

SYLLABUS

DEGREE OF BACHELOR OF ARCHITECTURE

UNIVERSITY OF MUMBAI

FIRST YEAR ARCHITECTURE

1.1 BASIC DESIGN :

Teaching Hours

Lecture : -----

Studio : 256 periods of 45 mins. each. (192 Hours)

Sessional Marks

Internal : 100

External : 100 (by external examination – jury)

Examination Scheme

Duration : -----

Marks Max. : -----

Marks Min. : -----

GENERAL GUIDE LINES :

1. Course in Basic Design shall be conducted by giving small time assignments of the duration of 15 to 20 days each (total 10 to 12 Nos. in a year)
2. Each assignment shall be aimed at teaching the principles of Aesthetics and Visual Design and its application in Architecture forms and spaces.
3. Goals and Objectives of each assignments shall be made clear to the students before starting the assignments.
4. There shall be transparency in process of evaluation and students shall be made aware about the visual merits and demerits of their work/submissions.
5. Each assignment shall have meaningful sequence with the previous assignments and the next assignment.

BASIC DESIGN ASSIGNMENTS SHALL INCLUDE THE FOLLOWING TOPICS :

1. **Principles of Visual Compositions :** The assignment shall be aimed at understanding and using principles like Repetition, Rhythm, Radiation, Focal point, Symmetry, Unsymmetry, Background, Foreground, Sense of Direction, Harmony, Balance and Proportion.
2. **Elements of Visual Composition :** Assignment shall be aimed at understanding role of the following basic elements of visual design existing in paintings, compositions, murals, sculptures, building and in a nature –
Dots, Lines, Planes, Patterns, Shapes, Forms, Spaces, Colour, Texture, Levels, Light, Fenestration's.

3. **Exploring Colour Schemes and its application on Architectural Forms & spaces** : Assignment on Colour shall be aimed at developing the skills to create Visually pleasing Colour Schemes based on principles of Harmony and Contrast and degree of Chromatism.
4. **Study of Textures and Textures Schemes.**
5. **Study of Openings for light, shadow, shades and sciography** : This assignment shall be related to openings in the building, windows, roof, lighting and its impact on visual character of the space.
6. **Study of Planer Forms** : This assignment shall be aimed at creating abstract sculptures out of Mount Board, Box Board, Metal Foils and any other planer material and also exploring the adoptability of these sculptures to Architectural functions.
7. **Study of Paper Forms** : This assignment shall include explorations of various folded paper forms and its possible use in Architectural Spaces.
8. **Study of Solids and Voids** : This assignment shall include creation of abstract and semi abstract symbolic sculptural forms and spaces.
9. **Study of Linear Forms** : Students should be asked to create : Wire Sculptures, Mobile Sculptures, Atrium Sculptures, Space sculptures, Geodesic Domes etc. for outdoor and indoor Architectural spaces.
10. **Study of Fluid / Plastic Forms** : This assignment shall include use of clay, plaster or any other mouldable material and create plastic and free flowing Sculptural forms.
11. **Building Appraisal** : In this assignment the students shall be asked to present any analytical study of the sculptural building forms and its critical appraisal of visual character.
12. **Application of Basic Design in Architecture** : This assignment shall be aimed at learning to adopt compositions, murals and sculptures for semi recreational and semi functional Architectural spaces like children playing area, Exhibition Spaces, Outdoor Dinning Area, Entrance Gates of Exhibition, Compound Wall, Compound Gate, Floor patterns, Atrium or Courtyard with levels, Monumental Sculptures in Foreground of Buildings, Outdoor Recreational Spaces, Atrium Sculpture, Building Facades, Graphics on the Dead Walls, Murals in the Entrance Halls etc.

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1.2 GRAPHICS - I

Teaching Hours

Lecture	: -----
Studio	: 224 periods of 45 mins. each. (168 Hours)

Sessional Marks

Internal	: 100
External	: -----

Examination Scheme

Duration	: -----
Marks Max.	: -----
Marks Min.	: -----

STAGE I :

1. Introduction to metric scales.
2. Plan Geometry.
3. Descriptive Geometry / Solid Geometry / Introduction to Orthographic Projections.
4. Architectural Lettering for titles.
5. Three Dimensional Views such as Axonometric, Oblique & Isometric.
6. Inter – Penetration of Solids.
7. Surface Developments and Sections.
8. Free - hand Drawing :-
 - a. Study of Basic elements of drawings, line, texture, tone and colour
 - b. Study of shade and shadows and their presentations in pencil, ink and colour, preferably in Three – Dimensional objects and group of objects.
 - c. Sketching of furniture pieces, parts of building in relation with human scale and proportions.

Submission of sessional work of 100 marks shall be assessed by the Jury of Internal Examiners from time to time.

STAGE II :

Perspective Drawing :- Introduction to theory of Geometrical Perspective Drawing.

1. Perspective by Side Elevation Method.
2. Angular and Parallel perspective.
3. Perspective of different solids and building elements.

Sciography :-

1. Introduction to theory of conventional direction of light.
2. Shadows of planes and solids.
3. Shades and shadows cast by group of solids.
4. Shades and Shadows of building and parts of buildings.

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1.3 ARCHITECTURAL DESIGN - I

Teaching Hours

Lecture	: -----
Studio	: 224 periods of 45 mins. each. (168 Hours)

Sessional Marks

Internal	: 100
External	: -----

Examination Scheme

Duration	: -----
Marks Max.	: -----
Marks Min.	: -----

STAGE I :

In this term sessional work should be related to preparation of actual measured drawings at selected locations rural in nature and further elaborated with notes on form, functions utility, method of construction etc.

This exercise shall be followed by a design problem based on the above work and to understand the function of a single unit such as living area, bed room, stalls, booths , bus-stops etc.

The design problem shall also take into consideration.....

Activities and their relationship with spaces function.....

Scales and proportions, climate.

STAGE II :

Design problem shall be rural in nature. Application of the measured drawings prepared in the 1st term viz. Method of construction, materials etc. and shall cover :

Principals of Architectural Planning.

Effects of basic requirements on design.

Orientation in relation to site and climatic conditions.

Design problem shall deal with planning for small groups of people and minor activities such as bungalows, shops, snacks, bars etc. and shall include data collection on climate, site conditions and user requirements.

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1.4 THEORY AND DESIGN OF STRUCTURES I

Teaching Hours

Lecture	: 128 periods of 45 mins. each.(96 Hours)
Studio	: ----

Sessional Marks

Internal	: 50
External	: ----

Examination Scheme

Duration	: 3 Hours
Marks Max.	: 100
Marks Min.	: 50

OBJECTIVES :

Developing in students, material skills to analyse and understand fundamentals and working of various parts of different structural systems.

1. INTRODUCTION

- Aims, objects and scope of study of Theory of Structures for architects.
- Technical names and function of various structural components from foundation to roof.
- Fundamentals of mechanics.
- S. I. System Units.

2. LOADS

- Various types of loads such as dead , live, wind, impact, earthquake etc. and their effect on structures.

3. FORCE AND MOMENTS :

- Definition, Cause, Effect, Units, Force as vector, Graphical representation.
- Resolution of forces by graphical and analytical methods.
- Types of Forces – Coplanar, Non- Coplanar, Concurrent, Non-concurrent, and parallel forces.
- Triangle of forces, Parallelogram of forces, Equilibrium of forces.
- Concept of Resultant and Equilibrium of forces.
- Conditions of Equilibrium by analytical and graphical methods.
- Beam reactions graphically and analytically, Statically Equilibrium.

4. PROPERTIES OF SECTIONS :

- Centre of gravity by graphical and analytical methods.
- Moment of inertia, Modulus of section, Radius of Gyration.

5. STRESS AND STRAIN :

- Concept of definition and units of stress.
- Compressive and shear stress.
- Young Modulus, Shear Modulus, Bulk Modulus and relation between them.
- Linear and lateral strain, Poisson's Ratio, stress and strain curve.
- Elastic limit, Yield point, Breaking stress, factor of safety. Safe stress values for materials.

6. SHEAR FORCE AND BENDING MOMENT :

- Shear force and bending moment diagrams in case of simply supported beams and cantilevers with distributed and point loads.
- Simply supported beams with overhangs, moments applied to cantilevers and beams.

7. THEORY OF SIMPLE BENDING :

- Theory of simple bending (No derivations) and equation and problems.
- Design of timber steel beams.

8. TRUSSES :

- Truss – stresses in pin-jointed frames (by methods of joints and observation only)

SESSIONAL WORK : (Plates and seminar 50 Marks, problem solving 50 marks)

SESSIONAL PLATES ON :

- Study of structural systems in nature-Trees. Honeycomb, Egg shell, Spider web, etc.
- Resultant of Forces, Equilibrium of forces
- Shear Force and Bending Moment –Graphical Method
- Simple Truss
- GROUP SEMINAR ON Comparative study of load bearing and framed structures, structural action, load / force transfer from component, Design philosophy of the two types, identification of locations of load concentration in load bearing and framed structure.

TEXT BOOKS RECOMMENDED :

- Engineering mechanics by A. K. Tayal
- Mechanics of structure Vol. I By Junnarkar

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1.5 THEORY OF DESIGN

Teaching Hours

Lecture : 32 periods of 45 mins. each.(24 Hours)
Studio : ----

Sessional Marks

Internal : 50
External : ----

Examination Scheme

Duration : ----
Marks Max. : ----
Marks Min. : ----

The idea is to introduce the students to the “Elements” that make a design such as :

- a) Spaces – their relation interaction and information in a structure
- b) Forms
- c) Functions of spaces and their flexibility.
- d) Elements of structure such as courtyards, waters, colours, etc.
- e) Natural forms and shapes and their relation in designing.
- f) Elements of construction and their thoughtful use to enhance designs

(These are some of the topics, there are many more that can be considered).

The students of First and Second year are very raw and therefore the idea of this exercise is to make them more aware of environment around them and also to open their minds to shapes and forms and their use in designing.

The idea is not only to study the various aspects but to even experience them where-ever possible by taking the students on site- visits and to learn about the way things work on site.

The other objective of this class is also to explore the materials available their uses, limits (structurally and aesthetically) and means of construction by means of models and actual experiments.

In a nutshell this subjects should be able to help them expand their awareness and perceptiveness and help them become better designers.

The exercises selected are broken up in to two formats where in the very basic are taken in the first term and the individual elements are taken in the second term.

The basic exercises considered are as follows :

- 1) A plane supported by a single support and being able to lift the weight of the plane the idea being that the fixed criteria is the plane and the size and the location of the support is to be designed by the student to achieve the aim.
- 2) A plane supported by a single support and the plane should be able to take the load of half a brick.
- 3) The same plane supported by multiple supports and be able to take the load of half a brick.
- 4) A plane is supported by a tensile form of support where in the support to be designed and material to be decided by the student to be able to stand by itself.
- 5) The tensile structure is now designed as a 30 cms long bridge and criteria is to be able to take to load of one brick wherein the plane is to be of mount board only.
- 6) Moving on beyond planes the students are required to study a stable form as exists in nature and to design a small structure using the same form to highlight the structural part of that form.
- 7) The next and final basic exercise to study a structure designed in the natural form studied by them and to be able to analyse and appreciate / criticize the success of the structure as a design element.

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1.6 BUILDING CONSTRUCTION - I

Teaching Hours

Lecture	: 64 periods of 45 mins. each.(48 Hours)
Studio	: 128 periods of 45 mins. each.(96 Hours)

Sessional Marks

Internal	: 100
External	: ----

Examination Scheme

Duration	: 3 Hours (To be combined with building materials
Marks Max.	: 70 or 30 marks. Hence minimum mark
Marks Min.	: 50 combined at 50).

Brick Masonry – Masonry tools and equipments, bonding and its principle, headers stretchers, king and queen closers, English and Flemish bonds for corner, tee and cross junctions in 35 cms, 23cms, 11cms brick walls and buttress and pilasters and piers of 45, 35 and 23cms size, section of a compound wall.

Stone Masonry - Various types of stone dressings, plain bevelled, and rebated joints, dowels and cramps, quoins, headers and bond of through stones, rubble, khandki and ashler masonry wall, walls with stones facing and brick backing.

Simple Foundations – Simple foundation for masonry load bearing walls and piers.

Lintels and Arches - Brick, stone, timber and R. C. C. Lintels, Arches Flat, segmental, semicircular, parabolic, elliptical in brick and stone masonry, joggle joint.

Simple Timber Doors - Ledged braced battened and false Panelled door.

Simple Timber Roofs – Roof layout, ridge, hip, valley, gable, eaves etc. Lean – to, couple and collar roof with tile and sheet covering.

Sessional work based upon above topics.

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1.7 BUILDING MATERIALS - I

Teaching Hours

Lecture : 64 periods of 45 mins. each.(48 Hours)
Studio : -----

Sessional Marks

Internal : 50
External : -----

Examination Scheme

Duration : ----- (To be combined with building construction
Paper of 100)
Marks Max. : ----- 70 marks Building Construction &
30 marks for Building Materials Hence
Marks Min. : ----- minimum mark combined at 50).

Brick – Standard sizes, properties of good brick manufacture.

Stones – Building stones, types, properties of good stone, natural bed, stone dressings of various types, aggregates for concrete work.

Sand – Pit, River and Sea sand, uses in mortar and concrete, properties of good sand, impurities in sand and their removal.

Lime – Lime ore method of burning of lime ore, quick lime, hydraulic lime, lime mortar mix and preparation, neroo, efflorescence peeling and flaking.

Cement – Composition and manufacture, properties of cement, initial setting time, slow setting, quick setting and rapid hardening cements.

Timbers – Building Timbers of various types of quality and properties, method of felling trees, method of seasoning, sawing and planning, carpentry and joinery, carpenters tools.

Iron and Steel - Cast iron, steel and wrought iron with properties, brief idea of manufacturing process, uses of iron work in buildings.

Glass – Study of history process & manufacturing, uses of glass in Architecture and working on glass as etching, bevelling and stained glass work.

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1.8 CREATIVE WORKSHOP

Teaching Hours

Lecture	:	-----
Studio	:	96 periods of 45 mins. each.(72 Hours)

Sessional Marks

Internal	:	50
External	:	25

Examination Scheme

Duration	:	-----
Marks Max.	:	-----
Marks Min.	:	-----

STAGE I

Introduction to carpentry tools and machines.

Different types of timber joints.

Introduction to modelling with paper, paper board and plaster.

Basic model making techniques.

STAGE II

Identification and selection of timber, Timber finishes, varnish, polish etc.

Demonstration of brick work, plastering textures and finishes.

Models for Basic design and Architecture design studio – work.

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1.9 HUMANITIES – I (HISTORY OF CULTURE)

Teaching Hours

Lecture : 64 periods of 45 mins. each.(48 Hours)
Studio : ----

Sessional Marks

Internal : ----
External : ----

Examination Scheme

Duration : 2 Hours
Marks Max. : 50
Marks Min. : 25

Prehistoric Cultures – Paleolithic and Neolithic
Egyptian Civilization
Mesopotamian Civilization
Indus Valley Civilization
Greece
Rome
Vedic Culture
Rise of Buddhism and Jainism
Art and Architecture under Mauryans and Gupta Empires.
