AUTONOMY 2022

TKM COLLEGE OF ENGINEERING KOLLAM

B. ARCH

SEMESTER IV

Course No.	Course Name	L-T-S P/D	Credits	Year of introduction
22ARB401	**CLIMATE AND BUILT FORM- II**	**2-0-0-2**	**4**	**2022**

Course Objectives: To introduce students to climate responsive architecture and enable them to apply climate responsive design strategies in the design of 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	Apply climate responsive design strategies in the design of shelters for tropical climates	Applying
CO-2	Experiment with the factors affecting ventilation and daylighting	Applying
CO-3	Analyse the climate responsive design strategies used in the existing buildings of tropical climates	Analysing
CO-4	Summarise the need for energy simulation in 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 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

Sun and design process, Ventilation and air movement, Daylighting, Application of climate responsive design – examples, Energy modelling.

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	**Sun and design process** Solar geometry – sun path at different latitudes, Solar angles – altitude and azimuth angles, Solar chart, Designing for the sun – orientation, planning of the rooms Shading – types of shading devices, Shadow angles and design process of shading devices	CO1	11
II	**Ventilation and air movement** Ventilation and air movement, Functions of ventilation Wind and ventilation – factors affecting ventilation, Stack effect and ventilation, Induced ventilation – sun induced and wind induced ventilation **Exercises (Lab):** 1. Measurement of wind velocity and wind direction – study on the factors affecting ventilation in indoor spaces	CO2	16
FIRST INTERNAL TEST			
III	**Daylighting** Photometric quantities, Components of daylight entering a building Daylight factor and design sky concepts Daylighting in tropical climates – warm humid and hot dry climates **Exercises (Lab):** 1. Measurement of indoor illumination – study on the effects of opening positions and sizes, effects of shading devices	CO2	16
IV	**Application of climate responsive design - examples** Climate response in vernacular buildings – examples from tropical climates. Climate response in the vernacular architecture of Kerala. Case studies of climate responsive modern buildings from tropical climates	CO3	11
SECOND INTERNAL TEST			

V	**Energy Modeling** Introduction to energy modeling. Advantages. Brief introduction to commonly used energy modelling softwares.	CO4	**6**
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.
- Baker N., Steemers K,. Daylight Design of Buildings: A Handbook for Architects and Engineers, Routledge, 2014.

Course materials, Guidance and Evaluation methods

- Lab exercises should be utilised for creating in depth understanding of the related topics.
- Students should be made aware of the practical Architectural applications of each topic.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARS401	**HISTORY OF ARCHITECTURE AND CULTURE - III**	**3-0-0-0**	**3**	**2022**

Course Objectives: The course traces the development of architecture across Asia, Europe and Africa during 10th to 19th centuries. Architectural development is to be understood as an outcome of socio-political, economic and religious influences. Focus is given to Islamic Architecture, Mughal Architecture and provincial variations of Islamic architecture in India. Special reference is to be given to important religious and secular architecture in Kerala, and the architectural elements of Traditional Kerala buildings.

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	Islamic architecture and its features, typologies	Understanding
CO-2	Important Islamic buildings in India and provincial variations	Analysing
CO-3	Mughal Architecture in India	Understanding
CO-4	Religious Architecture in Kerala	Understanding
CO-5	Secular and traditional Architectural elements of Kerala	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 B.Arch 2021 Regulations 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

Pre-Islamic Architecture of Persia and Iran, Islamic Architecture in India and abroad, Imperial Style, Oriental Architecture, Mughal Architecture, Regional styles, Religious and Secular Architecture in Kerala, Elements of traditional Kerala Architecture

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	Rise of Islam in Arabia- Structure of typical mosque- Ummayyad Mosque, Damascus- Great Mosque of Cordoba. Muqaranas, Madrasas. Palace of Alhambra. Ottoman Architecture- Topkapi palace.	CO1	6
II	Islam in India- Salient features of Mosques- QutbMinar. Quwwatul-Islam mosque complex. Architectural developments during Imperial Era- Alai Darwaza- Tomb of Tughlaq. Khirki MasjidSheesh Gumbaz- Purana Kila Provincial styles- Gujarat, Bengal, Bijapur and Hyderabad with significant examples. Stepwells- vav typology.	CO2	12
FIRST INTERNAL TEST			
III	Mughal Architecture- Humayun's Tomb, BulandDarwaza, Fatehpur Sikhri- layout and buildings, Taj Mahal, Red Fort- planning and design. Mughal landscape with special reference to Shalimar Bagh.	CO3	9
IV	Religious architecture of Kerala- Vadakkunnathan temple, Sree Padmanabhaswamy temple. Indigenous church Architecture of Kerala -St Mary's Orthodox church, Kallooppara, Basilica of St. Mary, Champakkulam, Our Lady of Life, Mattanchery, Synagogue in Mattanchery, Juma Masjid at Thazhathangady, Cheraman mosque.	CO4	9
SECOND INTERNAL TEST			

V	Secular- Padmanabhapuram Palace, Krishnapuram palace. Cultural- Koothambalam at Vadakkunnathan Temple complex. Documentation and drawing of features of traditional Kerala architecture- roof forms, joinery- study of proportions, materials and landscape in traditional Kerala architecture as observed during documentation.	CO5	9
END SEMESTER EXAMINATION			

Text 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.
- Brown, Percy. (1975). Indian architecture (Islamic period). Bombay : D.B. Taraporevala
- Shokoohy, Mehrdad. 2013. Muslim Architecture of South India: The Sultanate of Ma'bar and the Traditions of Maritime Settlers on the Malabar and Coromandel Coasts (Tamil Nadu, Kerala and Goa). London and New York: Routledge.
- Thampuran, Ashalatha. 2001. Traditional Architectural forms of Malabar Coast. Calicut: Vastuvidyapratisthanam Academic Centre.
- Zeiphudin, P.A; and Krishnakumar, K.G. 2012. Ponnanni Ponvahini Ponnanayam. Journal of Kerala Local Historians, 1: 1-30.

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.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARC401	THEORY OF STRUCTURES- IV	2-1-0-0	3	2022

Course Objectives: This course provides fundamental concept of reinforced concrete and its design. It enables the students to design and detail reinforced concrete structural elements such as beam, slab, column, and footing. The course also trains the students to use the code of practice of reinforced concrete design, IS 456: 2000.

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 philosophy of Limit state method.	Understanding
CO-2	Recall the structural behaviour of elements subjected to flexure and compression	Remembering
CO-3	Analyse the reinforced concrete elements such as beam, slab, column and footing subjected to dead and live loads to determine BM, SF, AF, and deflection	Applying
CO-4	Applying the principles of limit state method to design the reinforced concrete elements such as beam, slab, column and footing subjected to dead and live loads following IS 456 and SP 16.	Applying
CO-5	Preparation of structural drawings of the designed reinforced concrete elements such as beam, slab, column and footing following SP 34	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 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 plain and reinforced concrete – Design loads and load combinations - Design philosophy of Limit state method – Limit state of collapse and Limit state of serviceability - Analysis and design of singly and doubly reinforced beams by limit state method, Check for deflection. Detailing - Concept of T-Beams and L – beams.
Slabs – Classification- Load distribution and structural action of one way and two way slabs - Design of One Way slab – Detailing - Design of two way slab with corners free to lift up and corners held down condition - Detailing
Columns - Classification- Effective length - Limit state of collapse: Compression - Design of short column subjected to axial loads. Detailing - Column interaction curves. Design of short columns subjected to combined axial load and uniaxial bending [Using SP 16 Charts]. Detailing
Footings-Types of footings. Design of isolated footings of Square and Rectangular shapes subjected to axial compressive loads- Detailing Stair case – Structural action of stairs spanning longitudinally and transversely (Concept only)

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	Introduction- Plain and reinforced cement concrete – Design loads and load combinations - Design philosophy of Limit state method – Limit state of collapse and Limit state of serviceability - Analysis and design of singly reinforced beams by limit state method, Check for deflection. Detailing	CO1, CO2, CO3, CO4, CO5	10
II	Analysis and Design of Doubly reinforced beams by limit state method- Check for deflection - detailing T-Beams and L - beams (Concept only)	CO2, CO3, CO4, CO5	9
FIRST INTERNAL TEST			
III	Slabs – Classification- Load distribution and structural action of one way and two way slabs - Design of One Way slab – Detailing Design of two way slab with corners free to lift up and corners held down condition - Detailing	CO2, CO3, CO4, CO5	9

IV	Columns - Classification- Effective length Limit state of collapse: Compression Design of short column subjected to axial loads. Detailing Column interaction curves. Design of short columns subjected to combined axial load and uniaxial bending [Using SP 16 Charts]. Detailing	CO2, CO3, CO4, CO5	8
SECOND INTERNAL TEST			
V	Footings-Types of footings. Design of isolated footings-Square and Rectangular shapes only - Subjected to Axial compressive loads alone.- Detailing Stair case – Structural action of stairs spanning longitudinally and transversely (Concept only)	CO2, CO3, CO4, CO5	9
END SEMESTER EXAMINATION			

Text Books:

- Unnikrishnan Pillai and Devadas Menon, Reinforced Concrete Design,Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1999
- M. L. Gambhir, Fundamentals of reinforced concrete design, Prentice Hall India Learning Private Limited, 2006
- M. L. Gambhir, Design of reinforced concrete structures, Prentice Hall India Learning Private Limited, 2008

References Books:

- R. Park and T. Paulay, Reinforced concrete structures, Wiely, 1975 • P. C. Varghese, Limit state design of reinforced concrete, Prentice Hall India Learning Private Limited, 2008
- S.N. Sinha, Reinforced Concrete Design – Tata McGraw Hill Publishing Co. Ltd., New Delhi, 1998.
- P.Dayaratnam, Design of Reinforced Concrete Structures, Oxford and IBH Publishing Co., 1983.
- C. Sinha and S.K. Roy, Fundamentals of Reinforced Concrete, S.Chand& Co., New Delhi, 1983.
- B.C. Punmia, Reinforced Concrete Structures, Vol, 1 & 2 Laxmi publications, Delhi, 1994.

Standards:

- IS 456:2000, Indian Standard, Plain and Reinforced Concrete – Code of Practice, Bureau of Indian Standards.
- SP -16 Design Aids for reinforced concrete to IS 456, Code of Practice, Bureau of Indian Standards.
- SP 34 Handbook on concrete reinforcement and detailing, Code of Practice, Bureau of Indian Standards.

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARC402	**BUILDING SERVICES II- (ELECTRICAL, LIGHTING& ILLUMINATION)**	**2-0-0-1**	**3**	**2022**

Course Objectives: To introduce students to electrical services and illumination and to sensitize them with respect to their integration into Architectural Design.

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 the concept of electrical systems	Remembering
CO-2	Acquire knowledge about protection of equipments, and need of earthing	Understanding and analysing
CO-3	Acquire knowledge about household electrical appliances, various types of wiring systems, and design of electrical installation in domestic dwellings	Analysing and evaluating
CO-4	Understand the need for good illumination and knowledge of the various Electric light sources	Understanding and analysing
CO-5	Enable the students to design of interior and exterior lighting systems- illumination levels for various purposes light fittings- flood lightingstreet lighting	Understanding and 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 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, Basics of electricity, Electrical installations in buildings, protection equipments, Indian electricity rules, Electrical wiring design, Load calculation, Illumination and lighting, Lighting and electrical scheme.

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	Basics of Electrical systems Introduction to electrical services, General awareness of IS codes- Introduction of IS 732, IS 5216, IS 2309 Classification of voltages, standards and specification, Single and three phase supply basics, Supply and distribution of electricity to buildingsTransformer basics, Substations-Types, Symbols used in electrical wiring drawing layouts **Exercises (Lab):** Demonstrate the precautionary steps adopted in case of electrical shock	CO1	8
II	Electrical installations in buildings Main and distribution boards -Diagram Electric meter-basics, Panel board, MCB, RCCB,MCCBworking,uses,fuses-basics and types, Earthing for safety – Types-Pipe earthing, plate earthing, ISI specifications, Lightning protections Exercises (Lab): Identify different types of cables, wires, switches, fuses, MCB, RCCB and MCCB with ratings	CO2	**9**
FIRST INTERNAL TEST			
III	Introduction to Indian electricity rules. Electrical wiring design Electrical wiring system in domestic and light commercial buildings- Conduits, types of wiring, UG cables-basics,	CO3	10

	Accessories (Switches and Outlets, switch boards), Basic household wiring components (eg: Ceiling rose) Electrical load calculations Exercise in load calculation. (Numerical based on problems up to sub circuit calculation only) for exams **Exercises (Lab):** Wiring of a power distribution arrangement using a single phase MCB distribution board with RCCB main switch and Energy Meter		
IV	Illumination and lighting Commonly used terms in illumination. Laws of illumination, Measurement of luminous flux and lux meter – Working Lighting systems for building Natural/ Artificial Direct/Indirect General/Local Light sources (Incandescent, Fluorescent, HID, HPS and LPS,LED-Comparison) and Luminaries Day lighting and day lighting factor. Energy efficient lighting, Alternative sources of lighting, Basic idea of solar panels and its installation Scope of ECBC-Lighting and controls, Electrical and renewable energy systems Introduction to GRIHA- Criterion 5(Energy efficiency) and 6 (Renewable Energy utilization) **Exercises (Lab):** 1. Experiments proving inverse square law of illumination using a light source . 2. Experiment using Lux meter . (Eg : Measurement of Illumination Indoors- Natural and artificial , Measurement & analysis of daylight factor at room level) 3. Market survey of different types of light sources & luminaries.	CO4	9
SECOND INTERNAL TEST			
V	Lighting design and calculation Local/general lighting calculation-Lumen method Criteria and standards for different purpose/activity illumination-Residence, Office,Institution,Hospital and commercial display lighting. Outdoorlighting– Street Lighting –(Arrangement, Types), flood lighting(Sportsstadia)Swimming pool lighting and underwater luminaries. **Exercises (Lab):** 1.Preparationoflightingschemeasapartofassignment 2. Market Survey of energy efficient lighting Systems.	CO5	9
END SEMESTER EXAMINATION			

References

- Aly.S.Dadras,Electrical systems for Architects, McGraw-Hill Inc.,US, 1995
- M K Giridharan, Electrical Systems Design Data Hand book, M/s I K International Publishers, New Delhi, 2011 (Data book approved for use in examination)
- H.Cotton,ElectricalTechnology, Sir Isaac Pitman & Sons, Ltd, 1922
- L.Uppal,Electrical wiring, Estimating and Costing, Khanna Publishers, 1987
- LightingManual
- MarcSchiler,Simplified design of building lighting, Wiley, 1997
- NationalElectricalCode
- Raina&Bhattacharya,ElectricalWiring,DesignandEstimation, New Age International Publishers, 1991
- https://www.youtube.com/watch?v=FhTPAuK7LQo(Reference for experiment proving inverse square law)

Course No.	Course Name	L-T-S P/D	Credits	Year of introduction
22ARD401	ARCHITECTURAL DESIGN - III	0-0-8-2	10	2022

Course Objectives: To enable the students to get introduced to issues related with the design of human habitat, its components and space standards. To understand residential spaces in a specific context, relationship between human behaviour and space through site visits and studio exercises. To explore volume of space, shape, form, function, climatic consideration and material sensitivity through design exercise, and to understand the needs of privacy, communal spaces, efficiency of open spaces and ideas of extended living areas. The objective will be on understanding residential spaces in both the urban and traditional contexts.

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	Understanding
CO-2	Application of knowledge to initiate architectural design process by using space standards and environmental aspects to formulate concepts and design. Visualize design concepts and make simple and complex 3D objects	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	To generate design in through conscious consideration of human scale, environmental conditions, material and form	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

Study based on residential typologies, Consideration of climate and site contours in design development process. Study on usage of local materials, Concept development and design of a building with residential use. Introduction to 3D Modelling and Rendering.

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	Study based on residential typologies. Exercises relating personal experiences to behavioural needs and translating them into architectural program requirements Consideration of climate and site contours in design development process. Study on usage of local materials and innovative construction techniques.	CO1, CO2, CO3	30
II	**Introduction to 3D-modelling technique in CAD** 3D basics, 3D Object Modification, 3D Boolean operations, 3D primitive objects. Introduction to 3D Modelling and Rendering, Building Modelling and basic rendering techniques, Drawings of 3D models of buildings using CAD tools.	CO2	30
FIRST INTERNAL TEST			
III	Design of built environment for residential use in the immediate or observable environment with a focus on program and use. Introduction to the initial design parameters which include choice of Geography/situation (context), User Group/development model, and Development guidelines (bylaws).	CO1, CO3	30
IV	Space Standards and building codes for residential typologies. Data Collection, Case studies, Site studies, Analysis and Inferences	CO2, CO3, CO4	30
SECOND INTERNAL TEST			

V	Concept development, Design development/ Form Development Detailed drawings, Detailing of architectural features	CO2, CO3, CO4	30
END SEMESTER EXAMINATION/JURY			

Reference Books

- Francis D. K. Ching, 'Architecture: Form, Space and Order', John Wiley & Sons, 2007.
- Geoffrey Broadbent `Design in Architecture' John Wiley and Sons, 1973.
- Neuferts' Architect's Data
- Simon Unwin, 'Analysing Architecture', Routledge, 2003
- Simon Unwin, 'An Architecture Notebook :Wall' Routledge, 2000
- 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

Course No.	Course Name	L-T-S-P/D	Credits	Year of introduction
22ARB402	**BUILDING MATERIALS AND CONSTRUCTION TECHNIQUES IV**	**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
CO-1	Identify the relevant BIS specifications.	Remembering
CO-2	Identify appropriate walls, floors and roofs for various construction needs.	Understanding
CO-3	Work with various building materials in the construction yard and understand their behaviour.	Applying
CO-4	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

Wall Systems: Concrete- Masonry- steel- wooden. Floor system: Concrete- steel- wooden, Roof systems: Types of roofs- Types of trusses- Materials for roof coverings.Shoring, Underpinning and Scaffolding: Types of scaffoldings.Glass: Types of glass used in building constructions- Purposes and properties of glass. Glazing: Structural glazing and curtain walls.

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	**SHORING, UNDERPINNING AND SCAFFOLDING** Shoring: racking shores, flying or horizontal shores, dead or vertical shores. Underpinning: pit method, pile method Scaffolding: component parts, types of scaffolding single, double, cantilevered or needle, suspended, trestle, steel scaffolding, patented scaffolding. **Exercises:** Sketches of types of shores, underpinning methods and scaffolding types	CO1, CO2, CO3, CO4	9
II	**WALL SYSTEMS** Concrete System: Concrete columns, concrete walls. Lintels and sunshades Masonry System: Masonry walls unreinforced and reinforced, solid walls and cavity walls, masonry columns and pilasters, Arches. Steel System: Structural steel framing, steel columns,light gauge steel studs, balloon framing. Wooden System: Wood stud framing, stud wall sheathing, wood columns, wood post and beam framing. Partition wall systems. **Drawings:** Types of arches, RCC lintel and sunshade	CO1, CO2, CO3, CO4	9

FIRST INTERNAL TEST			
III	**FLOOR SYSTEMS** Concrete: One-way slab, One-way joist slab, Two-way slab, Two-way slab and Beam. Steel: One-way beam system, Two-way beam system, Triple beam system, Semi rigid connections, Open- web steel joists, Metal decking, Light-gauge steel joists. Wood: Wood joists, Wood joist framing, wood beams supports and connections, plank and beam framing. **Drawings:** RCC column, slab and beam	CO1, CO2, CO3, CO4	9
IV	**GLASS AND GLAZING** Glass products: Types of glass – wired glass, fibre glass, laminated glass, glass building blocks, Heat strengthened glass- toughened glass,laminated glass Special purpose glasses- Low emissivity glass, Solar control glasses and variable transmission glass, Fire resistant glass, Self-cleaning glass their properties and uses in buildings Glazing: Single, double and triple glazing Glazed curtain walls & sky lights. **Exercise:** Sketches: Structural glazing, Market surveys of glass products – sizes and cost. Collection of samples Glazing accessories	CO1, CO2, CO3, CO4	9
SECOND INTERNAL TEST			
V	**ROOF SYSTEMS** Flat roof, Sloping roof and curved roof. Deciding the slope or curvature of roof, Roof terminology Wood trusses: Different types of trusses, King post truss, Queen post truss, Fink Truss, North light truss, Structural Steel roof framing: Different types of Steel trusses and their construction details. Roof covering - thatching, tiling, AC sheets, GI and Aluminium sheets, FRP and RMP sheets and modern roofing. Roof drainage systems. Introduction to Space frames and Composite roof Systems **Drawings:** Types of Arches, Truss – King post truss, Queen post truss, Steel angular and tubular truss, details of roof covering and gutter details	CO1, CO2, CO3, CO4	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‘, 7thedition, 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

Course No.	Course Name	L-T-S P/D	Credits	Year of introduction
22ARS402	**SITE PLANNING**	**1-0-1-0**	**2**	**2022**

Course Objectives:

- To understand the importance of site in architectural design whereby the relationship between the built and the un-built environment and principles of site planning is established.
- To analyse ecological and geomorphological characteristics of a site which govern the siting of a building or group of buildings in a given site.
- To teach various techniques of site analysis through exercises and case studies.

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	To learn various terms involved in site planning and their relevance in design of buildings of varying scales	Understanding
CO-2	To understand various parameters that need to be considered in site analysis and its implications on site	Understanding
CO-3	To evaluate the consequences of interventions in a site at micro and macro scales	Applying Analysing Evaluating
CO-4	To apply the principles of site planning learnt in real/ studio projects	Applying Analysing Evaluating Creating

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
Tests (2 numbers): 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 contains 3 questions with 1 each from module 1, 2 and 4, having 4 marks for each question. Students should answer all the questions (3 x 4 = 12

marks). Part B contains 2 questions each from 1, 2 and 4 modules, of which the student should answer any one. Each question carries 8 marks (Total 3 x 8 =24). Part C will have one question from module 3 or 5 to assess the student's capacity for analysing the site and arrive at findings that lead to decisions in site planning and building design. The question carries 14 marks. Part B and C questions can have subdivisions.

Syllabus

Introduction – Stages in Site Analysis - Preparation of Site Analysis Diagram - Site Context - Site Planning and Site Layout Principles - Site design - Design Application

Course Plan

Module	Topic	Course Outcome	No. of Hours
I	**Introduction** Objective of Site Planning, Site Planning Process Definition of plot, site, land and region, units of measurements. Contouring – Contour interval – Characteristics, uses of contours. **Site Planning And Site Layout Principles** Organization of vehicular and pedestrian circulation, types of roads, hierarchy of roads, networks, road widths and parking, regulations. Turning radii and street intersections.	CO1, CO2	6
II	**Stages In Site Analysis** Importance of site analysis, Understanding site as an active network, Contextual Analysis Assessing various contexts - Physiographic,Biological,Land use, Infrastructure, Regulatory, Cultural and Historic On site and off site factors, Integration, Synthesis and Analysis leading to inference about the context	CO2	8
FIRST INTERNAL TEST (THEORY BASED)			
III	Preparation of site analysis diagram – Case studies and exercises on the above as studio assignments.	CO1, CO2, CO3	4
IV	**Site Context** Introduction to existing master plans, land use for cities, development control rules and their implications on the site. Preparation of maps of matrix analysis and composite analysis. Site selection criteria for housing development, commercial and institutional projects - Case studies.	CO2, CO3	6

	Drawing marking out plan, layout plan and centre line plan – Importance, procedure for making these drawings and dimensioning. Setting out the building plan on site – Procedure and Precautions.		
SECOND INTERNAL TEST			
V	**Site design** Elements in site design, considerations and methods used, design process. Design application – Develop a site plan for any one typology as a studio exercise	CO3, CO4	6
FINAL TEST (THEORY BASED) AND VIVA			

Text Books:

- Kevin Lynch, 'Site Planning', MIT Press, Cambridge, MA. 1957.
- White T. Edward, 'Site Analysis : Diagramming Information for Architectural Design', Architectural Media Publisher, 1983
- James A La Gro, Site Analysis, Informing Context Sensitive and Sustainable Site Planning and Design, John Wiley and Sons, 2013

Reference Books

- John Ormsbee Simonds, 'Landscape Architecture: A manual of Site Planning and Design', McGraw Hill, 1961.
- McHarg, lan, 'Design With Nature', Wiley Series in Sustainable Design,1995
- Joseph De Chiarra and Lee Coppleman, 'Planning Design Criteria', Van Nostrand Reinhold Co., New York, 1988.
- Thomas H. Russ, 'Site Planning and Design Hand Book', Pearson Education, 2002.
- Christopher Aalexander et.al., A Pattern Language: Towns, Buildings, Construction (Center for Environmental Structure Series),2015

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. B.Arch 2021 Regulations
- Case studies of site analysis, site planning and preparation can be given as class exercises
- Students are to be encouraged to watch movies and documentaries which give information about ecological and environmental aspects of human intervention of natural settings. Based on these reviews/ reports can be prepared and this can be discussed in class.
- The students can be encouraged to visit a site and photo/ video document the various stages in site preparation
- Each student should be encouraged to have a sketchbook with notes, graphical interpretations, sketches of all the topics covered.