TKM COLLEGE OF ENGINEERING
AN AUTONOMOUS INSTITUTION

SYLLABUS S9 -S10

BACHELOR OF ARCHITECTURE

2022 SCHEME (Autonomy)

Revised on 20.04.2026 (8th Academic Council)

SEMESTER IX

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARS901	Urban Design	2-0-1-0	3	2022

Course Objectives

To introduce students to the relevance of urban design as a discipline interfaced with architecture and urban planning

Course Outcomes:

After the completion of this course, the student will be able to

Course Outcome	Description of Course Outcomes	Prescribed learning level
CO-1	Understand urban design terminologies and the relevance of their studies to the architecture profession.	Understanding
CO-2	Analyze historical background of urban design and explore the various forces that have played a crucial role in the evolution of cities.	Analyzing
CO-3	Decode various urban design theories and explore their current applications in the field of urban design	Analyzing and applying
CO-4	Explore the different urban design dimensions, methods, and techniques involved in determining the project definition of a large-scale public architecture project.	Analyzing and applying
CO-5	Research and Analyse information through case studies essential for the development of urban design projects, with a focus on architectural and built components	Analyzing and evaluating

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks
Continuous assessment tests (2 numbers) : 20 Marks
Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

There will be two parts; Part A and B. Part A contains 5 questions with 1 question from each

module, having 4 marks for each question. Students should answer all the questions (5x4= 20marks).

Part B contains 2 questions from each of the 5 modules, of which the student should answer any one. Each question carries 8 marks (Total 5x8=40). Part B questions can have subdivisions.Syllabus Introduction to urban design & terminology, Introduction to urban form & cities, Cities And Urbanism Through Theories, Introduction to the various dimensions of urban design, Understanding the various urban design layers through selected case studies for architectural public projects both global and Indian context.

Course Plan

Module	Contents	Course outcomes	Hours
I	**Introduction to urban design & terminology** Definition of urban design and its evolution as a discipline. Relationship between Architecture, Urban design and Urban Planning. Scope and objective, Elements of urban design and relevance of urban design in current scenario. Understanding the various urban design terminology used in the field such as urban form, figure ground, scale, skyline, enclosure, mass, typology etc. Identify and map the urban design terminologies from your city	CO1, CO2	6
II	**Introduction to urban form & cities** Broad understanding of urban forms and spaces at various spatial scales through examples from historic cities. World context: -Urbanism of river valley civilizations. Morphology of prehistoric cities – Greek, Roman, Medieval, Renaissance and post-industrial ideal cities Indian context: -. Temple town and Mughal city form, colonial cities, Modern and post-modern Indian cities Comparative analysis of the spatial layout of cities, focusing on both global and Indian perspectives.	CO2	8
FIRST INTERNAL TEST			

III	**Cities And Urbanism Through Theories** Brief Introduction and discussion of theories of cities and urbanism World context: - Pattern language and Christopher Alexander, Image ability and Lynch, Townscape and Cullen, Historic city and Rossi, Social aspects of urbanism and the works of Jane Jacobs, William Whyte, Jan Gehl Indian context – (the students have to study at least 2 theories from Indian context) some suggestions as follows: - Vedic town planning principles like Vastu Shastra, Sthapatya Veda etc. The complexity of Indian urbanism (A G Krishna Menon, Amita Baviskar, Rahul Mehrotra's writings) Select any one urban design theory and explore its application through the analysis of a specific real-world case study.	CO3	8
IV	**Introduction to the various dimensions of urban design,** such as the morphological, perceptual, social, visual, and functional dimensions, and understanding different urban design methods and techniques to develop the project definition of a public architecture project Data sources and collection methods: - Secondary and primary sources Survey techniques: - Historical, imageability, Permeability and Visual analysis Mapping techniques- Heat maps, Dot density maps, Mental maps, activity maps, figure ground maps. Analysis tools – SWOT, Sieve mapping, STEEP analysis and Ped shed Analysis: Study the detailed project report (DPR) of any Urban Public Architecture project to identify the various layers used to develop project definition	CO4	13
SECOND INTERNAL TEST			

V	**Understanding the various urban design layers through selected case studies for architectural public projects, both global and Indian context.** Global context: -Urban Design projects – Highline, Hudson Yards NY, Potsdammer Platz Berlin, Superkilen, The Line etc. Architecture works of Jan Gehl, Oscar Niemeyer, Louis khan, Norman Foster, Bjarke Ingels etc Indian context: - Public Architecture Works of Le Corbusier Charles chorea, B. Doshi, Bimal Patel, Rahul Mehrotra etc. Students are required to select the case study of any urban Public architectural project for the S9 design studio and perform a critical appraisal of the project	CO4	10
END SEMESTER EXAM			

Reference books:

1. Spreiregen Paul D, 'Urban Design: The Architecture of Town and Cities', McGraw- Hill Book Company, New York,1965
2. Moughtin, C, 'Urban Design – methods and techniques', Architectural press

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Reg. No.:	Name:

TKM COLLEGE OF ENGINEERING, KOLLAM

NINTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR

Course Code: 22ARS901

Course Name: URBAN DESIGN

Max. Marks: 60		Duration: 3 Hours

PART A

	Answer all questions, each question carries 4 marks	Marks
1	Module 1	(4)
2	Module 2	(4)
3	Module 3	(4)
4	Module 4	(4)
5	Module 5	(4)

PART B

Answer any one question from each module, each carries 8 marks

	MODULE 1		
6			(8)
7			(8)
	MODULE 2		
8			(8)
9			(8)
	MODULE 3		
10			(8)
11			(8)
	MODULE 4		
12			(8)
13			(8)
	MODULE 5		
14			(8)
15			(8)

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARS902	Housing	3-0-0-0	3	2022

Course Objectives

1. The goal of this course is to help students understand the housing problems in India and the importance of housing and related infrastructure at a unit level to a National level.
2. The students will be introduced to different housing issues, schemes, policies, finance, acts, and design standards.
3. The students will be made aware of the role of an architect in society and increase their social responsibility by exposing the social realities around them.

Course Outcomes:

After the completion of this course, the student will be able to

Course Outcome	Description of Course Outcomes	Prescribed learning level
CO-1	Understand the issues and problems, and the importance of housing in the development of a nation.	Understanding
CO-2	Understand the historical context and evolution of housing acts, policies, and schemes around the world and in India.	Understanding
CO-3	Analyse the role of the various housing-related institutions in the state, national, and global level.	Analysing
CO-4	Investigate interdisciplinary perspectives on housing, including sociology and economics.	Analysing
CO-5	Engage with case studies and precedents of innovative housing projects.	Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks
Continuous assessment tests (2 numbers) : 20 Marks
Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

Part A: 5 questions (one from each module) with 4 marks each. (5 x 4 = 20 Marks)

Part B: 2 questions from Modules I–V. Answer any one. Each question carries 8 marks. Part B questions may have subdivisions. (5 x 8 = 40 Marks)

Syllabus

Housing Problem and Policies, Importance of Housing in socio-cultural & economic Development, Housing Programs, Schemes and Projects, Housing the poor, Institutional Framework and Housing Finance, Housing Typology and Considerations, Housing Design.

Course Plan

Module	Contents	Course outcomes	Hours
I	**Housing Problem and Policies** Magnitude of Housing Problem. Housing challenges due to Urbanization. Relationship with city planning; Role of architect in housing. Housing stock – Census - Quantitative & Qualitative, Housing shortage in Urban and Rural settlements: reasons for housing shortage. Importance of Housing in socio-cultural & economic Development. Maslow's hierarchy of needs. International declarations - IYSH, Habitat Agenda, MDGs and SDGs, New Urban Agenda. Housing Policies and programs introduced in the various Five-Year Plans, Niti Aayog. National Housing policy, National Urban Housing & Habitat Policy (2007), National Rural Housing & Habitat Policy.	CO1, CO2	10
II	**Housing Programs, Schemes, and Projects** The nature and types of housing development programmes in India. Important housing schemes in India for various economic categories, e.g., RAY, PMAY, IHSDP, VAMBAY, schemes under JNNURM, etc. Slums- Causes and effects, characteristics and magnitude of the problem, Policies & Strategies for Slum improvement. Slum-free cities. Housing the poor - Incremental housing, Core housing, Site, and services, Concept of aided self-help, Affordable housing, and Inclusive housing. International case studies - Alejandro Aravena, Shigeru Ban, etc.	CO2, CO4	8
FIRST INTERNAL TEST			
III	**Institutional Framework and Housing Finance** Objectives and role of Agencies like HUDCO, NHB, NBO, TCPO, BMTPC, State Housing Boards, Cooperatives, NGO's and other agencies in housing. Role of Private Sector in Housing. Co-operative housing in India. Importance and characteristics of housing finance. Sources of housing finance and essential characteristics, Formal and Informal systems of finance. Major housing finance agencies at the national and state levels, such as the NHB, HDFC, LICHF, GIC, etc.	CO3	7
IV	**Housing Typology and Considerations**	CO4, CO5	8

	Housing Typology - Characteristics of Housing in different regions and their typology - traditional houses, detached housing, row housing, cluster housing, plotted development, multi-storied housing, service apartments, etc. Residential Satisfaction. Emerging trends in housing types. Housing density- net density & gross density. The sociology of housing.		
SECOND INTERNAL TEST			
V	**Housing Design** Importance of standards, regulations, and laws on contemporary practices for housing and habitat development- KMBR, NBC, URDPFI etc. Principles of neighborhood planning & case studies - Physical and Social infrastructure. Planning and design considerations for rehabilitation housing.	CO4, CO5	12
END SEMESTER EXAMINATION			

Textbooks:

1. Housing in the Third World - analyses and solutions – edited by Harjinder Singh, Leslie Kilmartin, 1992
2. A. K. Jain 'Urban Housing and Slums', 2009
3. The Sociology of Housing: How Homes Shape Our Social Lives, Edited by Brian J. McCabe and Eva Rosen (2023)
4. Amos Rapaport, 'House Form and Culture', 1969
5. Arthur Gallion, 'Urban Pattern', 1953

Reference books:

1. Allen, W.A., Happold, E., Word, A.M., & Courtney (Ed.) "A Global strategy for Housing in the third millennium" E & FN Spon, London, 1992.
2. The Affordable Housing Market in India: Institutional Constraints, Informal Sector and Privatisation, Padmini Ram and Malcolm Harper (2020)
3. Introduction to Housing, HERA (Author) Prentice Hall (2005)
4. Innovative Approaches to Housing for the Poor – K. Thomas Poulose, 1988.
5. National Building Organisation, Slums in India-A Statistical Compendium, 2011
6. Urban and Regional Development Plans Formulation and Implementation (URDPFI) Guidelines, 2015
7. National Building Code of India, 2005
8. Kerala Municipality Building Rules, 2019

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TKM COLLEGE OF ENGINEERING, KOLLAM NINTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR		
Course Code: 22ARS902		
Course Name: HOUSING		
Max. Marks: 60		Duration: 3 Hours
PART A		
	Answer all questions, each question carries 4 marks	**Marks**
1	Module 1	(4)
2	Module 2	(4)
3	Module 3	(4)
4	Module 4	(4)
5	Module 5	(4)
PART B		
Answer any one question from each module, each carries 8 marks		
MODULE 1		
6		(8)
7		(8)
MODULE 2		
8		(8)
9		(8)
MODULE 3		
10		(8)
11		(8)
MODULE 4		
12		(8)
13		(8)
MODULE 5		
14		(8)
15		(8)

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARP901	Professional Practice	2-1-0-0	3	2022

Course Objectives

1. To familiarize Architecture as a profession and its role in moulding society, understand duties, liabilities, responsibilities & ethics as a professional.
2. To familiarize office administration, schedule of drawings/deliverables, office & client engagement, and design documentation.
3. To impart knowledge of tenders, contracts, building permits, project management & scope of Professional services.
4. To introduce the legal and regulatory framework with regards to Architectural practice, banking, taxation & other procedures of the office along with the laws applicable to architects.
5. To discuss and apprise the scope & avenues of professional architectural services and the demands & mode of professional practice field for setting up an architectural practice.

Course Outcomes:

After the completion of this course, the students will be able to familiarise with established norms of a professional practice by appreciating Architecture as a profession, scope of architectural services, setting up an architecture firm, office management, regulatory framework & demands & mode of Professional Practice field in line with the industry.

Course Outcome	Description of Course Outcomes	Prescribed learning level
CO-1	Familiarizing Architecture as a profession and its role in moulding the society.	Understanding
CO-2	Familiarizing of office administration, Schedule of drawings/deliverables, office management, client engagement and design documentation.	Understanding
CO-3	Knowledge of building permits, regulations, Development authority & scope of Professional services.	Understanding
CO-4	Develop a knowledge on legal and regulatory framework with regards to Architectural practice.	Analysing
CO-5	Appreciation of various Architectural practices and develop a knowledge for setting up an office.	Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks

Continuous assessment tests (2 numbers) : 20 Marks

Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

Part A: 5 questions (one from each module) with 4 marks each. (5 x 4 = 20 Marks)

Part B: 2 questions from Modules I–V. Answer any one. Each question carries 8 marks. Part B questions may have subdivisions. (5 x 8 = 40 Marks)

Syllabus

An overview of the Architecture profession and its role in moulding the society, Ethics of architectural practice, office management, design documentation, scope of professional practice in the context of today's rapidly evolving building construction industry. The syllabus also discusses about scope of professional services, fees, project management, staging of a project with client engagement from commencement to execution, regulatory frameworks and appreciation of various architectural practices for setting up a professional architectural practice.

Course Plan

Module	Contents	Course outcomes	Hours
I	**Architectural profession** Architects' Act-1972, Council of Architecture, Graduation to the registration process. Ethics and code of Practice, social responsibility and sustainability, UN Sustainable Development Goals, professional development associations - COA, IIA, IIID, IUDI, ITPI, ISOLA, AIA, RIBA.	CO1	5
II	**Architectural practice** Architecture Studio/company registration, Skillset for Practice, Software Expertise, office management, client engagement and communication, Schedule of drawings/deliverables, Scope of comprehensive design Services, Scale of Fees, and Site supervision, Documentation, design standards, Architectural coemptions, Feasibility of Site and projects, Various consultancy services & International practice.	CO2	8
FIRST INTERNAL TEST			
III	**Building permits, regulations and development authority** Types of Building permits, Building Bylaws/Regulations, Fire regulations, NBC, Various IS codes for construction practices, Occupancy of buildings, Access width, Occupant load FAR/FSI, Coverage, Setbacks, TDR in Real estate and construction. Height of the building, Development Authority, RERA, Joint development Power of Attorney, Various NOC's-Fire, Aviation, Railway authority NOC, MOU or development agreement NOC, Pollution control board NOC, PWD NOC, Heritage NOC, Forest NOC, Environmental clearance rules, Rules for Building in Hilly areas, Sustainable building practice. Safety Provisions for	CO3	10

	High Rise Buildings,		
	Completion certificate, Occupancy certificate, Development certificate, Introduction to Tendering, Contracts and Project management to staging/phasing a project.		
IV	**Legal and regulatory framework** Arbitration, Indian Arbitration act, Duties and responsibilities of Arbitrator, revoking authority, Umpire and Award, Legislation and registration, banking, insurances and Taxation (Income tax, GST), Valuation, factors affecting value, value classification, ownership, methods of valuation, valuation reports, Easements, types and essential conditions of Easements, valuation of easements. Role and Legal duties of Architects in Arbitration and Valuation.	CO4	10
SECOND INTERNAL TEST			
V	**Appreciation of architectural practice** Identifying and Analyse various successful architectural practices. Appreciate different types of Architectural projects, design standards and approaches in design. Architectural competitions, Intellectual property Rights/IPR, Start-up Eco system, Entrepreneurship, social commitment and service. Application of AR and VR in Architecture, Parametric tools in Architecture, Architecture of metaverse, Specialization in Architecture, Engage with Emerging technologies and platforms in AI-Midjourney, Vitras.ai, stable diffusion, robotics, social networking, Alternative business models. Exercise: The students may be encouraged to visit in groups to an established Architects firm, interact with them, understand the office functioning and prepare a presentation of their firm visit.	CO5	12
END SEMESTER EXAMINATION			

Reference books:

1. Dr Roshan H Namavati, Professional Practice: With Elements of Estimating, Valuation, Contract and Arbitration, (2016, Lakhani Book Depot).
2. Council of Architecture, Manual of Architecture practice-2022.
3. Hand book of Professional Documents, COA Publications.
4. Paul Segal, Professional Practice: A Guide to Turning Designs into Buildings, (2006, W W Norton & Co Inc).
5. Robert F. Dr Roshan H Namavati Herrmann, Menaker & Herrmann LLP Attorneys, Law for Architects: What You Need to Know, (2012, W W Norton & Co Inc).
6. Krishnamurthy K.G, Professional Practice, (2014, Prentice Hall India Learning Private Limited).
7. Kerala Municipal building Regulations -2019 (KMBR), KERALA GAZETTE, Local Self Government (RD) Department, GOVERNMENT OF KERALA.
8. AIA, The Architect's Handbook of Professional Practice, (2014, Wiley-Blackwell).
9. Wiley, The Architecture Student's Handbook of Professional Practice (Fifteenth Edition, John Wiley & Sons Inc).
10. R Klein, The Architect's Guide to Small Firm Management: Making Chaos Work for Your Small Firm, (2010, John Wiley & Sons Inc).
11. Jan Knikker, How to Win Work: The architect's guide to business development and marketing, (2021, RIBA Publishing).
12. Patrick MacLeamy, Designing a World-Class Architecture Firm: The People, Stories, and Strategies Behind HOK, (2020, John Wiley & Sons Inc).
13. Eric W. Reinholdt, Architect + Entrepreneur: A How-to Guide for Innovating Practice: Tactics, Strategies, and Case Studies in Passive Income: 2 (Architect and Entrepreneur), (2015, CreateSpace Independent Pub).
14. Harold Koontz, Heinz Weihrich, Mark V. Cannice, Essentials of Management, 11th Edition, (2020, McGraw Hill; Eleventh edition).
15. Dr Roshan H Namavati, Theory & Practice of Valuation, (land & Buildings) for Architects, Engineers, Surveyors, Advocates, & Income Tax Practitioners, (1968, Universal Book Corporation).
16. Architects Reference manual-workshops professional practice for architects by IIA Kerala chapter and Trivandrum centre, November-1996.
17. Stefano Brusaporci, Handbook of Research on Emerging Digital Tools for Architectural Surveying, Modelling, and Representation, Esr - June 2015.

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TKM COLLEGE OF ENGINEERING, KOLLAM NINTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR		
Course Code: 22ARP901		
Course Name: PROFESSIONAL PRACTICE		
Max. Marks: 60		Duration: 3 Hours
PART A		
	Answer all questions, each question carries 4 marks	**Marks**
1	Module 1	(4)
2	Module 2	(4)
3	Module 3	(4)
4	Module 4	(4)
5	Module 5	(4)
PART B		
Answer any one question from each module, each carries 8 marks		
MODULE 1		
6		(8)
7		(8)
MODULE 2		
8		(8)
9		(8)
MODULE 3		
10		(8)
11		(8)
MODULE 4		
12		(8)
13		(8)
MODULE 5		
14		(8)
15		(8)

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARP902	Project Management	2-0-0-1	3	2022

Course Objectives

To introduce students to the skills essential for managing projects, with an emphasis on construction project management. This can equip students with the skill set to manage projects while addressing organizational, technical, financial, human resource, safety, and quality concerns.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcomes	Prescribed learning level
CO-1	Summarize the project management procedures of project initiating phase.	Understanding
CO-2	Explain the procedure of awarding construction contracts and its legal aspects.	Understanding
CO-3	Demonstrate the use of project scheduling techniques in construction management.	Apply
CO-4	Discuss how to plan the project's resources and inculcate safety culture in construction projects.	Understanding
CO-5	Demonstrate the use of modern tools and techniques in construction project management.	Apply

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks

Continuous assessment tests (2 numbers) : 20 Marks

Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

Part A: 5 questions (one from each module) with 4 marks each. (5 x 4 = 20 Marks)

Part B: 2 questions from Modules I–V. Answer any one. Each question carries 8 marks. Part B questions may have subdivisions. (5 x 8 = 40 Marks)

Syllabus

Introduction to Project Management, Legal Aspects of Construction Contracts, Planning and Scheduling Construction Projects, Resource Management, Safety management in construction projects, and Modern tools and methods.

Course Plan

Module	Contents	Course outcomes	Hours
I	**Introduction to Project Management** Overview of project management, including its purpose, scope, and goals. Project stakeholders, project phases, project organization. Scientific approach to project management. The objectives and responsibilities of the construction management team and the construction managers. Summary of scheduling, monitoring, and controlling the phases of the project management cycle. Conducting feasibility assessments for projects.	CO1	6
II	**Legal Aspects of Construction Contracts** Definition and types of construction contracts, their purpose, merits, and demerits. Essentials of an executable contract. Tendering and contract awarding procedures. Basics of Contract Law and other relevant acts. Alternate Dispute Resolution procedures being used in construction projects.	CO2	6
FIRST INTERNAL TEST			
III	**Planning and Scheduling Construction Projects** An overview of time management. Basics of Work breakdown structure (WBS). Introduction to construction scheduling techniques - Bar chart / Gantt chart, Critical Path Methods (CPM) - creation of network, network analysis, and findings. Fundamentals and application of PERT.	CO3	9
IV	**Resource Management** An overview of the five resources for planning and scheduling. Allocation of resources – resource smoothing and levelling. Concept of materials management – planning and control of inventory. Planning of machinery for construction projects. Project cost and budget. Cost – benefit analysis of construction projects. Time – cost trade-offs. Project Crashing or accelerating a project and its downstream effects. Safety management in construction projects.	CO4	12
SECOND INTERNAL TEST			

V	**Modern tools and methods** Computerization and its advantages. Integrated Project management information system. Project management software like Project Libre or Microsoft Project or similar ones and their use. Application of BIM in project management. Role of AI in project management. Digital twin and its application in project management. Students are expected to do any one project management task using	CO5	12
	modern tools and methods under the guidance of experts from the industry.		
END SEMESTER EXAMINATION			

Reference books:

1. Harris, R. B. (1978). Precedence and Arrow Networking Techniques for Construction. John Wiley & Sons, INC.
2. Krishnamurthy, & Ravindra. (2017). Construction and Project Management (Second). CBS Publishers and Distributors Pvt Ltd.
3. Punmia, B., & Khandelwal, K. (2019). Project Planning and Control with PERT and CPM (Fourth). Trinity Press.
4. Singh, H. (2017). Construction Project Management (Second). Abhishek Publications.
5. Srinath, L. (2015). PERT and CPM Principles and Applications. (Third). Affiliated East-West Press Pvt Ltd.

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TKM COLLEGE OF ENGINEERING, KOLLAM NINTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR		
Course Code: 22ARP902		
Course Name: PROJECT MANAGEMENT		
Max. Marks: 60		Duration: 3 Hours
PART A		
	Answer all questions, each question carries 4 marks	**Marks**
1	Module 1	(4)
2	Module 2	(4)
3	Module 3	(4)
4	Module 4	(4)
5	Module 5	(4)
PART B		
Answer any one question from each module, each carries 8 marks		
MODULE 1		
6		(8)
7		(8)
MODULE 2		
8		(8)
9		(8)
MODULE 3		
10		(8)
11		(8)
MODULE 4		
12		(8)
13		(8)
MODULE 5		
14		(8)
15		(8)

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARD901	Architectural Design – VII	0-0-12-0	12	2022

Course Objectives

To situate architecture and placemaking within its ecological, historical, social, cultural, economic, infrastructural and political context and the legal and administrative framework of an urban/rural setting.

To use research and analytical tools to formulate a detailed design program.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcomes	Prescribed learning level
CO-1	Understand tools and techniques used to collect and collate data from the context through primary and secondary research.	Understanding/ Analysing/ Applying
CO-2	Analyse the data and make inferences that aids formulation of a project brief based on the intent of the studio.	Applying
CO-3	Devise a design programme for the project that addresses key issues with respect to the context/site.	Analysing/ Applying
CO-4	Represent the architectural scheme through drawings, renderings, multimedia and models.	Creating

Mark distribution:

Continuous Internal Evaluation marks	End semester jury marks	Total marks	Duration of end semester jury
50	50	100	2-3 days

Continuous internal evaluation pattern:

Attendance : 5 Marks

Design Assignments/Reviews/Tests : 45 Marks

Syllabus

The architectural design studio focuses on public projects situated in urban and rural environments. These public buildings are integrated into and influenced by the intricate systems (Ecology, History, Infrastructure networks, cultural dimensions, legal and administrative frameworks etc) of their respective contexts. Additionally, it's essential to consider a wide range of stakeholders, from the general public to decision makers.

Students are engaged in an architectural design exercise focused on the design/redesign of public built environments in an urban/rural setting that would have a significant influence on the people and the context. This exercise encompasses both research and design components.

Example of Projects: Transportation Terminals, Shopping Complex, Art galleries, Cultural centre, Administration buildings, Sports complexes, Performing Arts Centre, Condominiums etc.

Course Plan

Module	Content	Course outcome	No. of hours	Marks
I	Literature review to understand parameters for studying relationships between architecture and context. Case studies of designed public architecture from India and other parts of the world with an analysis of relationships to context.	CO1	18	10%
II	Primary study of a public project based on the parameters arrived at from the literature. The output of the study can be in the form of multimedia presentations.	CO1, CO2	18	10%
FIRST INTERNAL TEST				
III	Introduction of the public project and studies at both secondary and primary levels including case studies of the project introduced.	CO1	36	15%
IV	Analysis/inferences, formulation of design programme and area statements. Conceptual schemes and Site design based on the contextual studies and future vision of the place (the vision can be taken from the existing master plan/documents for the chosen area).	CO2, CO3, CO4	24	15%
SECOND INTERNAL TEST				
V	Architectural design and detailing for the project including service drawings and landscape details.	CO4	84	50%
END SEMESTER JURY				

References:

1. Gordon Cullen. (1961). The Concise Townscape. Architectural Press, London
2. William H. Whyte (1980), The Social Life of Small Urban Spaces, Conservation Foundation, University of Michigan
3. Christian Norberg-Schulz. (1980). Genius Loci: Towards a Phenomenology of Architecture. New York: Rizzoli.
4. Kevin Lynch. (1984). Good City Form. Cambridge, MA: MIT Press.
5. Jon Lang (2005). Urban Design: A Typology of Procedures and Products (1st ed.). Routledge.
6. Dell Upton (2002), Architecture in Everyday Life, New Literary History
7. Jan Gehl (2011). Life Between Buildings: Using Public Space. Washington, DC: Island Press.
8. Cliff Moughtin et al (2003) Urban Design Methods and Techniques. Architectural Press
9. Eric Parry 2015. Context: Architecture and the Genius of Place. Wiley

10. Herman Hertzberger (2017). Lessons for Students in Architecture. Rotterdam: Nai010 Publishers.
11. Bill Hillier, Julienne Hanson (1989) The Social Logic of Space. Cambridge University Press
12. Rob Krier and Colin Rowe. (1979) Urban Space. Academy Editions, London.
13. Allan B Jacobs, 1993. "Great Streets," University of California Transportation Centre
14. Matthew Carmona (2021) Public Places- Urban Spaces the Dimensions of Urban Design, Routledge
15. Philip Thalis, Peter John Cantrill (2013) Public Sydney: drawing the city. Historic Houses Trust of New South Wales and the University of New South Wales
16. Ingels, B., Brorman Jensen, B. (Ed.), Ginsberg, E., Pahhota, D., Zahle, D., Johansson, H., Pedersen, A., & Bergman, K.-U. (2009). Yes is More: An Archicomic on Architectural Evolution. (1st ed.) BIG Aps.
17. Charles Correa (2010). A Place in the Shade The New Landscape & Other Essays. Penguin Books India
18. All the relevant Building Codes, KMBR, URDPFI guidelines etc.

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARP903	Dissertation	0-0-2-0	2	2022

Course Objectives

To provide the students with an opportunity to carry out independent, objective research work on a topic of their choice which is directly related to the built environment.

Course Outcomes:

Course Outcome	Description of Course Outcomes	Prescribed learning level
CO-1	Introducing the background, identifying the problem and establishing the need for the study.	Understanding, Analysing
CO-2	Forming extensive theoretical and methodological framework of reading and writing on literature related to the area of research.	Understanding, Analysing
CO-3	Systematically abstracting, Analysing and interpreting the data from different perspectives to build evidence-based, convincing, and clear analysis or answers.	Understanding, Analysing, Evaluating, Applying
CO-4	Presenting the research output in standardized and systematic academic formats.	Analysing, Evaluating, Applying, Creating

Guidelines:

1. Dissertation committee: Dissertation committee will be formed to monitor the research work which includes the dissertation coordinator and two senior faculty members of the institute. The committee will be responsible for constituting the evaluation panels and publishing marks.
2. Area of research: The students will carry out the research work under the guidance of their guides on topics directly related to the built environment. They may be encouraged to choose topics that eventually culminate in their final semester design thesis. To establish the need for the study, adequate background research needs to be conducted, and a research gap needs to be found.
3. Topic selection: The students need to submit research proposals related to built environment in the 8th semester. The topics will be approved by the dissertation committee. The committee will ensure that the chosen topic falls within the scale and scope of architecture design and students will be able to complete the research work in the given timeframe.
4. Allotment of guides: The head of the department will allot faculty members of the institution as guides to students to supervise their research work.
5. Schedule and conduct of work: The synopsis finalization will be completed by the end of the 8th semester and the department can schedule the deadlines according to the 8th semester academic calendar. The dissertation will be an independent subject in the 9th semester and the schedule for the same will be published in the beginning of the semester. The schedule will include the details of different stages of reviews and the mode of presentation.

6. Deliverables: At the end of the dissertation, students shall submit a well written technical paper of max. 4000 words having publishable quality. The department shall collate the papers into a compendium for future reference.

Technical paper-

- Word limit- 4000 words (single side printing)
- Content- Font- Times New Roman, Size-12
- Spacing- 1.5
- Referencing style: As per the department
- Header: Topic name (Font- Times New Roman, size 10, Italics)
- Footer: Name and Register number with page number at right bottom corner- (Font- Times New Roman, Size- 10, Italics)

The institution can create their own format adhering to the minimum requirements given above.

Plagiarism: Plagiarism should be avoided and should be checked using any institution approved software. The institute can use softwares like DrillBit, Turnitin, Urkund etc.

Evaluation:

The dissertation committee will monitor the internal and external evaluations. A total of 100 marks will be awarded for the course.

i) Internal Reviews – 40 marks

Total marks will be 40 and it will be awarded in the following manner.

Stage	CO	Deliverables	Guide marks	Panel marks	Total marks
Preliminary (Beginning of 9th semester)	CO1, CO2	Background studies/ need for the project/ research gap Aim, objectives, scope, limitations etc. and methodology Literature review/ Data collection reflecting the methodology which is adopted or framed by the student	5	15	20
Intermediate (During 9th semester)	CO3, CO4	Results and discussion Analysing and inferring the findings Concluding and stating further scope	5	10	20
	CO1 CO2 CO3 CO4	Draft Paper	5		
				Total	**40**

ii) External Jury – 60 marks

The external jury evaluation will be conducted by the dissertation assessment board having 3 members. The board can conduct the evaluation on a convenient date before the deadline stated in the academic calendar. The chairperson of the board will be a senior faculty member from the institute. The board will have dissertation coordinator/ a faculty member from the institute as internal member and a CoA registered architect with minimum 5 years of experience, preferably from academic/ research institutes, as external member.

Submission requirements:

A minimum of 2 hard copies of the technical paper signed by the guide and head of the department/institution, needs to be submitted either on the previous working day of the jury or any other date prior to the jury after the completion of the semester, as announced by the dissertation committee.

- Soft copies of the same can be collected by the institution, prior to submission for checking plagiarism.
- The final presentation can be set as a slideshow.
- Joint author paper in conference proceedings and journals is encouraged in consultation with the guide. The primary author of the paper will be the student author.

Stage	CO	Deliverables	Panel marks
Final	CO1, CO2, CO3, CO4	**Technical paper – Structure of the paper** Abstract – The abstract is a brief, accurate, and comprehensive summary (max 200 words) Introduction – introduction is the true start of the paper – Background studies/ need for the project Main body – This is the main part, or "core" of the paper and includes the methods through which the work's been done, Aim, objectives, scope, limitations, methodology, results, analysis, and discussion sections Conclusion. References	60
		Total marks	**60**

Publication of marks: The marks for each stage need to be published within 2 working days after the review. Those students who fail to obtain 50% marks (internal and external evaluation marks put together) can work forward and reappear for the external jury on a date specified by the institution not earlier than one month of the regular jury evaluation.

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.
7. Day, R. A. (2012). How to Write and Publish a Scientific Paper. Cambridge University Press.
8. Yin, R. K. (2003). Case Study Research: Design and Methods. SAGE Publications.

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARE901.1	Earthquake Resistant Architecture	2-0-0-0	2	2022

Course Objectives

1. To give an insight to the students about understanding the behaviour of an earthquake and to provide foundational knowledge of seismology and the impact of earthquakes on structures.
2. To understand the behaviour of different building types during seismic activity and to familiarize students with earthquake-resistant design principles and relevant seismic codes.
3. To explore techniques for assessing damage and improving the seismic performance of buildings.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcomes	Prescribed learning level
CO-1	Recall fundamental concepts of seismology and key terminologies related to earthquakes. Understand the principles of earthquake.	Understanding
CO-2	Explain the impact of seismic forces on different building types and structural components.	Understanding
CO-3	Interpret seismic design codes and understand basic methods for improving earthquake resistance in buildings.	Analysing
CO-4	Analyse and evaluate structural systems for seismic resilience. Earthquake resistant methods and techniques.	Applying
CO-5	Design of buildings for earthquake resistance, Damage assessment of buildings: Apply advanced technologies and design techniques to create earthquake-resistant architecture.	Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Mark

Continuous assessment tests (2 numbers) : 20 Marks Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

Part A: 5 questions (one from each module) with 4 marks each. (5 x 4 = 20 Marks)

Part B: 2 questions from Modules I–V. Answer any one. Each question carries 8 marks. Part B questions may have subdivisions. (5 x 8 = 40 Marks)

Syllabus

Introduction to seismology, Impact of earthquake on various structures, masonry and R.C.C. buildings, Design of building for earthquake resistance using seismic design Code provision, Earthquake resistance methods and techniques, Tools and techniques for damage assessment of building, Improvement of seismic performance of building.

Course Plan

Module	Contents	Course outcomes	Hours
I	**Introduction to seismology** Basic Terminologies of Earthquake: plate tectonics, focus, epicenter, epicenter distance, fault line, magnitude of earthquake, intensity of earthquake, frequency, isoseismic lines. Causes of Earthquake: How the ground shaking occurs and cause soil liquefaction. Types of Earthquakes: Inter-plate earthquake, intra-plate earthquake, examples. Different types of seismic waves: p-waves, s-waves, Rayleigh waves, differentiate surface waves and body waves. Working of seismograph, Richter scale, MMI scale. Seismic zones in India, National Seismic Zone map, Prominent past earthquake in India.	CO1	5
II	**Impact of earthquake on buildings** Behaviour of brick and masonry building in earthquake. Case examples. Effect of earthquake on R.C.C. buildings. Behaviour of beams in earthquake, behaviour of columns in earthquake at column-beam joints and column-footing joints, localized failure in R.C.C. structures. Case examples. Effect of earthquake on Open-Ground storey building, soft storey effect. Seismic Effects on structures: effects on architectural features on buildings, twisting of buildings, Torsion effect, effects due to irregularities in building, Re-entrant corners, Short-Column effect, Inverted pendulum effect, Pounding effect.	CO2, CO3	5
FIRST INTERNAL TEST			
III	**Design of buildings for earthquake resistance** Seismic design philosophy for building. Principles and objectives. Importance of seismic design code, Indian seismic	CO4, CO2	6

	codes, IS:1893 and IS:4326, significance and interpretation. Seismic design code provisions: basic terms used in seismic codes and their meaning, horizontal design seismic coefficient, base shear of buildings and vertical distribution of loading. Factors affecting seismic loading: Mass, Natural period, Resonance, damping, ductility.		
IV	**Earthquake resistant methods and techniques** Relevance of building configuration: scale of the building-size in horizontal plane, size in vertical plane, Building proportions, symmetry of building. Importance of simple structural configuration for masonry building. Necessity of horizontal bands, vertical bands, gable bands, through stones and corner stones in brick and stone masonry buildings. Ductility and flexibility of buildings as solution to earthquake effects. Structural redundancy. Role of shear wall in R.C.C. building with open-ground storey. Ductile design of shear walls. Introduction to performance based seismic engineering: Overview of advanced modelling tools (Softwares like ETABS, SAP2000 or STAAD). Emerging technologies: Use of smart materials and sensors for earthquake resistance. AI and IoT in seismic monitoring and design.	CO4	6
SECOND INTERNAL TEST			
V	**Damage assessment of buildings** Causes of distress in buildings, Types and classification of damages due to earthquake. Various tools and techniques for damage assessment. Condition assessment of building, methodology of condition assessment, Detailed investigations required for assessment, Partially Destructive tests, investigation of soil profile, geological and geotechnical investigation, Shake table tests. Improvement of seismic performance of buildings: Seismic retrofitting of old and new buildings, various techniques, materials, components and methods. Techniques to reduce earthquake effects: base isolation technique, supplemental energy dissipation devices, different types of seismic dampers. Case examples.	CO2, CO5	8
END SEMESTER EXAMINATION			

Text Books:

4. Murty, C.V.R., 'Earthquake Tips- Learning Earthquake Design and Construction', 2005, National information Centre for Earthquake Engineering, IITK, Kanpur
5. Joshua Pwavodi, The role of artificial intelligence and IoT in prediction of earthquakes: Review. 2024, Journal - ScienceDirect, KeAi.
6. Lagario, H.J: Earthquakes: An architect's guide for non-structural seismic hazards, John Wiley and sons, New York, USA.
7. Dowrick, D.J: Earthquake resistant design for Engineers and Architects, 1987, Second edition, John Wiley, New York, USA
8. Earthquake resistant design of structures by Pankaj Agarwal and Manish Shrikhande, Prentice-Hall of India, 2006

Reference books:

1. IS:1893 – Indian Standard Criteria for Earthquake Resistant Design of Structures, Bureau of Indian Standards, New Delhi. Part1-2002, Part 6 2022.
2. IS:13935 – Repair and Seismic Strengthening of Buildings – Guidelines, 2009.
3. Priestley, J.N. (2010). "Performance-Based Seismic Design." IIT Kanpur.
4. Bhavikatti, S.S. (2010). "Seismic Analysis of Structures." I.K. International Publishing

		Total Pages:01
Reg. No.:		Name:
TKM COLLEGE OF ENGINEERING, KOLLAM NINTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR		
Course Code: 22ARE901.1		
Course Name: ELECTIVE IV – EARTHQUAKE RESISTANT ARCHITECTURE		
Max. Marks: 60		Duration: 3 Hours
PART A		
	Answer all questions, each question carries 4 marks	**Marks**
1	Module 1	(4)
2	Module 2	(4)
3	Module 3	(4)
4	Module 4	(4)
5	Module 5	(4)
PART B		
Answer any one question from each module, each carries 8 marks		
MODULE 1		
6		(8)
7		(8)
MODULE 2		
8		(8)
9		(8)
MODULE 3		
10		(8)
11		(8)
MODULE 4		
12		(8)
13		(8)
MODULE 5		
14		(8)
15		(8)

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARE901.2	Sustainable Cities and Communities	2-0-0-0	2	2022

Course Objectives

1. To provide students with a robust understanding of sustainable urbanism by integrating theoretical frameworks, policy analysis, and practical applications.
2. To equip students with the knowledge and skills to address challenges in urban systems, infrastructure, and governance, with an emphasis on sustainability, urban ecology and sustainable planning. Students are introduced to decision-making and resource-planning technologies.
3. To foster critical thinking through the evaluation of global and local case studies, enabling students to propose innovative solutions for sustainable development. By the end of the course, students will be capable of applying interdisciplinary approaches, engaging communities effectively, and formulating strategies to design and manage sustainable cities and communities, aligned with contemporary global and national sustainability goals.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcomes	Prescribed learning level
CO-1	Define and explain the key concepts related to sustainable development, sustainable communities and urban ecology.	Remembering and Understanding
CO-2	Familiarise with Sustainable Development Goals related to Sustainable cities and communities.	Understanding and Analysing
CO-3	Understand the objectives and approaches of sustainable urban planning and analyse the concepts.	Understanding and Analysing
CO-4	Evaluation and application of policies and initiatives promoting sustainable urban development in Urban Design studio.	Evaluating and Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks
Continuous assessment tests (2 numbers) : 20 Marks
Assignment/Quiz/Course project : 16 Marks

End semester examination pattern:

Part A: 5 questions (one from each module) with 4 marks each. (5 x 4 = 20 Marks)

Part B: 2 questions from Modules I–V. Answer any one. Each question carries 8 marks. Part B questions may have subdivisions. (5 x 8 = 40 Marks)

Syllabus

Foundations of Sustainable communities, Policy Frameworks and Governance, Sustainable Urban Planning, Sustainable Cities, Sustainable Urban Planning in Practice.

Course Plan

Module	Contents	Course outcomes	Hours
I	**Foundations of Sustainable communities** Key Concepts – Definitions and principles of sustainability, sustainable development and sustainable communities. Ecosystem services and their importance in urban areas, Blue green infrastructure and nature based solutions, Urban ecology and its principles. Liveable communities. Community Capital – Role in sustainable community development. Community Empowerment – Strategies for participatory governance and grassroots action.	CO-1	5
II	**Policy Frameworks and Governance** Global Policies - Sustainable Development Goals (SDGs) and their relevance to urban planning. Sustainable Development Goal 11 targets in India. National Frameworks – Smart Cities Mission under the Ministry of Urban Development, including principles of waste management, water management, energy management, and urban mobility.	CO-2	5
FIRST INTERNAL TEST			
III	**Sustainable Urban Planning** Sustainable Urban Development - Objectives and approaches. Sustainable Neighborhood Planning: Five principles, Public Participation, Smart Grid concepts, Integrated resource planning. Case Studies: Indian examples like Ahmedabad (energy, water supply, sewerage) and ecologically sensitive zones in urban contexts.	CO-1, CO-3	5
IV	**Sustainable Cities** Eco-Cities: Concepts and principles, with examples of eco-city planning frameworks globally and in India. Cultural and Social Sustainability - Role of heritage and inclusivity in urban planning.	CO-1, CO-3	5
SECOND INTERNAL TEST			

V	**Sustainable Urban Planning in Practice: Case Studies** Project-Based Learning – Students shall identify case studies on sustainable cities and communities, analyse, and evaluate the sustainable principles implemented. Literature Case Studies – Sustainable Urban Planning- Rio Nuevo Master Plan, Uttah City. Sustainable community case study- Hakka Tulou community settlements in Hezhou, China, Ralegan-Siddhi, Maharashtra, Mawlynnong Village, Meghalaya. Application to Architectural Design Studio- Critical evaluation and application of policies and initiatives promoting sustainable urban development in Architectural Design studio.	CO-4	10
END SEMESTER EXAMINATION			

Textbooks:

4. David Thompson, "Sustainable Communities: Creating a Durable Local Economy", McGraw-Hill, 2015.
5. Dennis N. H. Lee "Planning and Urban Design Standards", John Wiley & Sons, 2006.
6. J. Nicholas & A. J. Dragan "Introduction to Sustainable Development", Pearson Education, 2009.
7. Peter Calthorpe, "Urban Design for Sustainability: A Guide to Creating Sustainable Communities", Island Press, 2010.
8. Peter Roberts and Jonatan Pinkse, "Urban Sustainability: A Global Perspective", Routledge, 2016.
9. Philip Berke, "Urban Planning and Sustainable Development", John Wiley & Sons, 2013.
10. Prugh, Robert Costanza, and Herman Daly, "Sustainable Development: Principles, Frameworks, and Case Studies" Thomas, Island Press, 2016.
11. Rob Kitchin "Smart Cities: A Spatialized Intelligence", SAGE Publications, 2014.
12. Roberto Rocco and Frank Behrendt "Sustainable Cities: A Global Perspective", Routledge, 2017.

Reference Books:

1. Banister, D., Planning Sustainable Cities and Regions: Towards More Equitable Development, Routledge, 2015.
2. Block, P., The Power of Community: How to Build a Resilient Society, Berrett-Koehler Publishers, 2008.
3. Brundtland, G.H., Our Common Future, World Commission on Environment and Development, 1987.
4. Eizenberg, E., The Resilient City, Rockefeller Foundation and Arup, 2014.
5. Farr, D., Sustainable Urbanism: Urban Design With Nature, John Wiley & Sons, 2007.
6. Kibert, C.J, Sustainable Architecture: Principles and Practice.
7. Longley, P. A., GIS for Sustainable Development, Taylor & Francis, 2005.
8. MacKay, D. J. C., Energy Efficiency in the Urban Environment, Earthscan, 2011.
9. McHarg, I., Design with Nature, John Wiley & Sons, 1969.
10. McHarg, I.L, The Ecology of Cities, 1963.
11. Moore, S. A., The Sustainable City, Island Press, 2007.

12. Rao, C.V, Sustainable Cities: Concepts and Case Studies, 2014.

13. Sioshansi, F. P., Energy Efficiency: Towards the End of Demand Growth, Elsevier, 2017.

14. United Nations, Sustainable Development Goals: A Blueprint for Transforming Our World, United Nations, 2015.

15. Wheeler, S. M., & Beatley, T., Sustainable Urban Development Reader, Routledge, 2014.

		Total Pages:01
Reg. No.:		Name:
TKM COLLEGE OF ENGINEERING, KOLLAM NINTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR		
Course Code: 22ARE901.2		
Course Name: ELECTIVE IV – SUSTAINABLE CITIES AND COMMUNITIES		
Max. Marks: 60		Duration: 3 Hours
PART A		
	Answer all questions, each question carries 4 marks	**Marks**
1	Module 1	(4)
2	Module 2	(4)
3	Module 3	(4)
4	Module 4	(4)
5	Module 5	(4)
PART B		
Answer any one question from each module, each carries 8 marks		
MODULE 1		
6		(8)
7		(8)
MODULE 2		
8		(8)
9		(8)
MODULE 3		
10		(8)
11		(8)
MODULE 4		
12		(8)
13		(8)
MODULE 5		
14		(8)
15		(8)

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARE901.3	**Furniture Design**	**2-0-0-0**	**2**	**2022**

Course Objectives

1. To understand the historical evolution and cultural significance of furniture design.
2. To provide students with a comprehensive understanding of furniture design and its relevance and its impact towards architecture and interior design.
3. To introduce ergonomic and anthropometric principles for designing user-friendly furniture.
4. To explore materials, techniques, and technologies used in furniture manufacturing.
5. To integrate sustainability and design thinking methodologies into the furniture design process.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcomes	Prescribed learning level
CO-1	Understand the history and evolution of furniture design, its cultural significance, and its relevance to contemporary design practices.	Understanding
CO-2	Analyse ergonomic principles and their application in furniture Design.	Analysing
CO-3	Explore materials, manufacturing techniques, and furnishing methods for Furniture production.	Applying and Evaluating
CO-4	Develop creative solutions to furniture design challenges using design thinking methodologies.	Creating
CO-5	Integrate sustainability into the design process by considering material lifecycle and user needs.	Evaluating

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous Internal Evaluation Pattern:

Attendance : 4 Marks
Continuous Assessment Tests (2 Nos.) : 20 Marks
Assignments/Quiz/Course Project : 16 Marks

End Semester Examination Pattern:

Part A: 5 questions (one from each module) with 4 marks each. (5 x 4 = 20 Marks)

Part B: 2 questions from Modules I–V. Answer any one. Each question carries 8 marks. Part B questions may have subdivisions. (5 x 8 = 40 Marks)

Syllabus

Introduction to Furniture Design, Materials and Manufacturing Processes, Ergonomics and Human Factors in furniture design for social needs, Design Thinking and methodology in Furniture design, Sustainability in Furniture Design.

Course Plan

Module	Contents	Course outcomes	Hours
I	**Introduction to Furniture Design** Definition and evolution of furniture design. Cultural and historical significance. Overview of furniture styles and their impact on modern design. Understanding key terminologies in furniture design. Case studies of iconic furniture pieces: Panton Chair by Verner Panton, Barcelona Chair by Ludwig Mies van der Rohe, and Eames Lounge Chair by Charles and Ray Eames. Introduction to vernacular furniture styles in India: Examples from Kerala, Gujarat, and Rajasthan.	CO-1	4
II	**Materials and Manufacturing Processes** Exploration of materials: wood, metal, composites, and sustainable alternatives. Introduction to manufacturing techniques: joinery, bending, carving, and modern CNC methods. Finishing techniques and understanding material properties. Case studies from furniture design studios: Herman Miller and IKEA's approach to mass production and sustainability. Discussion on new-age technologies: 3D printing, generative design, and smart materials in furniture manufacturing.	CO-3, CO-5	6
FIRST INTERNAL TEST			
III	**Ergonomics and Human Factors in furniture design for social needs** Principles of ergonomics and anthropometry. User-centered design applications for functionality and comfort. Case studies on ergonomic successes and failures in furniture design. Discussion on award-winning designs: Red Dot Design Award winners in furniture.	CO-2, CO-4	6
IV	**Design Thinking and methodology in Furniture design** Introduction to design thinking and problem-solving. Research, concept development, prototyping, and testing. Integration of design principles such as balance, symmetry, rhythm, and scale. Discussion on current design trends: Minimalist, modular, and multi-functional furniture. Inclusion of	CO-4, CO-5	8

	Indian vernacular methods in furniture making.		
SECOND INTERNAL TEST			
V	**Sustainability in Furniture Design** Principles of sustainable design. Life Cycle analysis of materials. Designing for disassembly, recyclability, and eco-friendliness. Case studies in sustainable furniture. Recognition of notable awards: Wood Awards and Furniture Design of the Year by Dezeen.	CO-5	6
END SEMESTER EXAMINATION			

Textbooks:

1. Jim Postell, Furniture Design, John Wiley & Sons, Inc., Hoboken, New Jersey, 2012
2. Mark Hinchman, History of Furniture design- A global view, Fairchild Publications; First Edition, 2009
3. Will Holman, Guerilla Furniture Design: How to build Lean, Modern Furniture with salvaged materials, Storey Publishing, LLC, 2015
4. Don Norman, The Design of Everyday Things, Basic Books publishers, 2013.
5. Anna Yudina, Furnitecture: Furniture that transforms Space, Thames and Hudson, 2015
6. Julius Panero & Martin Zelnik, Human Dimension and Interior Space, Watson-Guptill Publishing, 1979

References:

1. Fiell Charlotte and Peter Fiell, Modern Furniture Classics, Thames & Hudson Publishing, 1991
2. Judith Miller, Furniture: World Styles from Classical to Contemporary, DK Publishing, 1991
3. Penny Sparke, An Introduction to Design and Culture: 1900 to the Present. Routledge Publishing, 2019
4. Edward Lucie-Smith, Furniture: A Concise History. Thames & Hudson Publishing, 1985
5. Mario Dal Fabbro, Modern Furniture: Its Design and Construction, Reinhold Publishing, 1950.
6. Mel Byars, The Design Encyclopedia, The Museum of Modern Art, New York, 2004.
7. Anne Massey, World Of Art Interior Design Of The 20th Century, Thames & Hudson Publishing, 2001

		Total Pages:01
Reg. No.:		Name:
TKM COLLEGE OF ENGINEERING, KOLLAM NINTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR		
Course Code: 22ARE901.3		
Course Name: ELECTIVE IV – FURNITURE DESIGN		
Max. Marks: 60		Duration: 3 Hours
PART A		
	Answer all questions, each question carries 4 marks	**Marks**
1	Module 1	(4)
2	Module 2	(4)
3	Module 3	(4)
4	Module 4	(4)
5	Module 5	(4)
PART B		
Answer any one question from each module, each carries 8 marks		
MODULE 1		
6		(8)
7		(8)
MODULE 2		
8		(8)
9		(8)
MODULE 3		
10		(8)
11		(8)
MODULE 4		
12		(8)
13		(8)
MODULE 5		
14		(8)
15		(8)

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARE901.4	Building Systems Integration and Management	2-0-0-0	2	2022

Course Objectives

1. To introduce the concept of building systems, sub-systems, and their interrelationships.
2. To familiarize students with the integration of building systems in diverse building typologies.
3. To equip students with knowledge of control systems and their applications in building services.
4. To explore advancements in integrated building management systems (IBMS) and remote monitoring technologies.
5. To enable students to evaluate and incorporate emerging technologies in building systems.

Course Outcomes:

After the completion of this course, the students will be able to

Course Outcome	Description of Course Outcomes	Prescribed learning level
CO-1	Understand the role of systems and sub-systems in buildings and their interdependencies.	Understanding
CO-2	Identify building systems for different typologies and suggest optimization methods.	Understanding, Evaluating
CO-3	Analyse and integrate smart technologies in building management systems for efficient operation.	Analysing, Applying
CO-4	Explore advancements in service control technologies and their applications in sustainable building design.	Understanding, Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	40	60	3 hours

Continuous internal evaluation pattern:

Attendance : 4 Marks
Continuous assessment tests (2 numbers) : 20
Marks Assignment/Quiz/Course project : 16
Marks

End semester examination pattern:

Part A: 5 questions (one from each module) with 4 marks each. (5 x 4 = 20 Marks)
Part B: 2 questions from Modules I–V. Answer any one. Each question carries 8 marks. Part B

questions may have subdivisions. (5 x 8 = 40 Marks)

Syllabus

System and Sub-systems in buildings, relationship and analysis of sub-systems; Building systems for different building typologies, Optimization and sub-system; Control systems for various building services, Types of controllers, Integrated building management systems, Remote monitoring and management, home automation, Developments in service control systems.

Course Plan

Module	Contents	Course outcomes	Hours
I	**System and Sub-systems in buildings** Introduction to Building systems: Structural system & Non-structural Systems. Sub-systems: Subsystems of Structural system- Building elements, Subsystems of Non-structural - Enclosure & Protection System, Mechanical systems (MEP, Fire-fighting, Waste disposal, recycling systems, etc.), Mechanical transportation systems. Interrelationships and dependencies among various systems (structural, HVAC, plumbing, electrical, etc.) and their role in building performance. Factors affecting selection, assembly and integration of building systems.	CO-1	6
II	**Building Systems for various Building Typologies and Optimization** Variations in building systems based on typology (residential, commercial, industrial, healthcare, institutional, etc.). Optimization of building systems for energy, cost, and operational efficiency. Space and resource optimization in integrated systems, Use of tools like Building Information Modelling (BIM) for system coordination.	CO-2	6
FIRST INTERNAL TEST			
III	**Control Systems for Buildings Services** Introduction to Control systems and its significance. Components: Sensors, Actuators, controllers. Types of controllers: On-off, PID and their applications in HVAC, Lighting and Security. Preparation of control system drawings: Schematics and layouts using BIM software.	CO-3	6
IV	**Integrated Building Management System** Introduction to IBMS: Components, functionalities and its benefits. Home automation and smart systems: lighting, security, HVAC, and plumbing.	CO-3	6

	Remote monitoring and management of building services. Case studies of buildings with IBMS/Automation.		
SECOND INTERNAL TEST			
V	**Developments in Service Control Systems** Emerging trends: IoT, artificial intelligence, and machine learning in building services. Energy-efficient technologies and green building systems. Case studies on buildings with advanced service control systems.	CO-4	6
END SEMESTER EXAMINATION			

Reference Books:

1. Ching, F. D. K. (2014). Building Construction Illustrated (5th ed.). Wiley.
2. Wujek, J. B., & Dagostino, F. R. (2010). Mechanical and Electrical Systems in Architecture, Engineering, and Construction (5th ed.). Pearson.
3. Grondzik, W. T., & Kwok, A. G. (2019). Mechanical and Electrical Equipment for Buildings (13th ed.). Wiley.
4. Watson, R., & Collins, B. L. (1993). Building Systems Design Handbook. McGraw-Hill.
5. Casini, M. (2016). Smart Buildings: Advanced Materials and Nanotechnology to Improve Energy-Efficiency and Sustainability. Woodhead Publishing.
6. Ahuja, A. (2013). Integrated M/E Design: Building Systems Engineering. Springer.
7. Bell, M. J., & Schmid, F. A. (2009). Building Control Systems (2nd ed.). Wiley-Blackwell.
8. Smith, P. R. (2007). Energy and Environmental Issues for the Practicing Architect. Charles C. Thomas Publisher.
9. Krarti, M. (2020). Energy Audit of Building Systems: An Engineering Approach (3rd ed.). CRC Press.
10. Thumann, A., & Younger, W. J. (2020). Handbook of Energy Audits (10th ed.). Fairmont Press.
11. Sinopoli, J. (2009). Smart Building Systems for Architects, Owners, and Builders. Butterworth-Heinemann.
12. Binggeli, C. (2016). Building Systems for Interior Designers (3rd ed.). Wiley.
13. McDowall, R. (2008). Fundamentals of HVAC Systems. Elsevier.
14. Stein, B., Reynolds, J. S., Grondzik, W. T., & Kwok, A. G. (2006). Mechanical and Electrical Equipment for Buildings (10th ed.). John Wiley & Sons.
15. CIBSE (Chartered Institution of Building Services Engineers). (2012). CIBSE Guide H: Building Control Systems. CIBSE Publications.
16. Levermore, G. J. (2013). Building Energy Management Systems: Applications to Low-Energy HVAC and Renewable Energy. Routledge.
17. Smart Building Alliance for Smart Cities (SBASC). (2020). Smart Buildings: A Convergence of Technology and Sustainability. SBASC Press.
18. ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers). (2021). ASHRAE Handbook – Fundamentals. ASHRAE.

		Total Pages:01
Reg. No.:		Name:
TKM COLLEGE OF ENGINEERING, KOLLAM NINTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR		
Course Code: 22ARE901.4		
Course Name: ELECTIVE IV – BUILDING SYSTEMS INTEGRATION AND MANAGEMENT		
Max. Marks: 60		Duration: 3 Hours
PART A		
	Answer all questions, each question carries 4 marks	**Marks**
1	Module 1	(4)
2	Module 2	(4)
3	Module 3	(4)
4	Module 4	(4)
5	Module 5	(4)
PART B		
Answer any one question from each module, each carries 8 marks		
MODULE 1		
6		(8)
7		(8)
MODULE 2		
8		(8)
9		(8)
MODULE 3		
10		(8)
11		(8)
MODULE 4		
12		(8)
13		(8)
MODULE 5		
14		(8)
15		(8)

SEMESTER X

Course No.	Course Name	L-T-S-P/D	Credits	Year of Introduction
22ARD1001	Architectural Design Thesis	0-0-0-0	18	2022

Course Objectives

- To equip students with the skills to provide creative design solutions for complex architectural projects.
- To enable students to develop a design program based on the specific domain of the selected project.

Students in the B.Arch. degree program are required to prepare an Architectural Design Thesis during the tenth semester under the guidance of faculty appointed by the department. A departmental Thesis Committee, consisting of the Head of the Department, Staff Advisor, Thesis Coordinator, and senior faculty members, shall be formed to oversee the proper conduct of the thesis within the department. This committee shall be independent of the Thesis Evaluation Committee.

Mark distribution:

Total Marks	Continuous Internal Evaluation Marks	End Semester Jury Examination Marks	End Semester Jury Examination Duration
500	250	250	2-3 days

Selection of Thesis Topic:

The student must obtain prior approval for the thesis topic from the department's Thesis Committee. The primary areas of study and research shall include advanced architectural design for public/private projects. However, particular emphasis should be placed on selecting topics that lead to substantial architectural design components.

The student shall be assigned a faculty member from the department as a guide. The project and its specific topic shall be developed by the student under the guidance of the assigned faculty member. The scale of the project, its research context, and the area of architectural intervention shall be decided by the Thesis Committee, based on the requirements of the individual project.

Thesis course work:

The thesis work shall include a detailed study of the project, its spatial requirements, research components, and a comprehensive site study addressing topography, climate, context, and the suitability of the site for the project. An integrated process shall be reflected in the design approach adopted for the selected topic and in the preparation of drawings, models, and the written report.

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

The research should be selected based on the design challenge it presents and should offer sufficient scope to complement the architectural design scheme.

Internal Evaluation of thesis:

The department shall establish an internal evaluation committee consisting of the guide and a minimum of two members other than the guide for conducting internal reviews. The jury members are to be selected either from the faculty of the Architecture department of the Teaching College and/or from among Architects registered with the Council of Architecture, incorporated under the Architects' Act of 1972, with no less than ten years of experience.

The progress of the thesis work shall be assessed periodically by the internal evaluation committee through four reviews, the dates of which shall be published by the department and approved by the Thesis Committee. The student is required to orally present the thesis work, supported by architectural drawings (hand-drawn sheets/printouts), a design process model, and the work diary.

The scope for each review:

Review-1

Introduction to the thesis topic, justification for architectural intervention in context, identification of the research premise, basic data, space standards, and relevant primary and secondary case studies. Develop a design program derived from the research conducted. Case studies should include content, context, and spatial analysis. Based on research and case studies, create the project brief and area statement. Justification for the identified site. Site analysis should include relevant bylaws and regulations.

Review-2

Detailed site study and analysis, including climatic and environmental conditions, site context, and specific site features. Detailed design development process, including concept development, zoning at the site and building levels, development of the layout plan, and the formation of a form-based understanding for the project. The students should submit the first draft report. The goal is to evolve a design based on the research, case studies, and site-level understanding.

Review-3

Detailed layout plan with sketch designs for various building blocks, including all floor plans, sections, elevations, views, and block models, along with the second draft report.

Review-4

Detailed site layout with landscape and service details; detailed plans of all floors; sections, elevations, and views; drawings demonstrating the application of the research; building-level service drawings; block model; and the final draft report.

Continuous internal evaluation pattern:

Review Stages	Continuous Progress Stage (Guide Marks %)	Review (Guide Marks %)	Jury (%)
Review 1	5%	5%	20%
Review 2	5%	5%	20%
Review 3	5%	5%	20%
Review 4	2%	2%	6%

Eligibility to appear for the Final External Evaluation:

The student must present the thesis work for all the four progress evaluations and the mock review and obtain a minimum of 40% combined marks from the four progress evaluations and guide marks in order to be eligible to appear for the final evaluation by a committee appointed by the University.

Documents to be submitted for the Final External Evaluation:

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

1. Architectural drawings, not exceeding 30 A1-size sheets, prepared in the format prescribed by the thesis committee. These should be submitted at the teaching institution on the working day before the date of the final external evaluation.
2. One copy of the research report for the thesis project, compiled and presented along with the final submission in A3 size.
3. Final sheets and two copies of the final report, prepared in the format prescribed by the Thesis Committee shall be submitted at the teaching institution on the working day prior to the date of the final External Evaluation.
4. Models to be submitted on the date of the final External Evaluation, at or before 9 a.m.

Any additional instructions regarding the schedule of reviews, preparation of bound volumes of data collection, final report, final sheets, models, etc., will be announced by the teaching institution.

Final External Evaluation:

A committee appointed by the University shall conduct the final external jury examination of the thesis work. The committee shall consist of one faculty member from the institute as the internal examiner and an expert from the industry/institute, having valid CoA registration and a minimum of ten years of experience after registration with CoA, as the external examiner.

Students must secure a minimum of 40% in the Continuous Internal Evaluation (CIE) and External Jury separately, and 50% combined from the CIE and final jury assessment marks to successfully complete the architectural thesis.

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.