

## ARPC-101: Architectural Design-I

L	T	P	S	Credits	Total contact hours
1	0	0	6	7	7

**Brief description of the course:** The course is designed to train the students in visual compositions by using various elements of design and to make them familiar with the meaning and purpose of Architectural design.

### Course Content

#### UNIT- I (12 Hours)

Introduction to Basic Design, Concept of design in everyday life, Objectives of design, Elements of design, Principles of Design.

#### UNIT- II (26 Hours)

Detailed study of color theory and its applications through geometric compositions. Principles of design such as Scale- Balance- Proportion- Rhythm- Harmony- Contrast- etc. Application of the same through exercises in two and three-dimensional compositions; using single and multiple types of elements.

#### UNIT- III (24 Hours)

Floor tile design, carpet, mural, door paving patterns, Sky line of city/village, Experience in 3D Design, compositions with simple forms like cube, cuboids, cylinder, cone, prism etc., Compositions with 3-D Solids.

#### UNIT- IV (22 Hours)

Introduction to Anthropology, Anthropometric data for adults & children: Standing position front & side arms extended- various seating positions-various working positions. Habitable space such as Living Room, Dining Room, Bedroom, Kitchen & Toilet with furniture layout.

#### Text Books/Reference:

1. Design through Discovery by M.E. Bevin, Harcourt Brace College Publishers, University of Wisconsin, 1994.
2. Drawing and Perceiving by Douglas Cooper, John Wiley & Sons, New York, 2007.
3. Principles of Design in Architecture by K.W. Smithies, Van Nostrand Reinhold, New York, 1981.
4. Architectural Drawing Masterclass by Tom Porter, Charles Scribner's, London, 1993.
5. Time-Saver Standards for Architectural Design: Technical Data for Professional Practice by Michael J. Crosbie and Donald Watson, McGraw-Hill, New York, 2005.
6. Time Saver Standards for Building Types by Joseph De Chiara and Michael J. Crosbie, McGraw-Hill, New York, 2001.
7. Architectural Graphic Standards by Charles George Ramsey, Harold Reeve Sleeper,

Bruce Bassler John Wiley & Sons, New York, 2008.

8. Form Space & Order by Francis DK Ching, John Wiley & Sons, New Jersey, 2015

**Course outcomes**

Upon successful completion of the course, the students will be able to

CO1: Understand basics of Architectural profession.

CO2: Describe the process of design.

CO3: Learn the various human dimensions and its applications.

CO4: Understand application of the process of design.

## ARPC-102: Building Construction & Materials – I

L	T	P	S	Credits	Total contact hours
2	0	0	3	5	5

**Brief description of the course:** The course has been designed to impart students the knowledge with basic building materials and their construction details.

### Course Content

#### UNIT- I (10 Hours)

Behavioral characteristics and applications of basic building materials- brick, stone, lime, cement, sand: Application, properties, and defects.

Building components- wall, floor, roof, and foundation; construction terminology through the typical section. Effects of sun, rain, wind, and other climatic and environmental conditions on building materials and the built environment.

#### UNIT- II (10 Hours)

Stones- Process of rock formation, types, properties, applications etc. Various kinds of stones used for Building Construction, their properties, applications, etc. Stone masonry, Detail drawings of various types such as Rubble walling, Polygonal walling, Flint walling, Ashlars walling, Masonry joints, Stone arches, Maintenance etc.

Bricks – Constituents and properties of soil, manufacturing, types, sizes, properties and uses.

#### UNIT- III (15 Hours)

Building construction techniques in brick and stone masonry, Various types of bonding in walls such as Stretcher bond-English bond-Single & Double Flemish bond etc. Explanation of bonds with respect to varying wall thicknesses such as ½ brick-1 brick- 1½ brick, etc., various types of junctions such as L junction- T junction- Cross junction, etc. Stone masonry of various types, Rubble walling, Polygonal walling, Flint walling, Ashlars walling, Masonry joints, Maintenance, etc.

#### UNIT- IV (15 Hours)

Lime and cement: Sources, classification, properties, hydration, method of manufacturing, testing, mixing, and uses, Manufacturing process, physical and chemical properties, classification of cast- in-situ and precast systems.

#### UNIT-V (10 Hours)

Foundation, column & beam structure, lintels, sunshades, floor and roof slabs in concrete, granolithic flooring, CC blocks (solid & hollow), fly ash bricks as a walling material, cement bonded particle boards. Different grades, composition, preparation, and properties of cement mortar. Use and selection of mortar for different construction work.

**Note-** Site visits, case studies, and educational tours may be organized.

**Text Books/Reference:**

1. Building Construction by Sushil Kumar, Standard Publishers Distributors, New Delhi, 2006.
2. Building Construction Metric Vol. 1-2 by W.B.Mckay, Orient Longman Private Limited, Mumbai, 2006.
3. Building Construction Illustrated by Francis D.K. Ching, John Wiley & Sons, 2007, 2011.
4. Construction Technology Vol. 1 by oy Chudley, Roger Greeno, Prentice Hall (UK), 2005.
5. Appropriate Building Materials by Roland Stulz, Kiran Mukerji, SKAT, 1993.
6. A Textbook of Building Construction by S.P. Arora and S.P.Bindra, 4thEdition, Dhanpat Rai, Delhi, 1996.

**Course outcomes**

Upon successful completion of the course, the students will be able to

CO1: Study building materials.

CO2: Understand the constituents, properties, and manufacturing process of building materials

CO3: Learn to draw brick masonry and stone masonry

## ARPC-103: Architectural Structures-I

L	T	P	S	Credits	Total contact hours
2	0	2	0	3	4

**Brief description of the course:** The course is a problem-focused engineering course that helps students to develop the ability to understand and analyze static forces on a variety of structures and engineering applications. The course begins with fundamental concepts and principles to explain the importance of mechanics in the context of engineering and conservation equations. It introduces the techniques for analyzing the forces in the plane trusses and frames. To understand the fundamental principles of stresses, strains and their relationship. To understand the estimation of various loads and load distributions on beams. To evaluate the principal stresses & strains and use of Mohr's Circle. To learn the concepts in analysis and design of columns.

### Course Content

#### UNIT-I (04 Hours)

Centroid of an area, moment of inertia, radius of gyration, polar moment of inertia, product of inertia, parallel and perpendicular axes theorems, perpendicular axes.

#### UNIT-II (04 Hours)

Concept of stress and strain, stress-strain curve, moduli of elasticity, Poisson's ratio, etc.

#### UNIT-III (04 Hours)

Shear force and bending moment diagrams for simply supported cantilever and over hanging beams.

#### UNIT-IV (06 Hours)

Theory of simple bending, distribution of bending stresses. Shear stress distribution in beams of rectangular, circular I and T sections.

#### UNIT-V (06 Hours)

Analysis of pin jointed plane frame- method of joints and method of section. Long and short columns, slenderness ratio, buckling load for various end conditions.

### Laboratory Experiments (24 Hours)

1. Stress-strain relationship for brittle and ductile materials (Concrete Cube and Steel Bars).
2. Shear test on Concrete.
3. Compression test on timber/mortar Cube
4. Bending test on concrete beam/timber/plywood.
5. Compressive strength test on bricks
6. Flexural strength of flooring/roofing tiles.

7. Experimental and analytical study of behavior of struts with various end conditions.
8. To determine elastic properties of a beam.
9. Experimental and analytical study of an elastically coupled beam.

**Text Books/Reference**

1. Strength of Materials & Mechanic of Structure by B.C.Punmia
2. Structural Mechanics & Analysis by V.S.Prasad
3. Basic Structural Analysis by C.S.Reddy
4. Mechanics of Materials, 3rd Edition by Beer and Johnston E. R. Tata McGraw Hill.
5. Strength of Materials by R. K. Bansal, Laxmi Publications
6. Strength of material by S. Ramamurtham, Dhanpat Rai Publication
7. Strength of Material by S.S. Rattan, Tata McGraw-Hill Publication Co. Ltd.
8. Strength of Material by B.K. Sarkar, McGraw-Hill.
9. Mechanics of Materials by R. C. Hibbeler, Prentice Hall Publication.

**Course outcomes:**

Upon successful completion of the course, the students will be able to

CO1. Apply methods of analysis to analyse beams and trusses.

CO2. Understand the stress strain behaviour of brittle and ductile materials, State of Stress and also be able to define the relationship between various elastic constants.

CO3. Draw Shear force and bending moment diagram and also able to plot through thickness variation of bending stresses and shear stress.

CO4. Analyse the behaviour of columns under uniaxial loading.

### ARPC-104: History of Architecture–I

L	T	P	S	Credits	Total contact hours
2	0	2	0	3	4

**Brief description of the course:** The course has been designed to understand evolution and development of architectural and urban built environment in context to geophysical, social and technological factors.

#### Course Content

##### UNIT- I (10 Hours)

Introduction to Indus Valley civilization. Study of architectural characteristics. Introduction to the Vedic village. Study of its building typology and construction.

##### UNIT- II (12 Hours)

Introduction to Buddhist settlement in India. Detailed studies of Architectural characteristics of various building types such as Stupas, Chaityas and Viharas through suitable examples from each geographical context to illustrate differences in Form, Construction methods and Ornamentation.

##### UNIT- III (14 Hours)

Study of evolution of Hindu architecture, Rock-cut and structural forms and comparison of Temple forms in various regions of India.

Study of various styles of temples such as Dravidian and Nagara Style with its regional sub categories with respect to functional components, architectural form, construction and ornamentation.

##### UNIT- IV (12 Hours)

Study of Islamic architecture in various Era's from provincial styles to Mughal architecture. Delhi or Imperial Style: Slave, Khilji, Tughlaq, Sayyed, Lodhi. Provincial Style: Bengal, Jaunpur, Deccan, Malwa, Bijapur. Mughal Architecture in North India under Humayun, Akbar, Jehangir, Shahjahan.

#### Text Books/Reference

1. Architecture in India by Marilia Albanese, Sandeep Prakashan, Indore, 2001.
2. Hindu India by Henri Stierlin, Taschen, Cologne, 1998.
3. Ancient Indian Architecture by Sanjeev Maheshwari and Rajeev Garg, CBS Publishers & Distributors, Delhi, 2001.
4. The Hindu Temple by R. Champakalakshmi and Usha Kris, Roli Books, Delhi, 2000.
5. The Architecture of India: Buddhist and Hindu by Satish Grover, Vikas Publishing House Pvt. Ltd, India, 1980.
6. Islamic Architecture in India by Satish Grover, Galgotia Publishing Company, Delhi, 1996.

**Course outcomes**

Upon successful completion of the course, the students will be able to

CO1: Understand the architectural characteristics of Indus Valley civilization and Vedic village

CO2: Understand the architectural characteristics of Buddhist settlement in India

CO3: Understand the evolution of Hindu architecture.

CO4: Understand various architectural styles.



## ARPC-105: Architectural Drawing and Graphics-I

L	T	P	S	Credits	Total contact hours
1	0	0	3	4	4

**Brief description of the course:** The course is designed to provide the students with the knowledge of basics of drafting, lettering techniques and visualization of geometric forms.

### Course Content

#### UNIT- I (08 Hours)

Significance and Scope, Usage of Drawing Instruments, Dimensions, Scales, Free hand Lettering, Line types such as Elevation lines- Construction lines – Section lines – Hidden lines – Centre lines.

#### UNIT- II (12Hours)

Introduction to orthographic projections, First angle projection. Projection of line parallel to both reference planes / parallel to one and inclined to other reference plane / inclined to both the reference planes followed by illustrative examples in each case. Projection of plane parallel to VP / parallel to HP / perpendicular to VP and inclined to HP/ perpendicular to HP and inclined to VP / inclined to both HP and VP followed by illustrative examples in each case.

#### UNIT-III (16 Hours)

Introduction to solids bounded by plane surfaces such as prisms / pyramids and solids of revolution such as cylinders / cones, Projection of solids having axis perpendicular to one of the reference planes/axis parallel to either of the reference plane and inclined to other reference plane/axis inclined to both the reference planes followed by illustrative examples in each case.

#### UNIT- IV (12 Hours)

Introduction and Importance, Method of drawing, Sciography of points, lines, planes and solids followed by illustrative example in each case. Introduction to object drawing, indoor and outdoor sketching of Built Environment/landscape.

### Text Books/Reference

1. A Textbook of Engineering Drawing by Prof. P.J. Shah, S. Chand Publishing, 2008.
2. Engineering Drawing with an Introduction to AutoCAD by Dhananjay A. Jolhe, Tata McGraw Hill, 2007.
3. Architectural Graphics by Francis D. K. Ching, Wiley; 5th Edition, 2009.
4. Architectural Shades and Shadows by Henry McGoodwin, Nabu Press, 2010.
5. Rendering with Pen and Ink by Robert W. Gill, Thames & Hudson Ltd., 1984.
6. Architectural Drawing by Tom Porter, Hamlyn, 1990.

**Course outcomes**

Upon successful completion of the course, the students will be able to

CO1: Use Drawing Instruments and pencils of various grades.

CO2: Learn to draw plan, front elevation and side elevations.

CO3: Learn to draw shades and shadows in plan, front elevation and side elevations.

## CHIC101: Energy and Environmental Science

L	T	P	S	Credits	Total contact hours
2	0	2	0	3	4

**Brief description of the course:** The course is designed to provide the students with the knowledge of issues and challenges relating to energy and environmental science, environmental impact of various energy sources and also the effects of different types of pollutants. the principal renewable energy systems and human impact on the environment and human exposure to environmental contaminants.

### Course Content

#### UNIT- I (6 Hours)

Environment, Ecosystems and Biodiversity, Environment: Multidisciplinary nature, scope and importance, Need for public awareness. Ecosystems: Concept, types, structure and functions, Producers, consumers and decomposers, Food chains, food webs and ecological pyramids, Energy flow in an ecosystem. Biodiversity: Values of biodiversity, hot spots and threats to biodiversity, conservation.

#### UNIT- II (8 Hours)

Natural Resources, Renewable and non-renewable resources: Natural resources and associated problems. Forest resources: Use and over-exploitation, deforestation, case studies, Timber extraction, Mining, Dams and their effects on forest and tribal people. Water resources: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water, Dams – benefits and problems. Mineral resources: Use and exploitation, Environmental effects of extracting and using mineral resources, case studies. Food resources: World food problems, Changes caused by agriculture and overgrazing, Effects of modern agriculture, Fertilizer-pesticide problems, Water logging, Salinity, case studies. Energy resources: Present energy resources in India and its sustainability, Energy demand scenario in India, Growing energy needs, Renewable and non-renewable energy sources, Use of alternate energy sources. Solar energy: Basics of solar energy, solar thermal energy, photovoltaic (PV) solar cells, advantages and disadvantages, environmental impacts and safety. Wind energy: Energy from wind turbines, India's wind energy potential, off shore wind energy, environmental benefits and impacts.

#### UNIT- III (10 Hours)

Environmental Pollution, Air pollution: Sources and effects of pollutants, primary and secondary pollutants, control measures. Acid rain: Impacts on human communities and agriculture. Green-house effect: Definition, causes and consequences. Depletion of ozone layer, destruction of ozone layer by CFC, consequences, effect of ozone modification, Photochemical smog, Bhopal gas tragedy. Water pollution: Water characteristics, water quality (WHO standard), natural water pollutants their origin and effects: oxygen demanding wastes, pathogens, nutrients, salts, heavy metals, pesticides, volatile organic compounds. River/ lake/ ground water pollution: DO, BOD, COD, pH and eutrophication. Thermal pollution: Causes, effects and control measures.

Solid waste management: Causes, effects and control measures of urban and industrial wastes. Nuclear hazards: Causes, effects and control measures.

#### UNIT- IV (06 Hours)

Social Issues and the Environment, From unsustainable to sustainable development: Urban problems related to energy, Water conservation, Rain water harvesting, Watershed management.

Environmental Ethics: Issues and possible solutions, consumerism and waste products, Acts: Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and Control of Pollution) Act, Public awareness, Population explosion, Environment and human health, Role of Information Technology in environment and human health.

### **Laboratory Experiments**

1. Determination of alkalinity in the water sample
2. Determination of dissolved oxygen (DO) in the water sample.
3. Determination of chemical oxygen demand (COD) in the water sample.
4. Determination of residual chlorine in the water sample.
5. Determination of total dissolved solids in water/effluent sample.
6. Determination of total Ca<sup>2+</sup> and Mg<sup>2+</sup> hardness in water.
7. Determination of strength of nitrite ions in water samples.
8. Analysis of BTX through Gas-Chromatography in air samples.
9. Analysis of heavy metal ions in industrial effluent by Atomic Absorption Spectroscopy (AAS).
10. Determination of moisture and pH of soil sample.

### **Text Books/Reference**

1. Environmental Studies by A. Basak, Pearson Education; 1st Edition, 2009.
2. Environmental Studies for Undergraduate Courses of all Branches of Higher Education for University Grants Commission by E. Bharucha 2013.
3. Text Book of Environmental Studies by D. Dave and S.S. Katewa, Cenage Learning India Private Limited, 2nd Edition, 2012.
4. Fundamentals of Environmental Studie by S. Somvanshi and R. Dhupper, S. K. Kataria and Sons, Reprint 2019.
5. Environmental Chemistry by A. K. De, New Age International (P) Limited, 8th Edition, 2017.
6. Environmental Studies by R. J. Daniels and J. Krishnaswamy, Wiley India Private Limited, Reprint, 2013.
7. Environmental Studies by B. Joseph, McGraw-Hill Education (India) Private Limited, 3rd Edition, 2017.
8. Perspectives in Environmental Studies by A. Kaushik and C.P. Kaushik, New Age International (P) Limited, 7th Edition, 2021.
9. Applied Chemistry-Theory and Practice by O. P. Virmani and A. K. Narula, New Age India Publishers, New Delhi, 2nd Edition, 2017.
10. Essentials of Experimental Engineering Chemistry by S. Chawla Dhanpat Rai Publishing company Ltd., New Delhi, 2006.

### **Course outcomes**

Upon successful completion of the course, the students will be able to

CO1: Know the environmental pollutants and their health effects and environmental remediation and management.

CO2: Understand the principles of renewable energy systems and explore the environmental impact of various energy sources

CO3: Understand interrelationships among science, technology, and environment.

CO4: Appreciate the Importance of saving energy and environment.

**NON-CONVENTIONAL INSTITUTE CORE COURSES**

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## ARPC-106: Architectural Design-II

**Pre-requisite:** Architectural Design-I

L	T	P	S	Credits	Total contact hours
1	0	0	6	7	7

### Brief description of the course

The course is designed to train the students in understanding the interdependence of form, function and structure in the process of Architectural design.

### Course Content

#### Unit -I (24 Hours)

Concepts of a load bearing structure.

#### Unit -II(30 Hours)

Building Type: load bearing structure - Check Post, Post-Office, Design of small buildings Milk booths, Cafes, Canopy etc. involving circulation, form, structure, and function

#### Unit -III(30 Hours)

Building Type: load bearing structure- Bank, Crèche, Dispensary, Architect's Office, Doctor's Clinic, Lawyer's office & such similar projects of small scale like Cycle stand, E- Rickshaw stand, Taxi stand & Parking layouts, etc.

**Note:** Two design problems and one time problem of 01 week is to be completed in the semester. The concerned faculty is required to frame a detailed program for each of the above design problems and time problem in context to the above contents

### Text Books/Reference

1. Building drawing with an integrated approach to Built Environment by M. G. Shah, C. M. Kale, S. Y. Patki, Tata McGraw-Hill Education, 2002.
2. Site Design Graphics by Michael S. Kendall, Van Nostrand Reinhold, 1989.
3. Architectural Graphics, 6th Ed. by Francis D. K. Ching, John Wiley & Sons, 2015.
4. Time-saver Standards for Architectural Design Data: The Reference of Architectural Fundamentals by Donald Watson, McGraw-Hill, 1997.
5. Time Saver Standards for Building Types by John Hancock Calendar, Joseph De Chiara, McGraw-Hill, New York, 1983.
6. Architectural Graphic Standards by Charles George Ramsey, Harold Reeve Sleeper, Bruce Bassler John Wiley & Sons, New York, 2008

### Course Outcomes

Upon successful completion of the course, the students will be able to

CO1. Understand concepts of load bearing structures.

CO2: Understand working process of a Single storied load bearing structure.

CO3: Understand design process of a Single storied load bearing structure.

## ARPC-107: Building Construction & Materials – II

**Pre-requisite:** Building Construction & Materials – I

L	T	P	S	Credits	Total contact hours
2	0	0	3	5	5

### **Brief description of the course**

The course familiarizes the students with the use of timber in building construction.

### **Course Content:**

#### **Unit-I (12 Hours)**

Behavioral characteristics and applications of Timber: Variety of Indian timbers, characteristics, and suitability for different uses, defects, and decay, seasoning, and preservation; manufactured timber products and their applications as insulation materials and decorative materials. Ecological impact due to the use of wood, deforestation, etc. Study of engineered wood used in buildings, i.e., plywood, block boards, particle boards, and other types. Application of timber in building components with Joinery details. Mitering, ploughing, grooving, rebating, veneering.

#### **Unit-II (12 Hours)**

Building construction techniques in timber doors and windows: Detailed drawings and construction details of Battened-Ledged-Braced doors, Battened- Braced-Framed doors, Flush doors, etc. Introduction to various types of windows in Timber. Detailed drawings and construction details of Casement windows and Bay windows in Timber. Workshop practice for carpentry joints used in various timber constructions.

#### **Unit-III (12 Hours)**

Building construction techniques in timber floors: Introduction to the nature and characteristics of wooden floors at the ground and first- floor level, its advantages & Limitations.

#### **Unit-IV (12 Hours)**

Building construction techniques in timber roofs: Introduction to the nature and characteristics of wooden roofs, its advantages, and Limitations. Characteristics of the roof, types of roofs (flat/ slopy roof), classification of roofs by the method of geometry and methods of construction – pitched, lean-to, coupled, couple-closed, collar, scissor, king post, and queen post. Detailed drawings and construction details of flat roof batten & tile and various sloping roofs in timber such as Lean to roofs, King Post truss, and Queen Post truss using AC/CGI, Mangalore tiles & slates roof coverings.

#### **Unit-V (12 Hours)**

Introduction to staircases with respect to material and shapes: Definitions, Tread, riser, stringer, nosing, flight, landing, headroom, handrail, balusters, newel post ,etc. Types of staircases: straight, dog-legged, open-well, geometrical, circular, spiral, and bifurcated. Detailed drawings & Construction details of a wooden staircase.

**Note:** Site visits, case studies, and educational tours may be organized.

**Text Books/Reference**

1. Building Construction Handbook by Roy Chudley and Roger Greeno, Routledge, New York, 2013
2. The Construction of Buildings, Vol. 1-2 by R Barry, Wiley, 2001.
3. Building Construction Metric Vol. 3 by W.B. McKay, Orient Longman Private Limited, Mumbai, 2006.
4. Building Construction Illustrated by Francis D.K. Ching, John Wiley & Sons, 2011.
5. Construction Technology Vol. 1-4 by Roy Chudley and Roger Greeno, Prentice Hall (UK), 2005.
6. Workshop Practice 2ndEd. by H.S. Bawa, Tata McGraw-Hill Education, 2009.
7. Carpentry and Joinery by George Mitchell, Cengage Learning EMEA, 1995.
8. Arco's complete woodworking handbook by Jeannette T. Adams, Arco Pub., 1981.

**Course Outcomes**

Upon successful completion of the course, the students will be able to

CO1: Understand introduction to Timber as a building material.

CO2: Understand the process of timber joinery and learn to draw timber details.

CO3: Understand the process of timber floor construction and learn to draw timber floors.

CO4: Understand the process of timber roof construction and learn to draw timber roofs.



## ARPC-108: Architectural Structures-II

**Pre-requisite:** Architectural Structures-I

L	T	P	S	Credits	Total contact hours
2	0	2	0	3	4

### Brief description of the course

The course is designed to provide hands on session for verifying various methods of structural analysis.

### Course Content

#### UNIT-I (04 Hours)

Slopes and deflections in statically determinate beams using double integrations method, moment area method and conjugate beam method.

#### UNIT-II (04 Hours)

Equilibrium and stability of structures, static and kinematic indeterminacies of beams and plane frames.

#### UNIT-III (06 Hours)

Analysis of continuous beams and simple portal frame using slope deflection method and moment distribution method.

#### UNIT-IV (06 Hours)

Approximate method of analysis for lateral loads- portal and cantilever method.

#### UNIT-V (04 Hours)

Arches: Geometrical properties, basic mechanics, arch action; three hinged arch, and two hinged arches.

### Laboratory Experiments (24 Hours)

1. Verification of reciprocal theorem of deflection using a simply supported beam.
2. Verification of bending moment variation at the point of loading in a simply supported beam.
3. Verification of moment area theorems for slopes and deflections.
4. To plot influence line diagram for horizontal thrust in a 3 hinged arch.
5. To plot influence line diagram for horizontal thrust in a 2 hinged arch.
6. Experimental and analytical study of a 3-bar pin jointed Truss.
7. Experimental and analytical study of deflections for unsymmetrical bending of a Cantilever beam.
8. Elastic displacements of curved members

### Text Books/Reference

1. Strength of Materials & Mechanic of Structure by B.C.Punmia
2. Structural Mechanics & Analysis by V.S.Prasad
3. Basic Structural Analysis by C.S.Reddy
4. Beer and Johnston E. R. Mechanics of Materials, 3rd Edition, Tata McGraw Hill.

5. Strength of Materials, R. K. Bansal, Laxmi Publications
6. Strength of material by S. Ramamurtham, Dhanpat Rai Publication
7. Strength of Material, by S.S. Rattan, Tata McGraw-Hill Publication Co. Ltd.
8. Strength of Material, by B.K. Sarkar McGraw-Hill.
9. Strength of materials by Singer and Pytel, Harper and Row Publication.
10. Mechanics of Materials by R. C. Hibbeler, Prentice Hall Publication.

### **Course outcomes**

Upon successful completion of the course, the students will be able to

CO1. Define static indeterminacy and kinematic indeterminacy of structures, apply methods of analysis and be able to analyse trusses.

CO2. Analyse continuous beams and simple portal frame using slope deflection method and moment distribution method.

CO3. Understand various methods of analysis for lateral loads using portal and cantilever method.

CO4. Analyse and understand behaviour of arches, their basic mechanics, and arch action in three hinged and two hinged arches.

## ARPC-109: History of Architecture-II

**Pre-requisite:** History of Architecture-I

L	T	P	S	Credits	Total contact hours
2	0	2	0	3	4

### **Brief description of the course:**

The course covers the evolution and development of architectural and urban built environment in context to geophysical, social and technological factors.

### **Course Content**

#### **UNIT- I (12 Hours)**

Introduction to examples of early shelter, Stone Age as an expression of man's physical and spiritual needs. Introduction to Egyptian civilization. Study of local context and architectural characteristics of public buildings such as mastabas, pyramids and temples to be explained with examples.

#### **UNIT- II (12 Hours)**

Introduction to Mesopotamian civilization. Study of urban context and architecture of public buildings such as Ziggurat of Urcity and Khorsabad Palace

#### **UNIT- III ((12 Hours)**

Introduction to Greek civilization. Architectural characteristics of typical civic spaces such as Agora, Acropolis, theatres. Systems of proportioning, Greek orders, optical corrections etc. through illustrative examples such as Parthenon etc.

#### **UNIT- IV (12 Hours)**

Study of Roman town with respect to location, Architectural characteristics of typical civic spaces such as Forum, theatres etc. Detailed studies of monuments/temples of Roman period with reference to materials, construction systems and Roman orders through illustrative examples.

### **Text Books/Reference**

1. The World of Architecture by Paul Holberton, Chancellor Press, 1997.
2. A History of Architecture by Sir Banister Fletcher, CBS Publisher, 1999.
3. A History of Architecture by Spiro Kostof, Oxford University Press, 1995.
4. Encyclopedia of World Architecture by Henri Stierlin, Facts on File, 1978.
5. A Global History of Architecture, Mark M. Jarzombek, Vikramaditya Prakash and Francis D. K. Ching, John Wiley & Sons, 2011.

### **Course outcomes**

Upon successful completion of the course, the students will be able to:

CO1: Understand the architectural characteristics of Stone Age and Egyptian civilization.

CO2: Understand the architectural characteristics of Mesopotamian and Greek civilization.

CO3: Understand the architectural characteristics of roman civilization.

## ARPC-110: Architectural Drawing and Graphics-II

**Pre-requisite:** Architectural Drawing and Graphics-I

L	T	P	S	Credits	Total contact hours
1	0	0	3	4	4

### **Brief description of the course:**

The course is aimed to provide students with adequate knowledge to have a better visualization/understanding of a three-dimensional entity through drawings: Sections- Metric views-Sciography and Sketching: Indoor-Outdoor, etc.

### **Course Content**

#### **Unit-I (12 Hours)**

Introduction and importance of surface development, Method of drawing surface development for Tetrahedron / Cube / Octahedron / Dodecahedron / Icosahedrons / Truncated Tetrahedron / Truncated Cube.

#### **Unit-II (12 Hours)**

Introduction and importance of metric projections, Method of drawing Isometric projection / Axonometric projection / Elevation oblique projections followed by illustrative examples, Uses of these Metric Projections.

#### **Unit-III (12 Hours)**

Introduction to perspective, one points, two points, and 3 points.

#### **Unit-IV (12 Hours)**

Introduction to Auto CAD. Drafting objects, Plan, elevation and sections in AutoCAD. Drafting of perspectives of objects like prism, pyramid, cube, cuboid, tetrahedron, combination of objects, one room (indoor)

**Note:** The focus of concluding lectures should be to emphasize the value addition of the subject and also on how it impacts the environment. Further, the faculty may suggest possible sustainable solutions/emerging technologies/innovations towards sustainability in the subject domain.

### **Text Books/Reference**

1. A Textbook of Engineering Drawing by Prof. P.J. Shah, S. Chand Publishing, 2008.
2. Engineering Drawing by Dhananjay A. Jolhe, Tata McGraw Hill, 2007.
3. Architectural Shades and Shadows by Henry McGoodwin, Nabu Press, 2010.
4. Rendering with Pen and Ink by Robert W. Gill, Thames & Hudson Ltd., 1984.
5. Architectural Drawing by Tom Porter, Hamlyn, 1990.
6. Sketching the Concept by Harold Linton and Scott Sutton, Design Press, 1993.
7. Drawing the Landscape by Chip Sullivan, John Wiley & Sons; 4th Edition, 2014.
8. Time-Saver Standards for Architectural Design: Technical Data for Professional Practice by Michael J. Crosbie and Donald Watson, McGraw-Hill, New York, 2005.

## **Course Outcomes**

Upon successful completion of the course, the students will be able to:

CO1: Learn and understand to draw sections of solids.

CO2: Understand and draw intersection of solids.

CO3: Understand and draw development of surfaces.

CO4: Learn and understand to draw metric projections.

CO5: Learn to understand and draw free hand sketching.

## HSIC-101: Communication Skills in English

**Pre-requisite:** Basic English Language

L	T	P	S	Credits	Total contact hours
2	0	2	0	3	4

**Brief description of the course:** The course has been designed in such a manner that the students can communicate effectively with an increase in their confidence to read, write and speak English fluently. They should also demonstrate a significant increase in word power. The variety of exercises and activities that will be conducted in the Language Lab will develop the skills needed to participate in a conversation like listening carefully and respectfully to others' viewpoints; articulating their own ideas and questions clearly and overall students will be able to prepare, organize, and deliver an engaging oral presentation

### Course Content

#### Part-I Theory Teaching

##### Unit-I Introduction to Communication Skills: (6 Hours)

Introduction to Communication Skills: meaning and definition of communication, forms of communication, barriers to effective communication, ways to overcome barriers in communication; Communication Skills: Listening Skills, Speaking Skills, Reading Skills, Writing Skills; Technical Communication; Digital Communication

##### Unit-II Soft Skills for Professional Excellence Introduction to soft skills: (6 Hours)

Meaning, nature, scope and importance of soft skills in the present organizational set up; managing interpersonal relationships: leadership skills, team work, attitude, creativity, resilience etc.; nonverbal communication: body language and gestures, significance and role of body language in effective communication across cultures

##### Unit-III Written Communication: (6 Hours)

Formal letters, curriculum vitae and resume writing, writing e-mails, technical reports with an emphasis on different styles and structures/formats

##### Unit-IV Grammar and Punctuation: (6 Hours)

Parts of speech, tenses, subject verb, active passive, interjections, capitalization etc. Use of comma, period, exclamation marks, ellipsis, question mark, colon, semi-colon, quotation marks, apostrophe etc. Common errors and acceptable forms of English language

#### Part- II Language Laboratory

##### Unit-I Listening Skills Listening Process and practice: (6 Hours)

Introduction to recorded lectures, poems, interviews and speeches, listening tests, problems in

comprehension and retention, importance of listening in organizational set up.

### **Unit-II Reading and Pronunciation Skills Phonetics and Phonology: (6 Hours)**

Introduction to sounds, vowel and consonant sounds, diphthongs etc. IPA transcription of words, word stress, weak forms, voice, intonation, tone etc.

### **Unit-III Soft Skills Proper use of Body Language: (6 Hours)**

Facial expressions, eye contact, gestures, postures and dressing; emotions displayed by body language; different types of handshakes; desirable and undesirable body language under different professional situations.

### **Unit-IV Speaking Skills Standard and formal speech: (6 Hours)**

Activities like Group discussion, oral presentations, public speaking, business presentations etc. Conversation practice and role playing, mock interviews etc.

### **Text Books/Reference**

1. The Pronunciation of English. By Daniel Jones Cambridge: Cambridge University Press, 1956.
2. English Pronouncing Dictionary by James Hartman & et al. Ed. Cambridge: Cambridge University Press, 2006.
3. Better English Pronunciation by J.D.O' Connor. Cambridge: Cambridge University Press, 1980.
4. An English Grammar: Comprehending Principles and Rules by Lindley Murray. London: Wilson and Sons, 1908.
5. Examine your English by Margaret M. Maison. Orient Longman: New Delhi, 1964.
6. Effective Technical Communication, By M. Ashraf Rizvi. Mc-Graw Hill: Delhi, 2002.
7. Technical Communication: A Practical Approach. 6th ed. By William Sanborn and T.V.S Padmaja, Delhi: Pearson, 2007.
8. Strengthen your Communication Skills by Salivendra Jayaraju. Maruthu Publications: India.
9. The Definitive Book of Body Language by Allan Pease and Barbara Pease. Manjul Publishing House: New Delhi.
10. Language Through Literature: An Introduction. Paul Simpson. United Kingdom, Routledge.

### **Course Outcomes**

Upon successful completion of the course, the students will be able to:

CO1: To develop communication skills.

CO2: To build confidence in speaking English with correct pronunciation.

CO3: To develop basic writing skills and vocabulary.

CO4: To develop the ability to comprehend text in various contexts.

### ARPC-111: Construction Workshop

L	T	P	S	Credits	Total contact hours
0	0	2	0	1	2

#### Brief Description about the course:

#### Course Content

1. Common tools used in carpentry shop.
2. Carpentry machines, common accessories in carpentry.
3. Details of carpentry joints.
4. Materials used in model making.
5. Site relief and modification.
6. Method of finding surfaces and volumes of solids.
7. Brick bonding theory - partition walls.
8. Brick bonding theory - load bearing walls using English bond.
9. Brick bonding theory - load bearing walls using Flemish bond.
10. Building material- Plaster of Paris.
11. Building material – Wire mesh.
12. Building material – Thermocol / clay/ any other material.

#### List of Experiments

1. Preparing a carpentry joint- Mortise & Tenon joint, Dovetail joint, Butt joint.
2. Practice of cutting various board such as sun board, cardboard, plyboard etc. for use in model making.
3. Preparing a model of contoured site.
4. Surface development for making various solids.
5. Construct a Header (1 brick thick) & Stretcher bond (half brick thick) wall using conventional burnt bricks.
6. Construct an English bond wall of various thickness using conventional burnt bricks.
7. Construct a Flemish bond wall of various thickness using conventional burnt bricks.
8. Sculpture making using Plaster of Paris.
9. Sculpture making using Wire mesh.
10. Sculpture making using Thermocol/ clay/ any other material.

#### Textbooks/Reference

1. Introduction to Basic Manufacturing Processes and Workshop Technology by Rajender Singh, New Age International Pvt. Limited, Publishers, 2006.
2. Barry's Introduction to Construction of Buildings by Stephen Emmitt and Christopher A. Gorse, Wiley-Blackwell, 2010.
3. Time-Saver Standards for Architectural Design: Technical Data for Professional Practice by Michael J. Crosbie and Donald Watson, McGraw-Hill, New York,



2005.

4. Building Materials by S.K.Duggal, New Age International Pvt. Limited, Publishers, 2012.

**Course Outcomes**

At the end of the course, the student will be able to:

CO1: Learn to make carpentry joints.

CO2: Learn to make architectural models.

CO3: Understand use of bricks in various masonry bonds.

CO4: Learn to make Sculpture