

AUTONOMY 2022
TKM COLLEGE OF ENGINEERING KOLLAM

B. ARCH
SEMESTER V

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARS501	HISTORY OF ARCHITECTURE AND CULTURE- IV	3-0-0-0	3	2022

Course Objectives:

The course is intended for the student to understand the technological innovations of mid-19th and early 20th century leading to an architectural style called Modernism. It gives a glimpse of the Master works of Modern Architecture and further mentions the evolution of the style, the Utopian concepts that followed and the criticisms about the style. The course also includes the colonial architectural typologies as well as post Independent Modernism influenced architecture that evolved in India during the period corresponding to Modernism in Europe and America.

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	Understanding how Scientific and technological innovations affect cultural movements that influence architecture	Understanding
CO-2	Study of Modernism as a cultural Movement and an architectural movement	Memorizing
CO-3	Understanding how society responds and reacts to architecture as it influences lifestyles.	Understanding and applying
CO-4	Learning about the architectural heritage of India as a mix of styles of vernacular and foreign.	Learning

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

Industrial Revolution and Modernism

Modern Architecture and prominent architects

Decline of Modernism- reasons and consequences

Colonial Architecture in India

Course Plan

MODULE	TOPIC	COURSE OUTCOME	NO. OF HOURS
I	A brief history of Architecture as a profession, till and during 19th century- Practice and Education- Ecole de Beaux Arts- separation of architecture from engineering. Technological advancements of 19th century- Invention of steam engine, formation of factories- Industrial Revolution- New materials - Crystal Palace- Writings of Eugene Viollet le Duc. Eiffel Tower. Movements and counter movements. Arts and Crafts Movement. Modernism as a cultural movement in literature and art- Ulysses, Cubism. Art Nouveau- Victor Horta. De Stijl, Deutscher Werkbund, Expressionism, Dada Movement. Antonio Gaudi- Sagrada Familia.	CO1	9
II	Breaking away from history- Walter Gropius and Bauhaus. Mies Vander Rohe- Seagram building. Le Corbusier- Villa Savoy. CIAM formation and declarations. Philip Johnson- Glass House, Sony Building. Daniel Burnham- White City, Montauk Building. Chicago School-Skyscrapers- William Le Baron Jenny- Home Insurance Building, Adler and Sullivan- Wainwright Building, Frank Lloyd Wright- Prairie style, Robie House, Queen Anne Style, Taliesin School.	CO2	9
FIRST INTERNAL TEST			
III	International Style definition and characteristics. Alvar Aalto- Villa Mairea, Saynatsalo Townhall, Louis Kahn- Salk Institute, Kimbell Art Museum. Second World War and its influences. Chancellor housing. Modern Utopian concepts- Archigram- Peter Cook- Plugin City. Le Corbusier's City of 3 million inhabitants. Team X and Brutalism. Metabolists of Japan- Kisho Kurokawa. Criticism of Modernism, intellectual, economic and social reasons that led to the bombing of Pruitt Igoe.	CO3	6

IV	Colonial Architecture and Indo Saracenic Architecture in India. New Delhi- Edwin Lutyens, India Gate, Rashtrapati Bhavan. Calcutta- Victoria Memorial Hall. Bombay- Indo-Deco style. CST Terminus, Gateway of India. Character study of Pondicherry French and Tamil Towns- and Goa- Indo Portuguese style. Chennai- Rippon Building. Kochi- St Francis Church, Hill Palace Museum. The Architecture of the Princely States of Jaipur, Bikaner and Mysore. Evolution and definition of typologies of Hill stations, Colonial Bungalows, Cantonments, clock towers, railway stations, public offices, assembly halls, water systems etc.	CO4	12
SECOND INTERNAL TEST			
V	Post-colonial, Nehruvian nation building initiatives; Planning Commission and public sector led industrialization; Building of new industrial towns (e.g. Bhilai, Durgapur, Rourkela etc.), New capital cities (e.g. Bhubaneswar, Chandigarh and Gandhinagar); Works of Corbusier and Louis Kahn in India and their influences on Indian architects; Millowners Building, IIM Ahmedabad. Works of public nature- Legislative assembly, High Court and Secretariat, Chandigarh.	CO4	9

Reference Books

- A Global History of Architecture/ Francis. D. K. Ching, Mark Jarzombek, Vikramaditya Prakash. Published by John Wiley and sons, Third edition 2017
- A History of Architecture: Settings and Rituals/ Spiro Kostoff. Revisions by Greg Castilo. Published by Oxford University Press, 1985, 1995
- Sir Banister Fletcher, “A History of Architecture”, CBS Publications (Indian Edition), 1999.
- Chopra P.M., 2000. Monuments of the Raj. Arya Book Depot.
- Desai Madhavi, Lang Jon, 1997. The Search for identity-India 1880-1980 Architecture and Independence. Oxford Univ. Press
- Frampton, Kenneth 1994. Modern Architecture: A Critical History. Thames & Hudson, London
- Pevsner, Nikolaus, 1960 Pioneers of Modern Design, Penguin Books
- Bhatt. & Scriver, P.,1990. After the Masters: Contemporary Indian Architecture. Mapin Publishing

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.

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Reg. No.:_		Name: _	
TKM COLLEGE OF ENGINEERING, KOLLAM			
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARS501			
Course Name: HISTORY OF ARCHITECTURE AND CULTURE - IV			
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
22ARC501	THEORY OF STRUCTURES- V	2-1-0-0	3	2022

Course Objectives:

This course provides fundamental concept of steel and timber structures and their design. It enables the students to design and detail steel structural elements such as tension members, compression members, and flexural members along with connection design. In addition, an introduction to the design of timber structures is given, which enable the students to design a timber beam and a column. The course also trains the students to use the code of practice of steel design, IS 800: 2007.

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	Comprehend the design philosophies of Limit state method and working stress method.	Understanding
CO - 2	Recall the structural behavior of elements subjected to tension, compression, and flexure.	Remembering
CO - 3	Design proper bolted or welded connections for steel structures subjected to given set of loading	Creating
CO - 4	Apply the principles of limit state method to design the steel elements such as tension members, compression members, and flexural members subjected to dead and live loads following IS 800: 2007	Creating
CO - 5	Apply the principles of working stress method to design the timber elements such as beams and columns	Creating

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 carries 8 marks.

Standards Permitted in the exam hall:

- IS 800: 2007 Indian Standard, General construction in steel – Code of Practice, Bureau of Indian Standards.
- SP: 6(1) -1964, Hand book for structural engineers - 1, Structural steel sections, Bureau of Indian Standards
- IS 883: 1994 Indian Standard, Design of structural timber in building – Code of Practice, Bureau of Indian Standards.

Syllabus

Introduction to steel and steel structures- Limit state design concept - Analysis and design of bolted and welded connections - Analysis and design of different structural members such as tension members, compression members, column bases and flexural members - Working stress method of design - Timber structures - Design of timber beams and columns - Flitched timber beams

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	Introduction to steel and steel structures, Properties of steel; Structural steel sections Limit state design concept Types of Connection, Analysis and Design of Bolted and Welded Connection (Moment Connection not required).	CO1 CO3	9
II	Tension members – Types of sections – net area -Design of tension members – Plate and single angled member	CO1 CO2 CO3	9
FIRST INTERNAL TEST			
III	Compression Members-Design of Struts - normal sections, single angled section. Solid and Built –up Columns for axial load Battens and lacing (Only theory is required) Column Bases-Design of slab bases only	CO1 CO2 CO4	9
IV	Flexural members – laterally restrained and laterally unrestrained beams – Simple and compound beams (Concept only) - Design of laterally restrained beam	CO1 CO2 CO4	9
SECOND INTERNAL TEST			

V	Introduction to Working stress method of design Timber structures, Types of timber – Classification, allowable stresses Design of timber beams - flexure, shear, bearing and deflection considerations Flitched timber beam- Types of Flitched Beam-Design of flitched timber beam Design of timber column	CO1 CO2 CO5	9
END SEMESTER EXAMINATION			

Text Books:

- S. Ramachandra, Design of Steel Structures - Standard Book House, Delhi, 1984
- N. Subramanian, Design of Steel Structures, Oxford Publications
- S.K Duggal, Limit State Design of Steel Structures, Mc Graw Hill Publications
- SP 6 – Part 1: 1964 (Reaffirmed 2003), Handbook for structural engineers - 1. Structural steel sections
- A.S. Arya, Structural Design in Steel, Masonry and Timber, Nemchand and Bros, Roorkee, 1971.
- Dayaratnam P., Design of Steel Structures, Oxford and IBH Publishing Co.
- Gurucharan Singh, Design of Steel Structures, Standard Publishers, New Delhi, 1982
- L.S. Negi, Design of Steel Structures – Tata McGraw Hill Publishing Company Ltd. New Delhi, 1997
- IS 883: 2016 – Code of Practice for Design of Structural Timber in Buildings, Bureau of Indian Standards, New Delhi
- IS 3629: 1986: Specification for structural Timber in building, Bureau of Indian Standards, New Delhi
- IS 800 – Code of Practice for use of Structural Steel in General Building Construction, Bureau of Indian Standards, New Delhi
- National Building Code of India, 1983, Part VI, Structural Design, Bureau of Indian Standards, New Delhi.

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TKM COLLEGE OF ENGINEERING, KOLLAM			
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARC501			
Course Name: THEORY OF STRUCTURES - 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
22ARC502	BUILDING SERVICES III- (HVAC, FIRE FIGHTING AND SAFETY)	2-0-1-0	3	2022

Course Objectives:

To understand the fundamentals and principles of mechanical ventilation systems.

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 learn the fundamentals of Refrigeration, HVAC	Understanding
CO2	To understand principles of Air-Conditioning and required components and equipment.	Understanding
CO3	To understand factors that affect human comfort	Understanding, Applying, Analyzing
CO4	To learn about the techniques and methods of air conditioning, distribution of conditioned air and representing them in drawings using symbols and legends	Understanding, Applying, Analyzing, Evaluating
CO5	To understand the fundamentals of fire safety To understand the requirements of buildings and preparedness of occupants in detecting and fighting fire Representing the components of firefighting systems in drawings using symbols and legends	Understanding, Applying, Analyzing, 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
 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

Fundamentals of Refrigeration, HVAC systems, Concepts on Human Comfort and Air Conditioning, Air Conditioning and Distribution Systems, Fundamentals of Fire Safety, Detection and Fighting

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	Fundamentals of Refrigeration Modes of heat transfer. Basic laws of Conduction, convection and radiation. Heat transfer through Composite wall, composite cylinders, thermal resistance, overall heat transfer coefficient and its importance. Simple numerical examples, Insulation material used in air-conditioned building. Vapour compression refrigeration Cycle- pressure enthalpy diagram. COP.	CO1	6
II	HVAC Systems Components of vapour compression refrigeration system, compressors, reciprocating compressors, rotary compressors, scroll compressors, hermetically sealed compressors, their relative merits and demerits, type of evaporators, condensers - air cooled, water cooled, evaporative type, their application and selection, expansion devices, capillary tube, automatic expansion valve. Refrigerants, properties, ODP, GWP, environment friendly refrigerants and their comparison and application.	CO2	9
FIRST INTERNAL TEST			
III	Concepts on Human Comfort and Air Conditioning Psychometric chart, psychometric processes, DBT, WET, dew point temperature, Absolute Humidity, Relative Humidity, Specific Humidity, specific volume, Humidity measurements, human comfort, effective temperature, comfort chart, Simple numerical examples Air conditioning - Capacity of an air condition machine, TONS, EER, ISEER, star rating, cooling load calculation, factors effecting cooling load calculation, sensible and latent heat load, room sensible heat factor. Grand sensible heat factor. heat load due to mixing of outdoor air, numbers of air changes per hour, need of mixing outdoor air, factors to	CO2 CO3	9

	consider percentage of outdoor air mixing and their methods. Cooling load calculations, Simple numerical examples		
IV	<p>Air Conditioning and Distribution Systems Type of air conditioning machines, split , cassette system, window, central air conditioning, direct expansion, chilled water system of air conditioning, fan coil unit, double duct system, reheat system , Zonal system, air – water system , relative merits and demerits. Selection criteria of different models. Air distribution systems- supply duct, return duct, location of return duct opening, throw, AHU, Duct lay out pattern, wall duct system, ceiling duct system, Types of diffusers. Air filters, HEPA filters, Symbols and legends used in building HVAC layout. Case Study or Simple drawings of central air conditioning system for an auditorium, for a seminar hall, for an office</p>	CO4	9
SECOND INTERNAL TEST			
V	<p>Fundamentals of Fire Safety, Detection and Fighting Fire sources, spreading, and growth decay curve, Principles of fire behavior, Fire safety design principles _ NBC Planning considerations in buildings – non-combustible materials, egress systems, Exit Access – Distance between exits, exterior corridors – Maximum travel distance, Doors, Smoke proof enclosures General guidelines for egress design for Auditoriums, concert halls, theatres, other building types, window egress, accessibility for disabled. NBC guidelines – lifts lobbies, stairways, ramp design, fire escapes and A/C, electrical systems. Heat smoke detectors – sprinkler systems, Firefighting pump and water requirements, storage – wet risers, Dry rises Fire extinguishers & cabinets, Fire protection system – CO2 & Halon system, Fire alarm system, snorkel ladder Configuring, sizing and space requirements for firefighting equipment. Case study or Simple drawings of fire detection and fighting for a medium/ high rise building</p>	CO5	12
END SEMESTER EXAMINATION			

Text Books:

- William H. Severns and Julian R. Fellows, “Air conditioning and Refrigeration”, John Wiley and Sons, London, 1988
- “Fire Safety: National Building Code of India 1983” published by Bureau of Indian Standards.

- National Building Code of India, 2005 (NBC 2005).

References Books:

- A.F.C. Sherratt, “Air conditioning and Energy conservation”, The Architectural Press, London, 1980
- Andrew H Buchanan, “Design for fire safety”, First edition John Wiley & Sons Ltd., New York., 2001

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TKM COLLEGE OF ENGINEERING, KOLLAM			
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARC502			
Course Name: BUILDING SERVICES III - (HVAC, FIRE FIGHTING AND SAFETY)			
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
22ARS502	LANDSCAPE DESIGN	2-0-1-0	3	2022

Course Objectives:

To enable the students to understand the principles of landscape design, construction techniques, site planning etc. and imbibe the importance of integrating landscape design with the built environment.

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	Demonstrate knowledge of fundamental concepts such as elements and principles of landscape architecture.	Understanding
CO-2	Examine the basic principles of site grading, site drainage, and site layout and their application in the design of outdoor environments.	Analysing, Applying
CO-3	Exhibit knowledge about various landscape construction techniques and plant materials	Understanding
CO-4	Appreciate historic precedents to understand how landscape architects utilize the elements and principles of landscape design to shape outdoor spaces.	Analysing, Applying
CO-1	Demonstrate knowledge of fundamental concepts such as elements and principles of landscape architecture.	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.

Syllabus

Introduction to Landscape Architecture, Landscape Engineering, Landscape Construction, Study of Plant Materials, Historical perspective of Landscape design.

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	Introduction to Landscape Architecture: Introduction to Landscape Architecture, definition, importance, need and scope, Role of landscape design in architecture. Landscape elements (Major and Minor Elements, Natural and Manmade elements, Tangible, and Intangible elements, Soft and Hard landscape elements). Understanding the visual characteristics (colour, form, texture) and the non-visual characteristics (smell, touch, sound) of these elements and their application in functional, aesthetic and environmental goals. Principles of landscape design (harmony, balance, symmetry, contrast, etc.) Surfacing, Enclosure, Vistas, Visual corridor.	CO1	9
II	Landscape Engineering: Site Studies and Site Planning - Introduction to grading, Landform modifications; Earth form grading; Basic grading principles, Cut and fill processes, Retaining walls. Surface drainage, vegetation and existing features, etc.	CO2	9
FIRST INTERNAL TEST			
III	Landscape Construction: Circulation: Vehicular roads and Parking, Pedestrian paths, and plazas; Level Change: Wall, steps, and ramps. Planting: Planters, beds, edges, and terraces. Water elements: Pool types and water bodies. Green Practices, energy efficient site planning	CO3	9

IV	<p>Study of Plant Materials: Trees, shrubs, ground cover, climbers, Indoor plants. Plant selection criteria - Functional, visual, ecological, and microclimatic aspects. The role of plant material in environmental improvement (e.g., soil conservation, modification of microclimate). Planting for shelter, windbreaks, and shelter belts.</p>	CO3	9
SECOND INTERNAL TEST			
V	<p>Climate responsive design for tropical climates Changing perceptions of man's relationship with nature till the early 19th century; Ancient Heritage: Mesopotamia, Egypt, Greece, Rome; Western Civilization: Europe; Italy, France, and England The middle east: The Persian tradition and its far-reaching influence Eastern Civilization: China and Japan. Ancient and medieval period in India; Mughal and Rajput Landscapes; Colonial landscape development in India (Lutyens Delhi). Modern and contemporary landscape design.</p>	CO4	9
END SEMESTER EXAMINATION			

Textbooks

- Lynch, K. Site Planning, Cambridge: The MIT Press. 1962
- Motloch, J. L. Introduction to Landscape Design, US: John Wiley and sons

References

- Bose, T.K. and Choudhary, K. Tropical Garden Plants in Colour. Horticulture and Allied Publishers. 1991.
- Dee, C. Form and Fabric in Landscape Architecture: A visual introduction, UK: Spon Press.2001
- Laurie, M. An Introduction to Landscape Architecture, NY: American Elsevier Pub.Co Inc.1975
- Simonds, J.O. Landscape Architecture: The Shaping of Man's Natural Environment, NY: McGraw Hill Book Co. Inc. 1961.
- Simonds, J.O. Landscape Architecture: A manual of Site Planning and Design, McGraw Hill, 1961.

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TKM COLLEGE OF ENGINEERING, KOLLAM			
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARS502			
Course Name: LANDSCAPE 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
22ARD501	ARCHITECTURAL DESIGN - IV	0-0-10-0	10	2022

Course Objectives:

To learn the procedure of documenting and preparing measured drawing of buildings.

To understand socio-economic, cultural patterns and environmental characteristics of a settlement.

Students will be introduced to the site and context as the primary generators of design decisions through design exercises, taking into account site conditions, ecological aspects, activities, services, and building methods, as well as social use phenomena in the design development process.

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	Documentation of a heritage building / settlement study to understand the building materials, construction technology & the various determinants of design of the built form like the context /environment, livelihoods, socio- economic and cultural aspects, climate, rituals, customs etc.	Understanding
CO-2	To increase one's understanding of site planning techniques, barrier-free design principles, and construction techniques in order to develop design programs that consider context and functional requirements through data analysis, inference from data collection, and case studies of projects related to the design project.	Developing
CO-3	Applying site planning techniques to initiate the architectural design process, with the site and context serving as the primary generators of design decisions	Applying
CO-4	To design through conscious consideration of Site, context, and principles of barrier-free design	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: 45Marks

Syllabus

Documentation of a heritage building / settlement study. Study complex projects like Polyclinics, Convention Centre, Education institutions like Architecture schools, Dental college etc. emphasizing ecologically responsible site planning techniques and principles of Barrier- free design.

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	Preparation of measured drawing of a heritage building to understand the building materials, construction technology & the various determinants of built form. Or Documentation on housing settlements of a small community, with focus on the integration of socio-economic, cultural patterns and environmental characteristics and context as generators of architectural space and forms.	CO1	20
II	Study of ecologically responsible site planning methods and barrier-free design concepts with a focus on how the built and natural environments interact. The location, the context, and how they relate to the built environment will be the main points of emphasis. Site characteristics, ecological factors, activities, services, construction techniques, and social utilisation are all taken into account during the design creation process.	CO2	40
FIRST INTERNAL TEST			
III	Introduction to the project – Projects may be on Polyclinics, Convention Centers, Education institutions etc. Emphasis on the site planning techniques with respect to the ecological aspects of the site, zoning regulations/land uses, and barrier- free considerations. Study Space Standards and building codes, basic design parameters, such as the user group, zoning laws and regulations, the site context, and barrier-free considerations, etc for the selected project	CO-2 CO-3	30

	typology. Data Collection, Case studies, Site studies, Analysis, and Inferences		
IV	Concept development, Design development/ Form Development. Understand how site and context as prime generators of design decisions and the significance of landscape, open spaces, circulation networks, and utility infrastructure. Elements of Barrier-free design have to be included to make the design inclusive.	CO-3	30
SECOND INTERNAL TEST			
V	Detailed Site Layout landscape, open spaces, circulation networks, utility infrastructure, etc. Detailed drawings of the proposed design with details of architectural features.	CO-4	30
END SEMESTER EXAMINATION/JURY			

Reference Books

- Francis D. K. Ching, 'Architecture: Form, Space, and Order', John Wiley & Sons, 2007.
- Christopher Alexander et al, The Oregon Experiment, New York: Oxford UP, 1975
- Edward T White, Site Analysis: Diagramming Information for Architectural Design, Architectural Media Ltd. 1983
- Simon Unwin, 'Analysing Architecture', Routledge, 2003
- Neuferts' Architect's Data
- Time-Saver Standards for Architectural Design Data Time-Saver Standards for Architectural Design Data.
- Rudolf, A 'The dynamics of architectural form', Berkeley and Los Angeles: University of California Press, 1977.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARB501	BUILDING MATERIALS AND CONSTRUCTION TECHNIQUES-V	1-0-0-2	3	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. After this course, the students will be able to recognize 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	Identify appropriate foundations for various construction needs.	Understanding
CO3	Work with various building materials in the construction yard and understand their behaviour.	Applying
CO4	Use the various building materials in their design processes appropriately	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
 Portfolio presentation (15) / drawings (15): 30 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 B. Arch 2021 Regulations 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 two drawing questions, from any two different drawing-based modules, of which the student should answer any one. The question carries 15 marks.

Syllabus

Vertical transportation systems; Ramps and Stairs-Planning, Design parameters-Stairs; Standards-types of stairs- construction details- Elevators and Escalators; Planning and design parameters-Different types- Construction details- Wood substitutes: Different types wood substitutes available – Properties- Market forms- Plastics: Plastics as a building material- Damp proofing and Termite proofing: Causes of damp proofing- Materials used for Damp proofing- Anti termite treatments.

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	VERTICAL TRANSPORTATION SYSTEMS: RAMPS AND STAIRS Planning of vertical transportation systems – design parameters. Ramps: Planning of ramps, slope, finishes, safety precautions. Stairs: Planning staircases - Standards, rules and regulations. Components of stairs, Support conditions like inclined slab, cranked slab, cantilever. Stair plans, stairs with straight, circular and curved flights. Construction details of Wood stair, fire escape stairs, Concrete stair, Steel stair and Composite stair <i>Drawings: Wooden stair, RCC stair, Steel Stair, Composite stair.</i>	CO1 CO2 CO3 CO4	9
II	ELEVATORS AND ESCALATORS Elevators: Planning and grouping of elevators. Elevator design parameters. Different types of elevators – passenger elevators, observation elevators, hospital elevators and freight elevators. Construction details – lift shaft, lift pit, machine room etc. Escalators: Planning and details of escalators and travelators <i>Drawings: Passenger lift, Capsule lift, Escalator.</i>	CO1 CO2 CO3 CO4	9
FIRST INTERNAL TEST			

III	<p>WOOD SUBSTITUTES</p> <p>Industrial products as substitutes for natural hard wood. Characteristics, physical properties, areas of application, available forms and sizes of: Veneers and veneer ply woods, particle board, hard board, fibre board, block board, lamina-boards, glulam, laminates, cement particle board, e-board, bamboo ply, etc. <i>Market study: wood substitutes.</i></p>	<p>CO1 CO2 CO3 CO4</p>	9
IV	<p>PLASTICS</p> <p>Plastic as a building material. Brief history of their use through examples. Manufacture. properties, types, uses and application of plastics in building industry. Different types of adhesives and sealants.</p> <p>Plastic joints. Specific materials such as polycarbonate sheet and teflon. Introduction to plastic based products in building construction such as such as doors, windows, ventilators, partitions, floors, walls, roofs, handrails. Current innovations <i>Understanding of product literature/ shop drawings. Site visits with documentation in the form of sketches/ photos</i></p>	<p>CO1 CO2 CO3 CO4</p>	9
SECOND INTERNAL TEST			
V	<p>DAMP PROOFING AND TERMITE PROOFING</p> <p>Damp proofing: Causes and methods of damp proofing of foundation, effect of damp proofing, materials used for damp proofing, walls, floors, roofs. DPC treatment in buildings, swimming pools, roof gardens, water tanks. Termite proofing: Anti termite treatment, site preparation and soil treatment, physical and structural barriers, post construction treatments. <i>Damp proofing: Causes and methods of damp proofing of foundation, effect of damp proofing, materials used for damp proofing, walls, floors, roofs. DPC treatment in buildings, swimming pools, roof gardens, water tanks.</i> <i>Termite proofing: Anti termite treatment, site preparation and soil treatment, physical and structural barriers, post construction treatments.</i></p>	<p>CO1 CO2 CO3 CO4</p>	9
END SEMESTER EXAMINATION/JURY			

Text Book

- P.C. Varghese, 'Building Materials', Prentice hall of India Pvt Ltd, New Delhi, 2005
- Dr.B.CPunmia , Building Construction

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

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Reg. No.: _____		Name: _____	
TKM COLLEGE OF ENGINEERING, KOLLAM			
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARB501			
Course Name: BUILDING MATERIALS AND CONSTRUCTION TECHNIQUES - V			
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
22ARE501.1	VERNACULAR ARCHITECTURE	3-0-0-0	3	2022

Course objectives:

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

To understand the process of creation of vernacular architecture specific to a region, to create an understanding about the social and physical environment, climate of the place, materials and methods of construction

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	Learning from Vernacular architecture and its relevance.	Understanding
CO-2	Different approaches and concepts to study of vernacular architecture	Understanding
CO-3	Vernacular Architecture as a process – explore the concepts of culture and civilization and their impact on these architectural products	Analysing
CO-4	Studies of Vernacular settlements of the various parts of the world	Analysing
CO-5	Survey and study of vernacular architecture Physical experience of buildings in order to appreciate the complexity of the physical and metaphysical influences bearing on 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 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

A brief overview of the process of creation of vernacular architecture, its cultural and contextual responsiveness, its determinants, role of social, cultural, political, economic, symbolic, climatic, technological contest in creation of form, different approaches and concepts to study of vernacular architecture, and the specific vernacular architectural forms in the northern and southern parts of India.

Course plan

Module	Contents	Course outcome	No. of Hours
I	Introduction to Vernacular architecture Definitions and classifications of Vernacular architecture. Determinants of vernacular architecture: Role determinants in the creation of vernacular architecture of a region. Cultural and contextual responsiveness of vernacular architecture Learning from Vernacular architecture and its relevance.	CO1	6
II	Approaches and concepts Different approaches and concepts to study of vernacular architecture: Aesthetic, Architectural and anthropological studies in detail. Survey and study of vernacular architecture: The process of recording, categorizing and dissemination of knowledge about vernacular architecture.	CO2	9
FIRST INTERNAL EXAMINATION			

III	<p>Vernacular architecture as a process Vernacular architecture as a continuous process, dynamic process and participatory process. Study of examples from various regions of the world. Urban vernacular architecture. Vernacular architecture examples of urban settlements.</p> <p>Vernacular architecture as an indicator of changes in social, cultural, economic, climatic, political, symbolic and technological aspects.</p>	CO3	12
IV	<p>Vernacular Settlements Studies of Vernacular settlements of the various parts of the world based on location and topographical conditions, regions influenced by social and economic factors, the result of the local population's livelihoods etc. Examples from Egypt , Indonesia , Iceland , China etc</p>	CO4	9
SECOND INTERNAL EXAMINATION			
V	<p>Regional variations in the vernacular architecture in India Understanding how various factors impact Vernacular Architecture. Study based on the vernacular architecture of the following regions: Bohra houses of Gujarat, wooden houses of Himachal Pradesh, Bangla houses (village huts) of Bengal, Toda Houses Tamil Nadu, Bhunga Houses of Gujarat, Naga Houses of North East India, Tribal houses of Kerala.</p>	CO5	9
END SEMESTER EXAMINATION			

Reference Books

- Paul Oliver, Encyclopedia of Vernacular Architecture of the World, Cambridge University Press,1997.
- Amos Rapoport, House, Form & Culture, Prentice Hall Inc1969.
- Vellinga Marcel, Oliver Paul & Bridge Alexander , Atlas of Vernacular Architecture of the World , Taylor & Francis Ltd ,2008
- 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
- Desai Madhavi Traditional Architecture: House Form of Bohras in Gujarat, National Institute of Advanced Studies in Architecture (NIASA), 2007

- John May Handmade Houses and Other Buildings the World of Vernacular Architecture, Thames & Hudson 2010
- R W Brunskill: Illustrated Handbook on Vernacular Architecture, 1987.
- R.W. Brunskill, 4th ed 2000 Faber and Faber, Vernacular Architecture: An Illustrated Handbook
- S. Muthiah and others: The Chettiar Heritage; Chettiar Heritage 2000
- Tejinder S. Randhawa, Vernacular Architecture of India: Traditional Residential Styles and Spaces, INTACH 2022
- Willi Weber and Simos Yannas, Lessons from Vernacular Architecture: Achieving Climatic Buildings by Studying the Past, Routledge, 2013
- Reimar Schefold, Gaudenz Domenig and Peter J. M. Nas, Indonesian Houses: Tradition and Transformation in Vernacular Architecture, Koninklyk Instituut Voor Taal Land, 2003
- Ronald G. Knapp China's Vernacular Architecture: House Form and Culture, University of Hawaii 1989
- G.H.R. Tillotsum – The tradition of Indian Architecture Continuity, Controversy – Change since 1850, Oxford University Press, Delhi, 1989.

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TKM COLLEGE OF ENGINEERING, KOLLAM			
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARE501.1			
Course Name: VERNACULAR 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)

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARE501.2	APPRECIATION OF ART IN ARCHITECTURE	3-0-0-0	3	2022

Course objectives:

- To explore visual art forms and their cultural connections across historical periods
- To understand and analyze any piece of artwork by means of elements and principles of design
- To acquire basic knowledge about various art mediums and develop skills in using the various mediums as effective and versatile presentation tools.
- To understand the relationship among art, art appreciation and architecture
- To help students Critically interpret, evaluate, and contextualize works of art.

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 and differentiate art works as expressions of values across varied cultural and historical contexts.	Understanding
CO2	To analyze and summarize the elements of art and the principles of design through creative works in various mediums and materials.	Applying, Analyzing
CO3	Identify and describe a body of art works, understand the art elements of artists.	Understanding, Creating
CO4	To understand and gain a fundamental knowledge of art expressions, design- its elements and principles and demonstrate using techniques.	Applying, Analyzing, Evaluating, Creating
CO5	To learn about individual artists and their role in society.	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
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. Part B contains 2 questions from each module, of which the student should answer any one. Each question carries 8 marks. One or two questions can have subdivisions. Some questions can be framed in such a manner to assess the student's capacity for analyzing the topics and linking it with other courses.

Syllabus

Introduction and Fundamentals – Art understanding – Indian art – Tools and techniques in print making, photography and plastic arts – works of international artists

Course plan

Module	Contents	Course outcome	No. of Hours
I	Fundamentals of Art Introduction to Art- definition and Interpretation. Introduction to History of Art, Artistic Tradition and Theories. Examples from Greek, Roman, Gothic, Renaissance, Art Deco, Modern , Post Modern, Futuristic Art in space perception- Contemporary approaches vs. traditional approach Contemporary Art Issues Recent Art Movements	CO1	6

II	Understanding Art Form and content in art Elements & design principles that create artistic form a) line, shape, light, colour, texture, pattern, space, motion b) unity, variety, focal points, emphasis, balance, symmetry, rhythm, scale, proportion Iconography in art	CO1 CO2	6
FIRST INTERNAL EXAMINATION			
III	Indian Art Introduction to aesthetics of Indian Art, Sculpture & Painting Art in Prehistoric, Islamic, Medieval, Colonial times Works of Indian artists	CO1 CO2 CO3	9
IV	Imaging and sculpting Printmaking: techniques and tools. Digital art Architectural Photography: time, emotion, abstract, construction, environment setting through the lens; technological developments and methods. Plastic arts: sculpture, modeling, installation: artists and techniques.	CO2 CO4	1 2
SECOND INTERNAL EXAMINATION			
V	Artists works Art and approach to art of famous artists- <ul style="list-style-type: none"> • Picaso, Michelangelo, Van Gogh, Salvador Dali, • Yayoyi Kusama, Kurt Schwitters, Jason Rhoades , Kara Walker, Doris Salcedo • Jeanette Hägglund, Hufton and Crow, Cristóbal Palma Auguste Rodin, Boccioni, Jeff Koons, Anish Kapoor 	CO1 CO3 CO5	1 2
END SEMESTER EXAMINATION			

Text Books:

- Fichner-Rathus, Lois. Understanding Art. 11th edition
- Pamela Sachant, Peggy Blood, Introduction to Art: Design, Context, and Meaning 2016
- Dennis J.Sporre, Perceiving the arts. 11th edition 2015

Reference Books

- Charles Wallschlaeger & Synthia Busic Snyder, Basic Visual Concepts & Principles for artists, architects & designers, McGraw hill, USA, 1992.
- Francis D.K Ching, 'Drawing, Space, Form, Expression'.
- J.H.Bustano, by 'Principles of Colour and Colour Mixing'.
- Luis Slobodkin, 'Sculpture-Principle and Practice'.
- Roy C. Craven, 'Indian Art'.
- Suzanne Huntington, 'Art of Ancient 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.
- Representing art works through drawing, painting, photography, sculpting, printing etc. can be given as class exercises
- The students can be encouraged to attend workshops and visit art related exhibitions, events and sites.
- Each student should be encouraged to have a sketchbook with notes, graphical interpretations, sketches of all the topics covered.

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TKM COLLEGE OF ENGINEERING, KOLLAM			
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARE501.2			
Course Name: APPRECIATION OF ART IN 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)

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARE501.3	ARCHITECTURAL DESIGN WITH STEEL AND GLASS	3-0-0-0	3	2022

Course Objectives:

- To provide a basic knowledge on Glass and Steel as an architectural building materials.
- To provide the students with the latest & recent trends in architecture and to understand the selection and usage of glass for appropriate purposes and for improving the building performance using glass.
- To introduce the design potential of steel as an important material in modern construction and familiarize the students with the structural merits and limitations of steel.
- To understand the sustainability of steel in construction field.

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 importance of glass and steel in architecture and its types.	Remembering
CO2	Identify appropriate glass and steel for construction and its applications	Understanding
CO3	Introduce the sustainability of steel and identify the technical aspect of combining steel and glass	Applying
CO4	Case study of green building designed predominantly with energy efficient materials.	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

Glass as a building material: Evolution and importance of glass. Types of glass:

Glass and green architecture: Building physics, Day lighting in buildings, Achieving energy efficient using glass, Case study of green buildings: Steel as a building material – structural properties of steel, advantages of steel in construction - Sustainability of steel: Recycled, reuse and adaptive reuse of steel. Various steel and glass envelope systems

Course plan

Module	Contents	Course outcome	No. of Hours
I	Glass As Building Material Evolution & importance of glass in modern architecture. Applications of glass in buildings (façade/ interior applications). Understanding the production & properties of glass. Types of Glass- mirror, lacquered, fire resistant. Modern glass with different applications. Glass for hospitals, green homes, airports, offices, other buildings. Role of glass in acoustics.	CO1 CO2 CO3 CO4	6
II	Glass And Green Architecture Building Physics. Theory of electromagnetic radiation. Understanding of internal and external reflections. Day-lighting in Buildings - introduction and basic concepts (VLT). Solar Control and thermal insulation (SF, UV, SHGC). Need for green Buildings. Energy efficient buildings. Achieving energy efficiency using glass. Factors of energy efficient material selection., Case study of green building designed predominantly with energy efficient materials.	CO1 CO2 CO3 CO4	6

FIRST INTERNAL EXAMINATION			
III	Introduction to Steel as Building Material Materiality of steel, structural properties of steel, advantages of steel in construction. History of metal in construction – Iron to Steel. Steel and tension. Industrialization and mass fabrication of steel. Casting of steel in historic and contemporary examples. Invention of hollow structural sections. Hot rolled steel shapes, various hollow structural sections.	CO1 CO2 CO3 CO4	9
IV	Sustainability of Steel Introduction to steel as a sustainable material. Recycled, reuse and adaptive reuse of steel. Steel and glazing systems, support systems for glazing. Technical aspects of combining steel with glass. Various steel and glass envelope systems - curtain wall system, wind braced support systems.	CO1 CO2 CO3 CO4	12
SECOND INTERNAL EXAMINATION			
V	Fabrications, Erection and Implications on Design Study on transformation of architectural design into fabricated elements. Steel in temporary/ exhibit buildings. Need for corrosion and fire protection. Various finishes and coating systems of steel. Detailed study on corrosion protection and fire protection systems. Transportation, site issues and erection on site. Erection of beams and columns. Effects of climate and weather on erections. Other issues relating to practical implication of design on site.	CO1 CO2 CO3 CO4	12
END SEMESTER EXAMINATION			

Text Books:

- Christian Schittich, 'Glass Construction Manual', Birkhauser Basel, 2007.
- 'Architectural Glass Guide', Federation of Safety Glass, 2013.
- Terrimeyer Buake, 'Architectural Design in Steel', SPON, 2004.
- Peter Silver et al, 'Structural Engineering for Architects', Laurence King, 2013.

Reference Books

- 'LEED 2011 For India - Green Building Rating System', Indian Green Building Council, 2011
- 'Energy Conservation Building Code. User Guide', Bureau of Energy Efficiency, 2009
- Training Manuals & E- Learning, Glass Academy.
- Victoria Ballard Bell & Patrick J Rand; 'Materials for Architectural Design', Lawrence King, 2006.
- Ettinger J. Van et all(Editor), 'Modern Steel Construction in Europe', Elsevier,1963.
- Leonardo Benevolo, 'History of Modern Architecture Vol 1 & 2', Reprint, MIT Press, 1977.
- 'Handbook of Steel Construction', Canadian Institute of Steel Construction, 2010.
- INSDAG Publications and Brochures.

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TKM COLLEGE OF ENGINEERING, KOLLAM			
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARE501.3			
Course Name: ARCHITECTURAL DESIGN WITH STEEL AND GLASS			
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
22ARE501.4	GRAPHIC AND PRODUCT DESIGN	3-0-0-0	3	2022

Course objectives:

To understand the role of visualization in design and to learn how to externalize the visualizations through various illustrations.

To understand the stages and processes involved in product design.

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 create geometric forms using light and shadows.	Understanding, Analyzing
CO2	To identify the relevance of proportioning systems.	Understanding, Analyzing
CO3	To articulate the design process.	Understanding, Analyzing, Evaluating
CO4	To evaluate the space dimension factors.	Understanding, Analyzing, Evaluating
CO5	To identify various occupational hazards.	Understanding, Analyzing

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= 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 form and proportion – Introduction to product sketching – Introduction to product design - Human physical dimension concern and ergonomics - Percentile and measurements and occupational safety.

Course plan

Module	Contents	Course outcome	No. of Hours
I	Introduction to form and proportion. Simple geometric forms and composition, principles of perspective, effect of light and shadows on surface composition, understanding the basics of proportions and application of scales in drawing.	CO1, CO2	6
II	Introduction to product sketching. Natural forms sketching, the human body and its parts, human proportions and proportioning systems. Man-made form sketching, introduction to product sketching, understanding the proportions and material properties, importance of line weights in representation.	CO2	9
FIRST INTERNAL EXAMINATION			
III	Introduction to product design. Research, Concept Development, Production, Launch. Various types of design process: Linear model, Double diamond, total design, waterfall design, Christmas tree. Importance of human centred design.	CO3	9
IV	Human physical dimension concern and ergonomics. Behavioural space dimension factors, Behavioural zones, Value of ergonomics in spaces, Principles of optimal spaces in workspace. Proper posture and proper optimisation of work component.	CO2 CO4	12
SECOND INTERNAL EXAMINATION			

V	Percentile and measurements and occupational safety. Percentile selection for design use, general working postures and workstation design. Various occupational safety and stress caused in the workspace and remedial measures	CO1 CO3 CO5	12
END SEMESTER EXAMINATION			

Reference Books

- Edwards Betty; New drawing on the right side of the brain. Publisher: Tarcher 2002
- D.K Francis; Design Drawing, John Wiley and Sons, 1998
- T C Wang; pencil sketching, John Wiley & sons, 1997
- Dalley Terence Ed; the complete guide to illustration & design, Phaidon, Oxford 1980
- Morris, Richard. *The fundamentals of product design*. Bloomsbury Publishing, 2016.
- Chakrabarti Debkumar, Indian Anthropometric Dimensions for Ergonomic Design Practice 1997.

Course materials, Guidance and Evaluation methods

- Design process and methodologies need to be emphasized in module 3 with the help of case studies.
- For Module 4 and 5 real time scenarios can be adopted as examples for a better understanding.

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TKM COLLEGE OF ENGINEERING, KOLLAM			
FIFTH SEMESTER B. ARCH. DEGREE EXAMINATION, MONTH AND YEAR			
Course Code: 22ARE501.4			
Course Name: GRAPHIC AND PRODUCT 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)