

SEMESTER IX

Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
AS 501	URBAN PLANNING	3-0-0-0	3	2016
Course Objectives <ul style="list-style-type: none">To study the origin and evolution of human settlements and the factors responsible for these.To study planning theories and concepts, and to understand the process of urbanisation.To understand the planning process, plan formulation and implementation mechanisms in India.To provide a holistic and multidisciplinary perspective about Urban Planning.				
Syllabus <p>Evolution of human settlements, theories and concepts in town planning, examples of modern planned cities from around the world, problems of urbanisation, process of urban planning in India, planning legislation, plan formulation & implementation mechanisms in India</p>				
Expected Outcome <p>Students will learn about the main factors influencing the development of urban areas and the problems of urbanisation. They will also learn about the planning process in India and the institutional mechanisms that enable planning and implementation.</p>				
Reference Books <ul style="list-style-type: none">John Ratcliffe, 1984, 'An Introduction to Town and Country Planning'Arthur B.Gallion, 1986, 'The Urban Pattern: City planning and design'Lewis Keeble, 1969, 'Principles and Practice of Town and Country Planning'Kevin Lynch, 1960, 'Image of the city'A.E.J Morris, 1972, 'History of Urban Form from Pre-history to Renaissance'C.A.Doxiadis, 1968, 'Ekistics: An Introduction to the Science of Human Settlements'Peter Hall &Ulrich Pfeiffer, 2000, 'Urban Future 21: A Global Agenda for 21st Century Cities'Ramachandran R, 1998, 'Urbanization and urban systems in India'Amiya Kumar Das, 2007, 'Urban Planning in India'Kulsreshtha, 2012, 'Urban and Regional Planning in India: A handbook for professionals'Ministry of Urban Affairs, Govt. of India, 'Urban and Regional Development Plan Formulation and Implementation Guidelines -2014'.				
Course Plan				
Module	Contents	Hours	Sem Exam Marks	
I	Introduction to urban planning: The process of urbanisation and its impact on environment. Need for planned development. Planning in ancient & medieval	7	15%	

	period: Mesopotamia, Greece and Rome, Walled cities of Medieval age- Carcassone in France, Renaissance cities - Florence, Industrial cities- Manchester. Reconstruction of medieval cities-Paris. Town planning in ancient& medievalIndia: Indus valley period -Mohenjodaro, Vedic principles of town planning, Medieval cities - Shajahanabad and Jaipur		
II	Planning theories of Post-industrial age: Contributions by Ebenezer Howard, Lewis Mumford, Patrick Geddes, Clarence Stein, Clarence Perry, C. A. Doxiadis and Le Corbusier to town planning. Planning of 20th century cities: Chandigarh, Navi Mumbai, Islamabad, Brasilia, Curitiba etc.	8	20%
FIRST INTERNAL EXAM			
III	Urban planning Terminology: Definition of urban area, CBD, nodes, peri-urban areas, conurbation, sprawl and ribbon development. Classification of Urban areas: Town, city, metropolis, megalopolis and their interdependence. Census classification of towns in India.	7	15%
IV	Early models of Urban structure: Concentric ring model, Sector model, Multiple nuclei model. Current Planning trends: New Urbanism, Transit Oriented Development, Inclusive cities, Sustainable cities, Resilient cities and Smart cities.	8	15%
SECOND INTERNAL EXAM			
V	Planning Process & Implementation in India: Urbanisation in India. Contents of Perspective plan, Regional Plan, Development plan, Local area plan etc and their inter-relationships. Process of plan preparation, Surveys for plan preparation, Major forms of land use regulation and control in India	8	20%
VI	Planning legislation in India: Origin and evolution of planning legislation in India, Salient Acts like Environment Protection Act, Coastal Regulation Zone Notification, 73 rd and 74 th Constitutional Amendment Act, Right to Fair Compensation and Transparency in Land Acquisition Rehabilitation and Resettlement Act 2013, Kerala Town &Country planning Act 2016 etc.	7	15%
END SEMESTER EXAM			

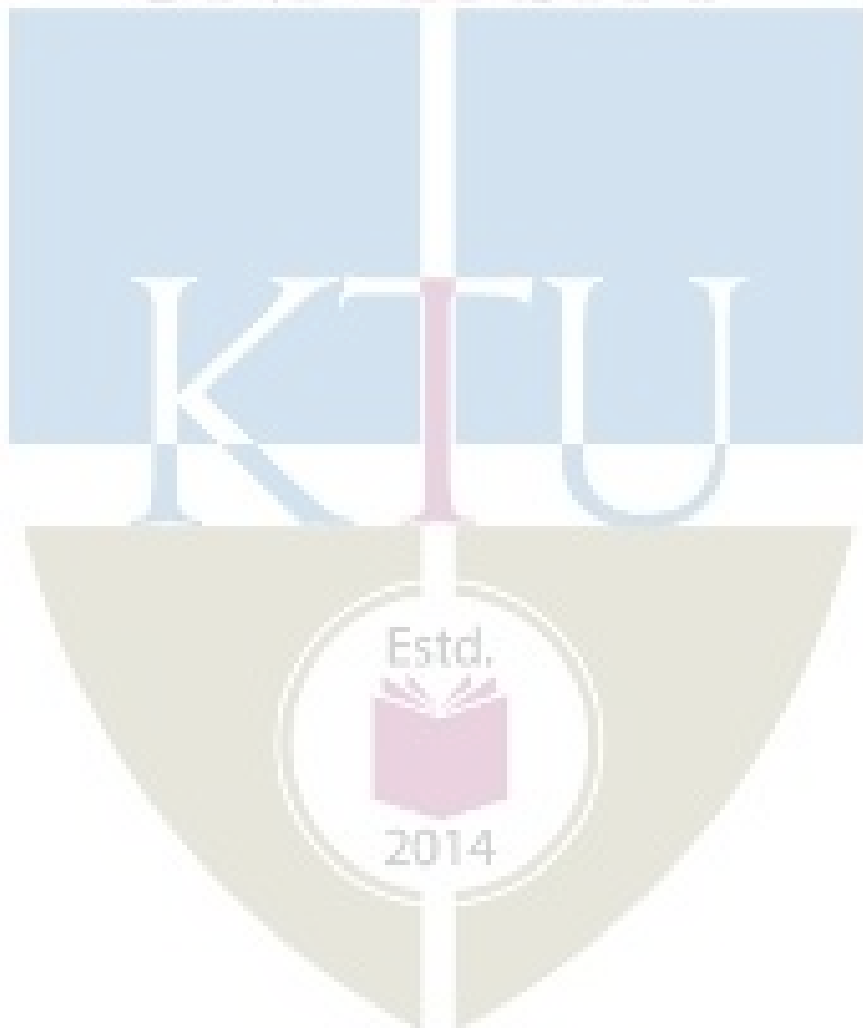
Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
AS 503	HOUSING	3-0-0-0	3	2016
<p>Course Objectives</p> <ol style="list-style-type: none"> 1. To sensitize students about the fundamentals of housing concepts and the housing conditions. 2. To increase social responsibility of architects by exposing them to understand the social realities around them and to make them aware of their role in addressing these. 				
<p>Syllabus</p> <p>Housing and Development, Housing Typology & associated standards Housing Issues, Policies and Strategies, Housing Programmes, Schemes & Projects Institutional Framework and Housing finance, Housing development and Environmental impact</p>				
<p>Expected Outcome</p> <ol style="list-style-type: none"> 1. Students should be able to understand housing issues of a place, compute housing shortage with relevant data 2. Students to get acquainted with housing in different cultures through primary study. 				
<p>Reference Books</p> <ol style="list-style-type: none"> 1. Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines, 2015 2. Joseph De Chiasa, Julius Panero, Martin Zelnik, <i>'Time Saver Standards for Housing and Residential Development'</i> 2017 3. National Building Code of India, 2005 4. Kerala Municipality Building Rules, 2019 5. Kerala Panchayat Building Rules, 2019 6. National Building Organisation, <i>Slums in India-A Statistical Compendium</i>, 2011 7. A.K.Jain <i>'Urban Housing and Slums'</i>, 2009 8. Amos Rapaport, <i>'House Form and Culture'</i>, 1969 9. K, Thomas Poulouse, <i>Innovative Approaches to Housing for the Poor'</i>, 1988 10. Arthur Gallion, <i>Urban Pattern</i>, 1953 11. M.Pratap Rao, <i>'Urban Planning: Theory and Practice'</i>, 2005 12. Paul Spriegren, <i>Architecture of Town and Cities</i>, 1965 13. Gunter Pfeifer, Per Brauneck, <i>'Courtyard Houses: A Housing Typology'</i>, 2007 14. Shelter, Hudco Publication 15. Yojana, A Development Monthly 16. ITPI Journals 				

Course Plan			
Module	Contents	Hours	Sem Exam Marks
I	Housing and Development Importance of Housing in socio cultural & Economic Development Magnitude of Housing Problem- at Global level, National level & State level Housing stock –Quantitative & Qualitative Housing shortage in Urban and Rural settlements International declarations and goals- IYSH, Habitat Agenda, MDGs and SDGs, New Urban Agenda	6	10%
II	Housing Typology Characteristics of Housing in different regions and their typology - detached housing, row housing, cluster housing, apartments etc. Housing density- net density & gross density Importance of standards, regulations, laws on contemporary practices for housing and habitat development-KMBR,NBC, URDPFI etc.	8	15%
FIRST INTERNAL TEST			
III	Housing Issues, Policies and Strategies Housing challenges due to Urbanisation Slums- characteristics and magnitude of the problem, Policies & Strategies for Slum improvement. National Housing policy, National Urban Housing & Habitat Policy, National Rural Housing & Habitat Policy, Introduction to Affordable housing and Inclusive housing.	8	15%
IV	Housing Programmes , Schemes and Projects Nature and types of Housing Development Programmes in India- Initiatives taken for Housing in Post independence era Housing Schemes & Programmes at National and State level- IAY,IHSDP,RAY,PMAY Housing the poor-Incremental housing, Core housing, Site and services. Case study of a low income housing project	8	20%
SECOND INTERNAL TEST			
V	Institutional Framework and Housing Finance Objectives and role of Agencies like HUDCO, NHB, NBO,TCPO, BMTPC, StateHousing Boards, Cooperatives, NGO's and other agencies in housing. Role of Private sector in Housing	7	20%

	Importance and characteristics of housing finance. Formal and Informal systems of finance. Financing Agencies at global, national and state level		
VI	Housing development and Environment impact Need for Sustainable building Practices Importance of Energy Efficiency, Selection of materials and Techniques, Cost Effectiveness and Disaster Resilience Establish through relevant Case studies	8	20%

END SEMESTER EXAM

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Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE561	ADVANCED CONSTRUCTION TECHNOLOGY	3-0-0-0	3	2016
<p>Course Objectives</p> <ol style="list-style-type: none"> 1. To understand shallow foundations and various ground improvement methods 2. To familiarize the students with advanced methods of construction 3. To understand the properties and uses of advanced and special concretes 4. To introduce the students to the repair and retrofitting methods 5. To introduce the students with types and uses of construction equipment and advanced building demolition methods 				
<p>Syllabus</p> <p>Foundation-Shallow foundation-Ground improvement methods-cofferdam-Tunneling-Earthquake and Flood resistant construction-Cost-effective construction-Strengthening of existing foundation-Shoring-Scaffolding-formwork-slip form construction-Special concretes-Joints in concreting-Framed construction-Repair of structures-Retrofitting methods-Construction equipments- Demolition of structures.</p>				
<p>Expected Outcome</p> <ol style="list-style-type: none"> 1. To explain various types of shallow foundations and ground improvement methods 2. To describe the principles of earthquake resistant, flood resistant and cost effective construction 3. To explain the formwork, method of strengthening foundation and slip form construction 4. To describe the composition of special concretes and to analyse their properties and applications 5. To explain the various repair and retrofitting methods used in the construction 6. To elucidate on the various types of equipment and demolition methods used in the construction 				
<p>Reference Books</p> <ol style="list-style-type: none"> 1. Shetty M.S., Concrete Technology, S. Chand & company. 2. Punmia B. C, Building construction. Laxmi Publications. 3. Concrete Technology, R. Santhakumar, Oxford Publications. 4. Peurifoy, R.L., Ledbetter, W.B. and Schexnayder, C., "Construction Planning, Equipment and Methods", McGraw Hill, Singapore 5. Arora and Bindra, Building construction, Dhanpath Rai and Sons. 6. Rangwala S C., Engineering Materials, Charotar Publishers. 7. P. Purushothamaraj, Ground Improvement Techniques, University Science Press, 2005. 8. Neville A. M. and J. J. Brooks, Concrete Technology, Pearson Education, 2008. 9. Mehta and Monteiro, Concrete-Micro structure, Properties and Materials, McGraw Hill Professional. 10. Sharma S.C., Construction Equipment and Management, Khanna Publishers New Delhi. 				

Course Plan			
Module	Contents	Hours	Sem Exam Marks
I	Shallow Foundation-Types, factors influencing selection of ideal foundation, Raft foundation, Ground Improvement methods-compaction pile, lime stabilisation, stone column, Ground Anchors, dewatering, confinement using sheet piling, Compaction of soil (shallow and deep compaction)	8	15%
II	Coffer dam – Types Tunneling – Method of tunneling through hard rock and soft soil, drainage, ventilation, lining. Earthquake and Flood resistant construction – Construction aspects only. Cost-effective construction - principles of filler slab and rat-trap bond masonry, sustainable building technologies	7	15%
FIRST INTERNAL TEST			
III	Strengthening of existing foundation-under pinning, shoring. Scaffolding, Formwork for concrete work- Requirements of a good formwork, different materials used. Formwork for beams, columns, slabs, de-shuttering forms, Slip form construction	7	20%
IV	Special Concretes - ready-mix concrete, high strength concrete, high performance concrete, self flowing concrete, ferro-cement, pumpable concrete, textile reinforced concrete, self-healing concrete, geo-polymer concrete, roller compacted concrete, shotcrete, mass concrete, underwater concreting,	8	20%
SECOND INTERNAL TEST			
V	Joints in concreting – construction and expansion joints. Framed buildings, erection of steel work, concrete framed construction Repair of structures – Repair of cracks, epoxy injection technique, methods of corrosion protection Retrofitting methods – strengthening using FRP, strengthening of columns, slab and beams	8	15%
VI	Construction Equipments – Excavators, Earth moving equipment, compacting equipment, hoisting equipments, dumpers, conveyors, pile driving equipment, Equipment for production of aggregate and concreting Demolition of structures – Engineered demolition methods	7	15%
END SEMESTER EXAM			

Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE 563	CONSTRUCTION AND PROJECT MANAGEMENT	3-0-0-0	3	2016
Course Objectives				
<p>The basic objective is to impart project management skills with particular reference to construction management, so that students can learn to formulate projects while dealing with all organizational, technical, financial, human resource and quality issues.</p>				
Syllabus				
<p>Introduction, Project management cycle, Construction procedures, Contracts, Tenders, Disputes, Scheduling techniques, Time cost trade off, Resource allocation and optimisation, construction cost and budget, risk and safety management, materials management, Project management information system</p>				
Expected Outcome				
<ol style="list-style-type: none"> 1. Manage the selection and initiation of individual projects and of portfolios of projects 2. Conduct project planning activities that accurately forecast project costs, timelines, and quality. 3. Implement processes for successful resource, communication, and risk and change management. 				
References				
<ol style="list-style-type: none"> 1. Dr. S Seetharaman, 'Construction Engineering and Management', Umesh Publications, Delhi, 2015 2. Hajdu M., Network Scheduling Techniques for Construction Project Management, Springer U S 2013. 3. Callahan M. T., D. G. Quackenbush and J. E. Rowings, 'Construction Project Scheduling', McGraw-Hill, 1992. 4. Robert B. Harris, 'Precedence and Arrow Network Techniques for Construction', University of Michigan, 1973. 5. Steven James D, 'Techniques or Construction Network Scheduling', McGraw-Hill, 1989. 6. Bhattacharjee S. K, 'Fundamentals of PERT/CPM and Project Management', Khanna Publishers, 2004 7. Vohra N. D., 'Quantitative Techniques in Management', Tata McGraw-Hill Publishing Company, 2001. 				

Course Plan			
Module	Contents	Hours	Sem Exam Marks
I	Introduction to construction management, need and importance, objectives and functions of project or construction management, role of Project or Construction Managers in the building industry, Project feasibility reports, Project management cycle-planning, scheduling, monitoring and controlling	7	10%
II	Types of projects, Construction procedures: Different methods of construction, types of contract, tenders, Prequalification procedure, earnest money deposit, security deposit, measurement book, The FIDIC Suite of Contracts, disputes and their settlement	8	15%
FIRST INTERNAL TEST			
III	Introduction to construction scheduling techniques - Bar chart / Gantt chart, Work break down structure (WBS), Network representation, Principles and application of CPM, Network analysis, development of CPM network, Identification of critical path, Different float computations	8	25%
IV	Principles and application of PERT Network-Probabilistic time estimates of activities, Analysis of PERT Network, Development of Critical path, Expediting the project, Time cost tradeoff, Optimization, Allocation of resources, Resource leveling and smoothing, Line of Balance method	7	20%
SECOND INTERNAL TEST			
V	Construction cost and budget: Construction cost, Classification of construction cost, Unit rate costing of resources, Budget, Types of budget, Project Master budget, Time value of money, cash flow, depreciation, cost benefit analysis Risk and safety management in construction– causes of risk, Risk management policies, Safety measures in different stages of construction, occupational and safety hazard assessment, implementation of Safety programme	8	20%
VI	Concept of materials management, Inventory, inventory control, Economic order quantity, Safety stock, ABC analysis. Project management information system: PMIS Concept, Information system computerization, Problems in information system management, Benefits of computerized information system, Project management software packages like PRIMAVERA	7	10%
END SEMESTER EXAM			

Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE565	EARTHQUAKE RESISTANT ARCHITECTURE	3-0-0-0	3	2016
Course Objectives To give an insight to the students about understanding the behaviour of different types of building in an earthquake. The course tries to lay a foundation for a general understanding of earthquake resistant building design for various kinds of construction.				
Syllabus Introduction of earthquake- plate tectonics, fault line, earthquake waves, focus, epicentre, magnitude, intensity, seismographetc. Behaviour of different kinds of buildings during earthquake, effects of earthquake on different kinds of structures: brick masonry, stone masonry buildings, Reinforced concrete buildings. Earthquake resistant methods and techniques for modern buildings. Tools and techniques for damage assessment of buildings Seismic retrofitting of old and new buildings				
Expected Outcome By the end of the course, students should be able to understand various basic techniques used to make an earthquake resistant building design.				
Reference Books <ol style="list-style-type: none"> 1. IS:1893 – Indian Standard Criteria for Earthquake Resistant Design of Structures, Bureau of Indian Standards, New Delhi. 2. IS:13935 – Repair and Seismic Strengthening of Buildings – Guidelines, 1993 3. IS:4326 – Earthquake Resistant Design and Construction of Buildings – Code of Practice, 1993 4. IS:13828 – Improving Earthquake Resistance of Low Strength Masonry Buildings, 1993 5. IS:13827 - Improving Earthquake Resistance of Earthen Buildings, 1993 6. IS:13920 – Ductile Detailing of Reinforced Concrete Structures Subjected to Seismic Force, 1993 7. Earthquake resistant design of structures by Pankaj Agarwal and Manish Shrikhande, Prentice-Hall of India, 2006 8. Seismic design of reinforced concrete and masonry buildings by T. Paulay and M.J.N. Priestley, John Wiley & Sons, 1991. 9. Ambrose, J; Vergun, D: Simplified building design for wind and Earthquake forces, JohnWiley, New York, USA 10. Arnold, C; Reitherman, R : Building configuration and Seismic design, 1982, John Wiley,Newyork USA 11. Bolt, B.A: Earthquakes, Fourth edition, 1999, W H Freeman, Sanfransisco, USA 12. Dowrick, D.J: Earthquake resistant design for Engineers and Architects, 1987, Second edition, John Wiley, New York,USA 13. Hugo Bachmann : Seismic conceptual design of buildings- Basic principle for 				

engineers, architects, building owners and authorities; Swiss Federal Office for Water and Geology and Agency for Development and Cooperation, Switzerland.

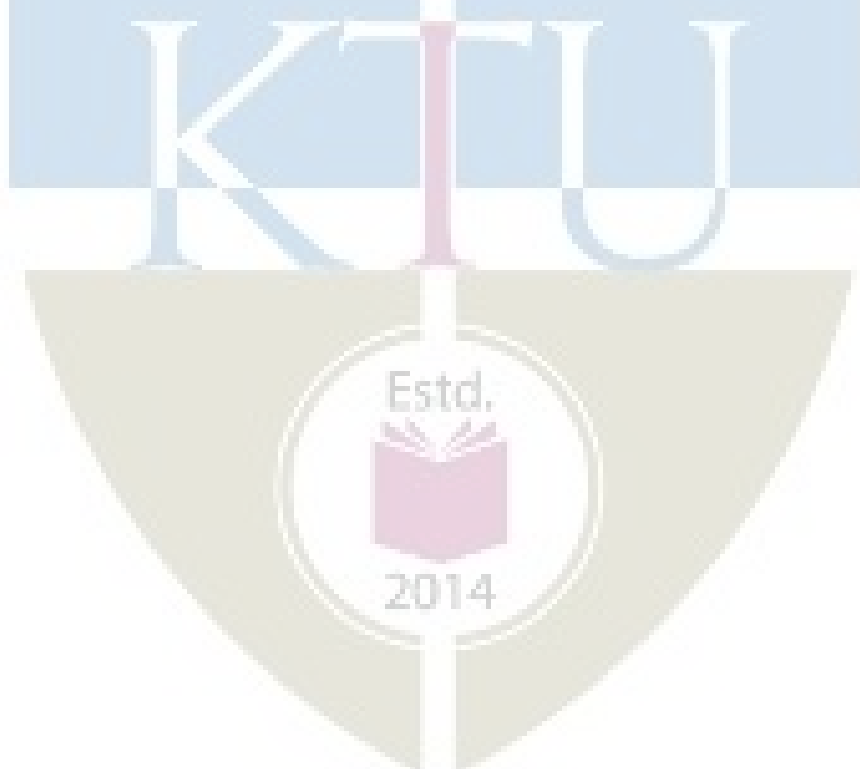
14. Lagario, H.J: Earthquakes: An architect's guide for non-structural seismic hazards, John Wiley and sons, New York, USA.

15. Murty, C.V.R: Earth quake tips, National information centre for Earthquake Engineering, IITK, Kanpur.

Course Plan

Module	Contents	Hours	Sem Exam Marks
I	Introduction: Causes of earthquake, how ground shakes, different types of earthquake waves: P-waves, S-waves , basic terminologies of earthquake: plate tectonics, focus, epicenter, fault line, magnitude of earthquake, intensity, epicenter distance, working of seismograph Seismic zones of India, seismic effects on structure, effects of architectural features on buildings, twisting of buildings, Seismic design philosophy for Buildings, ductility and flexibility of buildings as solution to earthquake affects, Indian seismic codes and practices	6	15%
II	Impact of earthquake on buildings using different materials Behaviour of brick and stone masonry building in earthquake, importance of simple structural configuration for masonry building, necessity of horizontal bands, necessity of vertical bands and cornerstones in masonry buildings Effect of earthquake on RC buildings, behaviour of beams in earthquake, behaviour of columns in earthquake-beam column joints, column footing joints, importance of structural ductility, localised failure in RC structures	9	15%
FIRST INTERNAL TEST			
III	Design of buildings for earthquake resistance: Factors affecting earthquake loading: Mass, Natural period, Damping, Ductility. Seismic Design Code Provisions: Basic terms used in seismic codes and their meanings, horizontal design seismic coefficient, base shear of building and vertical distribution of loads. Building Configuration: scale of building- size in horizontal plane- size in vertical plane- Building proportions- Symmetry of building (Torsion), Re-entrant corners, Redundancy, irregularities in building, Horizontal plane, Vertical plane (Soft storey, short column,	9	20%

	discontinuous walls).		
IV	Earthquake resistant methods and techniques for modern buildings. Vulnerability of open ground storey building, effect on short column during earthquake, role of shear wall, techniques to reduce earthquake effects, base isolators	6	10%
SECOND INTERNAL TEST			
V	Causes of distress in buildings, Damage assessment of buildings, types and classifications of damages, various tools and techniques for damage assessment, Condition assessment of Buildings, Methodology of condition assessment, Detailed Investigations required for assessment, Partially Destructive tests, Soil Profiles at the site	9	20%
VI	Seismic retrofitting of old and new buildings, various techniques, materials, components and methods	6	20%
END SEMESTER EXAM			



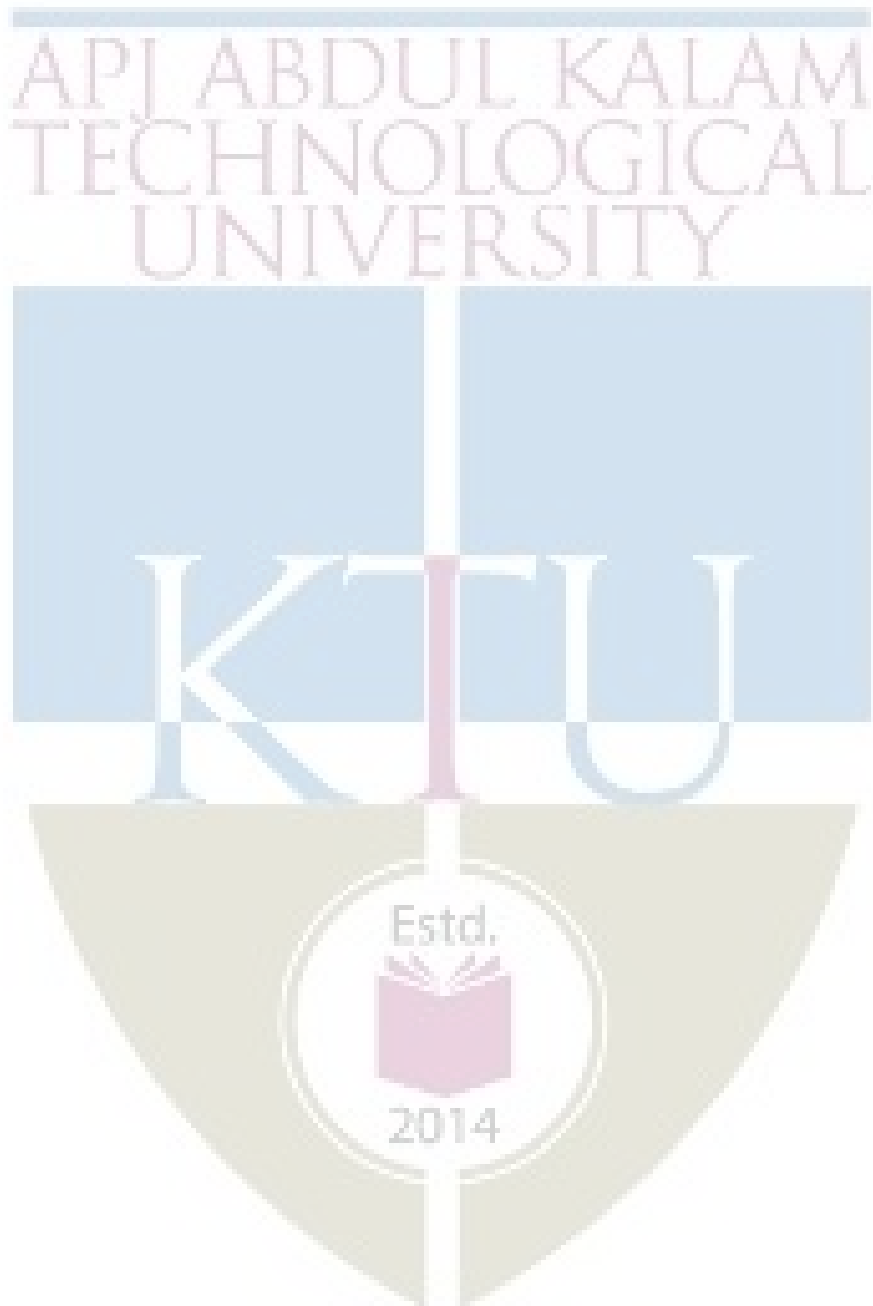
Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE 567	CONTEMPORARY PROCESSES IN ARCHITECTURE	3-0-0-0	3	2016
<p>Course Objectives</p> <ol style="list-style-type: none"> 1. To introduce the students to contemporary architects and their design processes. 2. To have an understanding of various digital design techniques and form generation. 3. To explore communication tools like movies, internet and social media and their influence in perception of space and Architecture. 4. To introduce the students to digital fabrication methods. 				
<p>Syllabus</p> <p>Digital design techniques, generative design processes, topology, morphology, materiality, folds, shape grammar, diagramming, liquid architecture.</p> <p>Contemporary architects- their theories and design processes.</p> <p>Media and the perception of space and architecture.</p> <p>Digital fabrication</p>				
<p>Expected Outcome</p> <p>By the end of the course the student has to have an understanding of what is digital architecture, what are the processes employed by contemporary architects for designing and form generation, a basic understanding of the different digital design processes, digital fabrication and how to draw parallels between virtual spaces and concepts in media and real space and architecture.</p>				
<p>Reference Books</p> <ol style="list-style-type: none"> 1. Ali Rahim, Contemporary Process in Architecture, John Wiley & Sons, 2000 2. Ali Rahim, Contemporary Techniques in Architecture, Halsted Press, 2002 3. Marcos Novak, invisible Architecture: An Installation for the Greek Pavilion, Venice Biennale, 2000. 4. MOVE, UN Studio 5. Peter Eisenmann, Diagram: An Original Scene of Writing, Diagram Diaries 6. Walter Benjamin, Practices of Art in the Age of Mechanical Reproduction Colin press, 1977 7. William J Mitchell, the Logic of Architecture: Design, Computation and Cognition. MIT Press, Cambridge, 1995 8. Work of Architecture in the Age of Mechanical Reproduction, Differences MIT press, 1997. 9. Bjarke Ingels, Yes is More 10. Daniele Pauly, Barragan, Space and Shadow, Walls and Colour, Birkhauser 2002 11. Kate Nesbitt, Theorizing a New Agenda for Architecture, Princeton Architectural Press, 1996 12. Koolhaas, Rem, and Bruce Mau, S, M, L, XL. New York: Monacelli Press, 1995 13. Michael Hays (ed)) Architectural Theory since 1960, MIT Press, 2000 				

14. MVRDV, FARMAX
 15. Tschumi, Bernard. Architecture and Disjunction. Cambridge, MA: MIT Press, 1994
 16. Ignaci de Sola Morales, 'Differences: Topographies of Contemporary Architecture', MIT Press, 1997.
 17. Peter Eisenmann; Diagram Diaries, Universe, 1999.
 18. Grey Lynn, 'The Folded, The Pliant and The Supple, Animate form', Princeton Arch. Press, 1999.
 19. L. Convey et al, 'Virtual Architecture', Batsford, 1995.
 20. William J Mitchell, City of Bits: Space, Place and the Infobahn', MIT Press, Cambridge, 1995.

Course Plan

Module	Contents	Hours	Sem Exam Marks
I	Beginnings of use of virtual space and high tech in design: works of Robert Venturi, Norman Foster, James Stirling. Overview of various contemporary design processes and introduction to digital technology in Architecture. Form follows deformation: Works of Peter Eisenmann, Rem Koolhaas, Frank Gehry, Zaha Hadid, Bernard Schumi, Daniel Libeskind.	6	15%
II	Form Based Aesthetics: Generative Design processes- Morphology, Topology, Materiality. Concept of Folds. Concept of Liquid Architecture. Contemporary processes of design involving diagramming, shape grammar, fractal geometry etc.	9	20%
FIRST INTERNAL TEST			
III	Generative Design-Theories and works of process oriented architects -Foreign Office Architects, Greg Lynn, Bernhard Franken, Ben Van Berkel and UN Studio, Herzog de Meuron, Neil Dinari, Bjarke Ingels, MVRDV	6	15%
IV	Geometry, materiality, virtual reality - Works of Zvi Hecker, Reiser+Umemotto, Asymptote, Shigeru Ban, Peter Zumthor. Liquid Architecture- Lars Spuybroek, Decoi, Marcos Novak, Diller Scofidio, NOX architects, Dominique Perrault	9	20%
SECOND INTERNAL TEST			
V	Digital fabrication- CNC printing- Contour crafting, sculpting. Kevin Roche and Viab Technology. Digital materiality, advanced materials. Future of forms.	6	15%
VI	Media in Architecture- Virtual Space- Movies and social media as space for Architecture- Creating emotions.		

	Reflecting contemporary society in movies as well as in Architecture.	9	20%
END SEMESTER EXAM			



Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE569	SERVICES IN HIGH RISE BUILDINGS	3-0-0-0	3	2016

Course Objectives

1. To discuss current vertical growth of cities which are the catalysts for increasing no. of high rise buildings.
2. To introduce the concept of various building services in high rise buildings which helps in improving the efficiency of the built up space.
3. To deliberate on various advancements in technology of building services, focusing on sustainability .

Syllabus

Typologies of high rise buildings, Service core & floors, Water supply and Sanitation, Fire safety, Ventilation and Thermal comfort, Mechanical Transportation, Electrification, Telecommunication, Security system and Building automation.

Expected Outcome

Knowledge about the special service requirements of high rise buildings and about various systems, equipment and technology that are used for the same, which will aid the student in the preparation of a schematic layout incorporating all services for a high-rise building.

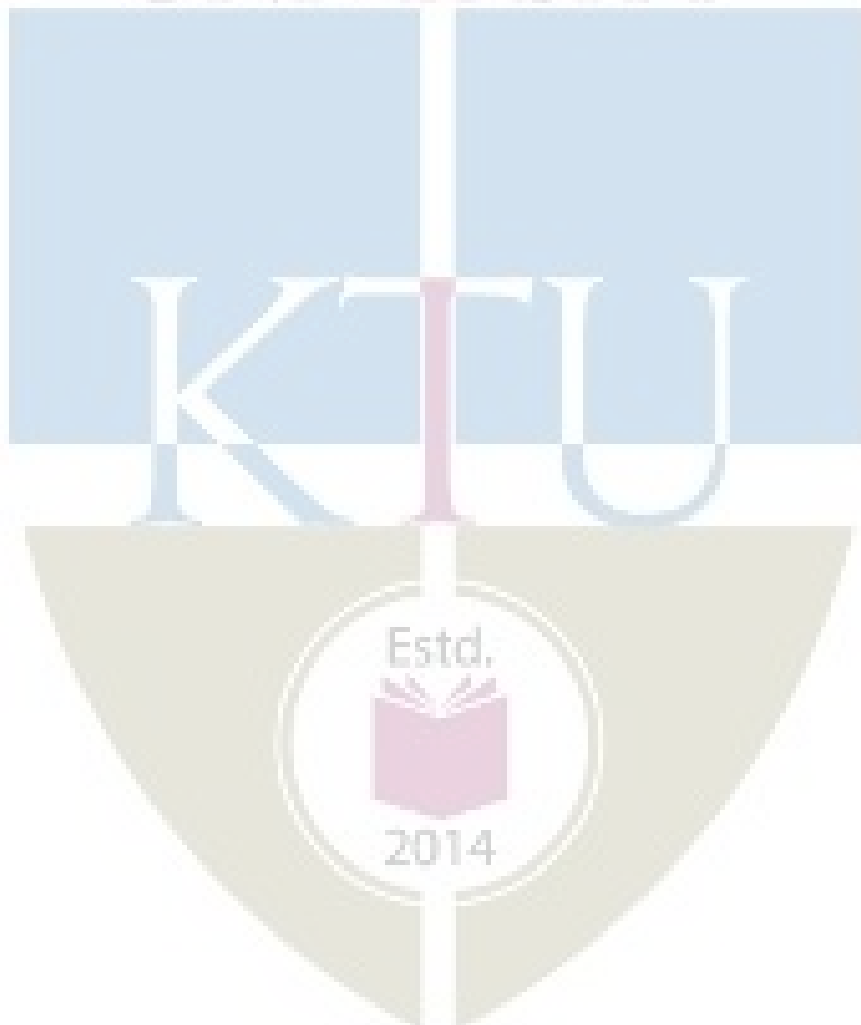
Reference Books

1. National Building Code of India, 2005
2. Fred Hall & Roger Greeno, Building Services Handbook, Elsevier, 2005.
3. V. K. Jain, 'Designing and Installation of Services in High Rise Building Complexes', Khanna Publishers 2013
4. A K Mittal, Electrical and Mechanical Services in High Rise Buildings Design and Estimation Manual, 2001
5. Maurice Eyke , Building Automation Systems – A Practical Guide to selection and implementation
6. Basem M. M. , Mechanical and Electrical Services for High Rise Buildings
7. V.K. Jain, Fire Safety in Buildings, New age publishers, 2010
8. Stein Reynolds Mc Guinness – Mechanical and Electrical equipment for buildings – vol 1 & 2 – John Wiley & sons
9. Francisco Asensio Cerver – The architecture of Skyscrapers – Hearst Book International - New York, 1997
10. Proceedings of the council for tall buildings – vol 1 & 2

Course Plan			
Module	Contents	Hours	Sem Exam Marks
I	Typologies of high rise buildings, Service core & floors Need of vertical growth of cities. Definitions of high rise buildings, Evolution and typologies of high rise buildings, Service core components & configuration, service ducts, service floors, zoning of services	6	15%
II	Water supply, Sanitation & Fire safety Types of water storage and distribution Systems in high rise buildings, Types of sewage collection and treatment systems in high rise buildings. Recycling & reuse of water in high rise buildings, Rain water harvesting in high rise buildings. Concepts of passive and active fire safety, Fire rating, Fire protection system, Fire detection system, Fire fighting system, Lightning protection.	9	20%
FIRST INTERNAL TEST			
III	Mechanical Transportation Planning and designing of elevator lobby and banks of elevators – Express & local Elevators, Classification of elevators. Classification of escalators, Multi-level car parking and Automated car parking	9	20%
IV	Ventilation and Thermal comfort Concepts of natural and mechanical systems of ventilation in high rise buildings, Concepts of managing solar gain in high rise buildings, HVAC load calculation, Types of HVAC systems employed in high rise buildings.	6	15%
SECOND INTERNAL TEST			
V	Electrification, Telecommunication, Security system and Building automation, Planning and location of power supply distribution systems, Power back-up system, Telecommunication systems in high rise buildings, Building automation and energy management, Security system – security system components, access control systems, perimeter protection, closed circuit surveillance systems, biometric controls, intruder alarm systems.	9	20%

VI	Live Case study & Service plan Live case study/ site visit of any high rise building to study services in high rise buildings. Preparation of service plan for previous semester Architectural Design Project (high rise building).	6	10%
END SEMESTER EXAM			

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Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
PE 571	DISASTER MITIGATION AND MANAGEMENT	3-0-0-0	3	2016
<p>Course Objectives</p> <ol style="list-style-type: none"> 1. To familiarize the students about the types of hazards and their magnitude, the preparedness and mitigation for each hazard based on their characteristics 2. To understand the importance of disaster preparedness and management. 				
<p>Syllabus</p> <p>Fundamental concepts of hazards and disasters: Introduction to disaster management cycle. Relationship between disasters and development, implications.</p> <p>Introduction to key concepts and terminology of hazard, vulnerability, exposure, risk, crisis, emergencies, Disasters, Resilience.</p> <p>Understanding the national and international frameworks for disaster management and preparedness.</p>				
<p>Expected Outcome</p> <p>Upon completion of the course, the student shall have acquired the importance of the various phases of disaster management including disaster mitigation, preparedness, response and recovery. The student shall acquire the ability to design and retrofit buildings responsive to various disasters.</p>				
<p>Reference Books</p> <ol style="list-style-type: none"> 1. Andrew, S., "Environmental Modeling with GIS and Remote Sensing", John Willey, 2002 2. Ariyabandu, M. and Sahni P. "Disaster Risk Reduction in South Asia", Prentice-Hall (India), 2003. 3. Bell, F.G., "Geological Hazards: Their assessment, avoidance and mitigation", E & FN SPON Routledge, London. 1999 4. Bossler, J.D., "Manual of Geospatial Science and Technology", Taylor and Francis, 2001 5. David Alexander, "Natural Disasters", Research Press, New Delhi, 1993 6. Matthews, J.A., "Natural hazards and Environmental Change", Bill McGuire, Ian Mason, 2002 7. Mitigating Natural Disasters, Phenomena, Effects and options, A Manual for policy makers and planners, United Nations. New York, 1991 8. Nick Carter. W., "Disaster Management - A Disaster Manager's Handbook". Asian Development Bank, Philippines. 1991 9. Gupta M C, Manual on natural disaster management in India, NIDM, New Delhi 2000 				

Course Plan			
Module	Contents	Hours	Sem Exam Marks
I	Terminologies, concepts & definition- Understanding disasters -An overview, - Hazard, Disaster, Risk, Vulnerability, Adaptation, Mitigation, Capacity building Resilience, Awareness and Impact of disasters.	3	15%
II	Typology of disasters Natural hazards and Disasters -Earthquake, cyclone, floods, lightning, Tsunami, Cloud burst: Causes, impacts, measures, policy changes, Relevant case studies Human induced disasters: - soil erosion, droughts, landslides, fire; nuclear explosion, terrorism causes, impacts, measures, Relevant case studies	12	25%
FIRST INTERNAL TEST			
III	Introduction to Disaster management cycle Disaster Management Act 2005, National Policy on Disaster Management. Disaster management cycle: Pre-disaster and Post disaster management. Mitigation, Adaptation & Preparedness - Mitigation strategies for various disaster typologies Community empowerment and preparedness, Preparing hazard-zonation maps, forecasting & warning, Sheltering and casualty management, retrofitting.	6	15%
IV	Response and Recovery phases Response and recovery strategies for various typologies of disasters. Community health and casualty management. Evacuation, Disaster Communication. Damage and Needs Assessment, Restoration of Critical Infrastructure, Early Recovery, Reconstruction, Rehabilitation and Redevelopment; Relief, Resilience building. UN frame works on disaster management, administrative framework in India, role of various governmental & non-governmental agencies.	9	35%
SECOND INTERNAL TEST			
V	Role of Land use management and Building Control regulations in vulnerable regions. A critical assessment of Kerala Floods 2018 and 2019.	8	5%
VI	Applying Science & technology in disaster monitoring and management such as remote- sensing and GIS applications and other technologies (demonstration)	7	5%
END SEMESTER EXAM			

Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
PP501	PROFESSIONAL PRACTICE	3-0-0-0	3	2016

Course Objectives

- To introduce standards and norms of professional conduct and setting up an office in India.
- To understand the Architects Act and COA's regulations, duties and responsibilities of architects.
- To equip students with knowledge about the procedures of tendering, valuation, easement, arbitration.
- To familiarize the students with various instruments of law and legislation relating to architectural practice.
- To help students choose between various career advancement options available for them.
- To emphasize the ethical aspects of the profession.

Expected Outcomes

By the end of the course the student has to have an understanding of what is expected of an architect by the client and by the society, architect's duties in the areas of valuation, arbitration etc, an understanding of the tendering and contracting processes, architectural competitions and laws relating to the profession, in order to help him or her to be able to set up practice in India.

Syllabus

Architects Act '72, Council of Architecture, Architectural competitions, Types of architectural offices, Tenders, Contract, Valuation, Arbitration, Easements, Laws and Legislation related to architectural practice.

Reference Books

1. Professional Practice: Roshan H Namavathi
2. Hand Book of Professional Documents: COA Publication
3. Professional Practice: K.G.Krishnamurthy, S.V. Ravindra
4. Harold K, Cyril, "Essentials of Management" -1979 Tata Mc Graw Hill
5. Theory of Practices of Valuation-- Namavathi Roshan
6. Architects Reference Manual-Workshops professional practice for Architects by IIA Kerala Chapter and Trivandrum Centre, November 1996.3

Course Plan			
Module	Contents	Hours	Sem Exam Marks
I	Architects Act '72-Council of Architecture, Functions and Powers, Architects Regulations, Standard terms for comprehensive architectural services including UD and Conservation works. Guidelines for architectural competitions. Professional Ethics. IIA- Functions and Powers, Registration for membership.	6	15%
II	Tenders: Types of tenders, Tender Notice, Inviting, Work order, Tender document, Tender acceptance, Tender for demolition work, Earnest money deposit, Security deposit, Retention amount.	6	15%
FIRST INTERNAL TEST			
III	Contract: General principles, Types of Contract, Discharge of contract, Contract Document, Contract drawings, Contract sum, Bills, Duties & Liabilities of Contractor, Architect and Employer under the contract, Administration of contracts, Determination of Contracts, Certificate of Payments.	9	20%
IV	Building permits- procedures involved in obtaining permit to build/ renovate or repair/ extend building. Related bye laws. Environmental clearances, Wetland Acts, CRZ rules, Laws relating to building on hilly areas. Architects' responsibility towards society and environment and necessity of abiding with rules for sustainable building.	6	15%
SECOND INTERNAL TEST			
V	Arbitration-Principles, Indian Arbitration act, Powers & Duties of Arbitrators, Revoking Authority, Umpire, and Award Valuation: Purpose, Value, Factors affecting value, Value classification, Classification of Ownership, Valuation reports, Methods of valuation. Easement: Definition, Various types, essential conditions for enjoyment of Easements, Valuation for Easements.	9	20%
VI	Professional organisations in Architecture & allied fields like planning, landscape, structural, environmental, building services etc. Setting up architectural practice: salaried appointments, public sector, private sector jobs, procedure of operation in government organization. Pre-requisite for Indian architects to work in other countries & vice versa.	6	15%
END SEMESTER EXAM			

Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
AS505	ARCHITECTURAL DESIGN - VII	0-0-12-0	12	2016

Course Objectives

Primary objective of the Course is to look at Urban design as ‘large scale architecture’. The studio work should enable the student to look up on the complexities and larger context of the precinct and read the subtle nuances of the fabric enabling the student to reach suitable conclusions to design in the context. Other objectives are viz. To understand and analyse the site level issues and to generate probable design solution integrating the larger ecological, socio-cultural, political and economic dynamics of the urban landscape/precinct delineated / identified for the design intervention. The learning should effectively support designing large scale projects in varied scales in the urban realm. The course should encourage innovative and interdisciplinary solutions integrating socio-spatial and cultural dimensions.

Expected Outcomes

The students should be able address the issues related to larger context and to work as designers in the public realm engaging multiple stake holders. They should be equipped with comprehensive understanding ,analytical and design skills and have a thorough knowledge about the analytical tools and legislative framework required for working in the public sphere.

Syllabus

Studio intends to make students learn to design for the public through large scale civic projects by examining the life and structure of the precinct, its historic, ecological, social, cultural, political and economic relevance with the city and develop the ability to bring together technically competent skills and knowledge to make meaningful and creative designs that address the varied urban problems faced by our cities. Studio exercises can involve large public projects/neighbourhood design/ or of any nature of Urban precinct.

Reference Books

1. BIS, Various Codes of Practice and National Building Code of India.
2. Kerala Municipal Building Rules
3. Watson, et. al, “Time Saver Standards for Urban Design”, McGraw Hill
4. URDPFI Guidelines, Ministry of Urban Development, Government of India
5. Ian MC Harg “Design with Nature”
6. Steiner, “Planning and Urban Design Standards
7. Ghel, J “Life between Buildings”
8. Carmona et.al “Public Places, Urban Spaces: The Dimensions of Urban Design”
9. Moughtin et.al “Urban Design Methods and Techniques”

Course Plan			
Module	Contents	Hours	Sem Exam Marks
I	Understanding a precinct and the urban design process through case examples (students should do primary/secondary studies based on the precinct identified and make detailed report and sheets)	40	15%
II	Introduction of the public project: city/precinct and primary studies at multiple scales (public projects could be cultural complexes, trade/exhibition centres, large shopping malls, market places, crafts bazaars, transport hub, sports village, entertainment parks, townships, etc.)	40	15%
FIRST INTERNAL TEST			
III	Analysis/inferences, formulation of project requirements, vision, development aims and objectives, guidelines and conceptual schemes	40	15%
IV	Urban design schemes, architectural interventions with detailed design and services drawings.	60	55%
SECOND INTERNAL TEST			
END SEMESTER EXAM			



Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
AS507	DISSERTATION	0-3-0-0	3	2016

1. Course Objective

To provide students with an opportunity to undertake independent research works on a topic of their choice related to built environment.

2. Allotment of Guide

The Head of Department of Architecture of the teaching institution will allot a guide to each student for supervising their dissertation work.

3. Area of Research

Students shall choose a research question related to Built Environment. The research question must be approved by the Department of Architecture of respective College/ Institute. Students may be encouraged to select the topic which may eventually culminate in the Architectural Design Thesis of the subsequent semester. The research shall emphasize on a hypothesis/research question to achieve a specific aim and a set of objectives. The data collected should reflect specific methodologies, adopted or developed. Emphasis shall be on critical understanding, logical reasoning, structured writing and interpretation of data. The study could be quantitative or qualitative research; whichever is suitable for the study (either laboratory based or social research based).

4. Conduct of work

The students under the guidance of their respective guides shall independently carry out their dissertation work during the 8th and 9th semester of the degree course. Students admitted to the 8th semester B.Arch. degree course shall submit a choice of their research questions for dissertation in the 8th semester. After the approval of the research question by the department of architecture, they are required to submit the synopsis and start the study in the 8th semester itself.

The Schedule / Mode of presentation of their work at Preliminary, Intermediate and Final stage shall be published by the Department of Architecture of the institution immediately after the commencement of the 9th semester. By the end of the 9th semester, students are expected to submit **a well researched technical paper of publishable quality of not more than 2500 words**. Standard referencing conventions and technical writing norms must be adhered to. Plagiarism should not be tolerated. Students shall present the progress of the study at various stages during the 9th semester. Final assessment of the students' work shall be based on the technical paper as well as oral presentation. However, greater weightage may be given for writing and research content of the study. **The institutions/colleges should come out with a compilation of technical papers presented as part of Dissertation.**

5. Evaluation

- i. The dissertation will be considered as an individual subject of the 9th semester B.Arch. degree course.
- ii. The entire 100 marks allotted to the dissertation will be awarded in the following manner.
 - Two progress assessment 20 marks each (internal)

- Final evaluation 60 marks (conducted by Institute)
- iii. Internal evaluation shall be conducted in 2 progress assessment stages. The project guide and two other faculty members of the same institute shall constitute the members of the two progress evaluations. Internal marks shall be awarded as given below.
- Preliminary Stage – Research Proposal, Literature study, Data Collection (20marks)
 - Intermediate Stage – Results and Interpretation, Draft Report (20 Marks)
- iv. The Final evaluation shall constitute 60 marks and shall be conducted by the Dissertation Assessment Board constituted by the Institute. The dissertation assessment board for final evaluation shall consist of the following members:
- **Chairperson:** A senior faculty member appointed by the institute
 - **Members:** Dissertation Coordinator/Internal faculty member, an external member either from academic/research institute or practicing COA registered architect with minimum five years experience who shall be appointed by the institute.
- v. The jury members after consultation among themselves will independently evaluate the final presentation as described below.
- Evaluation of the final report in the form of bound volume - 15 marks.
 - Evaluation of research work and Presentation of Slides- 35 marks.
 - Technical paper- 10 marks
- vi. Head of the Department shall publish the marks of the Dissertation on the next working day after the completion of the Jury.
- vii. A candidate has to obtain minimum 45% internal aggregate marks to be eligible for appearing in the final jury
- viii. A candidate who fails to obtain minimum 45% internal aggregate marks shall repeat the dissertation with the next regular batch
- ix. A candidate has to obtain 45% aggregate marks for dissertation (internal assessment + Jury) for a pass.
- **If the candidate fails to obtain 45% aggregate , the candidate has to work further and again appear for a final assessment on a specified date, from 3 months of publishing the marks.**
- x. A candidate, who fails for dissertation in this final assessment stage as well, has to reappear either in full or for the Final Jury only with any regular batch. He/she is required to register with the University for the same.

Evaluation Stage	% Marks Allotted	Evaluation Board	Schedule
Preliminary Stage – Research proposal detailing the aim and methodology of the study, review of literature and proposed methodology.	20%	The project guide and two other faculty members of the same institute.	Beginning of Ninth Semester
Intermediate Stage – Data collection, Analysis and Inferences.	20%	The project guide and two other faculty members of the same institute.	During Ninth Semester
Final Evaluation (Conducted by Institute) – Final Presentation, technical paper & report (2 hard copies of report to be handed over to Chairperson and soft copy of paper send as email to the department)	60%	Chairperson: A senior faculty member appointed by the institute Members: Dissertation Coordinator/Internal faculty member, An external member either from academic/research institute or practicing COA registered architect with minimum five years experience shall be appointed by the institute.	End of Ninth Semester

6. Reference Books:

1. Borden, I. and Ray, K. R. (2006). The dissertation: an architecture student's handbook. 2nd Ed. Oxford : Architectural Press.
2. Fink, A. (1998). Conducting research literature reviews: from paper to the Internet. Thousand Oaks : Sage.
3. Luca, R. (2016). Research Methods for Architecture. Lawrance King Publishing.
4. Groat L.& Wang D. (2002), Architectural Research Methods, John Wiley and Sons Inc
5. Kothari C. R. 1990 Research Methodology Sultan Chand & Sons, New Delhi
6. Creswell, John W. 2003 Research Design: Qualitative, Quantitative and Mixed Methods Approach Sage Publications

SEMESTER X

Course No	Course Name	L-T-S-P/D	Credits	Year of Introduction
AS502	ARCHITECTURAL THESIS	0-0-15-0	15	2016

Course Objectives

- To equip the student in providing creative design solutions for a complex architectural project.
- To enable the student to develop a design program based on the spatial and the social requirements and feasibility of the selected project.

Students of the B.Arch. Degree course are required to prepare an Architectural Design Thesis during the tenth semester of the B.Arch. Degree program under the guidance of the faculty appointed by the department. A department Thesis committee is to be formulated with the Head of the Department, Staff Advisor, Thesis coordinator and senior faculty as members in order to oversee the proper conduct of the thesis in the department. This shall be independent of the thesis evaluation committees.

a) Selection of thesis topic

The student has to obtain prior permission on the subject of thesis from the department thesis committee. The main areas of study and research shall include advanced architectural design including contemporary design processes, urban design including urban infill, environmental design, conservation and heritage precincts, housing etc. However specific thrust should be Architectural design of built environment.

The student shall be allotted a faculty of the department as guide. The project and the special topic shall be worked out by the student under the guidance of the guide. The total built up area of the project shall be a minimum of 10,000 square metres.

b) Thesis course work

The thesis work shall include a detailed study of the project, its spatial requirements and theoretical aspects, detailed site study with respect to topography, climate, context and suitability of the site for the project. The design is envisaged to evolve with the

integrated approach of the architect, engineer, urban designer, planner and landscape architect and this shall be reflected in the preparation of drawings, models and written report.

Students are required to maintain a work diary of the thesis work which shall be endorsed weekly by the guide and submitted for the progress evaluation review along with the thesis work.

The special topic should be selected on the basis of the design challenge posed and should have sufficient scope to provide detailed architectural design scheme.

c) Scheme of Thesis evaluation are as follows:

- Continuous evaluation by supervising guide- 25%
- Internal evaluation by team of three examiners- 25%
- Final Evaluation by team of two examiners - 50%

d) Internal Evaluation of thesis

The department shall set up an internal evaluation committee consisting of the guide, and two faculty members either from the department or academician or practicing architect registered with Council of Architecture, incorporated under the Architect's act 1972 and with minimum of five years of experience. The progress of thesis work shall be assessed by the internal evaluation committee periodically through, four reviews, the dates of which shall be published by the department. The student should orally present the thesis work with the aid of architectural drawings (hand drawn sheets/ print outs), block model and the work diary.

The mock review shall be scheduled with sufficient days prior to the final thesis submission.

e) The scope for each review

Review-1

Introduction of the Thesis Topic, Feasibility studies & Justification for Architectural intervention in context, Basic data, Space standards, Case studies (at least two case studies) /Primary surveys, Spatial Analysis, Arriving at Inferences and Design Program

with area statement, Site analysis including local Architectural context, climatic and environmental conditions, and prevalent bylaws

Review-2

Review of Previous stage, detailed design development process including concept, proximity studies, zoning at site and built level, development of master plan, layout plan and selection and approval of the special topic. The idea is to evolve a design based on the inferences of the studies done.

Review-3

Review of Previous stages, Sketch design for various building blocks including all floor Plans, Sections, Elevations, Views, Block Model and case study of the special topic.

Review-4

Review of Previous stages, detailed site layout with landscape and service details, detailed plans of all the floors, sections, elevations, views, drawings of application of special topic, service drawings and Draft Report.

Mock Review

The student shall present all finalized drawings, a sample sheet with title block, and Final Draft of the report. The student should appear for mock review to be eligible for the final evaluation.

f) Marks split up for internal evaluation

Review Stage	Guide Marks (%)	Members (2) Marks (%)
1	6	6
2	6	6
3	6	6
4	5	5
Mock Review	2	2
Total	25	25

g) Eligibility to appear for the Final External Evaluation

The student should present the thesis work for all the four progress evaluations and mock review and also obtain a minimum of 45% marks combining the marks of four progress evaluations and guide marks, to be eligible to appear for the final evaluation by a committee appointed by the University.

h) Documents to be submitted for the Final External Evaluation

The student shall submit all the following documents at the teaching institution for the final external evaluation at the date and time announced by the University.

1. Architectural drawings not exceeding 30 numbers of A1 size sheets, prepared in the format prescribed by the thesis committee to be submitted at the teaching institution on the working day prior to the date of the final external evaluation.
2. One copy of the Data Collection of the thesis project shall be compiled and presented along with the final submission in A3 size.
3. Two copies of the Final Report prepared in the format prescribed by the thesis committee shall be submitted on the date and time announced by the University
4. Models to be submitted on the date of the final external evaluation at or before 9 a.m.

Any other instructions regarding the schedule of reviews, preparation of the bound volumes of Data Collection, Final Report, Final Sheets, Model, etc. will be announced by the teaching institution.

h) Final External Evaluation

A committee appointed by the University shall do the final external evaluation of the thesis work. The committee shall consist of one senior faculty member from the institute and one senior faculty member from other institutes or from among the Architects registered with the Council of Architecture, incorporated under the Architect's act 1972, with not less than ten years experience.

Students shall secure minimum of 45% of marks in the internal assessment (guide marks + the marks for the four progress evaluations) and minimum of 45% for the final evaluation for successfully completing the architectural thesis.

Students who have failed to secure minimum 45 % aggregate for internal assessment

(guide marks + the marks for the four progress evaluations) shall register for the thesis in the next thesis semester.

Those students who have acquired a minimum pass in the internal assessment, but failed in the external evaluation will be given an opportunity to resubmit the thesis in the supplementary chance within one month of the publication of the result. Otherwise the student will have to register for the final external evaluation in the next thesis semester.

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