AR2023

# COURSE STRUCTURE & SYLLABUS FOR UNDER GRADUATE PROGRAMME IN ARCHITECTURE



**ODISHA UNIVERSITY OF TECHNOLOGY AND RESEARCH**

# Techno Campus, MahalaxmiVihar, Ghatikia,

**Bhubaneswar-751029, Odisha, INDIA** [**www.cet.edu.in**](http://www.cet.edu.in/)

# Ph. No.: 0674-2386075 (Off.), Fax: 0674-2386182

**COURSE: B. Arch. (Bachelor of Architecture) Duration: 5 years COURSE: B. Arch. (Bachelor of Architecture) Duration: 5years (Ten Semesters)**

# Program Outcomes (POs)

**The programme outcomes upon the successful completion of B.Arch level and becoming an architect, aimed to equip the student with the following learning outcomes:**

1. **Knowledge**: Students shall be equipped with gaining knowledge in the field of architecture as well as allied fields like history, climatology, environmental science, landscaping, sustainability, urban design, photography, architectural documentation etc.
2. **Site Analysis and Literature Study :** A graduate shall be able to analyze site conditions, similar literature study for the assigned design problem.
3. **Critical Analysis:** A graduate shall demonstrate his/her knowledge in analysing user need, spaces, by-laws in relation to the site, anthropometry study, social study and inferences drawn necessary for design development.
4. **Design development:** A graduate shall be able to use interfaces from the critical analysis to develop a design solution using the skill in free hand, design software in developing sustainable design solution.
5. **Use of Software Skills:** A graduate will be able to apply the knowledge of latest computer software such as CAD, Revit, Sketch up, 3Ds Max, Lumion, Corel Draw, Photoshop, BIM, Simulations & other supporting tools for the visualization of design projects.
6. **An Architect & Society:** An Architect & society apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Architectural practices.
7. **Environment and Sustainability:** : Understand the impact of the professional Architectural solution in societal and environmental contexts, and demonstrate the knowledge for sustainable development.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities, norms and code of conduct of the architectural professional practice.
9. **Individual and teamwork:** Function effectively as an individual as a member or leader in diverse teams of multidisciplinary group.
10. **Communication:** The graduate will be able to Communicate effectively through different critical thinking skills in giving solutions to different architectural design problems.
11. **Project management and Finance:** A graduate will be able to demonstrate the understanding of HR, Finance and Contract Management for the profession individually or as a team member.
12. **Life long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life long learning in the broadest context of technological change.

# COURSE: B. Arch. (Bachelor of Architecture) Duration: 5 years COURSE: B. Arch. (Bachelor of Architecture) Duration: 5years (Ten Semesters)

|  |  |  |
| --- | --- | --- |
| Abbreviations Used: |  |  |
| **L = Lectures** | **T= Tutorial** | **P = Practical or Laboratory** |
| **MC =** Mandatory course  **1st SEMESTER** | **PC =** Professional course | **LC=** Lab Course |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.**  **No.** | **Subject Name** | **Subject Code** | **Teaching**  **Hours** | | | **Credit** |
| **L** | **T** | **P** |
| 1 | Environmental Science | IP1431 | 2 | 0 | 0 | 2 |
| 2 | Mathematics | BH1451 | 3 | 0 | 0 | 3 |
| 3 | Building Material-I | IP1101 | 2 | 0 | 0 | 2 |
| 4 | Introduction to Architecture | IP1103 | 3 | 0 | 0 | 3 |
| 5 | Architectural Workshop | IP1501 | 0 | 0 | 3 | 1.5 |
| 6 | Basic Design | IP1503 | 0 | 0 | 6 | 3 |
| 7 | Building Construction-I | IP1505 | 0 | 0 | 6 | 3 |
| 8 | Descriptive Geometry-I | IP1507 | 0 | 0 | 6 | 3 |
| 9 | Communicative English | BH1533 | 0 | 0 | 3 | 1.5 |
| 10 | Yoga | BH1583 | 0 | 0 | 3 | 1 |
|  |  |  | 10 | 0 | 27 | 23 |

**2nd SEMESTER**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Sl.**  **No.** | **Subject Name** | **Subject Code** | **Teaching Hours** | | | **Credit** |
| L | T | P |
| 1 | Engineering Mechanics | IP1432 | 3 | 0 | 0 | 3 |
| 2 | Building Material-II | IP1102 | 2 | 0 | 0 | 2 |
| 3 | Climatology in Architecture | IP1104 | 3 | 0 | 0 | 3 |
| 4 | History of Architecture-I | IP1106 | 3 | 0 | 0 | 3 |
| 5 | Building Construction-II | IP1502 | 0 | 0 | 9 | 4.5 |
| 6 | Architectural Design Studio – I | IP1504 | 0 | 0 | 6 | 3 |
| 7 | Descriptive Geometry-II | IP1506 | 0 | 0 | 6 | 3 |
| 8 | Documentation and Measured Drawing | IP1508 | 0 | 0 | 3 | 1.5 |
|  |  |  | 11 | 0 | 24 | 23 |

# 1st SEMESTER

**THEORY SUBJECTS**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **SUBJECT TITLE** | **MATHEMATICS (**BH1451 **)** | | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  | |  | 3 | 0 | 0 |
| **SUBJECT TYPE** | **MC** | | **CREDITS** | 3 | | |
| **OBJECTIVE**  The course is aimed to develop basic mathematical techniques required to support architectural and engineering concepts, and is also oriented to understand and analyze practical engineering problems.  The intent of the mathematics courses for architecture students is three fold (i) modeling: Converting given data of a physical situation into a mathematical form (ii) solving them by standard techniques and  (iii) interpreting the results. It is expected that students should not only know different mathematical techniques but should also be conversant with different applications.  **Module 1**  Calculus: Curve tracing, curvature, asymptotes  Ordinary Differential Equations: First order differential equations, separable equations exact differential equations. Bernoulli’s equation.  **Module 2**  Linear differential equations of second and higher order, homogeneous equation with constant co- efficient.  **Module 3**  Series solution of differential equation: Power series method, Legendre's equation, Legendrer's polynomial. Bessel's equation, Bessel's functions Jn(x)  **Module 4**  Laplace transformation and its use in solving differential equations. Convolution, Integral equations. | | | | | | |
| **REFERENCES /TEXTBOOKS** | | 1. Calculus: Gorakh Prasad: 2. Advance Engineering Mathematics - E. Kreyszig 3. John Wiley & sons Inc. - 8th edition   Chapter 1 (1.1-1.7, Chapter 2 (2.1. - 2.10, 2.12) ,Chapter 4 (4.1- 4.6) ,  Chapter 5 (5.1- 5.7) | | | | |

# Course Outcomes :-

**CO1 :** Asymptotes are simple approximations to complex equations, and they are useful for graphing rational equations, using curve tracing for testing and verification of a wide range of devices.

**CO2 :** Solve a variety of first order and higher order differential equations selecting from a variety of

techniques covered in the syllabus.

**CO3 :** Find power series solutions of ordinary differential equations, solve Legendre equation and write the Legendre equation of first kind, also find the generating function for Legendre Polynomials, understand the orthogonal properties of Legendre Polynomials. Solve Bessel equation and write the Bessel equation of first kind of order n, also find the generating function for Bessel function.

**CO4** : Will be able to use the Laplace transform in finding the solution of linear differential equations. Using Laplace transform to find the derivatives, integrals and periodic functions.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **MATH EMATI CS** | Knowl edge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Communi cation | Project manage ment and Finance | Life long lear ning |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO1 2 |
| CO1 | H | H | H | L | M | L | H | L | L | L | L | L |
| CO2 | H | H | H | L | L | L | H | M | L | L | L | L |
| CO3 | H | H | H | L | M | M | H | L | L | L | H | L |
| CO4 | M | H | M | L | L | L | H | L | L | L | M | M |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **ENVIRONMENTAL SCIENCE (**IP1431 **)** | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 2 | 0 | 0 |
| **SUBJECT TYPE** | **MC** | **CREDITS** | 2 | | |
| **OBJECTIVE**  To introduce the basics of environmental science and its relevance to mankind, the built envelop around. To also introduce fundamentals of Climatology in view of its integral importance for students of Architecture. | | | | | |
|  | | | | | |
| **Module 1**  **Introduction to Ecosystems and Environment, environmental resources**  Types of ecosystems, characteristics features, structure and functions of Ecosystems – Forest, Grassland, Desert, Aquatic (lakes, rivers and estuaries).  **Bio-diversity and its conservation**  Value of bio-diversity . Conservation of bio-diversity, in-situ and ex- situ conservation. Environmental problems in India  Local and Global Issues, Causes, effects and control measures of Air pollution, Indoor air pollution, Water pollution, Soil  pollution, Marine pollution, Noise pollution, Solid waste management, composting, vermin culture, Urban and Industrial wastes, recycling and re-use. Nature of thermal pollution and nuclear hazards, Global warming, Acid rain and Ozone layer depletion.  **Module 2**  **Ecological aspects of built environment**  Impact of built environment on natural environment (unsustainable to sustainable development); human population and environment- population explosion, resource exploitation and depletion, human-wild conflict, loss of wet lands, mangroves, increasing desert areas, spread of diseases.  **Institutions and Governance**  Introduction to Environmental Acts, viz., Water (Prevention and Control of Pollution) Act, Air Prevention and Control of pollution act, Environmental Protection Act, Wild life protection Act, Forest Conservation Act, etc. | | | | | |
| **REFERENCES /TEXTBOOKS**   1. Agarwal, K. C. (2001). *Environmental Biology*. Bikaner: Nidhi Publications Ltd. 2. Benny, J. (2005). *Environmental Studies.* New Delhi: Tata McGraw Hill. | | | | | |

1. Bharucha, E. (2005). *Text book of Environmental Studies for Undergraduate Courses*. New Delhi: Universities Press, UGC.
2. Brunner, R.C. (1989). *Hazardous Waste Incineration*. New Delhi: Mc Graw Hill.
3. Kaushik, A. and Kaushik, C. P. (2010). *Basics of Environment and Ecology* New Delhi: New

Age International Publishers.

**REFERENCES**

**/TEXTBOOKS**

**Course Outcomes :-**

**CO1 :** Understanding of Sustainability: Develop an understanding of the principles of sustainability and how they

apply to architectural design and construction.

**CO2 :** Environmental Impact Assessment: Learn how to assess and mitigate the environmental impact of architectural projects, considering factors like energy consumption, resource use, and emissions.

**CO3 :** Regulatory Compliance: Understand the regulatory frameworks and codes related to environmental considerations in architecture, including zoning laws and building codes.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ENVIRO NMENT AL SCIENCE** | Kno wled ge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | H | M | M | M | H | H | L | L | L | L | H |
| CO2 | H | H | H | L | L | L | H | M | M | H | L | L |
| CO3 | H | H | M | L | M | M | H | H | L | L | H | L |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **INTRODUCTION TO ARCHITECTURE (**IP1103 **)** | CONTACT HOURS | **L** | **T** | **P** |
|  |  |  | 3 | 0 | 0 |
| **SUBJECT TYPE** | PC | CREDITS | 3 | | |
| **OBJECTIVE**  To provide a comprehensive understanding of Architecture and help students to develop an active interest in the  field of study. | | | | | |
|  | | | | | |
| **Module: 1**  **Understanding Architecture**: Definitions, interpretations and explanations; distinctive aspects of architecture, Architecture as a fine art, a technological field and as a profession; Language and medium of architecture.  **Module: 2**  **The inter-linkages between Architecture**, **Nature and Culture**: The concepts of Nature and Environment as systems and Architecture and Culture as sub-systems; Architecture as manifestation of culture; Traditional and vernacular architecture; Design as a theme in nature and architecture.  **Module: 3**  **Evolution of shelters.**  Factors influencing architecture of a region. Climate, material, technology and socio-cultural forces.  **Module: 4**  **Architectural Education:** Curricular framework and content of architectural education; Similarities and differences between engineering disciplines and architecture. Specializations in architectural education and profession; Requirements and qualities of a student of architecture.  **Module: 5**  **Architecture as a profession**: Unique aspects of architectural profession; Nature of job of an architect and the services provided by him; Role, responsibilities and essential qualities of an architect; related professions. Distinctive institutions of education and profession in India and abroad; Architectural challenges within and outside India.  Examples of good architectural works of famous architects | | | | | |
| **REFERENCES /TEXTBOOKS** | | | | | |
| 1. Francis D. K. Ching, Architecture - Form, Space and Order, Van Nostrand Reinhold   Company, 1979   1. Roger H. Clark, Michael Pause, Precedents In Architecture, Van Nostrand Reinhold Company , 1996   3.K.W.Smithies, Principles of Design in Architecture, Van Nostrand Reinhold Company, 1981 4. 4.Sam F. Miller, Design Process - A Primer For Architectural & Interior Design, Van Nostrand Reinhold Company , 1995   1. Ernest Burden, Elements of Architectural Design – A Visual Resource, Van Nostrand Reinhold Company , 1994 2. Vitruvius, Translation: Morris, H. M. (1960). | | | | | |

**Course Outcomes :-**

**CO1** : Anthropometrics pertaining to various areas of space design.

**CO2** : Determine space requirements for various day to day activities.

**CO3** : Establish relations between form, space and function with the help of simple flow path, circulation diagrams etc.

**CO4 :** To develop understanding of interconnections between form, volume and function.

**CO5 :** To sensitize students towards the interconnectedness of various elements of a context which impact the architectural design.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **INTROD UCTION TO ARCHITE CTURE** | Kno wled ge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | H | M | H | M | M | H | H | M | M | L | H |
| CO2 | H | H | L | H | L | L | H | M | M | H | L | M |
| CO3 | H | H | M | H | M | M | H | H | L | L | M | H |
| CO4 | H | H | L | H | M | M | H | H | L | L | L | H |
| CO5 | M | H | L | M | M | M | H | H | M | H | L | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJEC T TITLE | **BUILDING MATERIAL – I (**IP1101 **)** | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 2 | 0 | 0 |
| **SUBJECT TYPE** | **PC** | **CREDITS** | 2 | | |
| **OBJECTIVE**  The basic idea of the subject is to make aware of the primary building materials used in construction. Their properties, types and common usage. This will enable students to equip themselves with the knowledge of materials and their judicial usage.  To classify the different types of building materials used primarily in building construction work.  To identify the types of materials and their compositions.  To list, label and define the materials.  To illustrate use of materials and ascertain their application.  To identify the specific use and related technique for a required material. | | | | | |
|  | | | | | |
| **Module: 1 SOILS:**  Formation, index property, specific gravity, grain size distribution, plasticity and identification of local names.  I.S.I classification. **Module: 2 SAND:**  Sources of Sand, Classification, Test of Sand. Grades of sand and their uses  MORTAR: Types of mortar – lime mortar, mud mortar, lime-surkhi mortar, cement mortar. Different grades of mortar, their compositions and properties. Preparation of cement mortar. Use and selection of mortar for different construction work.  **Module: 3 BRICK:**  Composition, Sizes, Properties and Classification of bricks, Tests for bricks. Introduction of Brickworks: masonry bonding & ornamental bonding, Substitutes for bricks. Brick manufacturing process.  **Module: 4 STONES:**  Classification of stones. Common building stones used in India. Characteristics and use of stones. Dressing of stone. Artificial stones. Introduction of Stonework: Rubble and Ashlars masonry. Stone quarrying methods.  **Module: 5**  **LIME:**  Classification of lime. Fat and hydraulic lime – properties and use.  **CEMENT:** Composition of ordinary cement. Function of cement ingredients. Properties of cement – Fineness, Soundness, Setting times, etc. Grades of cement and different types of cements used in construction. | | | | | |
| **REFERENCES**  **/TEXTBOOKS** | 1. B. C. Punmia; *Building Materials and Construction.* 2. Bindra & Arora; *Building Materials and Construction*. 3. W.B. Mckay, ‘*Building Construction’*, Vol. 1,2,3 Longmans, U.K. 1981. | | | | |

**Course Outcomes :-**

**CO1 :** Provides students with a fundamental understanding of the materials used in construction and their properties, behaviours, and applications.

**CO2 :** Students learn how to select materials based on their properties, durability, cost, and environmental impact.

**CO3 :** Students study properties like strength, elasticity, and toughness. This knowledge helps in designing structures that can withstand various loads and stresses.

**CO4 :** Students learn to document material specifications and usage guidelines, enhancing their communication skills for professional settings.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **BUILDING MATERIAL**  **- I** | Knowl edge | Site Analy sis and Litera ture Study | Critical Analysi s | Design develop ment | Use of Soft ware Skills | An Archi tect & Socie ty | Envi ron me nt and Sust aina bilit y | profes sional ethics | Individ ual and teamw ork | Comm unicati on | Projec t manag ement and Financ e | Life long learni ng |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | L | L | H | M | H | L | M | L | L | M | H |
| CO2 | H | M | M | H | H | H | M | L | H | L | H | H |
| CO3 | H | H | H | H | H | H | H | H | M | L | H | H |
| CO4 | H | H | H | H | M | H | M | M | L | H | M | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

**SESSIONAL SUBJECTS**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **BASIC DESIGN (**IP1503**)** | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 0 | 0 | 6 |
| **SUBJECT TYPE** | **LC** | **CREDITS** | 3 | | |
| **OBJECTIVE**  To help the students grasp the fundamentals of design as a basic creative activity. To help the students grasp the basics of Architectural aesthetics.  To help the students learn about the basic elements of visual aesthetics through exercises aimed at experimentation.  To make the students become familiar with visual and verbal vocabularies of architecture. To develop analytical  thinking and move toward spatial analyses of visual culture. To encourage the students to enjoy looking at, talking about, and thinking about architecture and built spaces. | | | | | |
|  | | | | | |
| **Module: 1**  **Basics of Sketching and Drawing**  Free-hand drawing appropriate to visual & architectural representation, indoor & outdoor sketching, drawing from observation, terminology, abbreviations and signage used in visual representation.  **Module 2**  **Freehand presentations and rendering techniques**   * Freehand perspective sketching. Rendering, shades and shadows.   •Introduction to represent different textures and finishes in plan and elevation of interior and exterior spaces. • Graphical representation of furniture, automobiles, human figures, etc. in plans and elevations and 3- dimensions.  **Module 3**  **Manual techniques for painting/coloring of Architectural Drawings**   * Techniques Colouring of architectural presentation drawings in various medium * Monochromatic shades, Shades and shadows in multi-coloured drawings   **Module: 4**  **Understanding Architectural Aesthetics** - Exercises to understand the visual properties of two dimensional forms of both geometric and non-geometric surfaces. And Forms in Nature (Animate and Inanimate).  Exercises to demonstrate graphically the Visual Qualities of Point, Line, Size, Form, Pattern, Proportions, Repetition, Rhythm, Harmony, Contrast, Unity, Shape and Texture.  **Module: 5**  **Studies of Principles of Organization of Form & Space** with exercises of Block Model; Principles of three- dimensional Compositions.  **Module: 6**  **Study of anthropometry** and its association with built environment  Critically appraise and Design of an object in everyday use like Table, Chair, Stool, Drawing Board, T-Scale, etc. Expressing design idea/s through presentation drawings | | | | | |
| **REFERENCES /TEXTBOOKS** |  | | | | |
| 1. C. D. Joseph and Callender John; Time Saver Standards for Building Types. 2. C. D. Joseph and Callender John; Time Saver Standards for Architectural Design Data. 3. Christopher Alexander; A Pattern Language 4. Francis D.K. Ching; – Architecture: Form Space and Order; Van Nostrand Reinhold Co., (Canaa), 1979. 5. Pearce Peter; Structure in Nature – Strategy for Design. 6. Pickering, Ernest; Architectural Design, John Wiley and Sons Inc., Canada, 1949. 7. Neufert’s Architect’s Data. 8. V.S. Paramar, Design Fundamentals in Architecture, Somaiya Publications Pvt. Ltd., New Delhi – 1973. 9. VonMeissPieree; Elements of Architecture. | | | | | |

# Course Outcomes :-

**CO1 :** Acquire proficiency in basic architectural graphic presentation using diverse mediums and materials. **CO2 :** Comprehend visual composition, aesthetic principles, fundamental of design and development of design vocabulary to apply the same thought process in development of design.

**CO3 :** Develop spatial awareness and capability to compose spatial components into intricate structures and

understand their surroundings as built environment

**CO4 :** Communicate design concept through hand-crafted sketches, drawings, presentation and physical models.

**CO5 :** Enhance the creative skill through creative exercises and team work.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **BASIC DESIGN** | Kno wled ge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | M | M | H | H | L | H | M | H | M | M | H | H |
| CO2 | H | H | H | H | M | M | M | H | M | M | L | H |
| CO3 | H | M | M | L | L | H | L | H | L | L | H | H |
| CO4 | H | H | H | H | L | M | M | M | H | L | H | M |
| CO5 | H | H | H | M | M | H | H | H | L | H | M | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **DESCRIPTIVE GEOMETRY-I** (IP1507) | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 0 | 0 | 6 |
| **SUBJECT TYPE** | **LC** | **CREDITS** | 3 | | |
| **OBJECTIVE**  Introducing and familiarizing students with drafting tools and accessories and provide basic knowledge and skill to draft a drawing manually.  To acquire the knowledge and develop the skills listed below:  To present the fundamental principles of architectural descriptive geometry and its application to architectural problems.  To be able to express her/his ideas by drawing | | | | | |
|  | | | | | |
| **COURSE CONTENT**  **Module 1: Introduction**  Drawing instruments and its uses • Sheet layout and sketches • Lines, lettering, scales, and dimensioning  **Module 2: Orthographic Projections**  Introduction to Projections • Concept, Principle and Methods of Projections  Orthographic Projections of Point, Line and Plane • Projections of Solids in different positions Application of Projection for preparing architectural drawings  **Module 3: Application of Sections in Architectural Drawings**  Introduction of section of solids with simple forms • Concept and methods of drawing section of solids • Application of sections for simple building drawings • Section of complex form or structures  **Module 4: Development of Surfaces**  To draw and fold at the required positions to prepare the 2- dimension shape into 3- dimension model•  Introduction to development of surfaces and its uses. • Methods of development of surfaces • Development of  lateral surfaces of simple solids as cube, cone, pyramids, and prism• Development of complex solids, when two or more simple solids are joined together. | | | | | |
| **REFERENCES /TEXTBOOKS**  1.Elementary Engineering Drawing: Plane and Solid Geometry by N. D. Bhatt 2.Rendering with Pen and Ink by Robert W. Gill   1. Architectural Graphics by Francis D. K. Ching 2. Engineering Drawing by B.V.R. Gupta 3. Engineering Drawing: With Creative Design, Volume 2, by Hiram. E. Grant 6.Architectural Drawing: Perspective, Light and Shadow, Rendering by Sherley W.Morgan 7.Rendering in Pen and Ink by Arthur L. Guptil | | | | | |

**Course Outcomes :-**

**CO1 :** Understanding the fundamental principles and techniques of orthographic projections, auxiliary views, and basic geometric constructions.

**CO2 :** Developing the ability to visualize three-dimensional objects and interpret their representations in two dimensions.

**CO3 :** Acquiring the skills to solve complex spatial problems using descriptive geometry principles, including

intersections, developments, and true shapes of surfaces.

**CO4 :** Enhancing analytical skills to comprehend and solve spatial relationships between various geometric forms and their projections

**CO5 :** Developing effective communication skills to convey complex spatial concepts and designs through technical drawings and sketches

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DESCRIP TIVE GEOME TRY - I** | Kno wled ge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | M | M | M | M | L | L | L | L | H | L | H |
| CO2 | M | L | M | M | M | L | L | L | M | M | L | H |
| CO3 | H | L | H | M | M | L | L | L | L | M | L | H |
| CO4 | H | H | L | L | M | L | L | L | L | H | L | H |
| CO5 | H | H | L | L | M | L | L | L | L | H | L | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | |
| SUBJECT TITLE | | **ARCHITECTURAL WORKSHOP (** IP1501) | CONTACT HOURS | **L** | **T** | **P** |
|  | |  |  | 0 | 0 | 3 |
| **SUBJECT TYPE** | | LC | CREDITS | 1.5 | | |
| **OBJECTIVE**  After completion of this course student will be able to :  Review various tools and techniques and incorporate them in visual communication and model making. Critique the property of different materials for various products for designing and model making.  Review requirements and critique the design consideration of complementing field of architecture and designing  such as photography and set designing.  Evaluate various methods and material of model making and incorporate in product design. Design a functional model for real life situation.  Evaluate complete product designing project; analyze its problem, situation, user eco friendliness and cost. | | | | | | |
|  | | | | | | |
| Exercises to understand fundamentals of colour and colour psychology.  Study built environment, light and shade pattern, surface texture, scale and proportion.  **Module 1**  Introduction to model-making, using materials such as clay and plaster of Paris, putty etc. understanding of  various tools and Solid geometry models, material museum .  **Module 2**  Develop 2D / 3D forms using hard material such as paper, paper board, thermo Cole, wire, cardboard, wax, POP, acrylic sheets, wood, plastics, glass fiber; use of different scales, templates, measuring aids etc.  **Module 3**  Techniques for preparation of Models of Structural Systems: Making models of the various structural systems used in buildings like; Space frames – using Match sticks, wires; Different forms of shell roofs using POP, Clay, Soap;  **Module 4**  Tensile structures using fabric and Photography in built models, using lighting and natural background. | | | | | | |
| **REFERENCES /TEXTBOOKS** | 1. Wenninger (Magrus. J.) Spherical Models, Cambridge University Press, 1979 2.John W. Mills, The Technique of Sculpture, B.T. Batsford Ltd., New York Reinfold  Publishing Corpn, London, 1966.  3.Mitchell, W. J., Digital Design Media by, Published by Van Nostrand Reinhold, USA | | | | | |

**Course Outcomes :-**

**CO1 :** Gain improved understanding of fundamental architectural principles

**CO2 :** Acquire practical skills related to architectural design

**CO3 :** Able to creatively address design challenges and develop innovative solutions

**CO4 :** Develop the ability to present their design concepts effectively

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ARCHITE CTURAL WORKS HOP** | Kno wled ge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | L | H | M | M | M | H | L | L | M | H | L | H |
| CO2 | H | L | M | H | M | M | H | M | M | M | M | M |
| CO3 | H | M | H | M | H | M | M | M | H | H | M | M |
| CO4 | M | L | M | H | M | H | M | H | H | M | M | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **BUILDING CONSTRUCTION-I (**IP1505 **)** | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 0 | 0 | 6 |
| **SUBJECT TYPE** | **LC** | **CREDITS** | 3 | | |
| **OBJECTIVE**  To understand fundamental building material in the context of various construction methods.  Focus on various building materials would be emphasized based on the performing standards and codes, wherein application of each material would be discussed in detail, both in the context of traditional and modern construction methods and practices. Based on the lecture delivered, the students are required to produce report on materials, construction and detail drawings. With time, each topic can also focus on latest trends in practice and usage of new technology/materials. | | | | | |
|  | | | | | |
| **Module 1**  **Basic Building Components**  Introduction to building construction, understanding relation between architectural designs, building components (Foundation, plinth, wall, sill, lintel, roof, doors, windows, ventilators, staircases, sunshades etc.) along with the building materials.  **Module 2**  **Brick masonry**. Different types of bricks. Bonding of bricks, Stop end, T, L & cross Junctions of Stretcher bond, header bond, English bond, Flemish bond & Rat trap bond. Attached & detached piers. Brick jallis, Corbelling, Cornices, Types of coping, pointing & Threshold.  **Module 3**  **Stone Masonry**-Random rubble masonry, Ashlars masonry, coursed and uncoursed rubble masonry etc. Walls with stone facing and brick backing (composite wall).  **Module 4**  Types of joints in wood work: bearing joints, halving, dovetailing, housing, notching, tusk, and t enon etc.  **Masonry tools & equipment.**  **NOTE:**  Site visits to be arranged as a part of the curriculum. | | | | | |
| **REFERENCES /TEXTBOOKS**   1. Barry, R. (1999). The Construction of Buildings Vol. 2. 5th Ed. New Delhi: East-West Press. 2. Foster, J. and Mitchell, S. (1963). Building Construction: Elementary and Advanced, 17th Ed. London: B.T. Batsford Ltd. 3. McKay, W. B. (2005). Building Construction Metric Vol. I–V. 4th Ed. Mumbai: Orient Longman. 4. Hailey and Hancork, D. W. (1979). Brick Work and Associated Studies Vol. II. London: MacMillan. 5. Merritt, F.S. and Ricketts, J.T., Building Design and Construction Handbook, McGraw Hill. 6. Rangwala, S. C. (1963). Building Construction: Materials and types of Construction. 3rd Ed. New York: John Wiley and Sons. 7. Chudley, R. (2008). Building Construction Handbook. 7th Ed. London: Butterworth-Heinemann. 8. Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi: Standard Publishers. 9. Ching, F. D.K – Building Construction illustrated. VNR, 1975 10. A. Agarwal –Mud: The potentials of earth based material for third world housing – IIED, London, 1981. | | | | | |

**Course Outcomes :-**

**CO1 :** Students should gain knowledge about different construction materials, their properties, and appropriate usage in various construction projects.

**CO2 :** Students should learn different construction methods and techniques used in building construction.

**CO3 :** Students will be able to understand the property, use, advantage, and disadvantage of different materials used

in construction.

**CO4 :** Understanding the basic principles of structural analysis and the behaviour of different building components under various loads and stresses

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **BUILDING CONSTRUC TION - I** | Kno wle dge | Site Analy sis and Literat ure Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | M | L | M | L | L | M | L | M | L | M | M | M |
| CO2 | L | M | H | H | M | M | M | M | M | H | M | H |
| CO3 | M | L | M | M | M | H | M | H | H | M | L | M |
| CO4 | M | M | H | H | M | H | M | H | M | H | M | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **COMMUNICATIVE ENGLISH** (BH1533) | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 0 | 0 | 3 |
| **SUBJECT TYPE** | **LC** | **CREDITS** | 1.5 | | |
| **OBJECTIVE**  This is a practice-oriented, need-based, functional-communicative course. It seeks to develop the student's skills of communication in listening, speaking and writing. Reading, though formally not included, is still a recommended activity. The student is advised to cultivate the habit of reading newspapers, magazines and books in a free, extensive manner to consolidate the skills already achieved. A more interactive process of teaching/learning is called for in order to achieve the skills of effective communication.  The course attempts to familiarize the student with the sounds of English in a nutshell, particularly long and short vowels, some consonants, stress and intonation. Provide adequate listening and speaking practice so that the learner can speak with ease, fluency and reasonable clarity in common everyday situations and on formal occasions. Use of grammar in meaningful contexts and doing things with words,  i.e. performing functions like ordering, requesting, inviting and so on are to be extensively practiced. | | | | | |
|  | | | | | |
| **Module 1 COMMUNICATION**  Verbal and non-verbal spoken and written; Language functions-descriptive, expressive and social; To inform, enquire, attract, influence, regulate and entertain; Bias-free and plain English Formal and informal style.  **Module 2 WRITING I**  Paragraph writing - topic sentence, cohesion and coherence - sentence linkers (so, but, however, etc.); Preparation of a business report - writing a business proposal - format, length, structure  **Module 3 WRITING II**  Preparing notes - writing business letters and E-Mail messages; Documentation: *References*, notes and bibliographies.  **Module 4**  **WRITING III**  Writing curriculum vitae (both chronological and functional) along with an application for a job; Public relations - concept and relevance; PR in a business organization - handling the media.  **Module 5**  **MEETING AND PRESENTATION**  Organizing a meeting, preparing an agenda, chairing a meeting, drafting resolutions, writing minutes; Making an oral Presentation; Facing an interview. | | | | | |
| **REFERENCES /TEXTBOOKS**   1. Geoffrey Leech and Jan Swartvik “A communicative Grammar of English, Longman 2. O'connor, J.D., Better English Pronunciation, ELBS. 3. Chand, J.K. and Das, B.C., A Millennium Guide to writing and Speaking English, Friends ‘Publishers 4. John, S., Oxford Guide to Writing and Speaking English, OUP. 5. BoveeEtal, Business Communication Today, Pearson Education. | | | | | |

**Course Outcomes :-**

**CO1 :** This course intends to develop the student’s skills in communication in e.g. Speaking, Writing, and Listening. **CO2 :** This course intends to inculcate a habit of reading newspapers, magazines and books in a free manner in order to hone and polish the acquired skills.

**CO3 :** This course intends to develop effective communication skills among students by involving in more interactive

teaching-learning process.

**CO4 :** This course intends to familiarize the students with the Sounds of English in a nutshell e.g. long vowels, short vowels, consonants, stress and intonation.

**CO5 :** This course intends to make the students practice and learn the use of grammar in meaningful contexts and doing things with words e.g. ordering, requesting, inviting etc.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **COMMU NICATIV E ENGLISH** | Kno wled ge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | H | H | L | M | H | H | H | H | H | H | H |
| CO2 | H | H | H | L | H | H | H | M | H | H | H | H |
| CO3 | H | H | H | L | M | H | H | M | H | H | H | H |
| CO4 | M | H | M | L | L | L | H | L | H | H | M | H |
| CO5 | M | H | H | L | L | H | H | M | H | H | H | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

**2nd SEMESTER**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **ENGINEERING MECHANICS** (IP1432) | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 3 | 0 | 0 |
| **SUBJECT TYPE** | **MC** | **CREDITS** | 3 | | |
| **OBJECTIVE**  To explain the importance of mechanics in the context of engineering and conservation equations. To explain the significance of centroid, center of gravity and moment of inertia.  To introduce the techniques for analyzing the forces in the bodies.  To apply the different principles to study the motion of a body, and concept of relative velocity and acceleration and describe the trajectory of a particle under projectile motion. | | | | | |
|  | | | | | |
| **Module - I (12 Hours)**  Concurrent forces on a plane: Composition, resolution and equilibrium of concurrent coplanar forces, method of moment. General case of forces on a plane, Composition and equilibrium of forces in a plane. Plane truss analysis, (method of joints and method of sections). equilibrium of ideal systems.  Friction: Fundamentals of friction and Problems involving friction.  **Module-II (10 Hours)**  Parallel forces on a plane: General case of parallel forces, center of parallel forces and center of gravity, centroid of plane, composite figures and curves, Theorems of Pappus.  Moments of inertia: Plane figure with respect to an axis in its plane and perpendicular to the plane, Polar moment of inertia, parallel axis theorem Virtual Work: Principles and applications  **Module - III (14 Hours)**  Rectilinear translation: Kinematics, principle of dynamics, D Alembert’s Principle, Principle of work and energy for a particle and a rigid body in plane motion, Conservation of energy, Principle of impulse and momentum for a particle and a rigid body in plane motion, Conservation of momentum, System of rigid bodies. Impact, direct and central impact, coefficient of restitution.  Curvilinear translation: Kinematics, equation of motion, projectile, D Alembert’s principle of curvilinear motion. Kinematics of rotation of rigid body. | | | | | |
| **REFERENCES /TEXTBOOKS**   1. Engineering Mechanics: S. Timoshenko, D.H. Young, J.V. Rao, Sukumar Pati, 5th   Edition,2017 McGraw Hill.Reference books   1. Engineering Mechanics, Static and Dynamics, J. L. Meriam and L. G. Kaige, 9\* Edition,2021, John Wiley & Sons, Inc.« Fundamental of Engineering mechanics, S Rajesekharan & G Shankara Subramanium, 3% Edition, 2017, S. Chand . 2. Engineering mechanics: K. L. Kumar and Veenu Kumar, 4% Edition,2017, Tata MC   Graw Hill. | | | | | |

# Course Outcomes :-

**CO1 :** Draw free body diagrams and determine the resultant of forces and moments .

**CO2 :** Determine the centroid and second moment of area of sections.

**CO3 :** Apply laws of mechanics to determine efficiency of simple machines with consideration of friction.

**CO4 :** Analyze the motion and calculate trajectory characteristics .

**CO5 :** Apply Newton’s laws and conservation laws to elastic collisions and motion of rigid bodies.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ENGINE ERING MECHA NICS** | Kno wled ge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | L | M | H | L | L | H | M | L | H | L | M |
| CO2 | H | L | H | L | M | M | L | M | M | L | L | M |
| CO3 | H | L | L | H | H | L | M | L | L | M | M | L |
| CO4 | L | M | H | L | L | H | L | L | L | L | L | M |
| CO5 | H | L | M | H | L | H | H | L | M | L | L | L |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **HISTORY OF ARCHITECTURE-I (** IP1106) | CONTACT HOURS | **L** | **T** | **P** |
|  |  |  | 3 | 0 | 0 |
| **SUBJECT TYPE** | **PC** | **CREDITS** | 3 | | |
| **Pre Historic and Late Ancient (5000BC – 1st Century AD)**  **Objective**  To provide an insight into the architecture of prehistoric period and late ancient civilizations, and the architecture of Classical antiquity of late ancient period. Social, religious and political  character, construction methods, building materials and how they influenced their built form  and settlement pattern shall be explained with suitable examples. Combined influence of geology, geography, climate, beliefs, religion and culture on the architecture must be  highlighted so as to appreciate how architecture is embedded in place specific context. The study must enable students to do a comparative evaluation of various civilizations, Appreciate chronological developments along the timeline and across geographies. | | | | | |
|  | | | | | |
| **Module1**  **PRE-HISTORIC ARCHITECTURE & SETTLEMENT:**  Introduction to human settlement: People, their shelter, settlement (growth, factors influencing the development of a settlement), burial systems, megaliths, memorials. (Structures: Different types of graves, Stonehenge; & Settlements – World: CatalHoyuk, Jericho; India: Mehrgarh etc.) **Indus Valley Civilization (IVC)**  Indus - People, their shelter & civic buildings (typology, planning, construction & aesthetics), settlement pattern & citadel (Structures: Great Bath/Great Granary, simple Harappan house; & Settlements – Mohenjo-Daro/ Harappa)  **VEDIC:**  People, their shelter & buildings (typology, planning, construction & aesthetics), settlement (typical village, planning, shelter types, materials) (Structures – Vedic houses, Torana, railing around villages; & Settlements – Patliputra)  **Module 2**  **NILE VALLEY CIVILIZATION**  People, their shelter & buildings, settlement (growth, factors influencing the development of architecture & character, settlements of NVC) and religious (cult temples) & burial structures (typology, planning, construction & aesthetics) (Structures: Mastabas, Pyramids: stepped, bent & Great Pyramids of Cheops; Temple of Abu-Simble/Amun-Ra)  **MESOPOTAMIAN (EUPHRATES & TIGRIS) CIVILIZATION:**  Sumerian, Babylonian & Persian people, their shelter & buildings, settlement (growth, factors influencing the development of architecture & character, settlements) and religious structures. (Structures – Ziggurats, Persepolis; & Settlements – Planning of Ur & Babylon)  **Module 3**  **CLASSICAL ARCHITECTURE OF ANCIENT GREECE (AEGEAN CULTURE):**  Evolution of city states, Hellenic & Hellenistic period, factors influencing Greek Architecture, orders in Greek Architecture, proportion, optical correction. (Structures – Parthenon, Theatre, Agora, Stoas, & Settlements – Athens & Acropolis of Athens and Delphi)  **Module 4**  **ROMAN ARCHITECTURE (ETRUSCAN CULTURE)**  Evolution of Republican States, Roman construction techniques (masonry, vaults, domes, orders, use of concrete), building typology (Structures – Forum, Pantheon, Thermae, Basilica, Circus, Colosseum, etc.)  **Module 5**  Assignments on innovative interpretation of the periodic architectural styles. (To be decided by the subject teacher.) | | | | | |

**REFERENCES /TEXTBOOKS**

1. Fletcher, B. (1996). A History of Architecture on the Comparative Method. 20th Ed. London : B.T.Batsford Ltd.
2. Copplestone, T. and Lloyd, S. (1971). World Architecture: An Illustrated History. London : Verona Printed.
3. Brown, P. (2010). Indian Architecture: Buddhist and Hindu period. Mumbai: D.B. Taraporevala Sons and Co.
4. Lloyd, S. and Muller, H.W., (1986), History of World Architecture Series, Faber and Faber Ltd., London.
5. Crouch, P. D. (1985). History of Architecture: Stonehenge to Skyscrapers. London: McGraw-Hill.
6. Dutt, B. B. (2009). Town Planning in Ancient India. Delhi: Isha Books.
7. Grover, S. (2003). Buddhist and Hindu Architecture in India. 2nd Ed. New Delhi: CBS Publishers. 8.Roth, M. L. (2006). Understanding Architecture: Its Elements, History, and Meaning.

Columbia: West-view Press.

1. Harris, M. C. (1977). Illustrated Dictionary of Historic Architecture. New York : M. Courier Dover Publications.
2. Ingersoll, R. And Kostof, S. (2013). World architecture: a cross-cultural history. Oxford : Oxford University Press.
3. Singh, U. (2009). A history of ancient and early medieval India: from the Stone age to the 12thcentury. Delhi: Pearson India.

# Course Outcomes :-

**CO1 :** Students will acquire a comprehensive understanding of major architectural movements, styles, and significant buildings from ancient civilizations to the contemporary era.

**CO2 :** Students will be able to understand how cities and building designs evolved over time. The use of construction methods, building materials, religious and political character and how they influence built form and settlement patterns.

**CO3 :** Students will be able to understand how architecture influences society and its culture.

**CO4** : The study will enable students to do a comparative evaluation of various civilizations.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **HISTORY OF ARCHITE CTURE - I** | Kno wled ge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | M | L | H | L | H | H | M | M | H | M | H |
| CO2 | H | M | M | H | L | H | M | L | H | M | M | H |
| CO3 | H | H | H | H | H | H | H | H | M | L | H | H |
| CO4 | H | H | H | H | M | H | M | M | L | H | M | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **BUILDING MATERIAL – II (** IP11020 | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 2 | 0 | 0 |
| **SUBJECT TYPE** | **PC** | **CREDITS** | 2 | | |
| **OBJECTIVE**  The basic idea of the subject is to make aware of the primary building materials used in construction. Their properties, types and common usage. This will enable students to equip themselves with the knowledge of materials and their judicial usage.  To classify the different types of building materials used primarily in building construction work. To identify the types of materials and their compositions.  To list, label and define the materials.  To illustrate use of materials and ascertain their application.  To identify the specific use and related technique for a required material. | | | | | |
|  | | | | | |
| **Module 1**  **METALS: IRON & STEEL**  Pig iron, cast iron, wrought iron – types, properties, steel – properties, types, market form of steel and uses of steel in construction, properties of mild steel and hard steel, defects in steel.  **Module 2 GLASS**  Specialty Glass as a contemporary building material. Laminated, curved and tempered glass, Kinetic glass, Smart glass and smart windows. Introduction to Digital building facades: Building kinetics and facade engineering, sensor glasses for interiors.  **Module3 TIMBER:**  Qualities of timber for construction. Seasoning, Storage and Preservation of timber. Use of different type wood in various parts of building. Industrial timber: veneers, plywood, fiberboard, etc.  **Module 4**  **WOOD AND COMPOSITES**  Wood as an advanced material for buildings: Reconstructed wood, cross laminated timber, Ply boards, composite boards, Acoustics boards, and paneling materials, laminates and veneers, wood foam.  Advanced fiber composite materials: Bamboo, glass-reinforced plastic (GRP), Fiber reinforced polymers (FRP), Shape memory polymer composites. | | | | | |

|  |  |
| --- | --- |
| **REFERENCES**  **/TEXTBOOKS** | 1. Al-homound, M.S., Performance Characteristics and Practical Applications of Common   Building Thermal Insulation Materias, Building and Environment, Vol-40(3), 2005.   1. Duggal, S.K., Building Materials, New Age International Publishing Co., (3rd Ed.), 2008. 2. Varghese, P.C., Building Materials, PHI Learning Pvt. Ltd., 2005. |

**Course Outcomes :-**

**CO1 :** Students will cover the properties, applications, and performance of various building materials used in

construction.

**CO2 :** Identify different types of material such as glass, timber, wood and its use in building facades and interior works.

**CO3 :** Students will be able to understand the construction procedure of different components.

**CO4 :** Students will identify proper techniques for a required material.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **BUILDIN G MATERI AL- II** | Kno wled ge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | M | H | L | M | H | L | M | L | L | M | H |
| CO2 | H | M | M | H | H | H | M | L | L | L | H | H |
| CO3 | H | H | H | H | H | H | H | H | H | H | H | H |
| CO4 | H | H | H | H | M | H | M | M | L | H | M | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **CLIMATOLOGY IN ARCHITECTURE (**IP1104 **)** | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 3 | 0 | 0 |
| **SUBJECT TYPE** | **PC** | **CREDITS** | 3 | | |
| **OBJECTIVE**  To impart knowledge of climatic elements, their influence on building design and passive design strategies | | | | | |
|  | | | | | |
| **Module 1**  **Introduction to Climatology in Architecture**: Climatic zones, macro and micro climate, elements of climate and climatology data required for design of buildings  **Human Comfort**: Human heat balance and comfort, heat stress, comfort index, Corrected Effective Temperature, Thermal Stress Index and Bioclimatic Analysis  **Module 2**  **Climatic Elements:** Air temperature and humidity, Sol-Air temperature, heat exchange through conduction, convection, radiation and evaporation; wind study -diurnal and seasonal variations, heating and cooling of land and sea, effect of topography; Precipitation- water vapour, condensation, rain, fog, snow and architectural responses; Graphical representation of climatic elements- wind rose; Tools for measurement  **Module 3**  **Solar Radiation:** Apparent movement of sun, solar radiation and intensity on surfaces and buildings in different latitude, sun path diagram, shading device and its design, heliodon and its use; Opaque building and heat transfer through its multi-layered envelope; Transparent surface and solar radiation on it, absorbance, reflectance, transmittance and emittance.  **Module 4**  **Daylighting:** Fenestration, lighting level and glare, amount of light, sky as a source of light and daylight factor, effect of different types of fenestrations, their size, shape in different planes with and without obstructions **Natural Ventilation and Air Movement:** Air movement in and around building, stack effect, Venturi effect, cross ventilation, influence of opening size and positions, wind eddies, effect of wind on location for industrial areas, airport and other land uses  **Module 5**  **Site Climate:** Microclimate, site climate data, local factors, presence of water body and vegetation, topography, special characteristics, urban climate cooling degree days and heating degree days  **Module 6**  **Passive Design Strategies:** Orientation-sitting of building with respect to sun, wind and view, use of evaporative cooling, ground cooling-earth air tunnel, thermal mass-cavity wall, natural ventilation of attic space, night time cooling, reflective surfaces and radiant barrier, cool roof and green roof, solar radiation and sun space. | | | | | |

|  |  |
| --- | --- |
| **REFERENCES**  **/TEXTBOOKS** | 1. Koenisberger, O.H., Ingersoll, T.G., Mayhew A., and Szokolay, S.V, “Manual of Tropical Housing and Building- Part I: Climatic Design”, Orient Longman,2004 2. Givoni, G., “Climatic Considerations in Building and Urban Design”, Van Nostrand Reinhold,1998 3. Hausladen, G., “Climatic Design: Solutions for Buildings that can do more with less Technology”, Birkhauser,2005 4. Bansal, N.K., Hauser, G. and Minke G., “Passive Building Design: A Handbook of Natural Climate Control”, Elsevier Science.,1994 5. Drake, S., “The Third Sin: Architecture, Technology and Environment”, UNSW Press |

**Course Outcomes :-**

**CO1 :** Integrate and utilise the climate and its impacts in architectural design by understanding the basic and fundamental concepts of climatic design and elaborating the climatic design to site, surrounding and at building level. **CO2 :** Understand the benefits of incorporating climatic features into the design and making their concepts robust in terms of harnessing sun, wind, and light for better human comfort.

**CO3 :** Understand elementary principles of climatic design as an important aspect in design of spaces.

**CO4 :** Implement understanding and systems to achieve better human comfort and user experience in the design studio.

**CO5** : Apply an understanding of synoptic processes and the ability to interpret a range of graphical and visual data to the explanation of weather data.

**CO6** : Synthesise their understanding of climate processes at a range of scales to explain and critique the applications of climate modelling.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CLIMAT OLOGY IN ARCHITE CTURE** | Kno wled ge | Site Analysis and Literatur e Study | Critical Analysis | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | L | L | L | L | M | M | M | L | L | M | L | M |
| CO2 | M | L | M | M | M | L | H | M | M | L | M | M |
| CO3 | M | M | M | H | M | M | H | M | M | M | L | M |
| CO4 | M | M | L | M | H | M | H | M | M | M | M | H |
| CO5 | H | M | M | H | H | M | H | M | L | M | M | M |
| CO6 | M | L | M | M | M | H | H | M | M | M | L | M |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **ARCHITECTURAL DESIGN STUDIO – I (** IP1504) | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 0 | 0 | 6 |
| LC | SESSIONAL SUBJECTS | **CREDITS** | 3 | | |
| **OBJECTIVE:** After completion of this course student will be able: To identify and relate the concepts of space, form and order. To distinguish and analyze three dimensional designed space. To design objects based on the concept of space and form.  To classify different functional spaces and analyze their space requirements. To compile data required for architectural designing.  To identify the human standards of design based on ergonomics. To innovate, modify and evaluate an existing space. | | | | | |
|  | | | | | |
| **Module 1**  Basic graphical presentation of objects and symbols in architectural drawings.  Relationship between Basic Design and Architectural Design: comprehensive understanding of space, form,  function and design. .  **Module 2**  Application of elements of design to achieve design principles in creative work.  Design of small objects (parts of building, like, window grill, boundary wall, floor tiles and similar projects) with respect to function structure aesthetics.  **Module 3**  Introduction to external and internal form concept, their quality, concept of space, relation of space and volume. Approach to design as a continuous process through aesthetics, function and technology; study of basic components of a building and their functions.  Examples of Dimensions of different rooms.  Principal of design with reference to function, various activities and related spaces; Data collection, environments,  climate, orientation, site conditions, circulation flow diagrams.  **Module 4**  Study of basic human needs, standard measurements of human activities and allocation of spaces: Concepts of Anthropometrics and ergonomics.  Study and design of single units like living spaces, sleeping and cooking spaces, stalls, bus-stops, telephone booths, etc. detailed design of single room for simple function showing relationship with adjoining areas for other activities not more than 25sq.mts.  **Module 5**  Design problems dealing with planning for activities such as individual living units shops, stalls, snack bars, unilevel activities with three to four functions of total area up to 80 sq.mts. | | | | | |

|  |  |
| --- | --- |
| **REFERENCES**  **/TEXTBOOKS** | 1. Ching, D.K; From, Space and Order. 2. Robin Boyd; Puzzle of Architecture |

# Course Outcomes :-

**CO1 :** Explain and apply the fundamental principles of architectural design, including balance, proportion, rhythm, harmony, and scale.

**CO2 :** Create architectural drawings, sketches, and diagrams to effectively communicate design concepts using both hand-drawing and model making.

**CO3 :** Effectively present architectural design concepts through verbal, written, and visual means, clearly articulating the rationale behind design decisions.

**CO4 :** Develop and communicate innovative architectural design ideas that respond to specific site and program requirements.

**CO5 :** Successfully manage the design process, meeting project deadlines and demonstrating effective time and resource management.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **ARCHITECT URAL DESIGN STUDIO - I** | Kno wle dge | Site Analysis and Literatu re Study | Critical Analysi s | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | M | M | M | M | M | L | L | L | M | L | H |
| CO2 | M | M | M | H | M | M | L | M | M | H | L | H |
| CO3 | H | M | H | H | M | H | L | M | M | M | M | H |
| CO4 | H | H | L | H | M | H | L | M | M | H | M | H |
| CO5 | H | H | L | H | M | H | L | M | M | H | H | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | | **DESCRIPTIVE GEOMETRY-II** (IP1506) | **CONTACT HOURS** | **L** | **T** | **P** |
|  | |  |  | 0 | 0 | 6 |
| **SUBJECT TYPE** | | **LC** | **CREDITS** | 3 | | |
| **OBJECTIVE**  The course would help students identify suitable methods of representation and methods in different built environment scenarios. | | | | | | |
|  | | | | | | |
| **COURSE CONTENT**  **Module 1: Metric Drawing - Architectural Drawing Techniques**  Types used & advantage • Isometric, Axonometric & Oblique view • Metric drawings, projections, and their dimensions • Difference between perspective and metric projections  **Module 2: Basics of perspective drawings**  Anatomy of perspective: Station point, Eye level, Cone of vision, Picture plane, Horizon line, Ground line, Vanishing points  Types of perspectives : One point, Two point, Three point of simple objects – cube, cuboid, prism, pyramid,  spheres etc  **Module 3: Perspective**  Perspective drawings of interior spaces  One point and two points perspectives of interiors - Perspectives of simple household furniture items  Perspective drawings for exteriors  2 point perspectives of building exterior- 3 point perspectives of simple architectural forms  **Module 4: Sciography**  Application of sciography in 2-dimensional drawings with rendering techniques  Shades and shadows of buildings or a part of building  Introduction to sciography in perspective | | | | | | |
| **REFERENCES**  **/TEXTBOOKS** | 1.Perspective From Basic to Creative by Robert W. Gill, Thames and Hudson   1. Rendering with Pen and Ink by Robert W. Gill 2. Sherkey W, MORGAN; Architectural Drawing, Mc Graw Hill | | | | | |

**Course Outcomes :-**

**CO1 :** Able to comprehend the fundamental principles of geometry and their application in representing three- dimensional objects in isometric, axonometric and perspective views.

**CO2 :** Develop the ability to mentally visualize complex spatial arrangements and their representations on paper

**CO3 :** Effectively communicate complex spatial concepts and designs through drawings and sketches

**CO4** : Develop problem-solving skills by applying geometric principles to solve practical problems related to spatial representation and visualization

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DESCRIPTI VE GEOMETRY**  **- II** | Kno wle dge | Site Analysis and Literatu re Study | Critical Analysi s | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | M | M | M | M | L | L | L | L | H | L | H |
| CO2 | H | H | H | M | M | L | L | L | L | H | L | H |
| CO3 | H | M | H | M | M | L | L | M | L | H | L | H |
| CO4 | H | H | H | M | M | L | L | M | L | H | L | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **BUILDING CONSTRUCTION-II** (IP1502) | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  |  | 0 | 0 | 9 |
| **SUBJECT TYPE** | **LC** | **CREDITS** | 4.5 | | |
| **OBJECTIVE**  To understand fundamental building material in the context of various construction methods.  Focus on various building materials would be emphasized based on the performing standards and codes, wherein application of each material would be discussed in detail, both in the context of traditional and modern construction methods and practices. Based on the lecture delivered, the students are required to produce construction and detail drawings. With time, each topic can also focus on latest trends in practice and usage of new technology/materials. | | | | | |
|  | | | | | |
| **Module 1**  Lintel and Arches: Brick, stone, timber, and RC.C.  Flat, segmental, semi-circular, parabolic, elliptical in brick and stone masonry, Joggle joint.  **Module 2**  Simple Timber Doors:  Ledged and battened door,  Ledged, braced, and battened door,  Framed, ledged, braced, and battened door and  Types of panelled door – single, two-panelled, and four-panelled Mouldings:  Solid Mouldings- square, rounded, chamfered, ovolo, ogee  Planted Moulding  Bolection Moulding  **Module 3**  Roof layout: ridge, hip, valley, gable, eaves- flush, open, closed etc  Classification of roofs: (a) Single roofs; flat roofs, lean-to roofs, double lean-to, couple, close couple, and collar roofs (b) Double or Purlin Roofs. (c) Trussed rafter roofs (d) Triple or framed roofs (e) Common roof coverings with its laying  Waterproofing, rainwater gutter details.  King post and Queen post roof trusses | | | | | |
| **REFERENCES**  **/TEXTBOOKS** | 1. Barry, R. (1999). The Construction of Buildings Vol. 2. 5th Ed. New Delhi: East-West   Press.   1. Foster, J. and Mitchell, S. (1963). Building Construction: Elementary and Advanced, 17th Ed. London: B.T. Batsford Ltd. 2. McKay, W. B. (2005). Building Construction Metric Vol. I–V. 4th Ed. Mumbai: Orient Longman. 3. Hailey and Hancork, D. W. (1979). Brick Work and Associated Studies Vol. II. London: MacMillan. 4. Merritt, F.S. and Ricketts, J.T., Building Design and Construction Handbook, McGraw Hill. 6.Rangwala, S. C. (1963). Building Construction: Materials and types of Construction. 3rd Ed. New York: John Wiley and Sons. 5. Chudley, R. (2008). Building Construction Handbook. 7th Ed. London: Butterworth- Heinemann. 6. Sushil-Kumar, T. B. (2003). Building Construction. 19th Ed. Delhi: Standard Publishers. 7. Ching, F. D.K – Building Construction illustrated. VNR, 1975 8. A.Agarwal –Mud: The potentials of earth based material for third world housing – IIED, London, 1981. 9. HUDCO – All you wanted to know about soil stabilized mud blocks, New Delhi, 1989 | | | | |

**Course Outcomes :-**

**CO1-** Acquire an understanding of various construction techniques and processes involved in building construction.

**CO2-** Develop skills in analysing and designing simple structural elements and understanding the principles of structural behaviour and design.

**CO3-** Develop the ability to read and interpret architectural and structural drawings, plans, and specifications related to building construction projects.

**CO4-** Develop critical thinking and problem-solving skills to address challenges that may arise during the construction process and to make informed decisions.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **BUILDING CONSTRUC TION - II** | Kno wle dge | Site Analysis and Literatu re Study | Critical Analysi s | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | M | L | M | H | M | L | L | M | L | M | M | L |
| CO2 | M | M | H | M | H | M | M | M | M | L | L | M |
| CO3 | L | L | M | M | H | M | H | H | H | M | M | M |
| CO4 | L | L | M | H | H | M | H | H | H | M | M | L |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| SUBJECT TITLE | **DOCUMENTATION & MEASURED DRAWING (** IP1508) | | **CONTACT HOURS** | **L** | **T** | **P** |
|  |  | |  | 0 | 0 | 3 |
| **SUBJECT TYPE** | **LC** | | **CREDITS** | 1.5 | | |
| **OBJECTIVE**  Visual documentation enables to enhance effective use of graphics and artistic skill for visual communication. Measured drawing helps to develop understanding of real built spaces and represent them graphically. To expose the students to real world situation and to represent the observation and understanding through graphics, sketches and architectural technical drawings | | | | | | |
|  | | | | | | |
| **Module 1**  **VISUAL DOCUMENTATION:**  Visual documentation techniques: Anthropometry scale and proportion of Modular man and Vitruvian man. Sketches of human figures. On site activity analysis of different spaces and visual representation of user-activity- space through colour rendering. Using dot, line and/or colour rendering to represent light, shade and shadow of various interior and exterior of an architectural monument or building. Freehand drawings of spaces through different types of perspectives.  **SITE DOUMENTATION:**  On site and off-site data collection techniques.  Documentation of progressive work on site and preparation of report for the same. Data presentation  techniques: use of charts, diagrams, and other infographics.  **Module 2**  **MEASURED DRAWING**  Understanding of different scales, measurement device and their uses in practice – Drawings to scale, geometrical representation techniques and drafting skill;  Examples of Measured drawings- Furniture, Class room /Studio plan, Doors, Windows, Entrance Gate, buildings in different context (Rural, Heritage and Urban).  Drawings include plan, elevations and sections with all measurements and geometrical views (whole or sectional) of the structure. | | | | | | |
| **REFERENCES**  **/TEXTBOOKS** | | 1. Ching, F. D. K. (2011). A Visual Dictionary of Architecture. 2nd Ed. Hoboken: John Wiley &   Sons.   1. Lockard, W. K. (1992). Drawing as a Means to Architecture. 6th Ed. Newyork: Van Nostrand Reinhold Company. | | | | |

**Course Outcomes :-**

**CO1 :** Develop an understanding of the principles and theories of visual communication .

**CO2 :** Develop the ability to critically analyse and interpret visual content .

**CO3 :** Develop the ability to accurately measure and document the architectural and structural elements.

**CO4 :** Able to produce comprehensive documentation, detailed reports, annotated sketches, and scaled drawings.

# PO – CO Mapping

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **DOCUMEN TATION & MEASURE D DRAWING** | Kno wle dge | Site Analysis and Literatu re Study | Critical Analysi s | Design develop ment | Use of Soft ware Skills | An Architec t & Society | Environ ment and Sustaina bility | professi onal ethics | Individual and teamwork | Commu nication | Project manage ment and Finance | Life long learnin g |
| PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 |
| CO1 | H | L | M | M | H | L | L | L | L | H | L | H |
| CO2 | L | H | H | M | L | M | L | L | M | M | L | H |
| CO3 | H | L | L | H | H | L | L | M | L | M | L | H |
| CO4 | H | H | L | L | H | L | L | M | L | M | L | H |
| Abbreviation : H – HIGH , M – MEDIUM , L - LOW | | | | | | | | | | | | |