indian Philosophy, 1936 (http://archive.org/details/Contemporary.Indian.Philosophy)
- Richard Lannoy, The Speaking Tree: A Study of Indian Culture and Society,1971
- Lance E Nelson, Purifying the Earthly Body of God: Religion and Ecology in Hindu India,1998
- Carman Kagal (Ed.), Vistara: The Architecture of India,1986
- Aurobindo, Foundations of Indian culture, 1953(https://archive.org/details/in.gov.ignca.1542)
- Kireet Joshi, Philosophy of Indian Art,2011
- C.S. Gupta, Indian Folk and Tribal Painting,2008
- Syamala Gupta, Art Beauty & Creativity Indian and WesternAesthetics,1999
- G. Michell, The Hindu Temple – An Introduction to its Meaning and Forms,1977
- Thirumangalathu Neelakandan Moose, ManushyalayaChandrika
- CBSE textbooks on Traditions and Practices ofIndia
- S. Durai Raja Singam (Ed.), The Wisdom of Ananda Coomaraswamy: Reflections on Indian Art, Life, and Religion,1979
- Yatin Pandya, Concepts of space in Traditional Indian Architecture,2004

40. SEVENTH SEMESTER SYLLABUS

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
VII	I (a)	19AR07001	Architectural Design 7		10		10	250	250		500

Course Overview:

To familiarize students with housing design from a socio-economic perspective

- To observe lifestyles, social needs, human interaction, human normative behavior, tendencies, limitations and experiment with various housingtypologies
- To introduce fundamental economics of project and density-baseddesign
- To emphasize on dwelling community, neighborhood and housing infrastructure and services as major designparameters
- To introduce various tools and techniques of housing design- Land use survey, infrastructure, house hold surveysetc.
- To experiment with various construction methods and techniques suitable for masshousing
- To learn the efficiency of housing typology in various climatic zones, planning and circulation, health and hygiene, sanitation etc.
- To learn various techniques of affordable construction applicable in the housingtypology
- **Sustainable design objectives**: To equip the students to adopt sustainable housing design principles considering climate, building envelope, site selection and planning, water efficiency, energy efficiency, indoor air quality, green materials and resources, green infrastructure, renewable energy, natural lighting and fresh air ventilation, efficient landscape etc. Various green building rating systems such as IGBC (Green Homes), GRIHA, ECOHOUSING or any applicable rating systems may be considered. Advanced simulation and modeling techniques to orient the buildings and decide energy performance parameters may be explored

Course Outcomes:

Upon completion of the course, the student should:

- Understand the Housing economics, public policy and formulate appropriate spatialresponse
- Learn principles of housing standards and evolution of settlementpatterns
- Sensitize the students about land scarcity and expose them to different typologies of high-densityhousing
- Understand the challenges of bigger scale siteplanning

Major Project

The focus of the studio is to create housing typologies suitable to the context and experiment with different housing concepts. The project may focus on the design of a housing precinct/community with several housing types along with necessary amenities.

Projects can be formulated based on low-rise high-density housing and high-rise high- density housing depending on the context. Methodology may involve case studies, user interviews, questionnaire surveys, architect interviews, behavioral observations, meeting with housing

developers and job contractors, engineers, state housing department etc. may be used for collecting, comparing and analyzing information necessary for design decision making. Elaborate use of physical models and 3D models in addition to detailed drawings will be required to effectively communicate the design. Sample quantity estimates and specifications are to be prepared. Application of concepts of project phasing, fundamental economics of the project etc. may be considered.

Emphasis may be given on:

- Unit plan, cluster plan, zoning and blockdesign
- Structure, density, land use,coverage
- Urban infrastructure, Site and servicesschemes
- Housingshortages
- Basics of housingfinance
- Incrementalhousing
- Slums and squattersettlements
- Sustainability and energyefficiency
- Ventilation and daylighting
- Water and wastemanagement
- Walkability and universalaccess
- Affordable technology and prefabricationtechniques
- Participatory and community-oriented designapproach
- Parking and amenity sharing
- Residents associations and conflictresolution
- Buildingregulations

Safety and security services

Minor project

Detailing of a prototype unit and different permutations to achieve efficiency can be explored. Various techniques involved in modular construction/Prefabrication/ affordable construction techniques may be detailed out

Time bound project

Design of a simple public building/spaces such as banks, restaurants, food courts, supermarkets, public squares, monumental arches, memorials or any of similar scale and scope may be introduced for time bound evaluation of the student project

Reference:

- Christopher Alexander, “A pattern Language”, Oxford University press, New York1977
- SaxenaA.K.,“SociologicalDimensionsofUrbanHousingandDevelopment“,Commonwealth Publications, 2004
- Leuris (S), Front to back: “A Design Agenda for Urban Housing”, Architectural Press,2006.
- Richard Kintermann and Robert small, “Site planning for Cluster Housing”, Van Nastr and Reinhold company, London/New York1977.
- Correa, C. (2010). A Place in the Shade: The New Landscape and Other Essays. New Delhi: Penguin Books.
- Brooks, R. G. (1988). Site Planning: Environment, Process and Development.Michigan.
- Clapham, D., Clark, W. A. V. and Gibbs, K. (2012). The Sage Handbook of Housing Studies. London: Sage Publications.
- HUDCO publications – Housing for low income, sectormodel.
- Greater London Council. (1978). An Introduction to Housing Layout: A GLC Study.London.
- Lee, K. E. (1984). Time Saver Standards for Site Planning. McGraw-HillRyerson.
- Levitt, D. and Levitt, B. (2010). The Housing Design Handbook. New York:Routledge.
- Root, B. J. (1985). Fundamentals of landscaping and site planning. AVIPublications.
- Untermann, R. and Small, R. (1977). Site Planning for Cluster Housing. Van NostrandReinhold.
- National BuildingCode
- KPBR/KMBR/ Other relevant local buildingcode
- CPCB / State PCB regulations/impact studyguidelines

Sem	Subject Group	Course Code	Subject	Hours/week T	S	W/L	Credits	Marks CA	University Exam Jury	Written	Total
VII	I (c)	19AR07002	Working Drawings 2		4		4	100	100		200

Course Overview:

The subject aims to build upon what was taught in the previous semester by introducing ‘Good for Construction drawings’, preparation of structural, electrical, water supply and sanitation drawings for the design project of the previoussemester.

Course Outcomes:

Upon completion of the course, the student should:

- Develop necessary skills required to prepare ‘Good for construction’ workingdrawings
- Learn to draft and decipher supplementary working drawings of other disciplines and prepare coordinated working drawingsets.

Module 1: Project work

Learning Strategies:

- CAD DraftingStudios
- Workshops from industry experts including BIM asapplicable.

Module Contents:

- Project Work: Project continued from previous semester; Preparation of structural and services drawings anddetails.
- Structural drawings: Conventions & symbols; Foundations, Columns, Beams,Slab.

Module 2: Services Working Drawing I

Learning Strategies:

- CAD DraftingStudios
- Workshops from industryexperts

Module Contents:

- Electrical drawings: Conventions & symbols; Plans at alllevels.
- Water Supply drawings: Conventions & symbols; Plans at alllevels
- Sanitary drawings: Conventions & symbols; Plans at all levels; Site Plan, TerracePlan

Module 3: Services Working Drawing II

Learning Strategies:

- CAD DraftingStudios
- Workshops from industryexperts

Module Contents:

- Mechanical drawings: Conventions & symbols; Plans at all levels; Details ofLift.
- Complete integration of Architectural, Structural and Services drawings anddetails

Reference:

- Architectural Graphics by Francis D. K.Ching
- Building construction illustrated by Francis D.K.Ching
- Building construction metric Vol 1-5 by W.B.Mckay

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
VII	I (c)	19AR07003	Professional Skill Enhancement 7			4	2	50	50		100

Course Overview:

This course intends to provide/ enhance the soft skills in order that students perform well in their academics and beyond. These skills are intended to support the student to perform better in her/his core subjects and also build up robust performance through hands-on workshops and laboratory training. This course is subdivided into two categories – Mandatory and Optional. Mandatory courses help in preparations for respective semester subjects. The optional category helps students to take personal initiatives to develop in specific areas that can widen their horizon of their understanding of architecture and also initiate action at the society level. There are also options to work on competitive exercises alongside other similar institutions.

Course Outcomes:

Upon completion of the course, the student should:

- be given an exposure of varied skills that can bring in confidence in handling their core subjects such as workshops, communication skills, computer applicationsetc.
- be able to develop team spirit and interpersonal skills to manage complexsituations.
- be able to cope with stress and develop multi-taskingcapabilities.

Module 1: Team work skills

Learning Strategies:

- Practical hands onsessions
- Outdoor Workshops

Module Contents:

- Learning to work in a team as part of a largeendeavour.
- Learning to contribute with strategy suggestions, ideas andeffort.
- Cooperation and coordination.
- Assigning roles &responsibilities
- Resolvingconflicts
- Reliability

Module 2: Entrepreneurship skills

Learning Strategies:

- Groupdiscussions
- Interactive sessions

Module Contents:

- Identifying viableopportunities
- Ingenuity and creativity in conceptualising something that can take advantage of the identifiedopportunity.
- Establishing the resources needed for the conceptualisedenterprise.
- Starting and establishing the newenterprise.
- Managing theenterprise
- Acceptingrisks
- Reaping the anticipatedreward.

Module 3: Social initiatives or any other co-curricular activities

Learning Strategies:

- Technical and hands onworkshops
- Group discussions and Interactivesessions
- Self-initiatives

Module Contents:

- Optional content to be developed by each institution in order to help students to take part in activities that involve larger groups and facilitate peerlearning.
- The activities could be student initiated societal activities or participation in NASA or similar student led group initiatives which has an academic content aswell.

Reference:

- HILL, N. (2019). *THINK AND GROW RICH*. SIMON &BROWN.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
VII	II	19AR07004	Urban Design	2			2	50		100	150

Course Overview:

The subject is an overall understanding of urbanism and urban morphology as rising from history. The subject introduces the components of the modern city and their interdependencies, the scope and nature of urban design as a discipline. The key theories associated with urbanism and cities, an awareness of contemporary urban issues are addressed. The course introduces ways to perceive, document and explore cities.

Course Outcomes:

Upon completion of the course, the student should:

- Develop awareness on the evolution and characteristics of urban forms, their components and interdependencies.
- Understand urbanism through theories, aspects, issues andsolutions.
- Attain skills to observe, interpret and analyze the various urban scenario in presentday.

Module 1: Introduction & Theory

Learning Strategies:

- Lectures on urban design terminology, elements andprinciples.
- BookReviews

Module Contents:

- Relationship between Architecture, Urban Design and Urban Planning, Brief review on urban design as a discipline – Objectives and scope of urbandesign.
- Principles of urban design – Character, Continuity and Enclosure, Scale and mass, Quality of Public Realm, Ease of Movement, Legibility, Adaptability, Diversity, Sustainability. Skyline studies.
- Circulation – Shape of city - Road forms and hierarchy, Road pattern – Grid, Radial, Concentric, etc. Pedestrianareas.
- Theories of Urban Design – Figure Ground, Linkage and Place theory - Urban solid andvoid
- Urban morphology – Urban form – Determinants of urban form, Open space and urban space, Urban spaces and their characteristics, urban square /plaza.
- Elements of urban form (Urban structure, urban fabric, urban grain and tissue, Density & mix, Height and massing, Streetscape - street character, façade, materials, street furniture, lighting,signage.)

Module 2: History and surveying methods

Learning Strategies:

- Lecture on evolution on urban design through variouscivilizations.
- Debates on traditional and modern cases and projects of urbandesign.

Module Contents:

- Texts and theories of cities and urbanism – Imageability and Lynch, Townscape and Cullen, Genius Loci and Schulz.
- Understanding of urban forms and spaces at various scales through examples from historic cities - river valley civilizations (Mesopotamia, Indus Valley, Harappa), Classical cities (Greek and Romancities).
- Urban design elements in Medieval times (Castle town, Siena). Renaissance urbanism (Rome, idealcities).
- Impact of industrialization on urbanism - modern concepts (Haussmanisation of Paris, Eixample district Barcelona, Garden cities, City beautiful movement, Parksmovement.)
- Urban design projects in various scales: National, Metropolitan, City and project levels through Casestudies.
- Perceiving cities - Surveying methods and techniques - Demographic surveys, Infrastructure survey, Visual Survey, ecological survey and infrastructure survey- surveying building use and condition, colorcoding.

Module 3: Urban design – issues, opportunities & related terms and Urban Interventions

Learning Strategies:

- Lectures on various components of urban fabric, urban massing, urban conservation, various agencies involved.
- Seminar on understanding the stages involved in urban designprocess.

Module Contents:

- Zoning, land use, Place making, urban decay, change and renewal, heritage &conservation
- Suburban sprawl, TOD, gated communities, gentrification, modal split, waterfront development, globalization, community participation.
- Evolution of regulation, Urban design policies, formulation of policies for environment, conservation, transportation, parking, streetscape, built form and character, skyline through case studies.
- Legal aspects – LA act and town Planning act, Land Pooling,TDR.
- Agencies involved in the execution - Urban development authority, Municipal corporation / Municipality, Town and country planning organisation (TCPO), State Industrial Development & Investment Corporation, Housing and Urban development corporation Ltd. (HUDCO), role of Urban ArtsCommission
- Understanding aspects, issues and solutions related to urbanism today through study of literature and best practices/case studies (International and Indian) in urbandesign.

Reference:

- Paul D. Spreiregen, “Urban Design: The Architecture of Towns and Cities”, 1965,McGrawHill
- Kevin Lynch, 'The Image of the City' MIT Press,1960.
- Gordon Cullen, 'The Concise Townscape', The Architectural Press,1978.
- ‘Urban Design Reader’, 2006, Mathew Carmona and SteveTiesdell.
- Jonathan Barnett, 'An Introduction to Urban Design', Harper Row,1982.
- A.E.J. Morris, 'History of Urban Form before the Industrial Revolution', Prentice Hall,1996.
- Gosling and Maitland, 'Concepts of Urban Design', St. Martin’s Press,1984.
- Edmund Bacon, 'Design of Cities', Penguin,1976.
- 'Time Saver Standards for Urban Design', Donald Natson, McGraw Hill,2003.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
VII	II	19AR07005	Project Management	2				2	50		100

Course Overview:

- To make the students familiar with the various facts of construction planning and network analysis
- To familiarize students on project management procedures andmethods.
- To give an introduction to material management and safety measures in construction projects scheduling, resource and materialmanagement
- To introduce digital tools related to thesubject

Course Outcomes:

Upon completion of the course, the student should:

- Be able to understand different stages ofconstruction.
- Be able to use differentequipments.

Module 1: Planning Process and Network Methods

Learning Strategies:

- Site visit should be there to understand different stages ofconstruction

Module Contents:

- Introduction, Project Planning, Role of decision in projectmanagement
- Pre construction Planning Process, Pre construction planningActivities
- Scheduling and controlling, Importance of time, cost andresources
- Methods of planning andprogramming
- Introduction to Bar Chart, Development of barchart
- Short comings of bar chart and remedial measures: - Lack of degree of details, review of project progress, Activity inter relationships, timeuncertainties
- Network Method, Elements of network: -Event-Tail Event, Head Event, Dual RoleEvent,
- Activity –Representation and Identification, Inter relationships. PERT,CPM
- NetworkAnalysis
- NetworkCrashing

Module 2: Construction equipment, Resource scheduling, Material

Management Learning Strategies:

- Students are introduced to different constructionequipments.
- Students are introduced different systems in material management andsite.

Module Contents:

- Introduction to constructionequipments
- Construction Equipments-earth moving, handling, pneumatic and hoisting equipment – pile driving equipment– soil compaction &stabilization.
- Resource scheduling- resource allocation and resourceleveling
- Material management, Material controlsystems
- Inventory principles, Procurement planning, ABCAnalysis
- Fundamentals of Qualitymanagement
- Fundamentals of QualityAssurance

Module 3: Safety management, Risk Management, Maintenance

Management Learning Strategies:

- Site visit to understand the safetyfactors.

Module Contents:

- Recommended safety factors-Adjustment stress theory, Distractions theory. Chain of events theory
- Safety measures in different stages of construction – Pre planning programme. Implementation
- Risk Management, Types of risk inconstruction.
- Introduction to maintenance management inconstruction
- Introduction to software in projectmanagement

Reference:

- Robert Peurifoy, Clifford J. Schexnayder Construction Planning, Equipment and Methods, Mc GrawHill
- Callaghan,M.T,Quackenbush,D.G.andRowings-,J.E,'ConstructionProjectScheduling',McGraw-Hill

3. Robert B. Harris-, 'Precedence and Arrow Network Techniques for Construction

- Stevens James D, 'Techniques or Construction NetworkScheduling'
- Bhattacharjee S.K-,'Fundamentals of PERT/CPM and ProjectManagement'.
- N. P. Vohra- 'Quantitative Techniques inManagement'
- Construction Project management by Eddy MRojas
- Project Planning and Control with PERT and CPM by Dr. B C Punmia, K. KKhandelwal

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
VII	II	19AR07006	Environmental Science for Architecture	2			2	50		100	150

Course Overview:

- To enable understanding of the environment, and its interrelationship with livingorganisms.
- To help understand the importance of environment by assessing its impact on humans and to envision the surrounding environment, its functions and itsvalue.
- To give understanding of dynamic processes and features of the earth's interior andsurface.
- To give awareness about integrated themes and biodiversity, natural resources, pollution control and wastemanagement.
- To inform about scientific, technological, economic and political solutions to environmental problems.

Course Outcomes:

Upon completion of the course, the student should:

- Be able to make the students aware about the scientific knowledge and current debates on the environment at three nested scales, including their interlink ages – Global, Regional and Local.
- Enable the students to understand cause-and-effect relationships between various human, natural and climatic factors that impinges upon ecological systems and theirlinkages.
- Be thorough with its focus on real-life examples and through the medium of studio exercises, the student learns ways in which ecological and environmental concerns can be integrated (synthesis) into Architecturalprograms.
- Familiarize students with global & national environmental issues, the scale of impacts, important conventions, laws and policies in the field of biodiversity, and environmental protection.
- Familiarize students with global & national environmental issues, the scale of impacts, important conventions, laws and policies in the field of biodiversity, and environmental protection.
- Integrate with higher level studios that have complex briefs, including environmental and ecologicalconcerns.

Module 1: Environment, Ecosystems and Biodiversity

Learning Strategies:

- Lecturenotes
- Journals
- E-journals

Module Contents:

- Clean earth, nature and environment, environmental balance, the importance of environmental balance andsensitivity
- Natural cleansing and replenishing processes, life cycle systems, environmentalmodels
- Environmental carrying capacity, pollution, environmental damage, reversible and irreversiblechanges
- Types of ecosystems - Forest, Grassland, Desert, Aquatic (lakes, rivers and estuaries)., details of each type with examples
- Energy flow in the ecosystem, ecological succession, food chains, food webs, ecological pyramids and other schematicmodels
- Biodiversity, the importance of biodiversity, biodiversity at global, national and local levels, bio geographical classification of India, social, ethical and aesthetic perspectives on biodiversity and conservation
- Conservation of biodiversity, in-situ and ex-situapproaches

Module 2: Human Impact on The Environment

Learning Strategies:

- Lecturenotes
- Journals
- E-journals

Module Contents:

- Causes, cases, effects and control measures of different types of pollution including air, water, soil, marine, noise, thermal pollution, nuclearcontamination
- Consumerism, waste generation, waste management, causes, effects and control measures of municipal wastes, role of an individual in reduction and prevention ofpollution
- Over extraction and exploitation of natural resources, mineral resources, ecological impact of mining, case studies fromKerala.
- Water resources, use and overutilization of surface and groundwater, conflicts over water, water quality, toxicity, contaminants, construction of dams and their effects on forests and tribal people, case studies fromKerala.
- Forest resources, over-exploitation, deforestation with case studies fromKerala.
- Food resources, land use conversion, world food problems, overgrazing, effects of modern agriculture, monoculture, fertilizer-pesticide related problems, toxicity, soil salinity, case studies fromKerala.
- Energy resources - growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. casestudies.
- Land resources - land as a resource, land degradation, desertification, human link in disasters such as floods and landslides, human vulnerability, introduction to disaster mitigation, case studies fromKerala.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents, potential human extinction events, casestudies.
- Social impact, population growth, population explosion, disparity, skewed development, social/economic imbalance, inclusivegrowth

Module 3: Environmentally Sustainable and Conscious

Development Learning Strategies:

- Lecturenotes
- Journals
- E-journals

Module Contents:

- Vision of sustainability, environmental sustainability, social sustainability, models and approaches to sustainability, conscious decision making, inclusive planning, reduce-reuse-recycle concepts, introduction to sustainable, ecological and greendesign
- Cost-benefit comparison of developmentprojects
- Environmental mitigation, landscape ecology andreforestation
- Environmental legislation, environmental protection act, air (prevention and control of pollution) act, water (prevention and control of pollution) act, wildlife protection act, forest conservation act, law enforcement machinery, central and state pollution controlboards.
- Role of governmental and non-governmental and multilateral organizations in environmental debate, policymaking, mitigation, management and remediation, Ramsar convention, Gadgil Report and Kasturirangan Report on WesternGhats.

Reference:

- Gilbert M. Masters, ‘Introduction to Environmental Engineering and Science’, 2nd edition,Pearson
- Education,2004.
- Benny Joseph, ‘Environmental Science and Engineering’, Tata McGraw-Hill, New Delhi,2006.
- R.K. Trivedi, ‘Handbook of Environmental Laws, Rules, Guidelines, Compliancesand
- Standards’, Vol. I and II, EnviroMedia.
- Cunningham, W.P. Cooper, T.H. Gorhani, ‘Environmental Encyclopedia’, JaicoPubl.,
- House, Mumbai,2001.
- Dharmendra S. Sengar, ‘Environmental Law’, Prentice hall of India PVT LTD, NewDelhi,2007.
- Rajagopalan, R, ‘Environmental Studies-From Crisis to Cure’, Oxford University Press,2005.
- "Report of the Western Ghats, Ecology Expert Panel". Madhav Gadgil Commission. The Ministry of Environment and Forests, Government ofIndia

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
VII	II	19AR07007	Professional Ethics & Practice	2			2	50		100	150

Course Overview:

The Architects Act 1972, was the turning of in the history of Professional practice in India. This course is to define a value system in the architecture profession (practicing architecture) in the given diverse socio-cultural and economic-political context of India. The course will develop the correct attitude towards the highest standards of professionalism, integrity and competence. The Main goal is to equip the future architects to handle the social responsibility to ensure harmony, environmental protection, building social justice and the development of healthy communities within a high moral framework.

Course Outcomes:

Upon completion of the course, the student should:

- Be aware of the professional responsibilities of becoming anArchitect.
- Develop an understanding of the ethical responsibilities expected from anArchitect.
- Familiarise with the professional engagements with other stakeholders in theprofession

Module 1: Legalities of Profession

Learning Strategies:

- Analysis of judicial case studies
- Study of BareActs.
- Tender Documents andContracts.
- Measurements andValuation

Module Contents:

- Architectural Profession andlegalities
- Identify and discuss the provisions of architectural practice in various acts namely: The Architects Act 1972, Labour Laws of India, the companies Act 2013, The Arbitration and Conciliation Act 1996, Indian Copyright Act1957.
- Tenders – Tender Documents – EMD, Security deposit, Retention Amount, Bill of quantities and various abbreviations and Terminology used in tender document. Types of Tenders – their merits and demerits – Tenderingprocedure.
- Contracts – Articles of agreement and conditions of contract – Contract drawings – Contract Sum – Contract Bills – Consultants – Liquidated Damages – Variation and extras – Measurements - Certificates ofPayments
- Measurements and Valuation. Mode of measurements - methods. ValuationTechniques
- Conventions andCharters
- Role of Various Bodies – Council of Architecture (Govt), Indian Institute of Architects (Professional). Being part of the collective thought of thesebodies.
- Exposure to International Bodies likeRIBA
- History of Architecture Profession inIndia

Module 2: Morals & Ethics of Practice

Learning Strategies:

- Case studies of various case examples from professionalbodies.

Module Contents:

- Code of ethics for architecturalpractice
- Moral duties and responsibilities of anArchitect.
- Standards of Profession – Professionalism, integrity and competence, discussions on provisions of Competition Commission ofIndia
- Intellectual Property Rights Ancient IndianTexts

Module 3: Social Responsibilities and Duties

Learning Strategies:

- Case studies of various case examples on social issues relating to architectural profession and specific to the localcontext.

Module Contents:

- Social responsibilities ofprofession.
- Contributions to Government schemes and programmes, non-profit organisations, State and City level Improvementprogrammes.
- Public awareness of important architecturalissues
- Inclusivedesign
- Architecture as an agent of change – socio-economicperspective

Module 4: Architectural Practice & Management of Office

Learning Strategies:

- Students may choose offices and present an analytical report on office structure, managements.
- Case Studies from various offices in the City as well as acrossIndia

Module Contents:

- Architectural practice andoffice
- Work structure ofoffice
- Client management, office management, Human resource management, financial management
- Contracts and tenders and Fessstructure
- Architectural practice and building byelaws & National BuildingCode

Reference:

- Architectural practice in India by Prof. Madhav Deobakta and MeeraDeobakta
- Professional Practice by RoshanNamavati.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
VII	I (c)	19AR07008(A)	Elective Workshop 3: Contemporary process in Architectural Design	1		2	2	50	50		100

Course Overview:

- To introduce theories of media and its influence on the perception ofspace.
- To enable study of the various aspects of digital architecture and its exploration through emerging phenomena that relies on abstraction ofideas.
- To give understanding of the works of contemporary architects who have illustrated the influence of the digital media inarchitecture.

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding of the effect of contemporary theories of media on contemporary architecturaldesign.
- Have an insight into contemporary design process/theories and their relation to computation.
- Have the ability to understand specific aspects of contemporary processes appropriate to a design situation.
- Familiarise with architectural works derived from contemporaryprocesses.

Module 1: Introduction

Learning Strategies:

- Lectures, seminars, workshops andlabs

Module Contents:

- Investigation of contemporary theories of media and their influence on the perception of space and architecture. Technology and art. Technology and architecture. Digital technology andarchitecture.
- Aspects of digital architecture. Design and computation. Difference between digital process and non-digitalprocess.
- Architecture and cyberspace. Qualities of the new space. Issues of aesthetics and authorship of design.
- Increased Automatism and itsinfluence.

Module 2: Geometry and Surfaces

Learning Strategies:

- Workshops andlabs

Module Contents:

- Fractalgeometry.
- Shapegrammar.
- Hyper surface.
- Liquidarchitecture.
- Responsivearchitecture.

Module 3: Contemporary process and Architect's Works

Learning Strategies:

- Study to be undertaken in the form ofassignments/discussions/seminars/presentations.

Module Contents:

- Emerging phenomena such as increasing formal and functionalabstractions.
- Diagrams, diagrammatic reasoning, diagram and designprocess.
- Animation and design. Digitalhybrid.
- Ideas and works of architects related to contemporary processes. The architects to include Greg Lynn, Reiser + Umemotto, Lars Spuybroek / NOX Architects, UN studio, Diller Scofidio, Dominique Perrault, Decoi, Marcos Novak, Foreign Office Architects, Asymptote, Herzog and de Meuron, Neil Denari, Serie Architects, BIGArchitects.

Reference:

- Walter Benjamin, 'The Work of Art in the Age of Mechanical Reproduction', in Illuminations, Schocken Books, New York,1969
- Ignaci de Sola Morales,'Differences: Topographies of Contemporary Architecture', MITPress,1997.
- William J Mitchell, 'The Logic of Architecture: Design, Computation and Cognition', MIT Press,1995.
- Ali Rahim, 'Contemporary Process in Architecture', John Wiley & Sons,2000.
- Ali Rahim (Ed), 'Contemporary Techniques in Architecture', Halsted Press,2002.
- Peter Eisenmann; Diagram Diaries,Universe,1999.
- Grey Lynn, 'The Folded, The Pliant and The Supple, Animate form', Princeton Arch.Press,1999.
- Gillian Hunt, 'Architecture in the Cyberspace II', John Wiley & Sons,2001.
- L. Convey et al, 'Virtual Architecture', Batsford,1995.
- Rob Shields (ed.), 'Cultures of the internet: Virtual Spaces, Real Histories, Living bodies', Sage, London, 1996.
- John Beckman, 'The Virtual Dimension, Architecture, Representation and Crash Culture', Princeton Architecture Press,1998.
- William J Mitchell, City of Bits: Space, Place and the Infobahn', MIT Press, Cambridge,1995.
- Marcos Novak, 'Invisible Architecture: An Installation for the Greek Pavilion', Venice Biennale,2000.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
VII	I (c)	19AR07008(B)	Elective Workshop 3: Graphic Design	1		2	2	50	50		100

Course Overview:

To expose the students to the various graphical expressions and strategies. Upon completion of the course, the student shall acquire a basic awareness in creating and developing graphically mature designs at both smaller and larger scales, such as that of corporate logos to designer portfolios. They may continue to use this portfolio for Architectural Internship.

Course Outcomes:

Upon completion of the course, the student should:

- Be introduced to the discipline of GraphicDesign
- Develop basic skills required in handling simple sheetpresentations
- Describe the graphic design process and account for its conditions andterms
- Use basic sketching techniques to communicateideas
- Plan, implement and present a poster, e-book, portfolio, logoetc.
- Use any CAD-software to design with the help of effective illustrativemethodology
- Create a personalportfolio.

Module 1: Fundamentals of Graphic Design

Learning Strategies:

- Lectures, Discussion,workshops

Module Contents:

- Fundamentals of Graphic Design: Introduction to Graphic Design –works of prominent designers & the graphic designprocess.
- Overview of design basics – colour, harmony, rhythm, balance, proportionetc.
- Visual perception & graphicalthinking.

Module 2: Graphic Design in detail

Learning Strategies:

- Workshops andlabs

Module Contents:

- Tools of Graphic Expression. Styles of expression–an overview; Illustrations - developing manual presentation skills. Computer graphics - potentials &applications
- Designing forprinting.
- Typography.
- Design of books, posters, promotional materials, stationeryetc.
- Developing trade marks & corporate logos. Evolving a comprehensive corporate identity program.

Module 3: Project: Portfolio Design

Learning Strategies:

- Workshop on Architectural PortfolioDesign

Module Contents:

- Introduction to graphic design softwares such as Adobe Illustrator, Photoshop, InDesign,etc.
- The student has to create a portfolio design either Architectural or individual subjects or themes as decided by individual faculties. This may be based on product design, photography, interior design, landscape, corporate branding or soon.

Reference:

- White, Alex W, "The Elements of Graphic design",AllworthPress,2011
- Lupton, Ellen, "Thinking with type", Princeton architectural press,2004.
- Wheeler, Alina, "Designing brand identity", Jon Wiley and sons,2012
- Rand, Paul, "A designer's art", Yale University press,2001.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L		Jury	Written		
VII	I (c)	19AR07008(C)	Elective Workshop 3: Product Design	1		2	2	50	50		100

Course Overview:

To expose the students to the various theoretical and practical aspects of ergonomics and product design. Upon completion of the course, the student shall acquire a basic awareness in conceptualizing the design of a product and presenting it and develop a general understanding of the basic rules of product design as well as the physical and psychological requirements of design.

Course Outcomes:

Upon completion of the course, the student should:

- Be introduced to the discipline of ProductDesign
- Develop basic skills required in handling simple product designprojects
- Describe the product development process and account for its conditions andterms
- Use basic sketching techniques to communicateideas
- Plan, implement and present a product designproject
- Use any CAD-software to design products and with the help of top-downmethodology,
- Create small prototype of theproduct

Module 1: Introduction to Product Design

Learning Strategies:

- Lectures, discussions andworkshops

Module Contents:

- A brief introduction to Product Designing and concept generation. Design process andstages.
- Goals of Product Design and the Role of ProductDesigners.
- Factors affecting product design: Form, color, symbols, user specific criteria; material, technology and recyclability; packaging, cost, fashion, function, aesthetics, environmentetc.
- Multiple utility-oriented approach to productdesign.
- Visual Design, Typography and Product Brandingbasics.

Module 2: Product Design and Ergonomics

Learning Strategies:

- Lectures, discussions andworkshops

Module Contents:

- Study of Ergonomics and Anthropometrics. ProductErgonomics.
- Ergonomics and Human Factors. Human physical dimension concern. Posture andmovement.
- Behavior and perception. Industrial Product design, user friendly design, design for serviceability, design for environment, prototyping and testing, costevaluation.

Module 3: Project: Simple Product Design

Learning Strategies:

- Hands on Workshops on ProductDesign

Module Contents:

- Generation of themes, product brief and presentation. The student has to conceptualize a product and through the various stages of development reach a design for the product. This designstagesmaybemanualordigitalinnature.Finalproducthastobepresentedasa working or non-working prototype in a 1:1 scale (exceptions as decided by the faculty).

Reference:

- Will Potts, A-Level ProductDesign,
- Michael Ashby, Kara Johnson, Materials and Design: The Art and Science of Material Selection in ProductDesign,
- W.S. Green, Human Factors in ProductDesign,
- Lesley Cresswell, Product Design: Graphics with MaterialsTechnology,
- Jacob Goldenberg, David Mazursky, Creativity in ProductInnovation,
- Charles M. Eastman, Building ProductModels
- Time Saver Standards for InteriorDesign
- An invitation to Design, Helen MarieEvans.

41. EIGHTH SEMESTERSYLLABUS

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
VIII	I (c)	19AR08001	Professional Training			30	15	250	500		750

Course Overview:

This aims at creating an insight into the profession (practicing architecture) before completing the B.Arch. course. They are required to undergo Practical Training under a registered architect / Firm with minimum of 5 (five) years' experience after COA registration and approved by the teaching institution.

Course Outcomes:

Upon completion of the course, the student should:

- Have a general idea about the architecture profession and architect's office: Duties, responsibilities, how to function, coordination, services provided & Role of architect, do's and don'ts.
- Have a clear idea about the profession (in practicing architecture): from initial discussions, site surveys, design, presentation, client meetings, preparation of sanction drawings, schedules, inviting quotations/ Tenders, awarding of works, execution (soil investigation, setting out to the final completion along with site visits, stage certificates, measurements), valuation andarbitration.

The students are expected to get exposure in the following aspects:

i) Involvement in the Design process
ii) Site visits and sitesupervision
iii) Preparation of drawings for presentation, building permits, working drawings, service drawingsetc.
iv) Preparation of B.O.Q, estimates, Q.OB.M, tender documents and contractdocuments.
v) Discussion/ Meeting with clients, contractors and otherconsultants.

Monthly report & Evaluation:

The students are required to send joining report and monthly reports of the works done (in the format prescribed by the Institution) duly signed by the Trainer architect / an authorised officer supervising the work, immediately after the completion of each month, to the faculty in charge of the Teachinginstitution.

The University Exam of the Professional Training will be conducted at the end of 8th semester. The students are required to submit a complete report including the details of works done by them during the entire training period, illustrating with sketches, printouts and other supporting documents related to the projects on which she/he has involved both in office and site, a work diary

(showing the schedules/activities), originals of monthly reports, a certificate regarding their punctuality, performance and conduct of work done during the training period and regarding the successful completion of the training under the approved architect / Firm. In absence of all the above documents, students shall not be permitted to appear for the University Exam, which is part of theCA.

Minor Project:

Critical appraisal: The students are required to do a critical appraisal of one of the buildings designed by the architect under whom she/he undergoes Practical Training. All the students are required to submit a report on this at the end of Semester 8 (along with the Professional Training Report).

Reference:

- Professional Practice by RoshanNamavati.
- House of form and culture by AmosRapoport
- Architectural Design by JaneAnderson
- Elements of space making by YatinPandya

42. NINTH SEMESTER SYLLABUS

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
IX	I (a)	19AR09001	Architectural Design 8		10		10	250	250		

Course Overview:

- To familiarize students with urban design vocabulary and expose them to complexities of architectural intervention in urbansettings
- To introduce the students to the analysis, planning and design with the understanding of a wide range of related issues in urban or ruralcontext.
- To make the students understand the role of architecture in shaping the urban fabric and to create architecture which fits into a specific urbancontext.
- To understand the part to whole design process and improve communicative skills, team worketc.
- To sensitise the students about the interface between public and privatedomain
- **Sustainable designobjectives:**

  To understand the relationship of urban design with economic, environmental and social sustainability. To equip the students to adopt sustainable urban design principles considering climate, urban heat island mitigation, building envelope, site selection and planning, water efficiency, energy efficiency, indoor air quality, green materials and resources, green infrastructure, compact city planning, green mobility, barrier free accessibility, renewable energy, natural lighting and fresh air ventilation, efficient landscape etc. Indian Green buildingstandardssuchasIGBC(GreenCities),GRIHA,ECOHOUSINGorotherrelevantrating systems may be considered.

Course Outcomes:

Upon completion of the course, the student should have an:

- Understanding of contemporary urban issues as well as learn about possiblesolutions
- Understanding of various components of urban environment and theirinterrelationship
- Understanding of people as users of various urban environment and design implications on the enduser
- Understanding of mapping and diagrammingtechniques

Major Project

The project may focus to address varied components including large scale urban interventions, guidelines for heritage areas, adaptive reuse, transportation nodes and infrastructure additions, densification along transit nodes and corridors revitalization and renewal of urban fragments, new communities and community development, multi-use urban complexes, conservation and reuse of building in the context, Redevelopment of historic city center, revitalization of traditional urban cores, Green filed / Brownfield development, urban waterfront development, Market squares etc.

The students are expected to carry out urban intervention in a real-life location. The design considerations may involve context, views, orientation, volumetric study, skyline, vehicular and pedestrian circulation, figure ground study, utility, circulation network, street scape etc. The socio-cultural and economic perspectives may be well documented and analysis may be carried out to

finalize the suitability of intervention. Types of planning instruments such as structure plans, master plans and local area plans and zoning guidelines shall be introduced. The project will have to focus on the development of a physical environment considering planning norms, infrastructure network, built unbuilt relationship, connectivity andcharacter.

Emphasis may be given on

- Understanding the Elements and principles of Urbandesign
- Urban Conservation, Reuse and Building inContext.
- Urban insert, relationship of building to urban character and existingform
- Urban renewal and urbansprawl
- Urban sector or Block, its structure andcomposition.
- Sustainability and reuse of buildings incontext
- Infrastructure, building bye laws, co-relation of part towhole,
- Typo morphology
- Ecological concerns and sustainableurbanism
- Expressions of relationship to tradition urbanforms
- Design communication and role of publicparticipation
- Preparation of urban designguidelines

Minor Project

Urban design detailing - (built and landscape) – Plazas, city square, adaptive reuse-built form, residential/ public, commercial/mixed buildings, character of buildings in detail, sustainability and infrastructure detailing in site level, streetscape and street furniture, activity mapping, Preparation of urban design guidelines etc.

Time bound project

Tactical urbanism projects in their campus or any selected sector/street, design of a streetscape of the selected sector, Mental mapping of the selected sector, Understanding successful public places through individual live (video documentation & presentation) and literature case studies etc.

Reference:

- Gordon Cullen, *The Concise Townscape*, The Architectural Press,1978
- Donald Watson, *Time Saver Standards for UrbanDesign*.
- Paul D. Spreinegar, *Urban Design, the Architecture of Towns and Cities*, Mc GrawHill.
- Jonathan Barnett, *An Introduction to Urban Design*, Harper Row,1982
- Geoffrey Broadbent, *Emerging Concepts in Urban Space Design*, Taylor & Francis,2003.
- Kevin Lynch, *Image of theCity*.
- Edurand Bacon, *Design ofCities*.
- Edward D. Mills, *Planning the ArchitectsHandbook*.
- Julius Panero & Zeluik, *Human Decision and Interior Space*, Whitney Library of Design Publication, 1989.
- Jane Jacobs, *Death and Life of Great AmericanCities*.
- William H. Whyte, *The social life of small urbanspaces*.
- Moughtin, C., Cuesta, R., Sarris, C. and Signoretta, P. (2003). *Urban Design - Methods and Techniques*. Oxford: ArchitecturalPress.
- Lang, J. T. (2005). *Urban Design: A Typology of Procedures and Products*. Oxford: Elsevier/ArchitecturalPress.
- Watson, D., Plattus, A. and Shibley, R. (2003). *Time-Saver standards for urban design*. New York: McGrawHill.
- Marshall, S. (2009). *Cities design and evolution*. New York:Routledge
- Lynch, K. (1984). *Good city form*. Boston: MITPress.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L				Jury	Written
IX	I (b)	19AR09002	Advanced Building Technology	2	3		5	125	125		250

Course Overview:

The subject primarily aims at developing understanding in use of appropriate construction technique and material in building design based on feasibility of technology, physical properties (like density & specific gravity, strength, thermal properties), aesthetic value, socio-cultural impacts and relevance, socio-economic factors, Ecological footprint etc.

The course introduces the technological aspects of a building design from the perspective of functional building component where use of natural and artificial materials is discussed based on their application. Construction technology and appropriate materials for structural systems, roofing, enveloping and interior finishes shall be considered under this subject from simple examples to complex.

Course Outcomes:

Upon completion of the course, the student should:

- Develop necessary decision-making skills in using appropriate construction technologies and materials while designing buildings, based on understanding of their potentials and properties.
- Develop the skill to represent various construction techniques as well as materials through drawings supporting their buildingdesign.

Module 1: Pre-fabrication & Modular Co-ordination

Learning Strategies:

- Lecture on pre-fabricatedcomponents
- Market study on current construction practices
- Site visits and documentation to understand constructionpractices
- Detailed drawings of small prefabricatedstructures

Module Contents:

- Introduction to the concepts of standardization – need andimportance.
- Introduction to concepts of Modular Coordination Objectives of Modular coordination & definition of Basic Module. Modular controlling dimensions, Planning Modules and preferred Multi-modules.
- Introduction to concepts of prefabrication. Advantages & disadvantages of onsite & off-site prefabrication. Methods of prefabrication & Examples of prefabricated components. Process of prefabrication. Various issues related to prefabrication industry & Examples of prefabricationconcepts
- Modular and prefabricated construction using various materials – Concrete, Steel, Aluminum, Ceramics, Plastics, Wood – applications on wall, roof, structural members, floor, fenestrations.

Module 2: Advanced Architectural Building Structures

Learning Strategies:

- Lecture on various types advanced buildingstructures
- Site visits to construction sites during variousstages
- Case studies and presentations of different advanced buildingstructures
- Detailed drawings of constructionmethods

Module Contents:

- Pre stressed concrete structures: Precast pre stressed construction. Use and examples of various pre stressed structures. Two-way waffle slab, Two-way flat plate, Two-way flat slab, Pre tensioning, Post tensioning, Hollow core slabs, T beam andslab.
- Tensile structures: Concept of tensile structures, formation, classification, use and examples of various cable structures. Application of cable structures in architecture. Materials and construction methods of membranestructures.
- Special Structures: Concept, Classification and Application of Pneumatic Structures, Kinetic Structures and Mobile Structures, Portal frames: Definition, andApplication.

Module 3: Advanced Building Types

Learning Strategies:

- Lecture on various types advanced buildingstructures
- Site visits to construction sites during variousstages
- Case studies and presentations of different advanced buildingstructures
- Detailed drawings of constructionmethods

Module Contents:

- Design of buildings for earthquake resistance - Structural Systems, Seismic Design Code Provisions, design of nonstructuralelements.
- Seismic design and detailing of RC and steelbuildings
- High rise structures – structural systems – braced frame, rigid tube, tube in tube, diagrid, bundled tube, space frame and mega frame.
- High rise structures - planning and scheduling for high rise building, scheduling, Typical Floor Construction Cycle, Self-climbing form work &cranes

Reference:

- M.S. Shetty, 'Concrete Technology', S. Chand & Co.ltd, New Delhi,1986.
- S.C. Rangwala, 'Engineering Materials', Charotar Publishing House, India,1997.
- P.C. Varghese, 'Building Materials', Prentice hall of India Pvt Ltd, New Delhi,2005.
- Don A. Watson, 'Construction Materials and Process', McGraw HillCo.,1972.
- Jack M. Launders, 'Construction Materials and Methods', Careers, South Holland, Illinois,Wilcox Co.Ltd.,1986.
- Chudley, Construction Technology, ELBS,1993
- Barry, Construction of Buildings, East West Press,1999
- Emitt&Gorse(2006),"Barry'sAdvancedConstructionofBuildings",SecondEdition,WileyIndiaPvt. Ltd.
- Mackay, J.K. (2015), "Building Construction", Fourth Edition, PearsonIndia.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
IX	I (c)	19AR09003	Professional Skill Enhancement 8			4	2	50	50		

Course Overview:

This course intends to provide/ enhance the soft skills in order that students perform well in their academics and beyond. These skills are intended to support the student to perform better in her/his core subjects and also build up robust performance through hands-on workshops and laboratory training. This course is subdivided into two categories – Mandatory and Optional. Mandatory courses help in preparations for respective semester subjects. The optional category helps students to take personal initiatives to develop in specific areas that can widen their horizon of their understanding of architecture and also initiate action at the society level. There are also options to work on competitive exercises alongside other similar institutions.

Course Outcomes:

Upon completion of the course, the student should:

- Be given an exposure of varied skills that can bring in confidence in handling their core subjects such as workshops, communication skills, computer applicationsetc.
- Be able to develop team spirit and interpersonal skills to manage complexsituations.
- Be able to cope with stress and develop multi-taskingcapabilities.

Module 1: Thesis Initiation workshop

Learning Strategies:

- Seminars on Thesisorientation

Module Contents:

- Identify the broad study area for thesis based on literature review and case study, and its oral and visualpresentation.
- Interpretation drawings, visual presentation techniques withinfo-graphics.
- Literature review and identification of research area and stating the researchquestion.
- Time-workschedule
- Presentation on-Selection of topic, reason for selection, justification,synopsis

Module 2: Career perspectives

Learning Strategies:

- Group discussions and Interactivesessions

Module Contents:

- Exploring the Future in Architecture
- Employmentopportunities
- Diversifyingskills
- Specializations in Architecture and alliedfields
- Academicpursuits
- Research opportunities

Reference:

- Coles, R., Siener, W. and Coles, S. (2016). *Architecture + advocacy*. Buffalo ArtsPublishing.
- CROUCH, C. (2019). *DOING RESEARCH IN DESIGN*. [S.l.]: BLOOMSBURY VISUALARTS.
- Indranil, S. (2018). *11 Steps to Architectural Thesis*. 1st ed. NotionPress.
- Spector, T. and Damron, R. (2013). *How architects write*. New York, N.Y: Routledge, Taylor & Francis Group

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
IX	II	19AR09004	Green Built Environment	2			2	50		100	150

Course Overview:

- To give an understanding of the concept of human comfort and sustainabledevelopment.
- To enable understanding of the concept of sustainable communities and associated socioeconomic dimensions through casestudies.
- To inform about the need to use alternative sources of energy in view of the depleting resources and climatechange.
- To create awareness of current trends and futuristic ideas in the design of sustainable built environment.

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding of the concepts of ecosystem, carrying capacity, ecological footprint, human comfort and sustainabledevelopment.
- Have familiarity with approaches to achieving sustainable buildings andcommunities.
- Have familiarity with current trends in creating a sustainable builtenvironment.

Module 1: Global Environmental Issues and Approaches Towards Sustainability

Learning Strategies:

- Lecturenotes
- Journals
- E-journals

Module Contents:

- Overview of global warming, climate change and environmental degradation, impact on humans
- Approaches to sustainability, Space-Ship-Earth concept, global trends in environmental mitigation and remediation, Overview of green ratingsystems.
- Environmental ethics, polluter pays, environmental credits, carbon trading, global conventions, agreements and strategies, Climate protocols, Brundtlandreport
- Sources of energy & resources - renewable and nonrenewable, energy systems, energy crisis, energy demand, carbon emissions, embodied energy and transportationcosts
- Green energy- Solar, Wind, Bio, On grid and off grid, hybrid systems and newtechnologies.

Module 2: Sustainable Development

Learning Strategies:

- Lecturenotes
- Journals
- E-journals

Module Contents:

- Sustainable Development and Green cities, carrying capacity concepts, sustainability assessment
- Sustainable communities- social, cultural and economic factors, Low waste and net-zero community concepts,eco-communities
- Efficient urban mobility, multimodal public transport systems, electric vehicles & related infrastructure
- Sustainable urban waste management, Community level wastemanagement
- Open spaces, recreational spaces and urban forestry, urban ecology, public healthetc.
- Water and common resources management, Nuclear policy, Institutional framework for monitoring and promoting sustainability - Master plans, Development controlsetc.

Module 3: Sustainable Design

Learning Strategies:

- Lecturenotes
- Journals
- E-journals
- USGBC, IGBC and GRIHA webresources

Module Contents:

- Introduction to sustainable, ecological and green design, sustainable site selection anddesign
- Sustainable lifestyles, vernacular techniques and approach to sustainability, use of local materials inconstruction
- Thermal properties of materials, technological advancements in climatic control in different climatic zones with particular reference to Tropical climate, innovative construction materials andtechniques
- Energy, water and resource conservation in design, reduced, reused and recycled products in construction, Energy and Waterefficiency
- Indoor Environmental Quality - Importance of Ventilation, Low emitting materials, Lighting controls, Thermal comfort and Acousticalperformance.
- Introduction to Green building rating system in India- Griha, IGBC, BEE-ECBC with suitable examples.

Reference:

- 'Manual on Solar Passive Architecture', IIT Mumbai and Mines New Delhi,1999.
- Arvind Krishnan et al, 'Climate Responsive Architecture A Design Handbook for EnergyEfficient
- Buildings', Tata McGraw Hill Publishing Company Limited, New Delhi,2001.
- Majumdar M, 'Energy-efficient Building in India', TERI Press,2000.
- Givoni. B, 'Passive and Low Energy Cooling of Buildings', Van Nostrand Reinhold, NewYork,
- 1994.
- Fuller Moore, 'Environmental Control Systems', McGraw Hill Inc, NewDelhi,1993.
- Sophia and Stefan Behling, 'Solpower The Evolution of Solar Architecture', Prestel, NewYork,
- 1996.
- Patrick Waterfield, 'The Energy Efficient Home: A Complete Guide', Crowood press Ltd,2011.
- Dean Hawkes, 'Energy Efficient Buildings: Architecture, Engineering and Environment',W.W.
- Norton & Company,2002.
- David Johnson and Scott Gibson, 'Green from the Ground Up: Sustainable, Healthy andEnergy
- Efficient Home Construction', Taunton Press,2008.
- LEED v4.1 Building Design and Construction, US Green BuildingCouncil
- Abridged GRIHA Manual, GrihaIndia

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
									University Exam		
				T	S	W/L		CA	Jury	Written	Total
IX	II	19AR09005	Disaster Management & Mitigation	2				2	50		100

Course Overview:

The course intends to provide a general concept in the dimensions of disasters caused by nature beyond human control as well as the disasters and environmental hazards induced by human activities with emphasis on Natural disasters & Man-madedisasters.

The subject primarily aims at developing a fundamental understanding of different aspects of Disaster Management. It would also provide basic knowledge, skills pertaining to Planning, Organizing and Decision-making process for Disaster RiskReduction.

Course Outcomes:

Upon completion of the course, the student should:

- Develop a comprehensive understanding of the concepts and fundamentals of disasters caused by nature as well as the disasters and environmental hazards induced by human activities
- Develop a basic understanding of the principles and processes pertaining to disaster preparedness, response andrecovery

Module 1: Introduction to Disaster Management

Learning Strategies:

- Lectures explaining the concepts & fundamentals of disastermanagement.
- Case analysis of globaldisasters
- Screening of documentaries on recentdisasters

Module Contents:

- Disaster & Emergencies: Concept & Fundamentals of DisasterManagement
- Understanding the Concepts and definitions of Disaster, Hazard, Vulnerability, Risk, Capacity & Equations of DisasterManagement
- Types & Classification ofDisasters
- Causes & Consequences ofDisasters
- Global Disaster Trends - Changing Types &Patterns
- Disaster vsDevelopment
- Emerging Risks of Disasters –Climate Change and Urban Disasters

Module 2: Disaster Management Cycle and

Framework Learning Strategies:

- Lecture on disaster management cycle & phases of disastermanagement
- Caseanalysis

Module Contents:

- Disaster ManagementCycle
- Pre-Disaster –Risk Assessment and Analysis, Risk Mapping, Zonation and Micro zonation, Prevention and Mitigation of Disasters, Early Warning System; Preparedness, Capacity Development;Awareness
- During Disaster –Evacuation –Disaster Communication –Search and Rescue –Emergency Operation Centre –Incident Command System –Relief andRehabilitation
- Post-disaster –Damage and Needs Assessment, Restoration of Critical Infrastructure – Early Recovery –Reconstruction andRedevelopment
- IDNDR, Yokohama Strategy, Hyogo Framework ofAction

Module 3: Applications of Science and Technology for Disaster Management, Disaster Management Framework in India

Learning Strategies:

- Lectures
- National Disaster Management Plan, Ministry of Home affairs, Government of India http://www.ndma.gov.in/images/policyplan/dmplan/draftndmp.pdf)
- Manual on Disaster Management, National Disaster Management, Agency Govt ofIndia.

Module Contents:

- Geo-informatics in Disaster Management (RS, GIS,GPS)
- Structural and Non-Structural Mitigation ofDisasters
- Disaster Management in India - Disaster Profile of India, Disaster Management Act 2005, National Policy on DisasterManagement
- Role of Government (local, state and national) - NDMA, NIDM, NDRF, Non-Government and Inter-GovernmentalAgencies

Reference:

- Disaster Management by Mrinalini Pandey Wiley2014.
- Disaster Science and Management by T. Bhattacharya, McGraw Hill Education (India) Pvt Ltd Wiley 2015
- Earth and Atmospheric Disasters Management, N. Pandharinath, CK Rajan, BS Publications2009
- Reducing Disaster Risk: A Challenge for Development,U.N.D.P.2004.
- Introduction to Natural and Manmade Disasters and their Effects on Buildings, Macdonald Roxana, Architectural Book Publication Co,2003
- Introduction to International Disaster Management, Coppola D P, Elsevier Science (B/H), London, 2007.
- World Disasters Report, International Federation of Red Cross and Red Crescent, Switzerland,2009.
- Management of Natural Disasters in developing countries, H.N. Srivastava & G.D. Gupta, Daya Publishers, Delhi,2006
- Encyclopedia of Disasters –Environmental Catastrophes and Human Tragedies, Vol. 1 & 2, Angus M. Gunn, Greenwood Press,2008
- Encyclopedia of disaster management, Vol I, II and IIIL Disaster management policy and administration, S L Goyal, Deep & Deep, New Delhi,2006
- Tushar Bhattacharya Disaster Science and Management McGraw Hill Education (India) Pvt.Ltd.

						Marks

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	CA	University Exam		Total
				T	S	W/L			Jury	Written	
IX	I (c)	19AR09006	Research Methodology	2			2	50	50		100

Course Overview:

This course is designed to explore the meaning of research and generate an understanding about the importance of research in the field of architecture and train to write a technical paper of related research topics good for publishing.

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding of the role of research inarchitecture.
- Develop abilities to interpret and evaluateresearch.
- Develop abilities to conduct architectureresearch.
- Have an understanding of data, information, and knowledge and present researchresults.
- Develop technical writingskills.

Module 1: Introduction to Research

Learning Strategies:

- Lecture/Workshop on significance of research and significance of research in the field of Architecture

Module Contents:

- Introductionto“Research”,MeaningofResearch,SignificanceofResearch,Researchworld views and approaches.
- Types of Research, Scientific and Social Research, Researchprocess
- Meaning of research and its significance in the field of Architecture, Types of research in the field of architecture, potential areas/types, qualitative and quantitativeparadigms.

Module 2: Research Design

Learning Strategies:

- Lecture/Workshop on Research Design components & Researchmethods.

Module Contents:

- Components of Research design, formulating research questions, researchobjectives
- Choosing the research strategy- inductive and deductive research, Hypothesis types and testing
- Choosing the sample, Methods of data collection, specific techniques in architectural research.
- Literature search and review, significance, sources of information, the use of libraries and data bases, aim and structure of a literature review, Referencing and documenting the bibliography.
- Methods of Research in Architecture- Interview Techniques: Questionnaires /Face toface

Interviews / Internet survey. Designing a Questionnaire / Interview schedule. Visual Techniques: Observations (participant / nonparticipant / direct), activity mapping, accession/erosion trace observations, cognitive maps, etc. Content Analysis: Secondary data analysis.

Module 3: Quantitative Data Analysis and Introduction to Applied Statistics

Learning Strategies:

- Lecture/Workshop on Data analysis, interpretation & representationmethods

Module Contents:

- Understanding the nature and scale of data collected and methods of analysis suitable for that data (graphical / numerical / descriptive). Converting data into numerical form for data analysis.
- Concepts of dependent and independent variables, unit ofanalysis.
- Introduction to the simple statistical methods of analyzing numerical data – measures of central tendency and dispersion, Introduction to the concept of tests, correlation and regression. Inferring from the data and interpreting the meaning of those inferences. Use of MS Excel for statistical dataanalysis.
- Techniques of presenting the numerical data – graphical (pie charts, bar charts, line graphs etc.), tabulations, verbal qualitative data, architectural drawings /maps.

Module 4: Research writing & Technical paper

Learning Strategies:

- Workshop on Research writing. Technical paperpresentation

Module Contents:

- Significance of report writing, steps in writing report, structure of a report, Different sections of a research report, technical writing and language (tense, voice, etc.), the necessity for the development of writing skills, technical data about formal writing, the use ofvisuals.
- Introduction to scholarly writing and publishing a paper, guidelines for writing a research paper, structure of a research paper, sequence of tasks for research paper writing, writing and presenting a conference paper, presentation of scientificresearch.
- Use of primary and secondary references, bibliography, notation, cross-referenceetc.
- Understanding the relative advantages, disadvantages and application of various methods mentioned above and choosing a method appropriate for a research to achieve its objectives. The student is required to write a technical paper good for publishing, on any of the approved topics at the end of thecourse.

Reference:

- Groat, Linda N. and Wang, David C. 2002. Architectural Research Methods. New York: JohnWiley.
- Norman K Denzin and Yvonna S Lincoln (Eds.) Handbook of Qualitative Research, Thousand Oaks: Sage Publications, pp. 377392.1994.
- Giere R.N. (1991), "Understanding Scientific Reasoning", Holt Rinehart & Winston,U.K.
- Moroney M.J., "Facts from Figures", Penguin,1990.
- Day R.A., (1991) "How to Write and Publish a Scientific Paper", Cambridge University Press,R.K.
- Yin, R.K. (1994). Case Study Research- Design and Methods, Applied Social Research Methods Series. Vol V. Sage Publications.California.
- Krishnaswami, O.R. (1993). Methodology of Research in Social Sciences. Himalaya Publishing House. Bombay.
- Creswell John. W. (1994). Research Design – Qualitative and Quantitative Approaches. SAGE Publications.
- California.
- Thakur, N. (1998). "Building Knowledge through a Holistic Approach towards Architectural Education and Research". Proceedings of the seminar on Architecture andInterdisciplinary.
- Turabian Kate. L. (1982). A manual for Writers. The University of Chicago Press.Chicago.
- Bockman, J., R., and Couture, B. (1984). The Case Method in Technical Communication: Theory and Models. Texas: Association of Teachers of TechnicalWriting.
- Kothari C.R. (2004). Research Methodology- Methods and Techniques, New Age International (P) Ltd, Publishers, NewDelhi
- Till, Jeremy. (2007), Architectural research: Three myths and one model, RIBA,UK
- Dve, Anne (ed.), (2014), How Architects use research- Case studies from practice, RIBA,UK
- Frayling, Christopher. (1993), "Research in Art and Design", Royal College of Art ResearchPapers.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	S	W/L		CA	University Exam Jury	University Exam Written	Total
IX	II	19AR09007(A)	Elective Theory 4: Architectural Conservation	2			2	50	100		

Course Overview:

To introduce the field of Architectural Conservation, and to familiarize the students with the principles and methodology of management of heritage buildings and historic settlements.

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding of Architectural Conservation as an approach that establishes a link between past, present andfuture.
- Familiarise the students with the history of the conservation movement and various agencies involved in the field of conservation worldwide and theirpolicies.
- Be Introduced to international framework of conservation, definitions, principles and concepts. Various guidelines for the preservation, conservation and restoration of building, and an overview of current status of conservation and preservation in India areelaborated.
- Understand the concept of integrating development and heritage preservation, about opportunities and community participation are highlighted along with exposure to management of heritage buildings andsites.

Module 1: Introduction to Conservation

Learning Strategies:

- Introduction to the evolution of theories in conservation, and an introduction to planning theories, practice and worldheritage.

Module Contents:

- Introduction to Architectural Conservation: Need for conservation, Objectives, Values, Ethics and Scope of Architectural Conservation: from material based, value based to living heritage approach.
- Definition: Architectural Conservation, Urban conservation & Cultural Landscapes. Understanding Heritage: Types - Cultural heritage, Natural heritage, Built heritage - Ancient Monument, Tangible & Intangibleheritage.
- History of the Conservation movement in India & World view - Pioneers of conservation John Ruskin & William Morris, Eugène Viollet-le-Duc, Alexander Cunningham and others. Charters such as Venice charter (1964), Burra charter (1979), Florence charter (1982), Athens charter (1933), etc. Jirnodhar - the Indian philosophy ofconservation.
- Values in Conservation, Ethics of Conservation practice, Authenticity & Integrity in Conservation practice, Naradocument.
- Agencies involved in conservation - UNESCO, ICCROM, ICOMOS, Getty Conservation Institute, ASI, State departments of Archaeology, Town Planning departments, State Art and Heritage Commission & INTACH.
- World Heritage Sites & Nomination process & Endangered sites, elaborated with case studies (like Bhimbetka, Group of monuments at Hampi, Sydney Opera House, Angkor Wasetc.

Module 2: Diagnosis of decay in materials and structures

Learning Strategies:

- The module emphasises on the causes of decay of historic building materials and the technical aspects of the methodical study and development of appropriate conservation interventions for historic buildingmaterials/systems.

Module Contents:

- Traditional and modern building materials used in India, from pre historic times till date: Earth, clay, stone, brick, timber, bamboo, lime, iron, metals, glass, steel and concrete. Materials used in structural, non – structural and decorative applications. Study of types of plasters, stucco work andpaints.
- Causes of decay in materials and structure: Natural agents of deterioration and loss-Climatic causes – thermal movements, sun, rain, frost, snow, moisture, wind, gravity, ground water and dust. Botanical, biological and micro biological causes such as animals, birds, insects, fungi, moulds, lichens. Natural disasters – Fire, earthquakes, flood, lightning, storms. Human factors-Wars, pollution, vibration, vandalism, andneglect.
- Process of Identification of defects: Field investigations, Introduction to various types of tests such as Destructive Tests (DT), Minor Destructive Tests (MDT), Non-Destructive Tests (NDT), Monitoringtechniques.
- Diagnosis and assessment of defects and common problems in historic building materials, Estimation and remedial measures for common material defects in historic structures. Cleaning and maintenance of Historic building fabric – damp proof course, corrosion protection, fire protection, termiteproofing.
- Conservation of historic building: Immediate temporary emergency measures for distressed buildings: shoring, propping, underpinning, shuttering etc. Stabilization, consolidation, grouting, stitching, pointing, surface coating, retrofitting and replacement, Strengthening and stabilization of concrete structures using guniting or shortcreting, post tensioning, bracing, repair using polymers and epoxies, underwater repairs, jacketingetc.

Module 3: Principles, Methodology of Conservation & Introduction to Urban

Conservation Learning Strategies:

- The module focuses on the basic theories in the practice of conservation, an understanding of which is vital for responsible conservation of architectural heritage. Introduction to urban conservation and the role and link of conservation in developmentplanning.

Module Contents:

- Understanding basic principles of conservation such as (a) Prevention (b) Preservation (c) Conservation (d) Restoration (e) Rehabilitation (f) Reproduction (g) Reconstruction (h) Adaptation
- Preparatory procedures for conservation- Identification of the ‘values/significance’ of the object, monument or site: ‘emotional’, ‘cultural’ and ‘use’ values. Preparation of Inventories, listing, Initial inspections/Inspection report, Documentation - Condition & Material mapping, Research, Analysis and recording(Reports).
- Case studies of Heritage building conservation and documentation of historic monuments and sites.

- Introduction to Urban Conservation: Morphology of historic towns, introduction to the concept of heritage zones, methodology and analysis of character of heritage zones. Interventions in conservation such as Reuse, Revitalization, Rehabilitation, Regeneration, Renewal, Up-gradation, Redevelopment of historic areas and cities. Examples of Urban Conservation.
- Multidisciplinary of conservation: Scope, parameters of Integrated Conservation, and its role/ link with development planning and environmental design and the concept of Historic Urban Landscapes.

Reference:

- Fielden, Bernard M. 2003, Conservation of Historic Buildings, Architectural Press,London.
- Ashurst, J. and Dimes, F.G., 1990, Conservation of Building and Decorative Stone, Butterworth-Heinemann,London.
- Historic England, 1988, Practical Building Conservation Series, Routledge,London.
- Jokilehto, Jukka 2002, A History of Architectural Conservation,Butterworth-Heinemann,
- ICOMOS, 1993, Earthen Architecture: The conservation of brick and earth structures- Ahandbook.
- Beckmann, Poul & Bowles, Robert 2004, Structural Aspects of Building Conservation, Elsevier Butterworth-Heinemann.
- Kain, Roger 1981 Planning for Conservation, St. Martin's Press, NewYork
- Dobby, Alan 1978 Conservation and Planning,Hutchinson.
- Worskett, Roy 1969, Character of Towns: An approach to Conservation, ArchitecturalPress
- Harvey, J. H. 1972, Conservation of Buildings, J. Baker:London.
- Smith, J. F. 1978, A Critical Bibliography of Building Conservation, Mansell,England.
- Mathews, M. S. 1998, Conservation Engineering, Universitat Karlsruhe,Karlsruhe.
- Asian Heritage Management: Contexts, Concerns, and Prospects, 2013, Routledge, NewYork.

Websites:

- https://whc.unesco.org/en/list/
- http://asi.nic.in/
- https://cpwd.gov.in/Publication/ConservationHertBuildings.pdf
- https://www.nps.gov/tps/how-to-preserve/briefs.htm

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L		Jury	Written		
IX	II	19AR09007(B)	Elective Theory 4: Earthquake Resistant Architecture	2			2	50	100		150

Course Overview:

- To enable an understanding of the fundamentals of earthquake and the basicterminologies.
- To give basic knowledge of earthquake resistant designconcepts.
- To provide familiarity with design codes and buildingconfiguration
- To enable understanding of the different types of construction details to be adopted in a seismic pronearea.
- To give knowledge for applying earthquake resistant principles in an architectural design project.

Course Outcomes:

Upon completion of the course, the student should:

- Have the ability to understand the formation and causes ofearthquakes
- Have an understanding of the factors to be considered in the design of buildings and services to resistearthquakes.

Module 1: Fundamentals of Earthquakes

Learning Strategies:

- The module focuses on the basic understanding about the fundamental theories and terminologies in earthquake resistantstructures.

Module Contents:

- Basic understanding on fragile ecosystem, physiographic and geo-chemical data mapping, soil and topography, hydrological factors, climatic conditions. Site planning, building form and shape, considerations for earthquake resistantbuildings
- Earth's structure, seismic waves, plate tectonics theory, origin of continents, seismic zones in India.
- Predictability, intensity and measurement of earthquake. Basic terms- fault line, focus, epicentre, focal depthetc.

Module 2: Site planning, Performance of Ground and Buildings

Learning Strategies:

- This module emphasis on the impact of earthquakes on structural and nonstructural elements

Module Contents:

- Historical experience, site selection anddevelopment.
- Earthquake effects on ground, soil rupture, liquefaction, landslides. Behaviour of different types of building structures, equipment, lifelines, collapsepatterns.
- Behaviour of non-structural elements like services, fixtures in earthquake-pronezones

Module 3: Seismic design codes and Construction

details Learning Strategies:

- This module familiarise students various design strategies to be adopted for an efficient earthquake resistantbuilding

Module Contents:

- Seismic design code provisions. Introduction to Indiancodes.
- Building configuration - scale of building, size, horizontal and vertical plane, building proportions, symmetry of building - torsion, reentrant corners, irregularities in buildings like short storeys, short columns,etc.
- Seismic design and detailing of masonry structures, wood structures, earthenstructures.
- Seismic design and detailing of RC and steelbuildings.
- Design of non-structural elements – architectural elements, water supply, drainage, electrical and mechanicalcomponents.

Module 4: Design and Analysis of Earthquake resistant

Buildings Learning Strategies:

- This module equips students to analyse earthquake prone buildings and to design earthquake resistantstructures

Module Contents:

- Vulnerability of existing buildings, facilities planning, fires after the earthquake, socio-economic impact afterearthquakes.
- Conceptual design for earthquake resistance involving institutional masonry building with horizontal spread and height restriction, multi-storey RC framed apartment/commercial building.

Reference:

- Guidelines for earthquake resistant non-engineered construction', National Information centre of earthquake engineering (NICEE, IIT Kanpur, India),2004.
- C.V.R Murthy, Andrew Charlson, 'Earthquake Design Concepts', NICEE, IIT Kanpur,2006.
- Agarwal.P, 'Earthquake Resistant Design', Prentice Hall of India,2006.
- Ian Davis, 'Safe Shelter within Unsafe Cities: Disaster Vulnerability and Rapid Urbanization', Open House International, UK,1987
- 'Socio-economic developmental record'- Vol.12, No.1,2005.
- Mary C. Comerio, Luigia Binda, 'Learning from Practice- A Review of Architectural Design and Construction Experience after Recent Earthquakes', Joint USA-Italy workshop, Oct.18-23, 1992, Orvieto,Italy.

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
								CA	University Exam		Total
				T	S	W/L			Jury	Written	
IX	II	19AR09007(C)	Elective Theory 4: Green Building Rating system	2			2	50	100		150

Course Overview:

- To make students appreciate and learn the role and importance of Green Buildings in promoting sustainability and components involved in the planning and designing of Green Buildings
- To get awareness on the ratingsystem.

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding about the importance in creating sustainable planning while conceiving building/ development projects and become environmentally responsive to constructionrequirements.

Module 1: Introduction to Green Building

Learning Strategies:

- To give an understanding of the basic concepts of Green building and its relevance in Building construction

Module Contents:

- Green Buildings—Introduction, definition, objectives, scope, role and importance Green building, Benefits of green building- Tangible &Intangible.
- Green Building's Design—Approach, components, design parameters, orientation, Integrated approach to buildingdesign
- Green Building Rating System - Concept of green building ratingsystem
- Green building facilitation- Role offacilitator.
- Schemes and incentives provided for green buildings by different state govt with inIndia.

Module 2: Indian Green Building Rating System

Learning Strategies:

- A combination of Guest lectures, Field visits and debates enables the student to acquire knowledge about the latest trends in green buildings, rating systems in Indiancontext.

Module Contents:

Introduction to Indian rating system, certification process of –

- GRIHA, IGBC, ECBC etc.- approach, components, scoring, comparative and criticalanalysis.
    - Green Rating for Integrated Habitat Assessment- Introduction to GRIHA, Role of GRIHA in recognizing environment- friendly initiatives, Concept, its context, challenges, benefits, development and operationalization process and basic features, Process of rating buildings- registration and documentation, GRIHA evaluation process, Criteria for rating and Scoring points forGRIHA.
    - Indian Green Building Council system- Introduction to IGBC, Role of IGBC in recognizingenvironment-friendlyinitiatives,Concept,itscontext,challenges, benefits, development and operationalization process and basic features, Process of

rating buildings- registration and documentation, IGBC evaluation process, Criteria for rating and Scoring points for IGBC.

- Energy Conservation Building Code- Introduction to ECBC, Role of ECBC & BEE in environment- friendly initiatives, Concept, its context, challenges, benefits, development and operationalization process and basic features, Process of rating buildings- registration and documentation, BEE evaluation process, Criteria for rating and Scoring points for BEE.

- Live & literature case studies Good Practices--Study of Selected Examples of Sustainable Architecture – Vernacular, Historical andContemporary

Module 3: International Green Building Rating System

Learning Strategies:

- A combination of Guest lectures, Field visits and debates enables the student to understand the latest trends in Global rating systems for greenbuildings

Module Contents:

- LEED- USGBC, BREEAM, etc.- approach, components, scoring, comparative and critical analysis.
  - Leadership in Energy and Environmental Design- Introduction, History of LEED, Features of LEED, LEED -Vision, Structure and Services offered LEED NC overview and process- useofLEEDNC,Registration,CreditInterpretationRuling,Application, Review and Certification
  - BRE Environmental Assessment Method (BREEAM)- Introduction- BREEAM, drivers and users of BREEAM, Key Benefits of Users, Different Stages of BREEAM, BREEAM Criteria, Environmental Issues, History of BREEAM, Current Versions of BREEAM, CertificationProcess.
- Live & literature case studies Good Practices--Study of Selected Examples of Sustainable Architecture – Vernacular, Historical andContemporary

Reference:

- Arvind Krishnan, 'Climate Responsive Architecture A Design Handbook for EnergyEfficient
- Buildings', Tata McGraw Hill Publishing Company Limited, New Delhi,2001.
- Majumdar M, 'Energy-efficient Building in India', TERI Press,2000.
- Givoni. B, 'Passive and Low Energy Cooling of Buildings', Van Nostrand Reinhold, New York,1994.
- Publications and Rating manuals- GRIHA, LEED, IGBCEtc.
- Energy Conservation Building Codes- BEE star ratingsystem.
- Givoni, B., 1969. Man, Climate and Architecture, Elsevier Publishing CompanyLimited.
- Koenigsberger, O. H., Ingersoll, T. G., Mayhew, A., Szokolay, S. V., 1973. Manual of Tropical Housing and Building Part 1. Climatic Design, Orient Longman Pvt.Ltd.
- TERI, 2004. Sustainable Building Design Manual Volume 2, prepared under a European Union cofunded ASIA-URBS project under the leadership of InstitutCatala Energia (Spain), The Energy &Resources Institute, India.
- Scott Drake, 2009, The Elements of Architecture - Principles of Environmental Performancein
- Buildings, Earthscan, ISBN9781844077175
- Bob Doppelt, 2010, The Power of Sustainable Thinking, Earthscan, ISBN9781849710794
- Paul Appleby, 2010, Integrated Sustainable Design of Buildings, Earthscan, ISBN9781849711173

Subject Sem Group	Course Code	Subject	Hours/week			Credits	Marks			
			T	S	W/L		CA	University Exam		Total
								Jury	Written	

IX	**II**	**19AR09008(A)**	**Elective Theory 5: Architecture and Sustainability**	**2**			**2**	**50**	**100**		**150**

Course Overview:

To make aware of: -

- The environmental, Energy and Water scenario of our planet in general and Kerala in particular.
- To appraise them of the urgent need of making all future buildingssustainable.
- To equip them with the capacity to design and construct Sustainablebuilding.

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding of the importance in creating sustainable planning while conceiving building/ development projects and become environmentally responsive to construction requirements
- Have critical awareness of existing environmental rating systems (3) Practical application possibilities sustainable construction practices in regionalcontext

Module 1: Introduction to Sustainability

Learning Strategies:

- Lectures, discussions andseminars

Module Contents:

- Basics of Sustainability, Needs of Sustainable Outlook, State of theArt
- Pillars of sustainability, SustainableDevelopment
- Concept of Renewable/Non-renewable, Global warming, Space-Ship-Earthconcept,
- Objectives of Sustainable/ GreenBuildings,
- Different Indian and International Green building rating systems; LEED India rating & TERI GRIHArating
- Examples of Green buildings (Case Studies, Analysis and Architectural design of Sustainable buildings asTutorials).

Module 2: Energy efficiency

Learning Strategies:

- Lectures and seminars

Module Contents:

- Energy Efficiency, Reasons for the Energy Crisis, State of theArt
- Energy conservation, Need for the EnergyConservation
- Conventional and non-conventional sources, renewable, non-renewable energysources
- ECBC rules, Energy andbuildings,
- Concept of embodied energy & Transportationenergy
- Total Energy assessment inbuildings,
- Relation between Energy Efficiency and Sustainabledevelopment
- Energy Scenario of Kerala. (Case studies, Redesign of Own house to make it Energy Efficient asTutorial)

Module 3: Water Efficiency

Learning Strategies:

- Lectures andSeminars

Module Contents:

- Water, Water cycle, Water Conservation, Waste recycling, Waste water, Methods and techniques for water conservation in buildings
- Rain data of Kerala, Calculation of tank sizes for storage of rain water inKerala
- Green buildings and water conservation. (Case studies, Design of Rain Water tanks for buildings asTutorials)

Module 4: Material Efficiency

Learning Strategies:

- Lectures and discussions, market research,workshops

Module Contents:

- Selection of materials, Eco building materials andconstruction
- Low impact construction – bio mimicry, zero energy buildings, nano technology and smart materials
- Understanding various parameters for Sustainable Building Materials and evaluate using LCA (ISO14000)

Module 5: Waste Management

Learning Strategies:

- Lectures and workshops, casestudies

Module Contents:

- Types of waste, solid wastemanagement
- Methods and techniques for waste management inbuildings
- New technologies in waste management to make netzero.

Reference:

- 'A Water Harvesting Manual; for Urban Areas; Case Studies from Delhi', Centre for Scienceand Environment, New Delhi, 2003.
- Baker Nick and Steemers Koen, "Energy and Environment in Architecture", E& FN, Spon.London, 1999.
- Goulding, John, R, Lewis, Owen J and Steemers, Theo C., "Energy in Architecture", BastfordLtd., London,1986.
- Bansal Naveendra K., Hauser Gerd and Minke Gernot, "Passive Buildings Designs: Handbook of Natural Climatic Control", Elsevier Science, Amsterdam1997.
- Energy Conservation Building Code, Government ofIndia.
- Websites of TERI, LEED India, ECBC,etc.
- Manuals of GRIHA,IGBC

Subject Sem Group	Course Code	Subject	Hours/week			Credits	Marks			
								University Exam		
			T	S	W/L		CA	Jury	Written	Total

IX	**II**	**19AR09008(B)**	**Elective Theory 5: Architecture Pedagogy**	**2**			**2**	**50**	**100**		**150**

Course Overview:

To expose the students to education methods in architecture

Course Outcomes:

Upon completion of the course, the student should:

- Be acquainted with the history of development of education methods inarchitecture.
- Be introduced the students with the prevailing models of teaching-learning methods and their application in architectural designeducation.
- Familiarize students with the skills to evaluate architectural design and other artforms.
- Be introduced research methodology, paper writing and presentation as tools to transmit knowledge

Module 1: History and development of Architectural

Education Learning Strategies:

- Lectures, discussions,seminars

Module Contents:

- Traditional teaching methods of India – Gurukul, Universities of Nalanda &Takshashila;
- Transmission of knowledge in architecture through temple architecture in ancientIndia;
- History of formal architecture education in West and inIndia.
- Peculiar requirements of Architecture Education, Requirements of generation of creative thinking

Module 2: Introduction to learning methods

Learning Strategies:

- Lectures, discussions,seminars

Module Contents:

- Aims and objectives of architecture education inIndia,
- Blooms Taxonomy, Levin's field theory, Carl Roger's theory of experientiallearning,
- Peculiar requirements of ArchitectureEducation;
- Models of Teaching: Advanced Organizer, Concept AttainmentModel,
- Simulations – Use of advanced softwares to shape and visualizeideas,
- Synectics, Concept Mapping for organizing & communicatingideas,
- Basic aspects of classroom management

Module 3: Design Process pedagogy

Learning Strategies:

- Lectures, discussions,seminars

Module Contents:

- Various thinking skills, tools and techniques adopted by architects for deriving designideas,
- Development of Design Thoughts, Experiential learning (case study methods) as guide in Designprocess,
- Useofsynecticsinthedesignstudio,theessenceofcreativityinsynectics,variousformsof metaphoric thinking to activate "generative thinking"
- Arts, skill and technique of visual perception and formanalysis,
- Communication of the aesthetics of architecture and other associated art forms in a journalisticmanner.

Reference:

- S. K. Mangal (2009) "Essential of educational technology", PHI Learning Pvt. Ltd.,2009.
- Bruce Joyce and Marsha Weils, "Models of Teaching", Pearson; 9 edition (April 14,2014)
- Klausmier and Ripple (1971) "Learning and Human Abilities" Harper &Row, NewYork.
- Eames Charles & Ray, „An Eames Anthology", Yale University Press, Edited by OstroffDenial.
- George Kneller (1971), "Philosophy of Education" John Wiley & Sons Inc; 2nd Revisededition
- J. S. Chauhan, "Advanced Education Psychology" SumitPrakashan
- J. C. Agrawala (2009), "Essential of educational technology" Vikas Publishing House Pvt Ltd, 01-Nov-2009
- Bruce Joyce (2014), "Models of Teaching" Pearson; 9 edition (April 14,2014)
- Rizzoli (March 18, 2008); "How to Read A Building "Rizzoli (March 18,2008);
- Bruce Joyce, "Models of Teaching", Pearson; 9 edition (April 14,2014)
- New Trends in Architecture Education, By- AshrafSalama

Sem	Subject Group	Course Code	Subject	Hours/week T	S	W/L	Credits	Marks CA	University Exam Jury	Written	Total
IX	II	19AR09008(C)	Elective Theory 5: Building Performance and Compliance	2			2	50	100		150

Course Overview:

- To provide fundamental knowledge of building sciences for the development of high-performance buildings utilizing building modeling and simulation technology as a building performanceanalysis.
- To impart requisite knowledge for taking effective managerial decisions to ensure desirable performance conforming to good practices and national / international codes /standards.
- The purpose is to equip students with skills and techniques to calculate the energy consumption of heating, cooling, lighting, and other equipment by hand to understand the energy & thermal behavior of buildings, then compare and analyses these calculations with others calculated using energy modeling and simulationprograms.
- To develop competence to understand the environmental compliances and management systems for buildings and infrastructure projects.

Course Outcomes:

Upon completion of the course, the student should:

- Have an understanding the use of IT applications and software packages related to functional performance of buildings like thermal and lighting analysis, environmental qualityanalysis.
- Get knowledge on policies, standards, procedures, and various formats relating to environmental compliance requirements practically applicable for projects, and develops competence in their application.
- Develop the necessary skills and sensitivity towards sustainability ofbuilt-environment.

Module 1: Environmental Policies, Codes &

Standards Learning Strategies:

- Lecture notes, Journals, e-journals, ASHRAE standards,ECBC

Module Contents:

- Definition, Environmental Policies and Laws- Environment protection act, Water act, Kyoto protocol, ISO standards, CDM etc. Case studies in India under CDM; COPs / United Nations Climate Change Conferences; Government incentives and Schemes, Financial aid,subsidies
- ASHRAE standards – 90.1-2010 Appendix-G; ASHRAE standards – 55- 2010; ASHRAEstandards – 62.1- 2013
- IESNA standards forlighting
- Energy Conservation Building Codes, BEE Star ratedequipment's.

Module 2: Thermal Environment

Learning Strategies:

- A combination of Guest lectures, Field visits, debates and study of latest trends in green buildings, locally and globally, simulationtools.

Module Contents:

- Introduction to Thermal behaviour ofbuildings
- Introduction to Thermal behaviour of buildings- Building physics; Latent, specific heat gains in the building; Psychometric analysis; Weather analysis, buildingenvelope.
- Introduction to energy efficient buildings; Energy use in buildings; Energy Supply in Buildings: Heating, Ventilating, and Air-Conditioning (HVAC) Systems; Heating and cooling loads; Energy conservation consideration.
- Energy Performance Analysis: Energy Codes, Guidelines, and Standards; Constructing energy simulation models: Thermal modelling, Models for ventilation, Steady state and dynamic heat flow analysis; Evaluating models: Measurements, Comparisons andverifications
- Approaches to Thermal Simulation–
    - Prescriptive Approach – Codes &Standards
    - Performance building simulation – Energy plus, e-Quest6.3

Module 3: Luminous Environment

Learning Strategies:

- A combination of Guest lectures, Field visits, material study, debates and study of latest trends in green buildings, locally and globally, simulationtools

Module Contents:

- Introduction to Luminous environment- Parameters – openings and sizing, shape & configuration, skylights, U value, SHGC, VLT, light shelves, study on skyconditions
- Lighting Performance Analysis: Lighting Codes, Guidelines, and Standards; Constructing lighting simulation models: Lighting modelling; Evaluating models: Measurements, Comparisons andverifications
- Approaches to Luminous Simulation–
    - Prescriptive Approach – Glazing calculation,IESNA
    - Performance building simulation – ECOTECT v5.20

Reference:

- Givoni, B., 1969. Man, Climate and Architecture, Elsevier Publishing CompanyLimited.
- Energy Conservation Building Codes- BEE star ratingsystem.
- Manual on Mechanical and Electrical Equipment forBuildings
- Manual on Sustainable Building DesignSoftware
- American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc -www.ashrae.org
- Environment and forestry-http://www.envfor.nic.in/

43. TENTH SEMESTERSYLLABUS

Sem	Subject Group	Course Code	Subject	Hours/week			Credits	Marks			
				T	Hours/week S	W/L		CA	University ExamMarks Jury	UniversityWrittenExam	Total
Sem	Subject Group	Course Code	Architectural Design Subject	T	S	W/L	Credits	CA	Jury	Written	Total
X	III	19AR10001	Thesis		26		26	650	650		1300
X	I (c)	19AR10002	ElectiveWorkshop 4: Architectural DesignThesis	1		2	2	50	50		100

Course Overview:

To prepare the student for profession and practice by encouraging comprehensive and SpecialTopics detailed approach to design based on a holistic and comprehensive learning from the previoussemesters.

Course Overview:

The workshop enables students for taking up in depth study on any Architectural Design

To evaluate the potential and capability of the student to synthesize architectural, technical relatedandsocialareassystemsintendedthroughata apcapstonelicationprojectinArchitecturalandrepresentPlanning,theoutcomeBuildingusingMaterials,sufficient Constructionnumberofarchitecturaltechnology,drawings/Structural3D System,models andBuildingother Science,visualrepresentationtechniquesBuildingServices,etc. of a

The students are expected to demonstrate their creative and critical thinking through a single building block or group ofbuildings.
choice-based studio in their area ofinterest.

A special topic of study relevant to the thesis has to be identified and researched arriving at

To provide guidance in the area of interest of the student to help them further their career in designapplication. the direction of their choice within the scope of the B.Arch.program.

Any Architectural Design related topic, approved by the Teaching Institution recommended

Learning outcome and project deliverables

by the respective Architectural Design Thesis guide, appropriate for the Thesis project shall

A design project of suitable scale to be identified, designed and documented as a part of the be selected by the students. architectural design thesis. For the purpose of uniformity, it is recommended that the project

Thecoverstudentsanarea rebetweenexpcted8000toanalyze-10,000andsqsynthesize.m.approximatelyinformationcollected.Itisexpected. that the project Theselectedsu entsmustarebetoofbebenefitguidedtointhethesocietyareaof. Theinterestfeasibilityandtoofbedesignquipproposaledbettershallfor theirbeverified ArchitecturalsothatstudentsDeignareThesisable toprojdemonstratect. the practical possibility of their design thesis. A special topic of study relevant to the thesis has to be identified and researched along with the designproposal.

Deliverables:

The students are expected to produce a holistic and comprehensive outcome involving the

The work should include an intensive study of the topography of the site selected for area of Site Planning, Structural feasibility, functional efficiency and space planning, Form Architectural Design Project, the climatic features concerned, problems related to design of development, Environmental planning considerations, Building Services, Climate responsive spaces and structures etc,. The solution of the problem may be approached from the architecture, Sustainable approaches and energy efficient architecture, Projects contextual professional view point of the Architect, Engineer, Urban Designer, Planner or Landscape response, fundamental project economics and Architectural designDetailing Architect and the detailed nature of study shall be reflected in the preparation of seminars at

The final deliverables of the project shall include research documentation sheets including all various levels and in the finalreport.

studies relevant to the proposed project, Design evolution drawings and detailed The students are expected to present seminars at study and analysis level as well as architectural drawings, physical model, rendered perspective views and comprehensive applicationlevel. report of the project. An interactive 3D model may be made available to the jurors to

The final deliverables of the project shall include two copies of bound volume in A4 size visualize the project quickly and effectively. All scheme drawings of various stages showing format and shall be submitted on the date and time announced by the TeachingInstitution. the evolution of design should be made available for jurors' reference in all stages of evaluation.

Reference:

All books relevant to the topic of the architectural project, Guides / Jurors to make recommendations assuitable.