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	Hours/week S	Hours/week W/L	Credits	Marks CA	Marks University Exam Jury	Marks University Exam Written	Marks 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			Credits	Marks			
									University Exam		
				T	S	W/L		CA	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			
				T	S	W/L		CA	University Exam		Total
									Jury	Written	
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–

Thermal and acoustical treatment of ducts.

- 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