



**K.R. MANGALAM UNIVERSITY**  
THE COMPLETE WORLD OF EDUCATION

# Student Handbook 2018-19

**School of Architecture & Planning**



**K.R. MANGALAM UNIVERSITY**  
THE COMPLETE WORLD OF EDUCATION

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**K.R. MANGALAM UNIVERSITY**  
**THE COMPLETE WORLD OF EDUCATION**

**School of Architecture  
& Planning**

**Student Handbook**

**For**

**Bachelor of Architecture**

**2018–19**

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## 1. Introduction

The K.R. Mangalam Group has made a name for itself in the field of education. Over a period of time, the various educational entities of the group have converged into a fully functional corporate academy. Resources at KRM have been continuously upgraded to optimize opportunities for the students. Our students are groomed in a truly inter-disciplinary environment where in they develop integrative skills through interaction with students from engineering, social sciences, management and other study streams.

The K.R. Mangalam story goes back to the chain of schools that offered an alternative option of world-class education, pitching itself against the established elite schools, which had enjoyed a position of monopoly till then. Having blazed a new trail in school education the focus of the group was aimed at higher education. With the mushrooming of institutions of Higher Education in the National Capital Region, the university considered it very important that students take informed decisions and pursue career objectives in an institution, where the concept of education has evolved as a natural process.

K.R. Mangalam University is established under the Haryana Private University Act 2006, received the approval of Haryana Legislature vide Amendment Act # 36 of 2013 and consent of the Hon'ble Governor of Haryana on 11th April 2013, which was published in the Gazette notification vide Leg. No.10/2013, dated 3rd May 2013.

### K. R. Mangalam University Is Unique Because of Its

- i. Enduring legacy of providing education to high achievers who demonstrate leadership in diverse fields.
- ii. Protective and nurturing environment for teaching, research, creativity, scholarship, social and economic justice.

### Objectives

- i. To impart undergraduate, post graduate and doctoral education in identified areas of higher education.
- ii. To undertake research programmes with industrial interface.
- iii. To integrate its growth with the global needs and expectations of the major stake holders through teaching, research, exchange & collaborative programmes with foreign, Indian Universities/Institutions and MNCs.
- iv. To act as a nodal center for transfer of technology to the industry.
- v. To provide job oriented professional education to the Indian student community with particular focus on Haryana.

## 2. School of Architecture & Planning

School of Architecture & Planning offers, Council of Architecture (COA) approved, Five years B.Arch. Programme. This Programme has the distinct objective of equipping the students with knowledge, skills and attitude so as to make them capable of successfully meeting the present requirements and future challenges in the profession of Architecture. The course intends to impart intensive knowledge and training in subjects related to Architecture, reinforced with an overall perception towards the entire field of Human Habitat. This approach sensitizes the students to wider perspectives from an Architectural as well as Habitat point of view.

## 3. The B.Arch. Programme

(Approved by Council of Architecture, India)

Architecture is a challenging field that involves merging & intermingling to the skills of art and science. This programme is designed to attain a high level of contextual excellence in the arena of architectural design. Theory, Studio & Applied subjects are undertaken in the course structure of

this programme; with crucial inputs by experts in the field of Art, Architecture, Planning, Engineering and Technology. At the end of the Programme, the students graduate with a strong foundation of multi-disciplinary skills related to environment friendly and sustainable design, construction techniques, space transformations and aesthetical features.

**Eligibility Criteria:** Only candidates who have the following credentials shall be eligible for admission to B.Arch. Course .

- (i) Qualified recognized aptitude test in Architecture (NATA Or equivalent ) in 2018.
- (ii) Have Gone through any of the following curriculum with Marks as prescribed below:
  - (a) 10+2 or equivalent examination of central/State Govts. with 50% aggregate marks and with Mathematics as compulsory subject of examination ; or
  - (b) 10+3 Diploma (any stream )recognized by Central /State Govts. with 50% aggregate marks with Mathematics as a compulsory subject of examination ;or
  - (c) International Baccalaureate Diploma passed /appearing, after 10 years of Schooling with 50% marks in aggregate and with Mathematics as compulsory subject of examination.

No direct lateral admission is allowed at any other year /stage of B.Arch .course based on any qualification.

**4. Career Options:** Opportunities exist in both public & private sector, in the field of Architecture & Building construction industry. Independent professional practice is also one option in this field.

**5. Programme Duration:** The Minimum duration for the completion of B.Arch. Programme offered by the university is 5 years. i.e. 10 semesters

As per COA directives & regulations this programme shall comprise of two stages: Stage-I (First 3 years) & Stage-II (Fourth & Fifth Year).

The candidates admitted to the programme shall have to complete the first stage within five years of admission to the programme. However the maximum time allotted to complete both the Stages (I +II) is 8 years.

**6. Class Timings:** The classes will be held from Monday to Friday from 9.10 am to 4.10 pm.

**7. Programme scheme:** - For Programme scheme see **Annexure A.**

## Syllabi

The syllabi of all courses for first year for B.Arch. program offered by SOAP are given in the following pages. These are arranged in numeric order of the last three digits of the course code. For each course, the first line contains; Course Code, Title and credits (C) of the course. This is followed by the course objectives, syllabus (Unit I to IV), Text book and reference books.

**APAR117                      BASIC DESIGN & CREATIVE WORKSHOP                      CREDITS-12**

### Course Objective:

- Basic Design provides the framework for understanding design as a new language by sensitizing students to the conceptual, visual and perceptual issues involved in the design process.
- The Course sensitizes to the principles of design and design elements.
- Exercises complement the theories of design and ensure that the students learn to develop a series of compositions in two and three dimension.

## UNIT I

### Introduction to design:

- Meaning of design, Importance of design, Design in everyday life, Appreciation of Design

in nature.

- Exercises in terms of sketching of objects available in nature and surroundings.

## **UNIT II**

### **Elements of design:**

- Fundamental elements of design and their definitions-point, line, shape, form, space, texture, value and colour.
- Forms (2D&3D) created through points (segments), lines (columns) and planes (volumes), and combination thereof; using various techniques & materials like Paper, Card board, Mount board, Thermocol, Styrofoam, Softwood, Acrylic sheets, wires etc.

## **UNIT III**

### **Principles of Design:**

- Introduction to the principles, of design-unity, balance, symmetry proportion, scale, hierarchy, rhythm, contrast, harmony, focus etc. use of grids, creating repetitive patterns.
- Theoretical inputs to be followed by exercises to develop the ability to translate abstract forms in 2D & 3D into compositions depicting various principles of design.

## **UNIT IV**

### **Organic Designs:**

- Appreciation of design through various organic forms in nature & various design principles they exhibit. Introduction to Biomimicry.
- To be followed by exercises to create organic forms using clay, Plaster of Paris, Metal scrap, Jute fiber etc.

### **TEXT BOOK:**

1. Ching, Francis D. K., "Architecture: Form, Space, and Order", Wiley and Sons

### **REFERENCE BOOKS:**

1. Wallschlaeger, C and Snyder, S.B., "Basic Visual Concepts and Principles for Artists, Architects and Designers", McGraw Hill.
2. Laseau, P, "Graphic Thinking For Architects and Designers", John Wiley and Sons.

**APAR118**

**ARCHITECTURAL DESIGN-I**

**CREDITS-6**

### **Course Objective:**

- Introduction to basic design and the basic understanding of form and space in architecture.
- Sensitizing students to be more observant to their surroundings and promoting it as a basic creative instinct in the students.

## **UNIT I**

### **Study of Anthropometrics:**

- Studies and introduction to human dimensions and functions, space-activity, relationships, measured drawings of simple living units.
- This can be best understood through one or two short exercises in anthropometrics. Presentations should be made through simple sketches and drawings.

- Short exercises in design and layout of personal space for living, eating, sleeping, cooking, toilets, laundry area, outdoor sitting spaces such as verandah, balcony etc.

## UNIT II

### Scale in Architecture:

- Exercises to increase perception and sensitivity of the students about space in terms of balance & proportions.
- Simple measurement exercises, with & without proper measuring instruments, so that before the students start doing building design proposals, they have to have a fair and almost accurate idea about sizes & measurements of some typical requirements of architecture & design in everyday life.
- Measuring drawing & dimensioning of simple building components.

## UNIT III

### Design of mono-cellular-units/structures on a level plane

- Design of simple single activity units such as milk booth, tea stall, shelter in park, bus stop or designing of student's own room (as a student of architecture).

## UNIT IV

### Design of multiple but simple activity spaces involving primarily horizontal circulation.

- Exercise to emphasize the significance of the user in the process of design.
- The design of building unit to be completed in the following stages: Prototype study, Problem identification, Site analysis, Preliminary sketch etc. Models of the final design necessary for greater comprehension.
- Suggested exercises: Residence, Guest House, Dharamshala, etc.

### TEXT BOOK:

1. Ching, Francis D. K., "Drawing: A Creative Process", Wiley and Sons

### REFERENCE BOOKS:

1. Wallschlaeger, C and Snyder, S.B., "Basic Visual Concepts and Principles for Artists, Architects and Designers", McGraw Hill.
2. Laseau, P, "Graphic Thinking For Architects and Designers", John Wiley and Sons

APAR119

INTRODUCTION TO BUILDING MATERIALS

CREDITS-2

### Course Objective:

- To develop the understanding about elementary building materials & their applications.
- Properties of materials such as physical properties, structural strength, thermal & acoustical behavior - direct & indirect insulation, reflection and emission.

## UNIT I

### Stones:

- Classification; sources, properties of constituent components; methods of quarrying stones; uses, test for stones & quality of good building stones.

## UNIT II

### Soil:

- Formation—index property, specific gravity, grain size distribution, plasticity, characteristics & phase relationship, identification and local names; ISI classification; sources & uses of sand; fineness modulus.

### Lime:

- Definitions, classification, properties, sources, constituents of lime stone, manufacturing, uses, test.

## UNIT III

### Clay and Clay Products:

- Bricks: classification of bricks; properties of constituent components, manufacturing process, quality test of bricks - Burnt Bricks, Brick Tiles, fly ash bricks, Brick Ballast and Surkhi.
- Terracotta-manufacturing, varieties, advantages, uses & products.

## UNIT IV

### Timber

- Difference between Wood & Timber, sources, classification, structure of a tree, processing, seasoning, conversion preservation & storage of timber
- Defects, qualities of good timber used in construction.

### TEXT BOOK:

1. Rangwala, S. C., "Engineering Materials (Material Science)", Charotar Publishing House.

### REFERENCE BOOKS:

1. Farrelly, Lorraine, "Basic Architecture 02: Construction + Materiality", Ava Publishing
2. Agarwal, A., "Mud: The Potentials of Earth based Material for Third World Housing", IIED
3. HUDCO, "All you wanted to know about Soil Stabilized Mud Blocks", 4.Watson, Donald"
4. "Time-saver Standards for Building Materials and Systems", Tata McGraw Hill.

**APAR120**

**BUILDING CONSTRUCTION & MATERIALS-I**

**CREDITS-6**

### Course Objective:

- To acquaint the students to building materials such as wood, stone & brick; and with construction techniques for the use of these materials in building works.

## UNIT I

### MATERIALS:

**BRICKS:** Bricks for specific purposes like walls, flooring, cladding, tiling, etc. Their physical characteristics, specifications, manufacturing, testing, etc.

### CONSTRUCTION:

Types of bricks, various brick bonds,  
construction of arches



## UNIT II

### MATERIALS:

**STONE:** Stones for specific purposes like walls, flooring, cladding, tiling, etc. Their physical characteristics, types, specifications, uses etc.

### CONSTRUCTION:

Various stone masonry, jointing and pointing, construction of arches

## UNIT III

### MATERIALS:

**BINDING MATERIALS:** Lime, Mud and Cement: availability, manufacturing, composition, physical and chemical properties, types, uses etc.

### CONSTRUCTION:

Plastering, jointing and pointing

## UNIT-IV

### MATERIALS:

**TIMBER:** Structure, Classification, Characteristics, Seasoning, Storage, Defects, Preservation, Uses etc.

### CONSTRUCTION:

- Details of Ledged & Braced batten doors and windows

### REFERENCE BOOKS:

1. Farrelly, Lorraine, "Basic Architecture 02: Construction + Materiality", Ava Publishing
2. Agarwal, A., "Mud: The Potentials of Earth based Material for Third World Housing", IIED,
3. HUDCO, "All you wanted to know about Soil Stabilized Mud Blocks",
4. Watson, Donald, "Time-saver Standards for Building Materials and Systems", Tata McGraw Hill,
5. Rangwala, S. C., "Engineering Materials (Material Science)", Charotar Publishing House.

APAR129

HISTORY OF CULTURE & CIVILIZATION

CREDITS-2

### COURSE OBJECTIVES:

- To generate an understanding about the development of civilizations and its impact on Habitat as a solution to the need or demands of the society.
- Understanding of the periods in terms of their context of location, climate as well as the socio-cultural, historical, economic and political influences of the time.
- Understanding the evolution of architecture from a basic need for shelter to the development of aesthetics and Order.

## UNIT I

### Primitive Beginnings and Birth of Civilizations

- Introduction to History and Architecture with special emphasis on Stone Age to Neolithic

settlements in India, examples from Carnac, Bhibeteka & Stonehenge.

- In reference to the Asia-minor region with nascent cities like Jericho, Catalhayuk, and Hattasus etc.
- Indus Valley Civilization
- Particularly in reference to the town planning principles exemplified with examples from Mohenjo-Daro and Harappa.

## **UNIT II**

### **The Vedic / Aryan civilization**

- With its emphasis on the Vedic town plan, its motifs and patterns.

### **Mesopotamian Civilization**

- With special attention to cities of Mesopotamian like Ninveh, Khorsahbad, Marie, Babylon, and architectural constructs like Ziggurat.

## **UNIT III**

### **Egyptian Civilization**

- Particularly in reference to social & political context of Tomb Architecture and Temple Architecture with examples. Aegean civilization
- Characteristic features of Aegean and Helladic architecture, with special reference to cities like Troy, Sparta and Mycenae, which formed the basis of Greek civilization.

## **UNIT IV**

### **Greek & Roman civilization:**

- Evolution of Greek and Roman architecture- factors affecting development
- Hellenic and Hellenistic periods; Etruscan architecture and the Roman period.

### **Greek Architecture**

- Classical orders: mainly Ionic, Doric & Corinthian.
- Geometry and symmetry in their buildings; Geometry and symmetry of individual buildings and their relationship with others based on different organizing principles and conditions of site.
- Study of important acropolis, agora, temples, theatres, tombs and house forms.
- Brief introduction to Architecture, the classical orders & the advancements in construction techniques of the Romans (vaults & domes & stucco).

### **Roman Architecture:**

- Invention of concrete and construction of walls vaults and domes.
- Social ,political & economic influence on the development of Roman architecture
- Study of structures like aqua ducts, bridges, roads, sewage system and fountains.
- Study of important buildings like forums, temples, basilicas, thermaes, theatres, amphitheaters, circuses, tombs, triumphal arches, palaces, houses and villas

### **Text Books:**

1. Hiraskar, G.K., "The Great Ages of World Architecture (with Introduction to Landscape Architecture)", Dhanpat Rai Publications (P) Ltd.

## Reference Books:

1. Maheshwari and Garg, "Ancient Indian Architecture", CBS,
2. Grover, S. K., "Buddhist and Hindu Architecture in India", CBS,
3. Thapar, B., "Introduction to Indian Architecture", Periplus Editions
4. Surendra S., "Indian Architecture: Hindu, Buddhist and Jain", Ajanta Offset and Packaging Ltd.
5. Risebero, Bill, " The Story of Western Architecture", MIT Press
6. Ching Francis D.K., Jarzombek, Mark M., Prakash, Vikramaditya, "A Global History of Architecture", Wiley
7. Cruickshank, D., Fletcher, B., Saint A., "Banister Fletcher's - A History of Architecture", Architectural Press.
8. Brown Percy, Indian Architecture- Volume I and II, Apt Books.

**APAR128**

**THEORY OF DESIGN**

**CREDITS-2**

## Course Objective:

- To generate and appreciate the background aspects of thinking & philosophizing required in architectural design.

## UNIT I

### Basis for Architectural Design

- Basic Design and Architectural Design-Elemental Differentiation
- Perception and Experience
- Tangible and Intangibles in Architecture
- Colour Aesthetics

## UNIT II

### Relation of Form & Function

- Function, Structure and Form
- Space, Space Usage and Interrelationship of spaces
- Circulation within Spatial Units

### Order in Architecture:

- Geometrical, structural, dimensional, material, spatial orders —through observation of surroundings as well as simple exercises in 2D and 3D.
- Exercises in order and transformations of form and space.

## UNIT III

### Connectivity of Spaces

- Horizontal Circulation
- Vertical Circulation
- Circulation and Spaces between Buildings

## UNIT IV

### Manifestation of Design for Interpretation

- Relationship of Plan, Section and Elevation

- Architectural Scale
- Programming in Architectural Design

**TEXT BOOK:**

1. Francis, D.K. Ching —Form Space & Order.

**REFERENCE BOOKS:**

1. Snyder, J and Catanese, A, "Introduction to Architecture", McGraw-Hill.
2. Farrelly, Lorraine, "The Fundamentals of Architecture", Ava Publishing.
3. Voordt and Wegen, "Architecture in Use", Architectural Press.
4. Smithies, K.W., "Principles of Design in Architecture", Van Nostrand Reinhold Co.
5. Roger H. Clark and Michael Pause, "Precedents in Architecture", Van Nostrand Reinhold.

**APAR123**

**ARCHITECTURAL DRAWING-I**

**CREDITS-6**

**Course Objective:**

- Introduction and familiarization with drafting tools and accessories.
- To give basic knowledge of good drafting techniques.
- To develop comprehension and visualization of geometric forms.

**UNIT I**

- Introduction: Drawing Instruments and their uses.
- Sheet layout and sketching.
- Lettering: Exercises in drafted and freehand architectural lettering.

**UNIT II**

- Lines: Concept and types of lines. Line thickness. Dimension lines.
- Scales: Engineers scale, Graphical scale and Representation factor (R.F.)
- Scales on drawings. Types of scales: Plain scale and Diagonal scale.
- Dimensioning of 2D objects

**UNIT III**

**Orthographic Projections**

- Definition, Meaning & concept, principles and Methods of projection.
- Planes of projection: Four Quadrants, First angle projection, Third angle projection, Projection of points, lines & planes.

Note: Studio exercises to be based on aptly & clearly communicating the relationship of plan elevation & section of objects & buildings to the students.

**UNIT IV**

- Orthographic Projections-II
- Projections of solids: Axis perpendicular to the H.P. and Axis perpendicular to the V.P. Axis parallel to both the H.P. & V.P. axis inclined to one reference.
- Projection of solids simple sections of solids, complex solids, hollow object. Suggestive Studio Exercise: Measured drawing of simple objects.

**TEXT BOOK:**

1. Bhatt, N.D., "Engineering Drawing: Plane and Solid Geometry", Charotar Publishing House.

#### **REFERENCE BOOKS:**

1. Gill, Robert W., "Basic Perspective", Thames and Hudson.
2. Leslie, Martin C., "Architectural Graphics", Macmillan Publications.
3. K.L.Narayana, P.Kannaiah, 'Text Book on Engineering Drawing' Scitech Publications.
4. Malik, Shankar, "Perspective and Sciography", Allied Publishers.

#### **WEB REFERENCES**

1. [www.technologystudent.com](http://www.technologystudent.com)
2. [www.ider.herts.ac.uk/school/courseware](http://www.ider.herts.ac.uk/school/courseware)

**APAR124**

**ARCHITECTURAL DRAWING-II**

**CREDITS-4**

#### **Course Objective:**

- To develop the capability of understanding and drawing Three Dimensional Solids and their various complex sections as a basis of representing architectural design.

#### **UNIT I**

- To prepare drawings on Orthographic Projection of simple solids in simple positions.
- To prepare drawings on Orthographic Projection of group of solids in tilted positions.
- To prepare drawings on Orthographic projection of simple sections of solids, complex solids, hollow object and sections.

#### **UNIT II**

- To study the interpenetration of solids and development of surfaces & sections.
- To study the principles and techniques of axonometric, oblique and isometric views and construct three dimensional views of basic and complex geometrical shapes.

#### **UNIT III**

- To study the basic terms, principles, types and techniques of geometrical perspective drawing and to prepare perspective by measuring point method, angular and parallel perspective.
- To prepare drawings on the presentation of interior and exterior views in one point perspective and section perspectives.

#### **UNIT IV**

- To prepare drawings using two point perspectives for simple objects, inclined planes, cylindrical objects, arches and other circular forms etc.
- Introduction/ Meaning of Sciography, Projection of Sciography in plan and elevations.

#### **TEXT BOOK:**

1. Bhatt, N.D., "Engineering Drawing: Plane and Solid Geometry", Charotar Publishing House.

#### **REFERENCE BOOKS:**

1. Gill, Robert W., "Basic Perspective", Thames and Hudson.
2. Leslie, Martin C., "Architectural Graphics", Macmillan Publications.

3. K.L.Narayana, P.Kannaiah, 'Text Book on Engineering Drawing' Scitech Publications.
4. Malik, Shankar, "Perspective and Sciography", Allied Publishers.

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1. [www.technologystudent.com](http://www.technologystudent.com)
2. [www.ider.herts.ac.uk/school/courseware](http://www.ider.herts.ac.uk/school/courseware)

**APAR125**

**ARTS & GRAPHICS-I**

**CREDITS-4**

### Course Objective:

- To understand the techniques of sketching & rendering in different mediums.

### UNIT I

#### Indoor Sketching:

- To practice still life sketching of objects & figures with shades & shadows using pencil etc. (Black & White)

#### Outdoor Sketching:

- To practice still life sketching of objects & figures with shades & shadows using pencil etc. (Black & White)
- To understand principals of drawing shades & shadows with source of light being Sun.

### UNIT II

- Color theory- color mixtures, colour systems, colour organization, application of colour schemes, national and international standards on colour.
- Use of colors and coloring techniques Brush control exercises in water, oil, poster, crayon and mixed media.

### UNIT III

- Representation of scaled graphics of foliage-trees, plants & shrubs, human figures& urniture etc.

#### Architectural Presentation & Rendering of Landscape Elements:

- To practice presentation and rendering of Trees, herbs, shrubs, ground covers, contours & water bodies as a single entity, and in clusters / groups in association with built forms, both in plans & elevations, in Black & White and in color.

### UNIT IV

#### Architectural presentation & rendering of inanimate objects in manmade environment:

- To practice presentation and rendering of both plans & elevations of cars, furniture, buildings, accessories such as telephone, desktops, etc., in Black & White and in Colour.

#### Architectural Presentation & Rendering of Human Figures:

- To practice presentation and rendering of both plans & elevations, in Black & White and in Colour.

### TEXT BOOK:

1. Malik, Shankar, "Perspective and Sciography", Allied Publishers

## REFERENCE BOOKS:

1. Robert W. Gill , "Rendering with pen and ink"
2. Leslie, MartinC., "Architectural Graphics", Macmillan Pub Co

**APAR126**

**WORKSHOP**

**CREDITS-2**

### Course Objective:

- To introduce the carpentry tools, processes and wood working machines and learn about carpentry joints and their uses.

### UNIT I

- To introduce carpentry tools, processes and wood working machines. To prepare three dimensional solids like cube, cuboids, pyramids, spheres, cone and cylinders and make a composition.

### UNIT II

- Carpentry joints- Technical terms, classification of joints: lengthening, spliced or longitudinal joints; bearing joint, framing joint, angle/ corner joint, oblique/shouldered joint, widening or side joint
- Fastenings, Carpentry tools and various connecting devices
- To demonstrate the use of carpentry tools in making joints such as Dovetail Joint, Mortise and Tenon Joint, Lap joint, Butt Joint etc. to be used for making furniture.

### UNIT III

- To prepare joints (Lap and Butt) by metal arc welding

### UNIT IV

- To create complex three dimensional forms for models using carpentry methods.

## TEXT BOOKS:

1. Raghuwanshi, B.S., "A Course in Workshop Technology —'Vol. I and II', Dhanpat Rai and Co.

## REFERENCE BOOKS:

1. Morris, M., "Architecture and the Miniature: Models", John Wiley and Sons
2. Mills, Criss B., "Designing with Models: A Studio Guide to Making and Using Architectural Models", Thomson and Wadsworth.
3. McKay, W. B., Building Construction (Metric) (vol. 1 to 4).

**APCE113**

**STRUCTURAL DESIGN-I**

**Credits-3**

### Course Objective:

To understand the basic principles of structural mechanics so that it forms the basis for study of structural design.

### UNIT I

#### Composition & Resolution of Forces:

- Force & its units
- Laws of forces
- Resultant of a force system —Analytical, Method of resolution, Triangle Law, Polygon law,

Graphical (Vector) method

- Moment of force —Varignon's principle,
- Couple - Moment & Arm of a couple

### **Equilibrium of Forces:**

- Principles of equilibrium
- Analytical & Graphical method for equilibrium of forces
- Free body diagram
- Conditions of equilibrium
- Types of equilibrium

## **UNIT II**

### **Centroid & Centre of Gravity:**

- Definition, Centroid and Centre of Gravity
- Relationship between C.G., Centre of Mass and Centroid.
- Centroid of a Line
- Methods of finding out C.G. & Centroid of plane figures; Symmetrical sections, unsymmetrical sections, solids by different methods —Geometrical, By moments, & Graphical method.

## **UNIT III**

### **Moment of Inertia:**

- Definition & important theorems —Parallel axis & perpendicular axis theorem.
- Section modulus
- Radius of Gyration
- MI of plane lamina
- MI of Composite sections.

## **UNIT IV**

### **Support Reactions**

- Types of loading —point load, uniformly distributed load, uniformly varying load.
- Types of end supports of beams & frames —simple supported, Hinged, Overhanging beams  
Introduction to bending moment and shear force diagram in beam.

### **TEXT BOOK:**

1. Applied Mechanics by R.S. Khurmi, S.chand Publications.

### **REFERENCE BOOKS:**

1. Structure Mechanics for Architects by Prof. Harbhajan Singh, Abhishek Publications, Chandigarh.
2. Strength of Materials by S.Ramamrutham, Dhanpat Rai & Sons, New Delhi.
3. Mechanics of Materials by Dr. B.C. Punmia, Ashok Kumar Jain, Arun Kumar Jain, Laxmi Publications (P) Ltd., New Delhi
4. Mechanics for Engineers, Statics, Ferdinand P. Beer & E. Russell Johnston, Jr. Mc.Graw Hill, International Student Edition.



**Course Objective:**

- To understand the basic principles of structural mechanics that would be pertinent to simple design elements.
- To understand the structural behaviour of buildings.

**UNIT I****Determinate and indeterminate structure:**

- Definition of determinate and indeterminate structure
- Degree of freedom
- Concept of stress and strains
- Stress- strain relationship hook's law, examples

**Bending Stresses:**

- Concept of bending stresses
- Flexural formula
- Shear stress in beam

**UNIT II****Theory of Columns:**

- Types of end conditions of columns
- Equivalent length of a column
- Axial loads, combined bending & axial loads,
- Indian Standard Code recommendations - Euler's formula for long columns —
- Rankine's formula - Practical applications

**UNIT III****Theory of arches :**

- Classification of arches
- Analysis of three hinged arches
- Bending moment diagram for given loads - Normal thrust and radial shear

**Introduction to cables:**

- Types
- Bending moments & force analysis.

**UNIT IV****Analysis of perfect frames:**

- Simple stresses in frames —Tensile & Compressive
- Analysis of a perfect truss by method of joints, method of sections, graphical method & Link polygon
- Cantilever trusses
- Simply supported trusses

## TEXT BOOK:

1. Strength of Materials by Dr. R.K.Bansal, Luxmi Publications.

## REFERENCE BOOKS:

1. Structural Analysis, Punmia, B.C., Standard Publishers Distributors, New Delhi, 1995  
Strength of Materials by S.Ramamrutham, Dhanpat Rai & Sons, New Delhi.

## APCH125

## ENVIRONMENTAL STUDIES

CREDITS-3

### Course Objectives:

#### This course in environmental studies will develop the:

- Basic understanding about the concept related to environment such as eco system and biodiversity.
- Understanding about pollution and its control. Insight about the various concerns regarding environment such as population and social issues.

## UNIT I

**Introduction of Environmental Studies:** Multidisciplinary nature of environmental studies; Scope and importance; Concept of sustainability and sustainable development. Natural Resources: Renewable and Non-renewable Resources.

**Land resources:** land use change; Land degradation, soil erosion and desertification.

**Deforestation:** Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.

**Water:** Use and over-exploitation of surface and ground water, floods, **Energy flow in an ecosystem:** Food chains, food webs and ecological succession.

#### Case Studies of the following ecosystems:

- a) Forest ecosystem
- b) Grassland ecosystem
- c) Desert ecosystem
- d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

## UNIT II

**Biological Diversity:** Levels of biological diversity; genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots ; India as a mega-biodiversity nation; Endangered and endemic species of India; Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of Biodiversity: In-situ and Ex-situ conservation of biodiversity; Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

## UNIT III

**Environmental Pollution:** Types, causes, effects and controls; Air, water, soil and noise pollution. Nuclear hazards and human health risks; Solid waste management: Control measures of urban and industrial waste; Pollution case studies.

**Environmental Policies and Practices:** Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.

**Environment Laws:** Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; Nature

reserves, tribal populations and rights, and human wildlife conflicts in Indian context. International agreements: Montreal & Kyoto protocol and convention on biological diversity. Nature reserves, tribal population and rights, human wild life conflicts in Indian context.

#### UNIT IV

**Human Communities and the Environment:** Human population growth: Impacts on environment, human health and welfare; Resettlement and rehabilitation of project affected persons; case studies; Disaster management: floods, earthquake, cyclones and landslides; Environmental movements: Chipko, Silent valley, Bishnois of Rajasthan; Environmental ethics: Role of Indian and other religions and cultures in environmental conservation; Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

#### Field Work:

- Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
- Visit to a local polluted site-Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river, Delhi Ridge, etc.

#### TEXT BOOK:

1. Anubha Kaushik and C. P. Kaushik, Environmental Studies, New Age International Publishers (P) Ltd. New Delhi.

#### REFERENCE BOOKS:

1. AK De, Environmental Chemistry, New Age International Publishers (P) Ltd. New Delhi.
2. PH Raven, DM Hassenzahl & LR Berg, Environment, John Wiley & Sons, New Delhi.
3. JS Singh, SP Singh and SR Gupta, Ecology, Environmental Science and Conservation, S. Chand Publication, New Delhi.
4. Erach Bharucha, Textbook of Environmental Studies, Universities Press (P) Ltd., Hyderabad, India. droughts, conflicts over water (international & inter-state).

#### APEL101

#### COMMUNICATION SKILLS

#### CREDITS-4

**Course+ Objective:** The purpose of this course is to understand the basics of Grammar to improve written and oral communication and to speak correct form of English with proficiency Improve students' personality and enhance their self-confidence

#### UNIT I

**Introduction to Communication:** Meaning, Forms & Types of Communication; Process of Communication; Principles of Effective Communication/7Cs, Barriers in Communication; Literature: A Bird Came Down the Walk by Emily Dickinson

#### UNIT II

**Essentials of Grammar:** Parts of Speech: Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, Interjection; Using tenses; Articles; Types of sentences; Reported Speech; Punctuation; Literature: Stopping by Woods on A Snowy Evening by Robert Frost

#### UNIT III

**Building Vocabulary:** Word Formation (by adding suffixes and prefixes); Common Errors; Words Often Confused; One word substitution, Homonyms and Homophones; Antonyms & Synonyms, Phrasal Verbs, Idioms & Proverbs ( 25 each); Commonly used foreign words(15 in number); Literature: The Last Leaf by O'Henry

## UNIT IV

**Personality Development:** Etiquette & Manners; Leadership; Inter & intra personal skills; Attitude, Self-esteem & Self-reliance; Public Speaking; Body Language: Posture, Gesture, Eye Contact, Facial Expressions; Presentation Skills/ Techniques; Literature: My Prayer to Thee by Rabindranath Tagore;

### TEXT BOOK:

1. Kumar, Sanjay and Pushplata. Communication Skills. Oxford University Press.

### REFERENCE BOOKS / SITES:

1. Tickoo, M.L, Subramanian A. E. and Subramaniam P.R. Intermediate Grammar, Usage and Composition. Orient Blackswan.
2. Mitra, Barun K. Personality Development and Soft Skills. Oxford University Press.
3. "Best Poems", <http://100.best-poems.net/>. 20 July 2016.
4. "Classic English Short Stories", <http://www.eastoftheweb.com/short-stories/Collections/ClasEngl.shtml>, 20 July 2016. "Classic English Short Stories", <http://www.eastoftheweb.com/short-stories/Collections/ClasEngl.shtml>, 20 July 2016

## APEL171

## COMMUNICATION SKILLS LAB

## CREDIT-1

**Course Objective:** The Communication Skills Lab focuses on communication activities in functional and situational contexts. It encourages students to speak with fluency and accuracy as well as to enhance the four language skills of reading, writing, listening and speaking through real life and professional situations. In each practical class student should spend

- 5 to 10 minutes on effective browsing of online News paper
- 5 to 10 minutes on English Language software activities

Each student must actively complete the following ten activities in practical classes, and the Lab Record with the teacher's signature and the internal marks should be submitted to the External Expert during Viva.

**Activity 1: Self- Introduction:** Informal introduction & formal introduction; A detailed write up on formal 'Self Introduction'; Formal Introduction of oneself in front of the group.

**Activity 2: News Reading:** Introduction to 'online News papers'; Browsing and selecting the preferred News paper; Browsing through the News Headlines; Selecting interested News items; Comprehending the content, writing down the essence and reading the News in front of the Group. Discuss 5 to 8 new words or terms, 4 to 5 important personalities of that day's news etc.

**Activity 3: a. JAM:** Introduction to 'Just A Minute speech' and the 'Extempore speech'; Preparation of speech on given topic (different topic for each student); delivery of the speech; Feed back (on content, time management, body language etc. highlighting the positive aspects first.)

**b. Listening Comprehension:** Listen to online / downloaded oration by renowned Orators; write down the content in a precise form and give an oral presentation of that write up following all the etiquettes of public speaking.

**Activity 4: a. Turn Coat:** Speaking for and against by the same person with time specification; assign topics from the immediate surroundings; write down the content either from the Net or from personal knowledge; prepare well and deliver; feedback & suggestions for improvement.

**b. News Discussions:** Selecting News of the day, Discussing among the group, prepare the news content and prepare the group opinion about the issue and present it in front of the class by the group involving each member; select 5 new words & new usages from the selected news item

**Activity 5: Conversation Ability:** Characteristics of effective conversation; Listening to a few

sample conversations; preparing conversation based on the given situation; enacting the situation through effective delivery of the script; feedback & suggestions for improvement.

sample conversations; preparing conversation based on the given situation; enacting the situation through effective delivery of the script; feedback & suggestions for improvement.

**Activity 6: Role Play:** Characteristics of Role Play; assigning roles; developing the content to deliver; enacting the role with effective delivery; feedback & suggestions for improvement.

**Activity 7: Public Speaking:** Characteristics of effective Public speaking; possible barriers; watching demo online; topic assignment, information gathering & recording; delivery in front of the class; feedback & suggestions for improvement. (Different topic for each student)

**Activity 8: Group Discussion:** Importance and characteristics; Dos & Don'ts in GD; Demo display; assign topic for the group, Preparation & performance; feedback & suggestions for improvement.

**Activity 9: Debate :** Difference between Group Discussion & Debating; Watching demo of Debating; Topic for the group of 2 or 4; preparation and performance; feedback & suggestions for improvement.

**Activity 10: Interview:** Importance & purpose of Job Interview; Interview etiquettes; Watch demo interview; Appear for formal mock interview; feedback & suggestions for improvement.

#### **TEXT BOOK:**

1. Kumar, Sanjay and Pushplata. Communication Skills. Oxford University Press.

#### **REFERENCE BOOKS:**

1. Mitra, Barun K. Personality Development and Soft Skills. Oxford University Press.
2. Raman Meenakshi & Sharma, Sangeetha. Technical Communication Principles and Practices, 2nd Ed. Oxford University Press, New Delhi, 2011.



Annexure								
B.Arch.				Year 2018-23 ( Scheme of Studies)				SOAP
ODD SEMESTER					EVEN SEMESTER			
Year	Sno	Course Code	Course Title	C	Sno	Course Code	Course Title	C
First	1	APAR117	BASIC DESIGN & CREATIVE WORKSHOP	12	1	APAR118	ARCHITECTURAL DESIGN-I	6
	2	APAR119	INTRODUCTION TO BUILDING MATERIALS	2	2	APAR120	BUILDING CONSTRUCTION & MATERIALS-I	6
	3	APAR129	HISTORY OF CULTURE & CIVILISATION	2	3	APAR128	THEORY OF DESIGN	2
	4	APAR123	ARCHITECTURAL DRAWING-I	6	4	APAR124	ARCHITECTURAL DRAWING-II	4
	5	APAR125	ARTS & GRAPHICS-I	4	5	APAR126	WORKSHOP	2
	6	APCE113	STRUCTURAL DESIGN-I	3	6	APCE114	STRUCTURAL DESIGN-II	3
	7	APCH125	ENVIRONMENTAL STUDIES	3	7	APEL101	COMMUNICATION SKILLS	4
					8	APEL171	COMMUNICATION SKILLS LAB	1
		0	TOTAL	32	0		TOTAL	28
Second	1	APAR217	ARCHITECTURAL DESIGN-II	8	1	APAR218	ARCHITECTURAL DESIGN-III	8
	2	APAR219	BUILDING CONSTRUCTION & MATERIALS-II	6	2	APAR220	BUILDING CONSTRUCTION & MATERIALS-III	6
	3	APAR241	HISTORY OF ARCHITECTURE-I	2	3	APAR232	HISTORY OF ARCHITECTURE-II	2
	4	APAR239	ENVIRONMENT & CLIMATE	2	4	APAR222	ARCHITECTURAL GRAPHICS	4
	5	APAR225	ARTS & GRAPHICS-II	3	5	APAR224	COMPUTER APPLICATION IN ARCHITECTURE-II	2
	6	APAR227	COMPUTER APPLICATION IN ARCHITECTURE-I	2	6	APCE228	STRUCTURAL DESIGN-IV	3
	7	APCE237	STRUCTURAL DESIGN-III	3	7	APCE230	BUILDING SERVICES-I (WATER SUPPLY & SANITATION)	2
	8	APCE233	SURVEYING & LEVELLING	1				
	9	APCE235	SURVEYING & LEVELLING LAB	1				
		0	TOTAL	28	0		TOTAL	27

Third	1	APAR325	ARCHITECTURAL DESIGN -IV	10	1	APAR318	ARCHITECTURAL DESIGN-V	10
	2	APAR331	BUILDING CONSTRUCTION & MATERIALS-IV	6	2	APAR320	BUILDING CONSTRUCTION & MATERIALS-V	6
	3	APAR333	MODERN WORLD ARCHITECTURE	2	3	APAR336	TOWN PLANNING	2
	4	APAR329	HOUSING	2	4	APAR310	WORKING DRAWING & BUILDING BYELAWS	6
	5	APAR323	COMPUTER APPLICATION IN ARCHITECTURE-III	2	5	APCE332	STRUCTURAL DESIGN-VI	3
	6	APCE315	STRUCTURAL DESIGN-V	3	6	APAR328	BUILDING SERVICES-III (ACOUSTICS )	2
	7	APCE317	ESTIMATING, COSTING & SPECIFICATIONS	2	7	APAR334	AIR CONDITIONING & MECHANICAL SERVICES	2
	8	APEE321	BUILDING SERVICES-II (ELECTRICAL & LIGHTING)	2				
	0		TOTAL	29	0		TOTAL	31
Fourth	1	APAR419	ARCHITECTURAL DESIGN -VI	10	1	APAR402	PROFESSIONAL TRAINING	18
	2	APAR421	BUILDING CONSTRUCTION & MATERIALS-VI	6				
	3	APAR431	PROFESSIONAL PRACTICE & OFFICE MANAGEMENT	2				
	4	APAR425	PROJECT CONSTRUCTION MANAGEMENT	3				
	5		ELECTIVE-I	3				
	6		ELECTIVE-II	3				
	0		TOTAL	27			TOTAL	18
Fifth	1	APAR519	DISSERTATION	6	1	APAR520	ARCHITECTURAL THESIS	18
	2	APAR521	URBAN DESIGN	10	2	APAR522	SEMINAR	4
	3		ELECTIVE-III	3				
	4		ELECTIVE-IV	3				
	0		TOTAL	22	0		TOTAL	22
Elective Subjects			List of Electives		7	APAR507	LOW COST CONSTRUCTION TECHNOLOGY	3
	1	APAR407	ARCHITECTURAL CONSERVATION	3				
	2	APAR427	SITE PLANNING & LANDSCAPE DESIGN	3	8	APAR509	WATER RESOURCE MANAGEMENT	3
	3	APAR411	ART MOVEMENTS & ARCHITECTURE	3	9	APAR511	INTEGRATED WASTE MANAGEMENT & TECHNOLOGY	3
	4	APAR413	SUSTAINABLE ARCHITECTURE	3	10	APAR513	INTERIOR DESIGN	3
	5	APAR415	INTELLIGENT BUILDINGS	3	11	APAR515	VERNACULAR ARCHITECTURE	3
	6	APAR433	VISUAL ARTS	3	12	APAR517	STRUCTURAL SYSTEMS	3
Note: Educational Tour shall be conducted once a year in the I,II & assessed in relevance as part of various appropriate theory and studio courses				Total Hours: Lect[L]+Prac[P]+Stud[S]+Tut[T]				256
				Total Credits				264