

AUTONOMY 2022
TKM COLLEGE OF ENGINEERING KOLLAM

B. ARCH
SEMESTER VI

SEMESTER-6

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARS601	HISTORY OF ARCHITECTURE AND CULTURE- V	3-0-0-0	3	2022

Course Objectives:

The course looks at the architectural developments after 1970s when Modernism was criticised and counter movements such as Post Modernism and Deconstructivism etc became the new theoretical narratives. The period also saw rising environmental consciousness and an attempt for sustainable development. The New Architecture which includes many other disciplines started to take root and the period saw the rise of digital technologies in Architecture. The course gives special focus to local developments- the works of Indian, especially Kerala architects.

Course Outcomes:

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

Course Outcome	Description of Course Outcome	Prescribed learning level
CO-1	Learn the new and contemporary trends in Architecture and how the current world view influences architectural styles	Understanding
CO-2	Learn from the works of contemporary international architects	Understanding, Applying
CO-3	Understand the New trends in Architecture in India and works of contemporary masters	Understanding, Applying
CO-4	Study the Development of Architecture in Kerala post-independence	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
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= 20 marks). 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

Post Modernism

Deconstructivism, Critical Regionalism, Sustainability, Parametricism

New typologies in architecture and their evolution.

Contemporary architects and their works.

Post Independent Architecture in India and in Kerala.

Course Plan

Module	Topic	Course outcome	No. of hours
I	Critique of Modernism- Challenging CIAM declarations- Historic Revivalism - Pop Architecture - Post and Late Modern Architecture - Writings of Venturi- Jane Jacobs- Aldo Rossi - Christopher Alexander. Works of James Sterling, Charles Moore. Theories of Critical Regionalism, Structuralism, Deconstructivism, Parametricism. CAD/CAM and other digital technologies and their evolution in Architecture. Evolution of new typologies such as malls, resorts, IT parks. Atrium concept in architecture.	CO1	9
II	Industrial aesthetics of Richard Rogers, Norman Foster. Works of I.M.Pei, KenzoTange, Minoru Yamasaki, Toyo Ito. Peter Eisenmann, ZahaHadid, Frank Gehry, Bernard Tschumi, Santiago Calatrava. Rising environmental consciousness, Contemporary concepts of Earthships, Energy Efficiency, Sustainability, Floating Architecture, Berm Architecture. Theory of New Urbanism and Sustainable Architecture. Ideas and Works of Fathy-Ken Yeang -Tadao Ando - Geoffrey Bawa.	CO2	9
FIRST INTERNAL TEST			
III	Architecture and urbanism by great Indian masters: BV Doshi (Institute of Indology Ahmedabad, IIM-Bangalore and Gufa, Ahmedabad) and Charles Correa: (RamaKrishna House, Ahmedabad, Kanchen Junga Apartments, Mumbai and MRF Headquarters, Chennai). Raj Rewal and Uttam Jain (Pragati Maidan, New Delhi and Asian Games Village, New Delhi), Achyut Kanvinde(IIT, Kanpur and Nehru Science Centre, Mumbai), Uttam Jain(Lecture Theatres, Jodhpur and Engineering College, Kota).	CO3	9

IV	Change in architecture trends from late 1990, Socio-economic changes due to globalization. Rapid urbanisation, Rise of private townships, gated communities and globalised business parks; Rise of informality in production of space. Contemporary theories in Indian Architects like Minimalism, Expressive, Exposed Brick, Earthen Architecture, Sustainable Architecture, etc The concepts of contemporary architects like Hafeez contractor, Christopher Benninger, Sanjay Mohe, Dean D’Cruz, Chitra Viswanath, Jaisim, Morphogenesis Studio etc.	CO3	12
SECOND INTERNAL TEST			
V	Post Independent Architecture in Kerala. Redefining Traditional and Indian Vernacular styles. Change of Role of Courtyard. Works of Contemporary Architects in Kerala. Laurie Baker- CDS, Hamlet. Study Tour to see Masters’ works. Submission of Tour Report.	CO4	9
END SEMESTER EXAM			

Text Books:

- Kenneth Frampton, “Modern Architecture”: A Critical History, Thames and Hudson, London, 1994
- Leonardo Benevolo, “History of Modern Architecture”, 2 Vols., Routledge & Kegan Paul, London, 1971.
- Manfredo Taferi/ Francesodalco, “Modern Architecture’’, Faber and Faber/ Electa, 1980.
- Sigfried Giedion, “Space Time and Architecture”: The Growth of a New Tradition, Havard University Press, 1978.
- Thomas Metcalf, “An Imperial Vision”, Faber and Faber, London.1989.
- Aldo Rossi, the Architecture of the City, MIT Press, Massachusetts, 1982.
- Charles Jencks, the Language of Post-Modern Architecture, 1984.
- Christopher Alexander, Pattern Language, Oxford University Press, Oxford.
- D. Ghirardo, Architecture after Modernism, Thames and Hudson, London, 1990.
- Miki Desai et.al, Architecture and Independence, Oxford University Press, New Delhi, 1998.
- Robert Venturi, Complexity and Contradiction in Architecture, The Architectural Press, London, 1977
- Lang, J.T (2002). A Concise History of Modern Architecture in India.
- Lu, D (Ed). (2011). Third World Modernism, Architecture, Development and Identity. Oxon : Routledge.
- Mehrotra, R. (2011). Architecture in India Since 1990. Pictor.
- Singh, M. and Mukherjee, R. New Delhi- Making of a Capital. New Delhi : Roli Books.
- Tafari, M. (1980). Modern Architecture. Harry N. Abrams Inc.
- Verma, P. (2010). Becoming Indian – The Unfinished Revolution of Culture and Identity. New Delhi : Penguin India.

Course materials, Guidance and Evaluation methods

Books, research papers, e-books, videos etc. to be provided to the students by the faculty and ensure that they read it, by initiating discussions.

Faculty to act as facilitator and guide rather than one way lecturing.

Book Reviews are to be part of assignments.

Students are to be encouraged to watch movies and documentaries which give information about culture and architecture and prepare reviews/ reports and have discussions in class.

As far as possible the students are to be encouraged to visit the architectural monuments in their vicinity and prepare reports and sketches, regardless of whether they are part of the syllabus.

At the end of the course, each student has to prepare a short video on any of the topics in the syllabus.

Each student should be encouraged to have a sketchbook with sketches of all the topics covered.

		Total Pages: 01	
Reg. No.:		Name:	
TKM COLLEGE OF ENGINEERING, KOLLAM			
SIXTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARS601			
Course Name: HISTORY OF ARCHITECTURE AND CULTURE - V			
Max. Marks: 60		Duration: 3 Hours	
PART A			
<i>Answer all questions, each question carries 4 marks</i>			Marks
1			(4)
2			(4)
3			(4)
4			(4)
5			(4)
PART B			
<i>Answer any one question from each module, each carries 8 marks</i>			
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
22ARS602	SPECIFICATIONS, COST ESTIMATION AND BUDGETING	2-1-0-0	3	2022

Course Objectives:

The goal of this course is to provide knowledge about various types of estimation and specification of different civil engineering works. It equips students to analyze the rate of various items of work with reference to the standard data and schedule of rate. This course aims to develop capability of students to prepare the detailed estimate of various items of work related to construction and also preparation of the valuation of land and buildings.

Course Outcomes: After completion of the course the student will be able to:

Course Outcomes: After completion of the course the student will be able to:

Course Outcome	Description of Course Outcome	Prescribed learning level
CO-1	Explain the basic principles of quantity estimation, rate analysis and valuation	Understanding
CO-2	Formulate general and detailed technical specification for civil engineering projects	Applying
CO-3	Use CPWD data book and schedule of rates to prepare unit rate for various items of work pertaining to a Civil Engineering project work	Applying
CO-4	Compute the quantity of materials and labour to estimate the cost of civil engineering projects	Applying
CO-5	Assess the value of a property using different methods	Analysing

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
 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=20 marks). 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 specifications and analysis of rates of various items of work. Estimation of building construction cost. Valuation of properties.

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	<p>Introduction to Quantity surveying - Basic Principles, Roles / Responsibilities of quantity surveyor at various stages of construction</p> <p>Specifications: Necessity of specification, importance of specification</p> <p>Types of Specification- General or brief specifications and Detailed specifications - Principles of Specification writing.</p> <p>General specification for first, second and third class buildings</p> <p>Writing of detailed specifications, for items like earthwork excavations in foundation, DPC, PCC, RCC, Brickwork, Wood work for doors and windows, Plastering cement mortars, Pointing cement mortar, White washing, Colour washing, Distempering, Painting, Flooring like terrazzo flooring and tiles, ceramic tiles, marble, granite, distemper, glazing, and weathering course in terrace as per National Building Code and CPWD specifications</p>	CO 1 CO 2	8
II	<p>Estimate - Details required - Types of estimates</p> <p>Approximate estimates (plinth area method and cubic content method only), basic differences and advantages</p>	CO 1	8

	<p>Bill of Quantity - Typical format- Item of works- Identify various item of work from the drawings</p> <p>Units of measurement of various materials and works (focus may give to RCC residential building) - Methods of measurement of building and civil engineering works as per IS 1200 (Part 1).</p> <p>Introduction to Detailed Building Estimation or item rate estimate - Introduction of the format of details of measurement and calculation of quantities, format to prepare abstract of estimated cost.</p> <p>Details of documents to be accompanied with detailed estimate</p>		
FIRST INTERNAL TEST			
III	<p>Introduction to the use of CPWD schedule of rates as per latest DSR and Analysis of rate as per latest DAR.</p> <p>Analysis of rates, cost of materials and labour for various works such as Earth work in excavation for foundation, mortars, reinforced cement concrete Works, finishing work, masonry work, stone works, flooring with reference to latest DSR and latest DAR (Data should be given).</p> <p>Brief introduction to different methods of execution i.e., piece work, daily basis, lump sum, labour rates and percentage etc.</p>	CO 1 CO 3	10
IV	<p>Detailed Estimate- Preparation of detailed measurement using Centre line method and Short wall-long wall (separate wall) method for RCC single storied building (Flat roof) including stair cabin-</p> <p>Material quantity calculation of the items of works such as Earthwork excavation, Foundation, Superstructure (Brick work, Rubble work, Concrete works, Plastering and Painting)</p> <p>Approximate quantity of reinforcing steel required for various</p>	CO 1 CO 4	11

	RCC members (Detailed Calculation of reinforcement bars not required). Introduction to format and purpose of bar bending schedule (Detailed schedule preparation is not required)		
SECOND INTERNAL TEST			
V	Valuation – purpose, factors affecting Introduction to terms -Value, Cost, Price, Income- Gross income, net income, outgoings, annuity, sinking fund, Year’s purchase. Depreciation – methods of calculating depreciation – straight line method, constant percentage method, obsolescence. Free hold and leasehold properties Methods of valuation - rental method, direct comparison of capital cost, valuation based on profit, depreciation method. Valuation of land – belting method, development method	CO 1 CO 5	8
END SEMESTER EXAM			

Reference Books

- Dutta B N, Estimation and costing in Civil Engineering, UBS Publishers and Distributors Ltd., New Delhi
- Rangwala, Estimation, costing and valuation, Charotar Publishing House Pvt. Ltd.
- M. Chakraborty, Estimating, Costing, Specification and Valuation in Civil Engineering, Chakraborti, 2006
- Mahajan S P, Civil Estimating and Costing, Satya Prakashan, 1996
- IS 1200: 1968, Methods of measurement of building and civil engineering works
- CPWD DAR 2018 and DSR 2018 or the latest
- CPWD Specifications vol. 1 and 2 (2019 or latest)
- Shah N A, Quantity surveying and specification in Civil Engineering, Khanna Publishers, 1976

		Total Pages: 01	
Reg. No.:		Name:	
TKM COLLEGE OF ENGINEERING, KOLLAM			
SIXTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARS602			
Course Name: SPECIFICATION, COST ESTIMATION AND BUDGETING			
Max. Marks: 60		Duration: 3 Hours	
PART A			
<i>Answer all questions, each question carries 4 marks</i>			Marks
1			(4)
2			(4)
3			(4)
4			(4)
5			(4)
PART B			
<i>Answer any one question from each module, each carries 8 marks</i>			
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
22ARC601	THEORY OF STRUCTURES-VI	2-1-0-0	3	2022

Course Objectives:

This course provides fundamental concepts of commonly practiced structural systems which were not apportioned in the previous TOS courses. The structural behaviour and design concepts of industrial steel buildings, flat slab, grid / coffered floor systems, masonry structures, prestressed concrete elements along with seismic design philosophies are dealt in various modules.

Course Outcomes:

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

Course Outcome	Description of Course Outcome	Prescribed learning level
CO - 1	Summarise the structural behaviour/concept of commonly practiced structural systems such as industrial steel buildings, flat slabs, grid or coffered floor systems, and prestressed concrete.	Understanding
CO - 2	Explain the structural behaviour of masonry structural elements such as pillars, walls, retaining walls and foundations	Understanding
CO - 3	Design masonry structural elements such as pillars, walls, retaining walls and foundations following Indian standards	Creating
CO - 4	Explain the structural behaviour and EQ resistant design provisions of framed and masonry structures	Understanding

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
Tests (2 numbers)	: 20 Marks
Assignment/Quiz/Course project	: 16 Marks

End semester examination pattern:

There will be two parts; Part A and Part B. Part A contain 5 questions from each module, having 4 marks for each question. Students should answer all the questions. Part B contains 2 questions from each module, of which the student should answer any one. Each question can have sub divisions and carry 8 marks.

Standards Permitted in the exam hall:

IS 1905: 1987 Code of practice for structural use of unreinforced masonry, Bureau of Indian Standards.

Syllabus

Industrial steel building - Building configuration and components - Portal frame - Flat slab - Grid or coffered floor systems - Design as per IS code approximate method

Brick masonry pillars and walls - working stress and limit state approaches to analysis and design - Design of unreinforced brick masonry pillars, walls, retaining walls and foundation

Seismic design philosophies - Earthquake resistant design and detailing of framed structures based on IS codes -Earth quake resistant design provisions in masonry structures

Pre stressed concrete – Principles - prestressed beams and slabs - Analysis of rectangular prestressed beams - losses in prestress

Course Plan

Module	Topic	Course Outcome	No. of hours
I	Industrial steel building - Introduction - Building configuration and components - load and load combination as per IS 875 - Portal frame - analysis only (design not required) Flat slab - components - proportioning of component as per IS 456 - Structural behaviour - concept only Grid or coffered floor systems - Different configuration - Design as per IS code approximate method	CO1	9
II	Introduction to brick masonry pillars and walls - Mechanical behaviour of masonry assemblages under different gravity loads - working stress and limit state approaches to analysis and design of unreinforced, reinforced, confined masonry structures for gravity loads (Theory only) - Design of unreinforced brick masonry pillars and walls (WSM) using IS 1905: 1987	CO2 CO3	9
FIRST INTERNAL TEST			
III	Design of unreinforced masonry retaining walls – lateral earth pressure – stability of retaining walls Design of unreinforced masonry foundation – types of foundation –loads acting on the foundation	CO2 CO3	9
IV	Seismic design philosophies - Stiffness, strength, ductility, damping, center of mass, center of rigidity, torsion. Strong column- weak beam concept Earthquake resistant design of framed structures based on IS 1893- Reinforcement detailing –beams, columns, beam column joints, openings as per IS 13920. Behaviour of Masonry building during earthquakes. Earth quake resistant design provisions in masonry structures	CO4	10

SECOND INTERNAL TEST			
V	Introduction to Prestressed concrete – Principles of prestressing – Introduction to pretensioned and post tensioned beams and slabs (Concept only) – Analysis of rectangular prestressed beams at transfer and at service – Losses in prestress (theory only)	CO1	8
END SEMESTER EXAM			

Reference Books/ Standards:

- IS 1905: 1987 Structural use of unreinforced masonry - code of practice, Bureau of Indian Standards, New Delhi
- IS 4326: 1993, Earthquake resistant design and construction of buildings - code of practice, Bureau of Indian Standards, New Delhi
- IS 13920: 1993 Ductile detailing of reinforced concrete structures subjected to seismic forces - code of practice, Bureau of Indian Standards, New Delhi
- IS 1343: 2012 Prestressed concrete - code of practice, Bureau of Indian Standards, New Delhi
- Dayarathnam, P. Brick and reinforced brick structures, Oxford and IBH Publishing Co. Pvt. Ltd.
- Arya, Masonry and timber structures including earthquake resistant design, Nem Chand & Bros, Roorkee
- Harbhajan Singh, Design of Masonry and Timber structures, Abhishek Publications, Chandigarh.
- Pankaj Agrawal, Manish Shrikhande, Earthquake Resistant Design of Structures, PHI learning Pvt. Ltd
- Shashikant K. Duggal, Earthquake Resistant Design of Structures, Oxford P CVR Murty, "Earthquake Tips", National Information Centre of Earthquake Engineering , www.nicee.org/EQtips.php
- National Building Code of India 2016 Vol.1, Part 6 Section 4 Structural Design - Masonry
- R E Klingner 2010 Masonry structural design, McGrawHill Companies, Inc. New York
- M Tomazevic 1999 Earthquake-resistant design of masonry buildings, Series on Innovation in Structures and Construction, Vol. 1, Imperial College Press, London
- MJN Priestley and T Paulay 1997 Seismic design and assessment of reinforced concrete and masonry buildings, John Wiley and Sons.
- RG Drysdale, AA Hamid, LR Baker 1994 Masonry Structures: Behaviour and design, Prentice Hall, New Jersey, USA.
- AW Hendry 1981 Structural Brickwork, The Macmillan Press Ltd. Publications

NPTEL COURSE:

NPTEL course on Design of Masonry Structures, by Prof. Arun Menon, IIT Madras, <https://nptel.ac.in/courses/105106197>

		Total Pages: 01	
Reg. No.:		Name:	
TKM COLLEGE OF ENGINEERING, KOLLAM			
SIXTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARC601			
Course Name: THEORY OF STRUCTURES - VI			
Max. Marks: 60		Duration: 3 Hours	
PART A			
<i>Answer all questions, each question carries 4 marks</i>			Marks
1			(4)
2			(4)
3			(4)
4			(4)
5			(4)
PART B			
<i>Answer any one question from each module, each carries 8 marks</i>			
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
22ARC602	BUILDING SERVICES-IV (ARCHITECTURAL ACOUSTICS)	2-0-0-1	3	2022

Course Objectives

The objective of the course is to develop a basic understanding of the principles of architectural acoustics, the way we hear and perceive sound both indoors and outdoors, the appropriate criteria for listening environment and acoustical privacy, and the architectural decisions of layout and material selection in design.

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	Identify relevant IS specifications for Acoustic design.	Remembering
CO-2	Understanding the basic concepts of Acoustic design.	Understanding
CO-3	Application and Calculation of Acoustical values	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:

There will be two parts; Part A and Part B. Part A contain 5 questions from each module, having 4 marks for each question. Students should answer all the questions. Part B contains 2 questions from each module, of which the student should answer any one. Each question can have sub divisions and carries 8 marks.

Syllabus

Hearing and Perception-Behaviour of sound in enclosed spaces - Room Acoustics and Reverberation- Sound Absorption- Sound Transmission- acoustical materials- acoustical defects- Design Principles of Auditorium -Air borne & Structure Borne Noise- Planning against noise.

Course Plan

Module	Contents	Course outcomes	Hours
I	<p>Introduction to Architectural acoustics</p> <p>The nature of sound - propagation of sound-velocity, frequency and wavelength of sound.</p> <p>Sound pressure - Sound intensity and loudness- Decibel and Phons</p> <p>The human ear and hearing characteristics - Instruments and equipment"</p>	CO2	6
II	<p>Room Acoustics</p> <p>The behaviour of sound in enclosed spaces (sound phenomena).- Absorption, Diffraction, Diffusion, Reflection, Refraction and Transmission. Design Factors for enclosed spaces- Ray diagram.</p> <p>Acoustic properties of materials and types-Sound absorption coefficient, Sound absorbing materials, Porous materials, Panel materials, and Resonators. Space absorbers - variable absorbers.</p>	CO2, CO3	9
FIRST INTERNAL TEST			
III	<p>Understanding Reverberation Time, Frequency and Volume of spaces.</p> <p>Calculation of reverberation time - Sabine's formula.</p> <p>Acoustical defects in the enclosed spaces.</p> <p>Acoustical Design Principles of Auditorium</p> <p>Different acoustical defects in auditoriums and their solutions, acoustical correction design and modification techniques.</p> <p><i>Task: Calculating RT of classroom.</i></p>	CO2, CO3, CO1	12
IV	<p>Effect of noise on human beings</p> <p>Noise sources - airborne and structure borne- Methods of preventing airborne and structure borne noises.</p> <p>Sound transmission- Noise criteria –NC curve - Transmission loss - permissible noise levels for different types of spaces.</p> <p><i>Task: Measuring the noise level of a room, comparing it with IS code recommendations.</i></p>	CO2, CO3, CO1	9
SECOND INTERNAL TEST			

V	Planning for noise control Reduction of noise by Town Planning and regional planning considerations - landscaping, campus planning and building design. <i>Task: Acoustical analysis of a neighbourhood/ campus and suggesting remedies.</i>	CO2, CO3	9
END SEMESTER EXAM			

References

- Cavanaugh, Hoboken, Architectural acoustics : Principles and practice,: Wiley & sons,2010.
- Design for Good Acoustics and Noise Control, Macmillan Education, 1988.
- Ducan Templation, Acoustics in the built environment, Oxford ; Boston : ArchitecturalPress, 1997.
- J. Flynn, J. A. Kremers, A. W. Segil, G. Steffy, Architectural Interior Systems, Lighting, Acoustics, Air Conditioning, Van Nostrand Reinhold, 1992. .
- Kinsler and Fry, Hoboken, Fundamental of acoustics, NJ : Wiley, 2000
- Knudson and Harris, Acoustical Designing to Architecture, ‘American Institute of Physics for the Acoustical Society of America, 1978
- M. D. Egan , Architectural Acoustics, Mc Grawhill Inc., 1988.
- M. D. Egan, Concepts in Architectural Acoustics, 1972

		Total Pages: 01	
Reg. No.:		Name:	
TKM COLLEGE OF ENGINEERING, KOLLAM			
SIXTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARC602			
Course Name: BUILDING SERVICES IV – (ARCHITECTURAL ACOUSTICS)			
Max. Marks: 60		Duration: 3 Hours	
PART A			
<i>Answer all questions, each question carries 4 marks</i>			Marks
1			(4)
2			(4)
3			(4)
4			(4)
5			(4)
PART B			
<i>Answer any one question from each module, each carries 8 marks</i>			
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
22ARD601	ARCHITECTURAL DESIGN- V	0-0-10-0	10	2022

Course Objectives:

To introduce the students, the design of multifunctional and multi-storied buildings having a complex array of activities.

To design functionally complex buildings with an understanding of structural systems and the application of various building services and circulation systems.

To understand advanced construction technology and latest building materials.

Course Outcomes:

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

Course Outcome	Description of Course Outcome	Prescribed learning level
CO-1	Understand and identify different residential typologies and how they relate to spatial use and experience Understand through data collection/literature study/case study, different typologies of multi-story, multi-functional buildings with integration of structural design and building services.	Understanding
CO-2	Application of knowledge to initiate architectural design process within the selected site context by using relevant space standards and building rules to formulate concepts and design. Visualize design concepts and make block and site models and arrive initial design	Applying
CO-3	Analysis and inference through data collection, case studies of projects related to the design project and developing skills so as to create a design programme	Analysing and evaluating
CO-4	Arriving at final site-specific design solution integrating the various requirements of the design programme	Creating

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester Jury examination marks	End semester Jury examination duration
100	50	50	2-3 days

Continuous internal evaluation pattern:

Attendance : 5 Marks
 Design Assignments/Reviews/Tests/ CAD Assignments : 45 Marks

The studio involves the design of multi-functional and multi-storied buildings such as in healthcare (hospitals), hospitality (hotels), apartment complexes, mixed use commercial complexes, etc. The design studio focuses on building services, structural systems, building materials & technology. The studio encourages students to explore functionality, space optimization, conformity with standards & building rules, integration of structural systems and building services in architectural design.

Course Plan:

Module	Topic	Course outcome	No. of hours
I	Study of different typologies in multi-functional, multi-storied buildings with emphasis on building services, structural systems, building materials & technology. They will also learn about site planning and landscaping in tight spatial context.	CO-1, CO-2, CO-3	30
II	Study of Space Standards and building codes for design of multi-functional, multi-storied buildings. Detailed study about various building services, structural systems, building materials & advanced construction technology used in multi-functional multi-storied buildings. Arriving at architectural design programme based on user requirements, literature studies, case studies & design standards.	CO-2	30

FIRST INTERNAL TEST

III	Understanding the site, climate & context through site analysis. Application of knowledge to initiate architectural design process within the selected site context by using relevant space standards and building rules to formulate concepts and design. Visualize the design concepts in 3D and make block and site models and arrive initial design.	CO-1, CO-3	30
IV	Critical analysis of the effectiveness of initial design with respect to local context, climate, circulation within site & within building, structure, services, user behavioral patterns, etc. and revising the design accordingly.	CO-1, CO-3	30
SECOND INTERNAL TEST			
V	Detailed design development with integration of structural systems and building services in architectural layout and construction. Preparation of final presentation drawings including layout with parking & landscaping, architectural drawings with plans, section & elevations, detailed drawings of building services & structural systems, detailed 3D models, etc.	CO-4	30
END SEMESTER EXAMINATION/ JURY			

Reference Books

Baiche, B. and Walliman, N. (2012). Neufert Architects Data, 4th Ed. Oxford: Wiley-Blackwell.

Chiara, J. D. and Michael, J. C. 2001. Time Savers Standards for Building Types. Singapore: McGraw Hill Professional

Geoffrey Broadbent 'Design in Architecture' John Wiley and Sons, 1973

Neuferts' Architect's Data

Roth, L. M. 'Understanding Architecture: Its Experience History and Meaning', 3rd Ed. Philadelphia: West-view press, 2013.

Rudolf, A 'The dynamics of architectural form', Berkeley and Los Angeles: University of California Press, 1977.

Aouad, G, 'Computer Aided Design Guide for Architecture, Engineering and Construction', Taylor & Francis Publication, 2011

Parker, D. And Wood, A. (2013). The Tall Buildings Reference Book. New York: Routledge.

Wood, A. and Ruba, S. (2012). Guide to Natural Ventilation in High Rise Office Buildings. New York: Routledge.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARB601	BUILDING MATERIALS, CONSTRUCTION TECHNIQUES AND WORKING DRAWING	1-0-0-3	4	2022

Course objectives :

The goal of this course is to expose the students to elementary building materials and their applications. It aims to familiarize students to contemporary as well as vernacular and traditional building materials. It will also introduce students to prevailing & relevant BIS specifications and detailed Architectural working drawings. After this course, the students will be able to recognize construction techniques, working drawings and materials in the market and use them in their design visualization.

Course Outcomes:

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

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	Identify the relevant BIS specifications.	Remembering
CO2	Introduce Architectural working drawings.	Understanding, Applying
CO3	Working drawings including detailed construction drawings	Understanding, Applying
CO4	Use the various building materials in their design processes appropriately	Applying
CO5	Understanding advanced concrete and prefabrications	Applying

Mark distribution:

Total marks	Continuous internal evaluation marks	End semester examination marks	End semester examination duration
100	50	50	3 hours

Continuous internal evaluation pattern:

Attendance : 5 Marks
 Continuous assessment tests (2 nos.) :15 Marks

End semester examination pattern:

There will be three parts; Part A, B and C. Part A will contain 5 questions with 1 question from each module, having 3 marks for each question. Students should answer all the questions. Part B will contain 2 questions from each module, of which the student should answer any one. Each question carries 4 marks. Part C will have one essay question which can have subdivisions, to assess the student's capacity for analysing the topics and linking it with other subjects studied. The question carries 15 marks.

Syllabus

Wall finishes: Types of Wall finishes. Plaster. Paints and Varnish and Wall cladding. Floor finishes: Types of floor finishes- selection criteria- Methods of fixing. Working Drawings: Detailed working drawings of plan, section and elevations- Construction Details like foundation, joinery etc. Advanced Structural concepts in Architecture : Study of advanced concrete: Light weight, high density, fibre reinforced, polymer concrete- Properties and uses- Admixtures: Pre stressed concrete structures: Precast pre stressed construction Tensile structures: Plate structures

Course plan

Module	Topic	Course outcome	No. of hours
I	<p>WALL FINISHES AND FLOOR FINISHES</p> <p>WALL FINISHES: Plaster: Lime plaster and gypsum plaster. Fire resistant plaster, X-Ray shielding plaster and acoustic plaster. Paints and varnish: Characteristics of an ideal paint and varnish. Classification – various types of paints. Painting process. Defects in painting works. Process of varnish. Wall cladding: stone cladding, tile cladding, Wooden cladding and metal cladding. Stucco finish and other finishes.</p> <p>FLOOR FINISHES: Types of flooring, methods of laying, furnishing of floors with different floor finishes like cement, coloured cement, mosaic, terrazzo, tiles, wood, parquet flooring, stone, brick etc. Classification & properties of tiles used in flooring. Selection criteria & Methods of fixing various types of tiles</p> <p>Different type of resilient and vibration resistive floor like rubber, Linoleum and PVC flooring.</p>	CO1,CO2, CO3,CO4	10
II	<p>WORKING DRAWINGS Introduction to Architectural Drafting. Detailed working drawing of Plans, Elevations, and sections.</p>	CO1,CO2, CO3,CO4	15

Module	Topic	Course outcome	No. of hours
FIRST INTERNAL TEST			
III	<p>WORKING DRAWINGS</p> <p>Construction Details- Foundation details, joinery details, structural plans etc.</p>	CO1,CO2, CO3,CO4	15
IV	<p>ADVANCED STRUCTURAL CONCEPTS IN ARCHITECTURE</p> <p>Pre stressed concrete structures: Precast pre stressed construction. Two-way waffle slab, Two-way flat plate, Pre tensioning, Post tensioning, Hollow core slabs, T beam and slab.</p> <p>Tensile structures: Concept of tensile structures, classification, uses, materials used. Application of cable structures in architecture.</p> <p>Plate structures: Definition, classification and application, folded plates, flat slab and coffered slab.</p> <p>Special Structures: Concept, Classification and Application of Pneumatic Structures, Kinetic Structures and Mobile Structures, Portal frames: Definition, and Application.</p> <p><i>Sketches: folded pate, Post tensioned slab, Pre tensioned slab, Portal frame.</i></p>	CO1,CO2, CO3,CO4	10
SECOND INTERNAL TEST			

Mod ule	Topic	Course outcome	No. of hours
V	<p>STUDY OF ADVANCED CONCRETE Lightweight, high density, fibre reinforced, polymer concrete, outline of manufacture, properties and uses of the above. Admixtures - Water repellent, waterproofing compounds, accelerators, air entraining agents, hardeners, plasticizer - Their properties and uses.</p> <p>PRE-FABRICATION & MODULAR CO-ORDINATION Introduction to concepts of Modular Coordination. Definition of Basic Module. Modular controlling dimensions, Planning Modules. Introduction to concepts of prefabrication. Advantages & disadvantages of onsite & off-site prefabrication. Methods of prefabrication. Process of prefabrication.</p> <p>Various issues related to prefabrication industry & Examples of prefabrication concepts.</p>	CO1,CO2,CO3,CO4	10
END SEMESTER EXAMINATION			

Text Book

P.C. Varghese, 'Building Materials', Prentice hall of India Pvt Ltd, New Delhi, 2005

B C Punmia and Ashok Kumar Jain, Building Construction, Laxmi Publications, New Delhi,2005

Reference Books

Harry Parker, 'Materials and Methods of Architectural Construction', John Wiley & Sons Canada, 1958.

H Leslie Simmons, 'Construction – Principles, Material & Methods', 7th edition, John Wiley & Sons Inc., New York, 2001.

Relevant BIS codes.

Rosen Harold J, Construction materials for Architecture, Krieger Pub Co, 1992

Doran, David; Cather, Bob; Doran, D. K; Cather, R – Construction materials reference book, Routledge, 2013

		Total Pages: 01	
Reg. No.: _____		Name: _____	
TKM COLLEGE OF ENGINEERING, KOLLAM			
SIXTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARB601			
Course Name: BUILDING MATERIALS, CONSTRUCTION TECHNIQUES AND WORKING DRAWING			
Max. Marks: 60		Duration: 3 Hours	
PART A			
<i>All questions need to be answered. To be answered in about 50 words with supporting sketches.</i>			Marks
1	Module I		(3)
2	Module II		(3)
3	Module III		(3)
4	Module IV		(3)
5	Module V		(3)
PART B			
<i>Answer any one question from each module, each carries 4 marks</i>			
MODULE 1			
6			(4)
7			(4)
MODULE 2			
8			(4)
9			(4)
MODULE 3			
10			(4)
11			(4)
MODULE 4			
12			(4)
13			(4)
MODULE 5			
14			(4)
15			(4)
PART C			
<i>To be answered in a maximum of 200 words with supporting sketches.</i>			
16			(15)

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARE601.1	CULTURALLY RESPONSIVE BUILT ENVIRONMENT	2-0-0-0	2	2022

Course objectives:

To Introduce the concepts and theories of cultural discourse and its impact on Built Environment and appreciate built environment as a manifestation of a broader cultural and intellectual setting.

To develop an understanding of cultural expression in built environment as a resultant of the Socio-economic-political roots of the society.

Course Outcomes:

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

Course Outcome	Description of Course Outcome	Prescribed learning level
CO-1	Familiarizing culture and its significance in the development of Built Environment.	Understanding
CO-2	Responsive Built Environments –Theories and Concepts.	Understanding
CO-3	Dwellings, settlement and traditions -Cultural expressions, Contextual cues and their responses in the built environment.	Analyzing
CO-4	Determinants of built form - study of various Socio-political and Economic responses and case studies.	Analyzing
CO-5	Appreciation of the Physical manifestation of built form with respect time to understand the complexity and diversity of Built environments.	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:

There will be two parts; Part A and Part B. Part A contain 5 questions from each module, having 4 marks for each question. Students should answer all the questions. Part B contains 2 questions from each module, of which the student should answer any one. Each question can have sub divisions and carry 8 marks.

Syllabus

An overview of the development of Responsive built Environment, concepts and theories of culture and built environment, place Identity, Different Cultural expressions, Cultural and contextual cues and their responses in the built environment, Determinants of built form, various Socio-political and Economic responses and various developments across landforms and analysis of specific cases through the complexity and diversity of Indian subcontinent.

Course plan

Module	Contents	Course outcome	No. of Hours
I	Introduction to Culture and Built Environment. Definition of Culture and cultural discourse. Elements of culture and society, Tangible and intangible aspects of culture. Cosmopolitan Society- cultural diversity and multi-cultural mélange. Dwellings, settlements and traditions - Types and evolution of Built environments. Factors influencing the built form. Culture and context, their responses to built environment. Architecture of a Place- Identity and its Significance.	CO1	6
II	Theories and concepts of Culture and built environments. Different concepts and theories to study the cultural discourses in Architecture, Organization of space, Concepts of place and spaces. Identity of a place, Place making. Various Dimensions of culturally responsive built environments. Responsive Environments and various determining factors.	CO2	6
FIRST INTERNAL EXAMINATION			
III	Architecture as a process and a product of Culture. Vernacular architecture, Resource, materials and technology. Development of various cultural Expressions with case studies from different regions of the world. Understanding the Context -Variations in social-cultural Elements, economic, political and climatic influences and its effects in Built form. Dynamics of Urban and Rural setting, Cultural heritages, Relationship between people and places. Cultural disasters.	CO3	6
	Determinants of Built Environments. Built form and various elements of built form, Typology of built forms, factors influencing cultural and contextual determinants of	CO4	6

IV	built form. Contextual cues, mapping and analysing tools for exploring the built forms in a context and listing the contextual cues of a place. Cultural responsiveness from different civilizations/cultural contexts - Europe, Africa, America, Asia and Oceania.		
SECOND INTERNAL EXAMINATION			
V	Perception of Built Environment- Regional context. Understanding the Topographical, Climatic, cultural equilibriums in built environment. Appreciate the evolution of built environment as an outcome of various socio-political, economic influences with respect to the various cultural landscapes of India.Exploring the Parameters of user experience and spatial qualities to responsive built environments, Cultural responsiveness of the following regions: North east India cultural region, Dravidian- cultural region, Bengali cultural region, Sikh cultural region, Kashmiri Muslim cultural region, Ladaki-buddhist cultural region.	CO5	6
END SEMESTER EXAMINATION			

Reference Books

- Amos Rapoport, *Culture, Architecture and design*, (2005), Locke Science Publishing Company
- Amos Rapoport, *House, Form & Culture*, Prentice Hall Inc 1969.
- King A. (2004). *Spaces of Global cultures: Architecture urbanism identity*. London: Routledge.
- King A (ed) (1997) *Culture, Globalization and the world systems: Contemporary conditions for the representation of Identity*. Minneapolis: University of Minnesota.
- Bourdier J and Alsayyad N (eds) (1989). *Dwellings, settlement and Tradition*. Lanham, Maryland: University press of America.
- Leo Hansen, (2012), *Culture and Architecture, an integrated history*, Cognella Academic Pub.
- Adam Sharr, (2012), *Reading Architecture and Culture: Researching buildings, spaces and documents*, Routledge.
- Bryan Christiansen, Gülşah Koç, Marie-Thérèse Claes, (2016), *Cultural Influences on Architecture*, IGI Global.
- Kingston Heath, (2009), *Vernacular Architecture and Regional Design: Cultural process and Environmental Response*, Architecture press.
- Qian Yin, (2012), *When Culture Meets Architecture*, Design Media Pub.
- Paul Emmons, Jane Lomholt, John Shannon Hendrix, (2012), *The Cultural Role of Architecture, contemporary and historical perspectives*, Routledge.
- Castells M (1997), *The power of Identity*. Oxford: Blackwells.

Ian Bently, Alan Alcock, Paul Murrain, Sue McGlynn, Graham Smith, (2013) *Responsive Environments- a manual for designers*, Taylor & Francis Ltd.

Vellinga Marcel, Oliver Paul & Bridge Alexander, *Atlas of Vernacular Architecture of the World*, Taylor & Francis Ltd ,2008

G.H.R. Tillotsum – *The tradition of Indian Architecture Continuity, Controversy – Change since 1850*, Oxford University Press, Delhi, 1989.

Oliver, Paul (1987) *Dwellings: the house across the world*. (1987), University of Texas Press.

Oliver (2006) *Built to meet needs: Cultural issues in Vernacular Architecture*. Oxford: Architectural Press.

Lang, J Desai M (ed) (1997) *Architecture and Independence: the search for identity –India 1880 to 1980*, Oxford University press.

Carmen Kagal, *VISTARA—the Architecture of India*, Pub: The Festival of India, 1986.

Cooper, I. *Traditional buildings of India*. Thames and Hudson Ltd, London, 1998

Kathleen Kuiper, *the Culture of India*, (2010), Britannica Educational Publishing.

Dora P. Crouch, Professor Emerita Dora P Crouch, June Gwendolyn Johnson, (2001), *Traditions in Architecture: Africa, America, Asia and Oceania*, Oxford University Press.

		Total Pages: 01	
Reg. No.:		Name:	
TKM COLLEGE OF ENGINEERING, KOLLAM			
SIXTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARE601.1			
Course Name: CULTURALLY RESPONSIVE BUILT ENVIRONMENT			
Max. Marks: 60		Duration: 3 Hours	
PART A			
<i>Answer all questions, each question carries 4 marks</i>			Marks
1			(4)
2			(4)
3			(4)
4			(4)
5			(4)
PART B			
<i>Answer any one question from each module, each carries 8 marks</i>			
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
22ARE601.2	THEORY OF DESIGN	2-0-0-0	2	2022

Course Objectives:

To help students to understand the basics of language of architecture

To make the students to understand substances of Architecture to develop visual language

To equip students to understand the language of architecture which establishes relationship of space with user

To do evaluation of Case Studies to effectively understand the poetics in the language of architecture.

Course Outcomes:

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

Course Outcome	Description of Course Outcome	Prescribed learning level
CO1	To understand the basics of language of architecture	Understanding
CO2	To understand substances of Architecture to develop visual language	Understanding, analysing
CO3	To understand language of architecture that helps them to establish relationship with user	Understanding
CO4	To analyse and summarize the language of architecture through examples	Understanding 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 Part B. Part A contain 5 questions from each module, having 4 marks for each question. Students should answer all the questions. Part B contains 2 questions from each module, of which the student should answer any one. Each question can have sub divisions and carry 8 marks.

Syllabus

Experiencing Architecture, Sensory Experience, Language of Architecture, Evaluation

Course plan

Module	Contents	Course outcome	No. of Hours
I	Introduce the essential elements one needs to develop a visual language and the skills for critical thinking: Analysis, Concept, Representation The elements of design process: Program, Context, Environment	CO1 CO2	8
II	Physical Substances of Architecture: Mass, Structure, Surface, Materials Ephemeral Substances of Architecture: Space, Scale, Light, Movement	CO1 CO2	6
FIRST INTERNAL EXAMINATION			
III	Conceptual devices that contribute to Poetics of Architecture: Dialogue, Tropes, Defamiliarization, Transformation Organisational devices that contribute to Poetics of Architecture: Infrastructure, Datum, Order, Grid, Geometry	CO3	6
IV	Considerations an architect might have for the implicit possibility of construction: Fabrication, Prefabrication	CO3	4
SECOND INTERNAL EXAMINATION			
V	Evaluation of Case Studies to effectively understand the Poetics in Language of Architecture	CO4	6
END SEMESTER EXAMINATION			

Text Books:

Andrea Simitch, Val Warke - The Language of Architecture 26 Principles Every Architect Should Know (2014, Rockport Publishers)

Reference Books

Juhani Pallasmaa - The Eyes of the Skin - Architecture and the Senses (2012, Wiley)

Kate Nesbitt (editor) - Theorizing a new agenda for architecture - an anthology of architectural theory, 1965-1995- Princeton Architectural Press (1996)

Leon Krier - The Architecture of Community (2011, Island Press)

Steen Eiler Rasmussen - Experiencing Architecture (1964, MIT Press)

Anthony C. Antoniades- Poetics of Architecture: Theory of Design (Wiley, 1992)

Course materials, Guidance and Evaluation methods

Books, research papers, e-books, videos etc. to be provided to the students by the faculty and ensure that they read it, by initiating discussions.

Representing architecture through drawing, painting, photography, sculpting, printing, physical models etc. can be given as class exercises

The students can be encouraged to visit architecture through study tours and develop the skill of architectural appreciation by documenting. Each student should be encouraged to have a sketchbook with notes, graphical interpretations, sketches of all the topics covered

		Total Pages: 01	
Reg. No.:		Name:	
TKM COLLEGE OF ENGINEERING, KOLLAM			
SIXTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARE601.2			
Course Name: THEORY OF DESIGN			
Max. Marks: 60		Duration: 3 Hours	
PART A			
<i>Answer all questions, each question carries 4 marks</i>			Marks
1			(4)
2			(4)
3			(4)
4			(4)
5			(4)
PART B			
<i>Answer any one question from each module, each carries 8 marks</i>			
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
22ARE601.3	APPROPRIATE BUILDING TECHNOLOGIES	2-0-0-0	2	2022

Course Objectives:

To give exposure to the concepts of appropriate building technology and services suitable in global as well as Indian context, and its applicability in both rural and urban environment.

To give exposure to techniques which encompass choice and application that is small-scale, affordable, decentralized, labor-intensive, energy-efficient, environmentally sustainable, and locally autonomous.

Course Outcomes:

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

Course Outcome	Description of Course Outcome	Prescribed learning level
CO - 1	Understand use of appropriate technology and materials suited to the climate, socio-economic conditions and natural resources of an area	Understanding
CO - 2	Study alternative materials and construction techniques developed in recent past and vernacular setting	Understanding
CO - 3	Apply knowledge of science of materials and technology to building construction	Applying
CO - 4	Application of Technologies devised by Research Institutes in architectural design 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:

There will be two parts; Part A and Part B. Part A contain 5 questions from each module, having 4 marks for each question. Students should answer all the questions. Part B contains 2 questions from each module, of which the student should answer any one. Each question can have sub divisions and carry 8 marks.

Syllabus

Study of appropriate technology and materials suited to the climate, socio-economic conditions and natural resources of an area, and which contribute to sustainable development. Study of alternative materials and construction techniques developed in the recent past.

Course plan

Module	Contents	Course outcome	No. of Hours
I	Introduction to appropriate technology and Materials- Definition of appropriate technology, Need, Objectives, Selection of Technologies, Evaluation of appropriateness, Role of appropriate building technology in sustainable development, Types, Advantages, Limitations in use of Technologies	CO1	7
II	Appropriate building materials and technology in vernacular architecture Timber-frame construction, Wattle & daub walls, rammed earth walls, adobe walls, etc. Walls, vaults, domes using soil cement, compressed mud blocks, Nubian arch roof. Bamboo as building material, its properties.	CO2	9
FIRST INTERNAL EXAMINATION			
III	Evolutionary trends in Appropriate building technologies – for walls, floors, roofs, joinery- Precast building components- Prefab brick panel system, concrete panel system, jack-arch panel system, earthen construction techniques, pre-cast joists, 3D printing technology, Instant shelter for disaster relief	CO1,CO3	9
IV	Evolutionary trends in Appropriate building materials – for walls, floors, roofs, joinery- Fly ash- sand lime gypsum bricks, compressed earth bricks, ferrocement wall panels, coir polymer composite boards, Non-erodable mud plaster, Ferro cement plaster for mud walls and fire-retardent thatch roof, Ferro cement roofing channels, bamboo mat corrugated roofing sheet, GRP door shutters and frames, fly ash/red mud polymer doors and panel boards Utilisation of waste materials, construction and demolition waste, plastics, supplementary cementitious materials.	CO1,CO3	10
SECOND INTERNAL EXAMINATION			

V	<p>Material research, technologies and development by Research Institutes–</p> <p>Latest advances in techniques in building construction - Central Building Research Institute (CSIR-CBRI), Structural Engineering Research Centre (CSIR-SERC), National Environmental Engineering Research Institute (CSIR-NEERI), Building Materials and Technology Promotion Council (BMTPC), Centre of Science and Technology For Rural Development (COSTFORD), Auroville Centre for Scientific Research (CSR), Centre for Sustainable Technologies (CST, Indian Institute of Science) and other State level Institutes.</p> <p>Application of these techniques in architectural design projects</p>	CO4	10
END SEMESTER EXAMINATION			

Reference Books

S K Duggal, Building Materials, New Age Publishers, 2019

B C Punmia and Ashok Kumar Jain, Building Construction, Laxmi Publications, New Delhi, 2005

Henry J Cowan and Peter Smith, The Science and Technology of Building Materials, Van Nostrand Reinhold, 1988.

Kent A. Harries and Bhavna Sharma, Nonconventional and Vernacular Construction Materials – Characterisation, Properties and Applications, Woodhead Publishing, 2020

Varis Bokalders and Maria Block, The Whole Building Handbook – How to Design Healthy, Efficient and Sustainable Buildings, Routledge, 2010.

Gernot Minke, Building with Earth – Design and Technology of a Sustainable Architecture, Birkhäuser Basel, 2006

Handbook on Energy Conscious Buildings by J.K. Nayak and J.A. Prajapati

Nayak, J.K. and Prajapati, J.A. Handbook on Energy Conscious Buildings, 2006

		Total Pages: 01	
Reg. No.:		Name:	
TKM COLLEGE OF ENGINEERING, KOLLAM			
SIXTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARE601.3			
Course Name: APPROPRIATE BUILDING TECHNOLOGIES			
Max. Marks: 60		Duration: 3 Hours	
PART A			
<i>Answer all questions, each question carries 4 marks</i>			Marks
1			(4)
2			(4)
3			(4)
4			(4)
5			(4)
PART B			
<i>Answer any one question from each module, each carries 8 marks</i>			
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
22ARE601.4	TROPICAL ARCHITECTURE	2-0-0-0	2	2022

Course Objectives:

To introduce students to the regional, climatic, cultural features of the tropics and the resultant architecture in response to local characteristics.

Course Outcomes:

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

Course Outcome	Description of Course Outcome	Prescribed learning level
CO - 1	Interpret the geographical and climatic influences in tropics.	Understanding
CO - 2	Identify the comfort factors for human bioclimatic needs in the tropics.	Understanding
CO - 3	Examine climate responsive passive design strategies in vernacular and modern buildings in tropical zones.	Analysing
CO - 4	Appraise climate responsive and culturally significant vernacular design strategies in shelters for tropical climates.	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 Part B. Part A contain 5 questions from each module, having 4 marks for each question. Students should answer all the questions. Part B contains 2 questions from each module, of which the student should answer any one. Each question can have sub divisions and carry 8 marks.

Syllabus

Regional characteristics of the tropics. Relationship between nature and built form - Architecture in the tropics. Examples of climatic design. Vernacular influence and local architecture in various tropical countries, Warm humid Tropical climate with special reference to Kerala.

Course plan

Module	Contents	Course outcome	No. of Hours
I	<p>Introduction to Tropical regions</p> <p>Tropics – definition based on geography and climates. The state of the tropics –Brief on region, ecosystems, environment, cultures, economic and infrastructure growth. Climate change in tropics and impacts, Tropical expansion. Urban growth trends in tropics, Heat effects and indicators, Urban Heat Island (UHI) phenomenon, UHI Classifications, Case studies.</p>	CO1	9
II	<p>Climatic response and comfort perceptions.</p> <p>Climate of the tropics and classification – Tropical wet climate, Tropical dry climate and Tropical monsoon climate zones. Physiological needs in tropical climatic conditions, Thermal comfort in the tropics – Bio climatic needs of humans Indoor comfort indices for the tropics: Effective temperature (ET), Standard effective temperature (SET), PMV, Comfort Temperature, Adaptive Comfort Model Thermal comfort in the urban outdoors, outdoor comfort indices: WBGT, PET, OUT-SET.</p>	CO1	9
FIRST INTERNAL EXAMINATION			
III	<p>Examples of climatic design in various tropical countries</p> <p>Vernacular and Contemporary Architecture in the tropics and Subtropical regions.</p>	CO2	9
IV	<p>Warm humid tropical climate</p> <p>Characteristics of climate, landscape, evolution of climate responsive built forms and architectural features, external and internal spaces. Passive strategies for comfort and energy efficiency. Design treatment of construction elements.</p>	CO3	9
SECOND INTERNAL EXAMINATION			

V	Study of vernacular influence and local architecture as response to climatic conditions of Kerala. Field trip and Climate analysis through observation.	CO4	9
END SEMESTER EXAMINATION			

Reference Books

Koenisberger O. H., Ingersoll T. G., Mayhew A., Szokolay S. V., Manual of Tropical Housing and Building, Orient Blackswan, 1975.

Givoni B., Man, Climate and Architecture, Elsevier Publishing Company Limited, 1969.

Olgyay V., Design with Climate, Princeton University Press, 2015.

Krishan A., et al., Climate Responsive Architecture: A Design Handbook for Energy Efficient Buildings, Tata McGraw-Hill Education, 2001.

Fry, M. and Drew, J., Tropical Architecture in the Dry and Humid Zones. Londres: Bstford, 1964

Barreneche, R. A. Tropical Modern Thames and Hudson, London 2003

Lippsmeier, G., Building en the Tropics, Munich: Callwey, 1969

Made Wijaya, Architecture of Bali-A Sourcebook of Traditional & Modern Forms, 2011

Hyde, Richard. Climate Responsive Design: A Study of Buildings in Moderate and Hot Humid Climates. 2013.

		Total Pages: 01	
Reg. No.:		Name:	
TKM COLLEGE OF ENGINEERING, KOLLAM			
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARE601.4			
Course Name: TROPICAL ARCHITECTURE			
Max. Marks: 60		Duration: 3 Hours	
PART A			
<i>Answer all questions, each question carries 4 marks</i>			Marks
1			(4)
2			(4)
3			(4)
4			(4)
5			(4)
PART B			
<i>Answer any one question from each module, each carries 8 marks</i>			
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)