CURRICULUM

FOR

DIPLOMA IN
ARCHITECTURAL ASSISTANTSHIP
(3 YEARS)

REVISED BY:

BOARD OF TECHNICAL EDUCATION DELHI

(DELHI STATE)

EFFECTIVE FROM: 2013-14

CONTENTS

SYLLABUS
AND
STUDY & EVALUATION SCHEME

FOR AWARD OF

DIPLOMA IN
ARCHITECTURAL ASSISTANTSHIP

EFFECTIVE FROM JULY, 2013

DEPARTMENT OF ARCHITECTURE

BOARD OF TECHNICAL EDUCATION
NEW DELHI

LIST OF COMMITTEE MEMBERS

1.	Dr. Promila Suri	Architect and Guest Professor, Apeejay Institute of Technology
2.	Mrs. Rita Darbari	Architect and Retired Principal, MBIT
3.	Mrs. Manjushree Golhar	Architect & Guest Professor, School of Planning and Architecture
4.	Mr. K. Sridhar	Principal Architect, Yojana
5.	Mr. T. S. Ravichandran	Practising Architect
6.	Mr Suneet	Architect and Incharge, Deptt of Architecture, MBIT
7.	Dr. K. K. Prasad	Lecturer (Mathematics), MBIT
8.	Mrs. P. Vajpeyi	Lecturer (Architecture), MBIT
9.	Mrs. Vimala Devi K.	Retd. Lecturer (Civil Engg.)
10.	Mr. Tarun Sharma	OSD (B. T.E.)
11.	Mr. Sanjay Chaudhry	OSD (B. T. E.)
12.	Mr. S. P. Singh	Controller, Board of Technical Education

TABLE OF CONTENTS

FIRST SEMESTER

AA-130 ART APPRECIATION AND GRAPHICS I

	L		P
Hours/ Week	2	-	7

Objective: The objective of this course is to make the students well versed in drawing, sketching and 3D visualization. It will provide awareness to students on how design elements are juxtaposed in the object world and the effect they create on the users. The subject also aims at developing the observation skills of students in different aspects of architectural rendering. The course is geared towards providing students with practical hands on exposure.

Following detailed exercises are recommended for this course.

1. **Free hand sketching of simple geometrical surface**
   - 1.1. Free hand drawing of two and three dimensional geometrical objects such as cube, cone, prism, pyramid, cylinder, and sphere (1 sheets)
   - 1.2. Free hand drawing of a set of objects (1 sheets)
   - 1.3. Free hand sketching of simple buildings and landscaping (4sheets)
   - 1.4. Free hand sketching of monument, building and trees in different techniques and mediums such as, pencil pen, ink, charcoal, coloured-inks, colours and crayons.(4 sheets)
2. **Colouring and Rendering Exercises:**
   - 2.1. Definition and perception of colour and colour materials.
   - 2.2. Hue, values and intensity, value scale, and colour wheel (2sheet)
   - 2.3. Study of colour; emotional effect of colour, warm and cool colours, receding and advancing colours; effect of light in colour harmony and contrast.
   - 2.4. Use of colour in nature, art and architecture.
   - 2.5. Shades and shadows, indication of surrounding, sky, clouds, tree, and stylized human figures as used in architectural drawing in pencil, ink, colour and crayons. (4sheet)
3. **Art Appreciation**
   - 3.1. Introduction to theory of design - Primary elements of design, composition of elements, balance, rhythm, harmony, contrast, proportion, texture, colour, emphasis
   - 3.2. Simple abstract compositions
     - in 2 D (3 sheets) and
     - 3D composition (3 sheets) based on principles of design.
4. **Mural design exercises. (2Sheets)**
5. **Lettering practices. (Spacing between letters & words).**
   - 5.1. Ratio b/w height and width of letters and numerals, Capitals and smalls 7:4 and 5:4 (2 Sheets)
   - 5.2. Free hand single line lettering (small and block) in various style, thickness and heights (3 Sheets)
   - 5.3. Lettering with the help of stencils (1 Sheet)

Notes: At least one drawing sheet of lettering should be prepared in Hindi.

AA- 131 GRAPHIC PRESENTATION

	L	T	P
Hours/Week	2	-	9

1. **Introduction**

   1.1 Drawing equipment and drafting standards.
   1.2 Line drawing in pencil and ink (2 Sheets).

2. **Plain and solid geometry**

   2.1 Geometrical construction of polygons, ellipse, parabola, hyperbola (2 Sheet).
   2.2 Sub-divisions of lines, polygons (1 Sheet).
   2.3 Definitions of solid.
   2.4 Projection of point, line and plan figures (1 Sheet).
   2.5 Development of solids (3 Sheets).
   2.6 Projection of solids in simple positions in 1st angle (5 Sheets).
   2.7 Projection of circles, cylinders and cones (3Sheets).
   2.8 Sections by horizontal and vertical planes and inclined plane (5Sheets).
   2.9 True shape of sections (2 Sheets).

3. **Scale drawing exercise**

   3.1. Plane scales, graphic scale.(3 Sheets)
   3.2. Dimensioning.(3Sheets)
   3.3. Orthographic projections of solids (5 Sheets)
   3.4. Reduction and enlargements of drawings (1Sheet).

4. **3 D exercises**

   5.1 Introduction to 3D drawings
   5.2. Difference between isometric and perspective drawings
   5.3. Isometric projections (5Sheets).
   5.4. Isometric views (2 sheets)

5. **Perspective exercises**

   6.1 Reality and appearance.
   6.2 Basic of perspective, cone of vision, central visual ray picture plane, line of sight through the picture plane, height of spectator.
   6.3 Fundamentals, dimension, foreshortening and convergence.
   6.4 Perspective of simple objects.(5 Sheets)
   6.5 Principal aids of perspective, vanishing point, eye-level, station point.
   6.6 Study of cones, sphere, cylinder, prism, etc

6. **Graphical representation of different building materials (1 Sheet).**

7. **Measure Drawing**

   7.1 Measure drawing of a room, plan and elevations of all walls in appropriate scale (2Sheets)

AA – 132 BUILDING MATERIALS – I

	L	T	P
Hours/ Week	3		

1. **Building Stones**
   - 1.1. Utility of stones
   - 1.2. Classification of rocks
   - 1.3. Selection of stones for different building works
   - 1.4. Characteristics of good building stones
   - 1.5. Testing of stones
     - 1.5.1. Water absorption test
     - 1.5.2. Compressive strength test
     - 1.5.3. Durability test
   - 1.6. Natural bed of stones, its correct placement for effective placement in building
   - 1.7. Common building stones
     - 1.7.1. Granite, Basalt and Trap, Sandstone, Lime stone, Slate, Marble
     - 1.7.2. Composition, Properties, uses, their origin, transportation and storage Techniques
   - 1.8 Advantages and disadvantages of different types of stones and their suitability to different elements of building

2. **Bricks**
   - 2.1. Classification of bricks and brick earth
   - 2.2. Properties and uses of first class and second class bricks, clay and burnt bricks
   - 2.3. Advantages and disadvantages of different types of bricks and their suitability to different elements of building
   - 2.4. Characteristics of a good brick
   - 2.5. Size and weight of a standard brick
   - 2.6. Composition of brick earth
   - 2.7. Test for burnt clay bricks
     - Compressive strength test
     - Water absorption test and efflorescence test.
   - 2.8. Fire bricks, its properties, uses and availability.

3. **Timber**
   - 3.1. Characteristics and uses of common timbers used in buildings i.e. sal, deodar, kail, cheer, teak, etc.
   - 3.2. Characteristics of hardwood and softwood.
   - 3.3. Defects in timber.
   - 3.4. Characteristics of good timber.
   - 3.5. Characteristics & application of various wood boards and other wood products.
   - 3.6. Advantages and disadvantages of different types of timber and wood based products and others over timber and their suitability to different elements of building
   - 3.7. Seasoning of timber.

4. **Lime**
   - 4.1. Uses of lime, classification of lime
   - 4.2. Storing of lime
   - 4.3. Advantages and disadvantages of lime and their suitability and uses to different elements of building

5. **Cement**
   - 5.1. Composition of Portland cement
   - 5.2. Setting and hardening of cement
   - 5.3. Types of cement, their properties and uses
     - Ordinary Portland Cement (OPC)
     - Rapid Hardening Cement
     - High Alumina Cement
     - White Cement
     - Colored Cement
     - Pozzolana Portland Cement
     - Sulphate Resisting Cement
   - 5.4. Storage of Cement.
   - 5.5. Uses of cement
   - 5.6. Advantages and disadvantages of cement and their suitability to different elements of building

6. **Mortar**
   - 6.1. Function and types of Mortar
   - 6.2. Preparation of cement mortar& lime mortar and their applications.
   - 6.3. Proportion of mortar for different building works.
   - 6.4. Different types of sand.
   - 6.5. Bulking of sand.
   - 6.6. Advantages, disadvantages and applicability of different types and proportions of mortar and their suitability to different elements of building

7. **Concrete**
   - 7.1. What is concrete and Different types of concrete
   - 7.2. Concrete Mixes
   - 7.3. Mixing, placing and uses of lime concrete and cement concrete.
   - 7.4. Aggregate and its grading
   - 7.5. Placing and compaction of concrete.
   - 7.6. Curing of concrete.—reasons of curing and curing for different uses
   - 7.7. Reinforced cement concrete.
     - Necessity of providing reinforcement.
     - Properties of R.C.C.
   - 7.8. Advantages and disadvantages of different types and proportions of concrete and their suitability to different elements of building

AA-133 WORKSHOP PRACTICE

	L	T	P
Hours/Weeks	-	-	3

1. **Masonry (3 weeks)**
   - 1.1. Exercises on handling of bricks, cement, sand and aggregate
   - 1.2. Exercises on preparation of mortar
   - 1.3. Exercises on laying of bricks in various bonds.
   - 1.4. Exercises on pointing and finishing

2. **Painting and Polishing Shop (4 weeks)**
   - 2.1. Exercises in preparation of surfaces before painting
   - 2.2. Exercises in application of primer coat
   - 2.3. Exercises in polishing wood items
   - 2.4. Exercises in painting wooden and steel items

3. **Carpentry (1 week)**
   - 3.1 **Demonstration exercises on woodwork**
     Sawing, Planing, Joining of wood

4. **Introduction to model making (5 weeks)**
   - 4.1. Exercise in development and preparation of simple 3D geometric shapes such as cube, pyramid etc in card board and mount board

AA-134 APPLIED MATHEMATICS – I

	L	T	P
Hours/Week	3	2	-

1. Trigonometry: (25%)

1.1 Measurement of angles in degree and radian and their conversion.
1.2 Trigonometrical ratios and their relations, ratios of allied angles (without proof).
1.3 Sum and differences formulae and their applications,
1.4 Product formulae, from product to sum difference and vice versa,
1.5 Multiple and sub multiple angles (2A,A/2).

2. Matrices: (25%)

2.1 Definition and types of matrices, addition, subtraction, and multiplication of matrices,
2.2 Inverse of a 3 x 3 matrix by adjoin matrix method,
2.3 Solution of linear equations containing upto 3 unknown only.

3. Co-ordinate Geometry: (25%)

3.1. Point- Cartesian and polar co-ordinates and their conversion, distance between two points, internal and external division formula, co-ordinates of centroid, in center and circum-centre, conditions of co-linearity of points.

3.2. Straight line- Equation of a straight line in various standard forms, angle b/w straight lines, perpendicular distance formulae.

3.3. Circle- Equation of circle in standard and general form, finding the equation of circle when its centre and radius are given & when any 3 points on it are given.

3.4. Conics – Definition of conics, parabola, ellipse and hyperbola and their standard equation. Finding the equation of parabola when its focus and directrix or focus and vertices are given, finding the equation of an ellipse or hyperbola when focus, directrix and eccentricity are given. Given the standard equation of conic to find its focus, directrix, vertex, axis, eccentricity and the length of latus rectums.

4. Differential calculus (25%)

4.1. Limits and functions:

Concept of a function, its value and limit.

4.2 Evaluation of limits- four standard limits only, namely :

$$\lim_{X \to 0} \frac{\sin X}{X} \qquad \lim_{X \to 0} (1+X)^{1/X}$$

$$\lim_{X \to 0} \frac{X^n - a^n}{X-a} \qquad \lim_{X \to 0} \frac{a^X - 1}{X}$$

4.3 Differentiation:

- Definition , its physical meaning as rate measure and its geometrical meaning
- Differentiation from first principal of X^n, e^x, $\log a^x$ .sin X, cos X, tan X only.
- Differentiation of cot X, sec X, cosec X and of inverse ratio.
- Differentiation of sum, product and quotient of functions.
- Differentiation of function of a function.
- Logarithmic differentiation.

AA- 135 COMMUNICATION TECHNIQUES – I

	L	T	P
Hours/week	2	-	-

1. Prose Text Book (30%)

- A prose textbook of 150 pages well illustrated. It should contain roughly though not necessarily biographies of two engineers and scientists, biographies of two great men (one religious leader and one national leader), two literary short stories, two humorous short stories, one short story of the type of science fiction; one essay. This text-book shall be officially prescribed.

2. Terminology (10%)

- Common terms administrative and technical, (along with their Hindi equivalent) from a prescribed list. Foreign students or those who do not know Hindi may be asked to explain the terms in English

3. Grammar (40%)

A brief review of easy forms of tenses (past Indefinite, past continuous past perfect, past perfect continuous, present indefinite, present continuous, present perfect, present perfect continuous, future indefinite). Conversion of direct narration into indirect form of narration and vice versa (only simple sentences).

- Punctuation.

4. Essay (20%)

- Preferably on scientific topic from the given outlines. Paper settlers may be instructed to give a choice of attempting one out of three topics. The question paper shall provide the outlines. The essay will be of 250 to 300 words. The examiner may select three topics one from each of the following fields
    i. Science
    ii. Technology
    iii. General

5. Practice of speaking in English Language by Organizing; (Not for examination)

- Paper reading contests
- Student should present their drawings done in any subject to the entire class to develop public speaking confidence

AA - 136 APPLIED PHYSICS

	L	T	P
Hours/Week	2	-	

DETAIL CONTENTS

1. Units of measurement in SI system Dimensions and use of dimensional analysis.
2. Force and motion –Newton's Laws. Conservation of momentum, work and energy, Forms of energy, conservation of energy, stress ,strain ,elastic modulus
3. Spring mass system. Vibrations of bodies; amplitude, frequency and energy of vibrations; free and forced vibration, resonance, vibration of structural members.
4. Temperature and its measurement. Liquid in glass thermometer.
5. Expansions of solids, thermal stresses; specific heat and heat capacity and concept of thermal time lag in buildings, laws of thermodynamics, principles of heat engines and refrigeration and air-conditioning system. Humidity and its control.
6. Acoustics of building and simple calculation of reverberation time, principles of acoustical modelling, sources of sound.
7. Light as waves, solar energy, solar cells and green house effects, colour-primary colours, colour mixing. Radiant light flux, luminous intensity, illumination, light efficiencies, standards of illumination.
8. Electromagnetic waves, infrared and ultraviolet rays, coated glasses and their characteristics.
9. Electrical nature of matter, molecular forces-cohesive and adhesive forces, application to water-proofing.

AA- 137 INTRODUCTION TO COMPUTERS - I

	L	T	P
Hours/Week	-	-	3

1. **Introduction to computer**
   - 1.1. Block diagram of a computer and overview of its working.
   - 1.2. Basic concept in stored program execution.
   - 1.3. Input, output and secondary storage device.
   - 1.4. Concept of RAM (read access memory), ROM (read only memory).
   - 1.5. Introduction to operating system.
   - 1.6. Types of computer- Micro (PC, PC-XT, PC-AT), Mini, Tablets Main Frame and super computers-their capabilities.

2. **Word processing working on the computer to develop practice to use a word processing programme such as MS word etc.**
   - 2.1 Opening a document.
   - 2.2 Preparing a document.
   - 2.3 Editing a document.
   - 2.4 Formatting a document.
   - 2.5 Character, word and line editing.
   - 2.6 Margin setting, paragraph alignment and setting.
   - 2.7 Block operation.
   - 2.8 Spell checker.
   - 2.9 Saving document.
   - 2.10 Appling print control.

3. **Printing a document on any available printer.**

4. **Typing on a computer.**

SECOND SEMESTER

AA-230 ARCHITECTURAL DESIGN - I

	L	T	P
House/ Work	2	-	8

Objective : To make students aware of the proportions and dimensions of the human body and their impact on architectural design and detailing. Through practical, hands on activities, students will learn to estimate the area requirements for various spaces in conjunction with the postures, occupancy, furniture, circulation, and functional and behavioural needs of people. Students will study the dimensions of various household items/ fixtures and learn to apply this knowledge while designing spaces, so that they are able to develop designs that are comfortable, functional and optimally use the resources and material. Students learn to think about human dimensions when individuals are in motion and learn to apply this knowledge in design of circulation within spaces.

1. Study of Anthropometrics, based on age / sex through the practical exercises done by the students in groups. The students should take measurements of each other in different posture- i.e. - standing heights, height while sitting, vertical reach of objects, horizontal reach of objects, eyelevel in standing and sitting postures, etc and also while doing various solo activities like carrying a tray, brushing teeth, etc. The students must be able to appreciate the value of applying this knowledge in architectural designing and detailing.
2. Study of spaces for different human activities based on practical exercises- For example- sitting informally in groups, sitting formally on sofa, working on a table, eating on a dining table etc
3. Circulation and its relation with design in building
4. Study of dimensions of various household fixtures /items for example washbasins, kitchen sinks, W.C., T.V., fridge, plates, glasses, storage boxes, suitcases, shirt while hanging, shirt while folded etc. The students must be able to appreciate the value of applying this knowledge in actual drawing and detailing.
5. Problem in composition of various 2D and 3D geometrical figures (square, triangle, circle, rectangle, pentagon, etc.) in different tones and textures
6. Preparation of plan and elevation from the models of various forms (compositions of prisms, cubes, cylinders etc using the principles of design)
7. Study of design and furniture layout of house units under fixed roofs such as living, dining, bedroom, kitchen, study room and toilets and their combinations.
8. Design of one bedroom house with garage, on ground floor preferably on grid and prefixed roof systems.

    8.1. Circulation analysis
    8.2. Presentation drawings:
    - Basic Site analysis – approach, surroundings, orientation and natural vegetation
    - Floor plan,
    - Elevations,
    - Sections,
    - Furniture layout

9. Two time problems on any simple topic such as house/ canteen/ bus stand.

AA-231 BUILDING CONTRUCTION I

	L	T	P
Hours/week	2	-	6

	Theory	Drawing work
1.	**Brick work and stone work**	
1.1	Different sizes and types of bricks. Characteristics of a good brick	Drawing of different shapes and sizes of bricks(1 sheet)
1.2	Wall thickness, T-junctions, Cross-junction. Introduction to different types of bonds (English, Flemish and Rat Trap Bond), their advantages and disadvantages.	Drawings of different bonds, T-junctions, cross junction in wall thickness given below (6 sheets) • Half Brick Wall • One Brick Wall • One and half Brick Wall
1.3	Brick jallies and reinforcement	Reinforced brick work and *jallies* in half &one brick wall, in both English & Flemish Bond (1 sheet)
1.4	Different stone facing. Characteristics and classification of stone masonry	Drawings of different type of stone facing (1 sheet).
2	**Openings in walls**	
2.1	Classification of arches as per finish, shape and material.	Drawings of lintels, arches of various materials in half brick& one brick walls (1 sheet).
3.	**Damp Proof Course**	
3.1	Explanation of DPC and reasons for use.	Drawings showing of Damp proof course in a horizontal and vertical brick wall and in basements (1 sheet).
3.2	Sources and effects of dampness.	
3.3	Classification as per hardness of material & BIS stipulations of damp proofing	
3.4	Treatment of building components for effective damp proofing.	
4.	**Foundations**	
4.1	Different types of foundations with reference to advantage of one over other.	Drawings of Foundation details for Wall foundation for normal and eccentric footing for internal and external walls. Foundation detail for brick pier Foundation detail for 300mmx 300mm RCC column foundation Toe Wall Foundation Veranda Steps Foundation. (2 sheets).
4.2	Brief knowledge of different types of foundations	

Note: Field visits should be organized to clarify concepts.

AA-232 ART APPRECIATION AND GRAPHICS -II

	L	T	P
Hours/Week	2	-	6

Objective: To develop the skills of students in thinking and composing in three dimension using the principles of design. To develop a nuanced understanding in students on how to create and appreciate art which is aesthetically pleasing. Students also need to develop advanced skills of perspective drawing and architectural rendering in order to present their compositions and develop an effective communication style with clients/end users through visuals and graphics.

1. Theory of perspective
   - 1.1. Fundamentals, Dimension, fore shortening and convergence.
   - 1.2. Reality and appearance.
   - 1.3. Basis of perspective, cone of vision central visual ray, picture plane, line of sight through picture plane, spectator, vanishing points, eye levels.
2. Characteristics of perspective construction, determining vanishing points.
3. Relationship between station point (spectator) picture plane and perspective.
4. Two-Point perspective of a simple building with or without overhead roof (5 Sheets).
5. Comparative study of perspective of cubes and other solids like cylinders, prisms etc by changing eye levels and position of station point on side and in front of picture plane.
6. Perspective division of an area into area of equal sizes.
7. Two point perspective of a house (2 Sheets).
8. One point perspective, interior perspective (2 Sheets).
9. Perspective drawing using short cut methods (1 Sheet).
10. Sciography on plan, elevation and perspective of small buildings as per standard conventions(3 Sheets)
11. Shades and shadow of rounded bodies, shadow of a circular opening (arch) projection and cantilevers (2Sheets).
12. Rendering of perspective in different mediums- inks/ colour/ charcoal and free hand perspective view (2 Sheets)
13. **Elements of Design**

    Definition, examples and applications of the following:

    - 13.1 Primary elements - Point, Line, Figure, Plane, Volume; Color
    - 13.2 Composition – Shape, Size, Form, Function, Layout
    - 13.3 Balance - Symmetry & stability, Formal and informal balance
    - 13.4 Contrast - Light and shade, Nature and man-made
    - 13.5 Rhythm in movement - Rhythm in nature, Manmade rhythm
    - 13.6 Proportion
    - 13.7 Scale - Intimate scale, Human scale, Monumental scale
    - 13.8 Emphasis
    - 13.9 Colour
      - 13.9.1 Colour chart- tints, tones, shades; warm and cool colours; complimentary and contrasting colours
      - 13.9.2 Colour variations
      - 13.9.3 Effect of colour on building

14. Composition exercises in 2D and 3D using principles of design through the use of simple materials.
15. Time problem on composition exercises.

AA – 233 COMMUNICATION TECHNIQUES –II

	L	T	P
Hours / week	2	-	-

1. **Precise and Comprehension (25%)**

   1.1 Précis writing of simple passages selected from a pre-prescribed textbook. The selected passage should be of 100 to 150 words and easy to summarize. In order to test comprehension, a few questions on the passage may be set.

   1.2 Unseen Passages

2. **Communication techniques (10%)**
   - 2.1. Importance of Communication
   - 2.2. One–way and two–ways Communication
   - 2.3. Essentials of good Communication
   - 2.4. Methods of Communication-oral, written and non –verbal.
   - 2.5. Barriers of Communication
   - 2.6. Techniques of overcoming barriers.
   - 2.7. Concept of effective Communication

3. **Written Communication (50%)**

   - 3.1. Formal letters
   - 3.2. Informal letters
   - 3.3. Notices
   - 3.4. Advertisements
   - 3.5. Invitations & Replies

4. **Technical report writing (15%)**

   - Technical report writing from a given outline. A choice to attempt one out of three questions is to be given in the examination. The question paper shall provide the required outlines

5. **Practice of writing personal resume and applications for a job/ employment**

6. **Book Review (Not for Examination)**

7. **Practice of speaking English (Not for Examination)**

   Student should present their drawings done in any subject to the entire class to develop public speaking confidence

AA-234 APPLIED MATHEMATICS – II

P

Hours/Week 3 2

1. **Algebra: (30%)**

   1.1 Mensuration - Area of plane figures:-
   - Triangle,
   - Rectangle,
   - Circle,
   - Parallelogram

   1.2 Calculation of volume and surface area of a right rectangular prism,
   - Pyramid
   - Cylinder
   - Cone
   - Sphere and area of irregular figures.

   1.3 Arithmetic and Geometrical Progression - Definition and simple problems.

2. **Vector algebra: (25%)**

   2.1. Definition, notation and rectangular resolution of a vector.
   2.2. Scalar vector products of two vectors only.
   2.3. Simple problems related to work, moment and angular velocity.
   2.4. Addition and subtraction of vectors.

3. **Elementary Numerical Analysis: (25%)**

   Newton's forward and backward differences and shift operator, differences table, Newton's Gregory forward and backward interpolation formulae, Langrange's interpolation formulae.

4. **Integral Calculus: (20%)**

   4.1. Indefinite integrals
   4.2. Physical meaning of integration,
   4.3. Integration as inverse process of differentiation,
   4.4. Integration by substitution, by parts and by partial fraction.
   4.5. Definite integrals - Evaluation of definite integral, simple problems of integrations,
   4.6. $\sin^n x\,dx$, $\cos^n x\,dx$, $\sin^n x \cos^n x\,dx$ (without proof),
   4.7. Numerical integration by Simpson's rule.
   4.8. Definition of differential equations
   4.9. Formation of differential equation of first order and first degree.

AA – 235 APPLIED CHEMISTRY

	L	T	P
Hours/Week	2	-	-

1. Raw materials and admixtures used in the manufacture of copper, aluminium, iron and steel. Manufacturing process to be dealt in brief with flow diagrams.
2. Properties and uses of copper, aluminium iron and steel. Meaning of corrosion, prevention of corrosion by various methods.
3. Plastics-review of saturated and unsaturated hydrocarbons (Methane, ethane, ethylene acetylene and vinyl chloride, etc.), condensation and polymerization, thermosetting and thermoplastic, cold setting and hot setting. However, emphasis should be given to name of common varieties of plastics and their uses, adhesives and epoxy resins.
4. Refractors: Meaning of refractory material, general method of manufacturing of
    i. Acid refractories
    ii. Basic refractories
5. Paints and varnishes, drying oil, pigment, drier, thinner.

AA- 236 INTRODUCTION TO COMPUTERS – II

	L	T	P
Hours/Week	-	-	3

1. **Microsoft Excel (Latest version available)**

Getting Started
Spreadsheet terminology, exploring the Excel window, getting help, opening and navigating workbooks, closing workbooks.

- **Entering and Editing data**
  Creating workbooks, entering and editing labels and values, entering and editing formulas and saving & updating workbooks
- **Modifying a Worksheet**
  Moving and copying data, moving and copying formulas, using absolute references and Inserting & deleting ranges
- **Using Functions**
  Entering functions, using AutoSum, using AVERAGE, MIN, and MAX
- **Formatting Worksheets**
  Formatting text, formatting rows and columns, number formatting using Format Painter and AutoFormat
- **Creating Charts**
  Chart basics, modifying charts,
- **Printing**
  Preparing to print, page Setup options, printing worksheets and charts

2. **Power Point**

Introduction to Presentation Graphics

- Open a blank presentation, insert text in it, add slides and saving it.
- Work with slide views, move around in a presentation, check spelling, print a presentation and apply a different template.
- Insert objects in a presentation
- Move, copy, duplicate and delete slides
- Work in outline view and create a summary slide

Editing and Formatting Presentations

- Select and align text in a presentation, enhance text appearance, and apply
- Slide colour schemes and backgrounds.
- Copy text formatting, move and copy text, adjust paragraph spacing.
- Create slide and title masters, work in slide master view, insert footer in
- Change text and bullets.
- Work with rulers and guides, use floating toolbars, create graphic objects,
- Work with auto shapes, group and ungroup objects and layer objects.
- Create a custom template and work with custom templates.
- Add an organization chart and use charts and tables in a presentation.

Setting Up a Slide Show

- Check slides for style and consistency, show a presentation, add transitions, Sound and timings.
  Work with animation and animation effects toolbar.Use the annotation feature.
- Create notes pages and handouts; work with notes master and handout master
- Set up and run a presentation and create continuously running presentations.

2 **Practice of computer typing using a typing software**

3 **Typing an assignment and submission of prints using different architectural scales.**

THIRD SEMESTER

AA-330 ARCHITECTURAL DESIGN- II

	L	T	P
Hours/Week	2	-	8

1. **Design of a two- bedroom house on at least two floors with study and garage/ small canteen / clinic.**

   1.1 Study report on existing house/ self - occupied house including its circulation analysis.

   1.1 Study of basic site planning parameters

   Off-Site Consideration
   - Access
   - Surroundings
   - Transport routes
   - Nearest settlement
   - natural drainage Channel, H T wire
   - Climate etc.

   On- Site Consideration
   - Entry / exit points
   - Topography
   - Positive and negative aspects
   - Point of interest
   - Existing structures
   - Existing vegetation etc

   1.2 Presentation drawings:
   - Plans,
   - Site plan,
   - Elevations,
   - Sections,
   - View and
   - Block mode

2. Study of furniture layout in small public building such as library, restaurants, dispensary, community centre, etc.

3. **Two Time Problems on House design, small public building like canteen, clinic etc.**

AA-331 BUILDING CONSTRUCTION II

	L	T	P
Hours/ weeks	2		6

	Theory	Drawing work
1.	**Wooden doors and windows**	
1.1	Definition, functions, sizes, location and classification. Introduction to wooden doors (braced, battened and ledged doors)	Drawing of different types of doors and windows (panel, flush, glazed, sliding) showing joints and fixing details of hardware like tower bolt, aldrop, locks, handles, door closers, grills. Single and double rebate frames. Fixing of door/ window frames in masonry wall. Drawing of different type of wooden windows(casement, toilet etc.) (4 sheets).
1.2	Joints	Drawing of details of doors and windows (1 sheet)
2.	**Floorings**	
2.1	Types of flooring and Floor finishes for ground and upper floors	Drawing showing details of marble slab and cast in situ flooring, terrazzo flooring, plain cement flooring, pre. cast tile, paraquet flooring & any other floor finish (2 sheets).
2.3	External paving details	Drawing of external pedestrian and vehicular paving in different materials (2 sheets)
3.	**Staircases and ramps**	
3.1	Definition and types of staircases Relation between different components, their area requirements	Drawing of a RCC staircase with details of fixing of steel railing (1- 2 sheets). Different staircases (centrally supported, folded plate, toothed beams)
3.2	Staircases of different materials, brick, steel, RCC, timber, stone, composite staircases.	Staircase with different types of surface finishes (1 sheet)
3.3	Definitions, purpose, slopes, types of ramps and moving walks	
4.	**Roof and roof coverings**	
4.1	Pitch roof and terms related to roof, Different types of pitched and flat roofs and dome, etc	Drawing of Flat roofs in different materials- R.C.C, stone, prefabricated blocks, etc. (2 sheets), Tiling on pitched roof.
5.	**External wall section**	Drawing Through solid wall, through wall openings (showing chajja, window, sill, lintel details) and through veranda. Drawing of flat RCC roof, terracing and finishing, water proofing and joints with the parapet wall-(1 – 2 sheets)

AA-332 BULIDING MATERIALS II

	L	T	P
Hours/ Week	3	-	

1. **Floor and floor Finishes: Laying, sizes, availability, popular brand names:**

   1.1. Terrazzo Tiles and flooring
   1.2. Glazed terracotta and ceramic tiles
   1.3. Cement concrete tiles
   1.4. Marble, Kota stone, slate, red stone - their tiles and slabs
   1.5. Parquet (wooden) flooring
   1.6. Linoleum floors
   1.7. Rubber, PVC flooring
   1.8. Cast iron grit and heavy duty flooring for industrial buildings
   1.9. Advantages, suitability and uses of different finishes

2. **Wall Finishes**

   2.1. Different types of Wall boards and their trade names
   2.2. Laminated fibres and their names
   2.3. Polystyrene wall tiles
   2.4. Plastic wall tiles and their trade names
   2.5. Wall papers
   2.6. Cork sheets and tiles
   2.7. Thermocol as building material
   2.8. Foam rubber tiles
   2.9. Brick, ceramic and stone tiles
   2.10. Wall Cladding
   2.11. Advantages , suitability and uses of different finishes

3. **Ceiling materials (Size, quality, availability, types of finishes with their trade names)**

   3.1. Hessian cloth
   3.2. Gypsum plaster board
   3.3. Plain AC sheets
   3.4. Plywood
   3.5. Hard board
   3.6. Cellotex and other trade name as a material
   3.7. Fibre boards
   3.8. Glass
   3.9. Asbestos tiles
   3.10. Thermocol
   3.11. Bison Board
   3.12. Advantages, suitability and uses of different finishes

4. **Building hardware (Sizes, application)**

   4.1. Tower bolts
   4.2. Hinges
   4.3. Door handles
   4.4. Fan light catches
   4.5. Door springs
   4.6. Latches
   4.7. Floor door stopper
   4.8. Fan light pivots
   4.9. Mortise lock
   4.10. Door closer

4.11. Ventilator chains
4.12. Wires gauzes
4.13. Advantages , suitability and uses of different hardwares

5. **Glass its uses and sizes**
   5.1. Sheet glass
   5.2. Wired glass
   5.3. Laminated safety glass
   5.4. Plate glass
   5.5. Insulating glass
   5.6. Coloured glass
   5.7. Tinted glass
   5.8. Heat absorbing glass
   5.9. Glass blocks
   5.10. Glazing putty
   5.11. Painted glass
   5.12. Advantages , suitability and uses of different glass finishes

6. **Roofing materials, their standard sizes**
   6.1. Asbestos sheets
   6.2. GI sheets
   6.3. Fibre glass sheets
   6.4. Advantages , suitability and uses of different materials

7. **Additives and Admixtures, their availability and uses**
   7.1. Water repellents
   7.2. Accelerators
   7.3. Air trapping agents
   7.4. Hardness
   7.5. Workability increasing agents
   7.6. Fly ash

8. **Adhesives, their trade names and their uses**
   8.1 Natural adhesives
   8.2 Synthetic resins – Thermoplastics and thermosettings

9. **Paints, their covering capacity, trade names, uses and availability**
   9.1. Water based paints
   9.2. Distempers
   9.3. Oil based paints and emulsion
   9.4. Cement paints
   9.5. Acrylic emulsions
   9.6. Melamine finishes
   9.7. Varnishes
   9.8. Spirit polish, wax polish
   9.9. Lacquers
   9.10. Stucco paint
   9.11. Tar and bitumen paint
   9.12. Advantages, suitability and uses of different finishes

AA-333 HISTORY OF ARCHITECTURE – I

	L	T	P
Hours/Week	3	-	1

1. **Evolution of civilization with special reference to the following**
   - 1.1. Man and his needs with reference to shelter
   - 1.2. Man and culture
   - 1.3. Social groups, societies and civilisation
   - 1.4. Causes of rise and fall of civilisations.
   - 1.5. Indus Valley Civilisation
2. **Buddhist Architecture in India**
   - 2.1. Historical, economical, social and geographical background
   - 2.2. Emphasis on siting, concept, plans, elevation and sections, materials and construction methods
   - 2.3. Buildings types- Chaitya hall, Stupa, Stambh, Toranas and Viharas
   - 2.4. Large scale drawings of details used in Buddhist Architecture
3. **Temple Architecture in India**
   - 3.1. Dravidian Style
     - Emphasis on evolution, concept plans, elevations, sections, materials and construction methods
     - Area of studies - Pallavas, Cholas, Pandyas, Vijaynagar, Madurai
   - 3.2. Indo-Aryan or North Indian style
     - Emphasis on evolution, siting layout, concepts and plans, elevation and section, materials and construction methods
     - Area of study, Khajuraho, Orissa
   - 3.3. Jain Temples
     - Emphasis on evolution, concept of sitting, layout plans, elevation and sections, materials and construction method
     - Area of study - Mount Abu, Girnar
4. **European Architecture with reference to Arch style, Constt innovation and aesthetic evolution through important building types:**
   - 4.1. Egyptian period,
   - 4.2. Greek period,
   - 4.3. Roman period and
   - 4.4. Early Christian and Byzantine period

5. **Measure drawing (to be presented in portfolio and viva exam only)**

   5.1 Detailed sketch drawings of local old monuments/ heritage buildings (measure drawing) showing elevations, sections and various related details

   5.2 Preparation of large scale drawings of the various important details, used in the temple of different periods such as details of columns, cornices, balusters, *chajjas*, etc.

AA-334 CLIMATOLOGY

	L	T	P
Hours/week	2	-	

1. **General introduction**
   - 1.1. Definition of climatology, its relevance to architecture, differentiation between weather and climate.
   - 1.2. Climate and its impact on architectural form, design of openeings, choice of building materials and construction techniques etc
   - 1.3. Elements of climate: (temperature variations, humidity, precipitation, wind data, local factors, sky conditions, air movement, special characteristics, urban climate & methodology to collect climate data)
   - 1.4. Different global climatic zones with reference to tropical climate, warm humid climate, hot dry desert climate, cold climate and monsoon climate and their characteristics
   - 1.5. Introduction to Sun path diagram and its relevance to building

2. **Macro & micro climate factors**
   - 2.1. Factor affecting site climateand climatic elements, built up environment, urban climate
   - 2.2. Criteria for site selection for a designer with special reference to factors like
     - Wind direction
     - Orientation of building
     - Ventilation (supply of fresh air, cross ventilation, position, size & control of openings, air flow inside and around building, external features, humidity control)

3. **Ventilation- air flow patterns inside and outside buildings**

4. **Effect of climate on shelter in different climate zones,** (Introduction to bio climatic chart, Form, planning, internal spaces, roofs, walls, opening, external finishing, air flow inside and outside the building)

5. **Effect of climate on mans comfort condition** (structural and planning methods in different climatic zones, cooling by ventilations, evaporative cooling and humidity control)

6. **Interpretation of architectural principles.**
   - 6.1. Shading (sun and wind protection) devices.
     - Provision of barriers (trees, boundary wall, fences)
     - Structural controls (canopies, chajjas, and parapet wall)
     - Mechanical controls (louvers, curtain walls, blinds etc.)

7. **Solar passive architecture - introduction, definition, relevance and importance**

8. **Vernacular architecture (To be presented in the form of a report)**
   - 8.1. Relevance to climatic comfort
   - 8.2. Materials used,
   - 8.3. Construction techniques,
   - 8.4. Social background,
   - 8.5. Living pattern,
   - 8.6. Planning and design study and its relevance to present day.

9. **Climate of Delhi and its application in architectural design**

AA- 335 SURVEYING I

	L	T	P
Hours / Weeks	3	-	2

Theory

1. **Surveying**
   - 1.1. Definition, objective and its types
   - 1.2. Principles of survey.

2. **Chain Surveying**.
   - 2.1 Definition, tools and equipment such as chain, pegs, ranging rods, offset rods, cross staff, measuring tape etc.
   - 2.2 Principle of chain surveying survey reconnaissance, base line, main station, tie station, tie lines and their selections.
   - 2.3 Well conditioned and ill conditioned triangles.
   - 2.4 Ranging a line – Direct and indirect methods.
   - 2.5 Advantages and disadvantages of chain surveying.

3. **Compass Surveying**
   - 3.1 Prismatic compass, surveyor's compass, bearing of lines, angle measurements, magnetic and true bearing, local attraction, its detection and elimination, plotting of a compass survey traverse: adjustments of closing errors by graphical methods.
   - 3.2 Finding true north by sun's shadow in compass survey, errors in compass survey and how to avoid it, advantages and disadvantages of compass survey.

4. **Plane tabling**
   - 4.1. Methods of plane tabling- traversing, intersection, radiation and resection and situation where each is used
   - 4.2. Advantages and disadvantages of plane tabling

5. **Levelling**
   - 5.1. Definition of levelling and terms used in levelling.
   - 5.2. Types of levelling
   - 5.3. Parts of dumpy level
   - 5.4. Temporary adjustment of a dumpy level and setting up a level
   - 5.5. Reducing levels by rise and fall method
   - 5.6. Reducing levels by height of collimation method

6. **Introduction to theodolite and its uses.**

Practical

1. **Chain surveying.**

Exercise - 1
- Chaining of a line involving ranging.
- Taking offsets and setting out right angles using simple methods – swinging of arch with tape, setting 3 – 4 -5 triangles.

2. **Compass surveying.**

Exercise - 2
- To study a prismatic compass.
- Setting the compass and taking observations.
- Measuring angles between the lines meeting at a point.

Exercise – 3

- Closed traverse,
- plotting and adjusting closing error graphically

3. Plane Tabling

Exercise - 4

- To study plane table survey equipment.
- To set a plane table on a station point.
- To mark the north directions.
- Plotting a few points by radiation method.

Exercise - 5

- To orient the plane - table by back - sighting.
- Plotting a few points by intersection method.

4. LEVELLING

Exercise -6

i. Study of dumpy level and levelling staff.
ii. Temporary adjustment of a dumpy level.
iii. Taking staff readings on different stations from the single setting and finding difference of level between them.

Exercise -7

i. Find the difference of level between two distant points by check levelling.

AA-336 FIELD BASED MINOR PROJECT

	L	T	P
Hours/Week	-	-	2

Objective: To expose the students to the real world of building construction and design. Students get valuable practical exposure to the dynamics of construction of building projects, which can complement and supplement their theoretical knowledge. It also helps in development of the observation, analytical and evaluative skills of students. This kind of exposure will be of immense value in enhancing the market value of the students.

Methodology

- The student shall buy a scrap book (10" x 8") of about 100 pages.
- The student shall identify a simple and small residential building(s) under construction near his/her house for the purpose of the study.
- The student shall be in constant touch with the faculty/guide, owner of the residence and the contractors working on the site and make regular recordings about the following and get them countersigned weekly
- The students should observe all the stages of construction.
- The students should get information all about the building materials and their rates
- Sketches shall be free hand but to the scale
- Discussion with the contractors, owners and the *mistries* is desirable to understand the construction process.
- The question as specified below should be addressed by the students. The teachers can add to the list given below as per requirement.
- Students should also study the code of practice of Bureau of Indian Standards for various topics that they study in the project work to get an understanding of the correct field practice that should be followed on site.
- The submission of the project shall be in the form of a report enhanced with sketches/ photographs etc. Marks shall be rewarded for periodic reviews.

Content

The site observation shall cover the questions which are listed under the various topics

1. Statement of the functional / conceptual aspect of the house
2. Foundation
    - Site preparation for foundation
    - Laying out of building on site
    - Marking levels on site
    - Taking foundation measurements on site
    - Procedures for laying right angles on the site
    - Precautions to be followed during excavation
    - Different tools being used for foundation laying
    - Materials being used in foundation/ their cost per unit
3. Masonry work with mortar mixes
    - Type of brick and brick bond being used for masonry
    - Precautions to be followed while laying masonry wall
    - How is the straightness of courses (horizontal and vertical) maintained?
    - Mix of mortar being used in the construction & way of measuring it on site Tools being used for masonry laying
    - Different materials being used in masonry/ their cost per unit

4. **External finishes**

- Type of external finish being done on the site
- When is the external finish done in sequence of work followed on site?
- Surface preparation of the walls prior to external finish
- Precautions to be followed while finishing a wall
- Materials being used for finishing/ their cost per unit
- Tools and equipment used for painting

5. **Paints and Varnishes**

- Type of paint / varnish being used on the site for different kinds of materials like plaster, metal, woodwork etc
- When is the painting of walls done in the sequence of work being followed on site and reasons thereof?
- Surface preparartion of the walls/timber/metal/ masonary prior to painting
- Precautions to be followed while painting different surfaces
- Materials being used /cost per unit of the materials
- Tools and equipment used for painting

AA – 337 COMPUTER GRAPHICS I

L T P

Hours / Weeks -

OBJECTIVE: To enable the students to prepare architectural / municipal drawings through the use of Autocad (latest version).

1. **Getting Started with AutoCAD**
   - 1.1. Starting AutoCAD
   - 1.2. AutoCAD's User Interface
   - 1.3. Working with Commands
   - 1.4. AutoCAD's Cartesian Workspace
   - 1.5. Opening an Existing Drawing File, Viewing and Saving Work

2. **Basic Drawing & Editing Commands**
   - 2.1. Drawing Lines
   - 2.2. Erasing Objects
   - 2.3. Drawing Lines with Polar Tracking
   - 2.4. Drawing Rectangles
   - 2.5. Drawing Circles
   - 2.6. Undo and Redo Actions

3. **Drawing Precision in AutoCAD**
   - 3.1. Using Running Object Snaps
   - 3.2. Using Object Snap Overrides
   - 3.3. Polar Tracking at Angles
   - 3.4. Object Snap Tracking
   - 3.5. Drawing with Snap and Grid

4. **Making Changes in Drawing**
   - 4.1. Selecting Objects for Editing
   - 4.2. Moving Objects
   - 4.3. Copying Objects
   - 4.4. Rotating Objects
   - 4.5. Scaling Objects
   - 4.6. Mirroring Objects
   - 4.7. Editing with Grips

5. **Advanced Editing Commands**
   - 5.1. Trimming and Extending Objects
   - 5.2. Stretching Objects
   - 5.3. Creating Fillets and Chamfers
   - 5.4. Offsetting Objects

6. **Organizing Drawing with Layers**
   - 6.1. Creating New Drawings With Templates
   - 6.2. What are Layers?
   - 6.3. Layer States
   - 6.4. Changing an Object's Layer
   - 6.5. Creating Arrays of Objects

7. **Exercise**
   - 7.1. Preparation of drawings of simple layout of singe or two bed room unit
     - Site plan
     - All Floor plans
     - Terrace plan
     - Sections
     - Elevations
   - 7.2 Printing of the exercise on available printer.

FOURTH SEMESTER

AA-430 ARCHITECTURAL DESIGN III

	L	T	P
Hours/Week	2	-	7

1. **Design of a complex three bedroom house/ small public building such as nursery school, community centre, public library, restaurant, dispensary etc. in a specific climatic zone on multiple floors, split levels opening on to terraces.**

    1.1. Study report of and existing building
        1.1.1 Site study,
        1.1.2 Analysis of area requirement of different spaces and activities,
        1.1.3 Circulation

    1.2. Concept Plan
    1.3. Study of Climatic data of the city in which building is to be designed and its application in design
    1.4. Presentation drawings:
        1.4.1 Floor plans,
        1.4.2 Site plan,
        1.4.3 Elevations
        1.4.4 Sections
        1.4.5 Views
        1.4.6 BlockModel

2. **Requirements of parking in a building. Spaces required for parking of different vehicles.**
    2.1. Students should take measurements of different types of vehicles, study their turning radius and work out the parking requirements for different vehicles- cars, trunks, cycles, scooters, bus etc.

3. **Two time problem on small public building/house design.**

AA- 431 BUILDING CONSTRUCTION III

L T P

Hours/ Weeks 2 6

	Theory	Drawing work
1.	**Steel doors and windows**	
1.1	Using standard BSI steel sections	Drawing casement and sliding doors and windows using different sections Fixing details of Fixtures- aldrops, towerbolt, door closers, handle, grills, locks etc in different types of doors and windows(2-3 sheets). Drawing of rolling and collapsible shutters.
1.2	Using rolled sections as frames and wooden shutters	
1.3	Basics of Rolling and collapsible shutters. Hinge of different types & their applications	
1.5.	Fly shutters	Drawing of fly shutters in windows(1 sheet)
2.	**Roof covering AC, GI sheets**	
	Steel Truss- Single Lean roof, Double Collar Roof. Introduction to Large span structures roof and structural glazing	Drawing of details of roof covering with AC sheets and GI sheets on steel trusses. (1 – 2 sheets)
3.	**Finishes**	
3.1	Plastering and pointing, various types of external finishes, like plain plaster, sand faced plaster, grit wash finish, etc.	Drawing of details showing joints, fixing method of stone with the wall Drawing details showing fixing tiles (2 sheet)
3.2	Stone cladding and tiling on walls	
4.	**Formwork in wood and steel**	
4.1	Definitions of formwork, shuttering and materials used	
5.	**Compound wall**	Drawing details of compound wall showing name plate and steel gate, its fixing details(2 sheet)
6.	**Toilet Details- various fixtures, wall and floor tiles, mirrors, shelves etc**	Drawing details of fixing of fixtures (WC, washbasins, taps, traps, shower curtain, towel rail, hooks, bathroom mirror etc) (1 sheet) A report on various sanitary and light fixtures to be presented in portfolio and viva exam.

AA-432 WORKING DRAWINGS AND DETAILING I

	L		P
Hours / Week	1	-	4

Complete set of drawings of a house done by the students in the earlier semester

S. No.	Detail of Drawings	No. of sheets
	Foundation plan and details including excavation plans	2 Sheet
2	Site Plan	1 Sheet
3	Ground floor plan	1 Sheet
4	All upper floor plans as per design	Drawings as per requirement
5	Terrace floor plan showing rain water drainage and disposal	1 Sheet
6	Elevation- all elevations as required explaining the scheme.	Drawings as per requirement
7	Sections- as many sections as required explaining the scheme.	Drawings as per requirement
8	Doors and windows details	Drawings as per requirement
9	Any other drawing necessary to explain the scheme.	Drawings as per requirement

AA-433 BUILDING BYE - LAWS AND MUNICIPAL DRAWINGS

	L	P
Hours/Week	2	1

1. **Introduction to Building Byelaws**

   1.1 Necessity of framing bye-laws for urban development.
   1.2 Principles involved in framing bye-laws,
   1.3 Study of local bye-laws and local zoning plans as applied to buildings and their effects on design of building.

2. **Study of building bye laws of Delhi and relevant portion of Delhi Master Plan**

   2.1 Study of building bye - laws (I S 1256 provisions and definitions)
   2.2 Special emphases to be given to minimum sizes of various rooms, kitchens, toilet, courtyards, ventilation shafts, ledges, lofts and balcony projections.
   2.3 Laws related to fire.

3 **Preparation of Municipal drawings of the residence designed in third semester using applicable bye laws for submission to corporation.**

   3.1 Preparing plans of different floors to respective scales
   3.2 Preparing Front, Rear and Side elevations on scale(if plot is 3 side open)
   3.3 Preparing sections on scale:
   - Section through staircase and mezzanine if any
   - Section through kitchen, toilet and basement if any

   3.4 Preparing site plan on scale:
   - Site plan showing covered area, open area, service lane, front road, main features of adjoining areas, and setbacks of building as per Master Plan/Bye laws.
   - Part layout plans of surrounding plots in question/ key plan

   3.5 Preparing Details:
   - Foundation Detail and Section of RCC column if any
   - Schedule of doors and windows
   - Services Plan and Area Chart

   3.6 Miscellaneous:
   - Address of plot as per scale deed
   - Signature and address of applicant (s)
   - Name, address, registration no. and signature of architect & plumber
   - Scale on which drawing is prepared and north point.

   3.7 Prints and Submissions:
   - Protocols to be followed in submission of drawings in Delhi
   - Two sets of prints of drawing prepared, One set cloth mounted
   - All sets to be colored as per BBL
   - Folding of prints as per file cover size.

   3.8 List of documents and forms to be enclosed with the drawings
   - Notice to erect a building and General Specification
   - Attested copy of a receipt for payment of building fees and stacking charges
   - Affidavit and undertaking requirements of building fees and stacking charges required under Act
   - NOC from competent authority regarding land use as per Master/Zonal plan
   - Approval from chief inspector of factories for industrial buildings only
   - Indemnity bond in case of construction of basements
   - Supervision certificate of architect

5. **Calculation of permissible covered area and FAR of various sizes of residential commercial and industrial plots calculation of FAR and ground coverage.**

   4.1 Calculating plot areas, covered areas permissible on each floor.
   4.2 calculation of FAR

AA-434 HISTORY OF ARCHITECHTURE II

L T P

Hours / Weeks 3

1. Islamic Architecture in India

To be studied under historical, economical, social, political and geographical background, effect of local elements on invading forces in following periods.

1.1. Slave dynasty – Khilji, Tuglaq, Lodi & Sayyad Period
1.2. Provincial architecture, Area of study - Gujarat, Bijapur, Deccan
1.3. Mughal period with emphasis on works of Humayun, Akbar, Jahagir, Shahjahan,

2. Medieval architecture in Europe

2.1. Gothic Architecture in Europe with reference to English and French churches
2.2. Renaissance in Europe – social, economical, political and scientific factors that brought about renaissance and its influence on architecture especially in Italy and England

3. Industrial Revolution and its effects on Architecture

3.1. Role of iron and steel in 19th century – bridges, factories, exhibitions (Crystal Palace and Eiffel Tower)
3.2. The new building materials – RCC, wrought iron, cast iron, glass

4. Modern Architecture

4.1. Concerns of Modern Architecture
4.2. Pioneers of Modern Architecture
4.3 Study of Architectural philosophies and works of Le Corbusier, F.L. Wright, Mies vander Rohe and Walter Gropius

5. Modern architecture in India covering the works of Indian architects

5.1. B.V. Doshi, Charles Correa, Lawrie Becker, J.A. Stein
5.2. Study of New Delhi and Chandigarh city Planning

6. Measure Drawing

6.1. Critical analysis of an ancient building with respect to its planning, space, concept, aesthetics, use of materials, constructional technology, climatological aspect etc.

AA- 435 SURVEYING-II

AA- 435 SURVEYING II

	L	T	P
Hours / Weeks	2	-	1

1. **Contouring**
   - 1.1. Explanation of terms in contouring.
   - 1.2. Characteristics of contouring.
   - 1.3. Uses of contours.
   - 1.4. Method of contouring and their plotting.
   - 1.5. Interpolation of contours.

2. **Photo-grammetry and Remote Sensing**
   - 2.1. Introduction
   - 2.2. Scale of photograph
   - 2.3. Tilt and height displacement
   - 2.4. Stereoscopic vision and Stereoscopes
   - 2.5. Techniques of photo interpretation
   - 2.6. Principles of Remote Sensing

3. **Introduction to GIPS and GIS**
   - 3.1. Global Positioning System (GPS)
   - 3.2. Introduction, Principles and application of GPS in different field of Surveying
   - 3.3. Geographic Information System (GIS)
   - 3.4. Introduction, Geographical concepts and terminology
   - 3.5. Application of GIS

PRACTICAL EXERCISES

CONTOURING

Exercise -1

i. Preparing a contour plan by radial line method by taking the students to the appropriate site.

Exercise -2

i. Preparing a contour plan by method of squares of an appropriate site.

AA-436 THEORY OF STRUCTURES

	L	T	P
Hours/week	3	-	-

1. **Resultant of force system and equilibrium**
   - 1.1. Force: Definition. SI units, types, system of forces, graphical representation by Bow's notation.
   - 1.2. Resultant of concurrent forces, law of parallelogram, triangle law of forces, polygonal law of forces, resolution and addition of forces.
   - 1.3. Moment of forces: Statement of varignons theorem, resultant of non-concurrent forces, and parallel and non-parallel forces. Problems on resultant of forces system.
   - 1.4. Equilibrium: Concepts of equilibrium, equilibrium of two or more forces, conditions of equilibrium, body constraints, type of reaction provided by each constraint. Problems on equilibrium.

2. **Centre of gravity**
   - 2.1. Centre of gravity by geometrical consideration for rectangle, triangle, and semicircle.
   - 2.2. Centre of gravity by the method of moments of areas of composite and regular figures.

3. **Moment of Inertia**
   - 3.1. Meaning of the term, seconds moment of area, section modulus, and radius of gyration of a section.
   - 3.2. Theorem of parallel axis and perpendicular axis (statement only without proof).
   - 3.3. Second moment of regular figures - rectangle, triangle, circle and annular sections (formulae only)
   - 3.4. Moment of inertia for I and T-section.

4. **Shear Force and Bending Moments**
   - 4.1. Definition and concepts of SF and BM calculations of reactions.
   - 4.2. SF and BM diagrams for simply supported, overhanging, cantilever beams subjected to concentrated or uniformly distributed loads on entire or partial span.
   - 4.3. Calculation of position and magnitude of maximum shear force and bending moment, point of contra flexure.

5. **Simple Stress and Strain**
   - 5.1. Concepts and definitions, units types of stresses, axial stresses in bars, strain.
   - 5.2. Hook's law, tensile test on mild steel, working stress and factor of safety,
   - 5.3. Temperature stresses in simple bars, Poisson's Ratio, Young's, rigidity and Bulk modulus, problems on these.

6. **Theory of Simple bending**
   - 6.1. Bending stresses, neutral axis.
   - 6.2. Symmetrical and unsymmetrical sections.
   - 6.3. Assumptions in theory of bending.
   - 6.4. Flexure formulae and their application (no derivation).

AA – 437 COMPUTER GRAPHICS II

	L	T	P
Hours / Weeks -		-	4

1. **Advanced Object Types**
   - 1.1. Drawing Arcs
   - 1.2. Drawing Polylines
   - 1.3. Editing Polylines
   - 1.4. Drawing Polygons
   - 1.5. Drawing Ellipses
2. **Getting Information from Drawing**
   - 2.1. Working with Object Properties
   - 2.2. Measuring Objects
3. **Inserting Blocks**
   - 3.1. What are Blocks?
   - 3.2. Inserting Blocks
   - 3.3. Working with Dynamic Blocks
   - 3.4. Inserting Blocks Using DesignCenter
4. **Setting Up a Layout**
   - 4.1. Printing Concepts
   - 4.2. Working in Layouts
   - 4.3. Copying Layouts
   - 4.4. Creating Viewports
   - 4.5. Guidelines for Layouts
5. **Printing**
   - 5.1. Printing Layouts
   - 5.2. Printing from the Model Tab
6. **Text**
   - 6.1. Working with Annotations
   - 6.2. Adding Text in a Drawing
   - 6.3. Modifying Multiline Text
   - 6.4. Formatting Multiline Text
7. **Hatching**
   - 7.1. Hatching
8. **Adding Dimensions**
   - 8.1. Dimensioning Concepts
   - 8.2. Adding Linear Dimensions
   - 8.3. Adding Radial and Angular Dimensions
   - 8.4. Editing Dimensions
   - 8.5. Adding Notes to Drawing
9. **Working with Blocks**
   - 9.1. Creating Blocks
   - 9.2. Editing Blocks
   - 9.3. Removing Unused Elements
   - 9.4. Adding Blocks to Tool Palettes
   - 9.5. Modifying Tool Properties in Tool Palettes
10. **Creating Templates**
    - 10.1. Why Use Templates
    - 10.2. Controlling Units Display
    - 10.3. Creating New Layers
    - 10.4. Adding Standard Layouts to Templates
    - 10.5. Saving Templates

11. Annotation Styles
- 11.1. Creating Text Styles
- 11.2. Creating Dimension Styles
- 11.3. Creating Multileader Styles

12. Advanced Layouts
- 12.1. Quick View Layouts
- 12.2. Creating and Using Named Views
- 12.3. Creating Additional Viewports
- 12.4. Layer Overrides In Viewports
- 12.5. Additional Annotative Scale Features

13. Miscellaneous
- 13.1. Use of x-refs in the drawings.
- 13.2. Adjustment of building on the site

14. Exercise

14.1 Preparation of Municipal drawings of a residential building in 2D, showing site plan, key plan, all floor plans, sections and elevations including calculation of total covered area, F.A.R. and schedule of openings.

14.2 Printing of the above exercise on available printer.

FIFTH SEMESTER

AA-530 ARCHITECTURAL DESIGN IV

	L	T	P
Hours / Week	2	-	9

1. **Design of a medium-sized public building on two or more floors such as nursing home, cultural centre, hostel, club. Motel, etc.**

   1.1. Study report of an existing building

   1.2. Study of basic site planning parameters including

   Off-Site Consideration
   - Access
   - Surroundings
   - Transport routes

   On- Site Consideration
   - Entry / exit points
   - Topography
   - Positive and negative aspects
   - Point of interest
   - Existing structures
   - Existing vegetation etc.

   Analysis of area requirement of different spaces and activities
   - Circulation
   - Critical Analysis

   1.3. Presentation drawing:
   - Preparation of the concept note
   - Site analysis
   - Floor plans,
   - Site plan along with terrace plan of the building
   - Elevations,
   - Sections,
   - Views.

   1.4. Model

2. **Study report on parking:**
   - 2.1. Size and turning radius of various vehicles.
   - 2.2. Working of parking area for different angles.

3. **Two time problem on medium sized public building design from above mentioned topics.**

AA – 531 BUILDING CONSTRUCTION IV

L T P

Hours / Weeks 2 - 6

	Theory	Drawing work
1.	**Doors and Windows**	
1.1	Different types of aluminium sections and their finishes. Advantages and Disadvantages of different sections	Drawings of aluminium door and window showing fixing, beading, hardware, use of floor spring. (2 sheets).
1.2	Anodizing of aluminium sections	Drawing of sliding, sliding folding and pivoted doors, revolving doors.
1.3.	Beading in conjunction with aluminium	Drawing of casement and sliding windows fixing details of window grills.(3 sheets)
2.	**Interiors of Buildings**	
2.1	False ceilings and partitions	Drawing and detailing of false ceiling of plywood, POP and readymade aluminium sections. (2 sheets). Fixing details of light fixtures, AC duct, fire alarm and smoke detectors in false ceiling(1 sheet)
2.2	Different counters such as Bank counters showroom display counter, reception counter, and computer work station per usage.	Drawings of counters in different materials-stone tile, blockboard, wood, cement concrete with cladding, glass etc(3 sheets).
2.3	Panelling	Drawing of panelling details (1 sheet)
2.4	Wooden Partitions	High level and low level partitions with side plywood, partly glazed partition, sound proof partition, room dividers (2 sheet).
3.	**3.1 Sideboards** **3.2 Wardrobes**	Drawing of sideboards and wardrobes including • Drawers on slide channel • Drawer without slide channel Fixing detail of fixtures like locks, handles, cloth rails, hooks etc,(2 sheets)
4.	**Kitchen details**	Full cross section of marble counter with cabinets below and above.(I sheet)
5.	**Sequence of construction**	Sequence of different works in construction i.e. foundation, DPC, etc.
6.	**Expansion joints.**	

AA – 532 LANDSCAPING

	L	T	P
Hours / week	2	-	-

1. **Introduction to Landscape Architecture**

2. **Elements and Principle of landscape Design**
   Line, form, texture, colour, light, unity, rhythm, harmony, balance, contrast, emphasis, proportion etc

3. **Landscape Design Elements**
   - 3.1 **Soft Landscaping –**
     Plant and tree types, Using plants for screening and windbreaks, Using plants for their aesthetic appeal, Trees, Hardy shrubs, Herbaceous perennials, Grasses, Climbers; Planting for harsh environments, Planting for Climatic control, Common trees that grow in Delhi's climate- their height and foliage and their suitability for different uses.
   - 3.2 **Hard Landscaping-**
     Different types of hard landscapes, different types of paving, steps, boundary walls, water as a landscape feature etc

4. **Landscape Design with respect to function and aesthetics:**

   Landscape and usage of outdoor functional spaces in major building type like institutions, office buildings, residences, etc.

5. **Street Furniture-** definition, types, utilities and application
6. **Introduction to the gardens around the world.**
   - 6.1 Japanese
   - 6.2 Mughal
   - 6.3 Modern
   - 6.4 European

7. **Outdoor lighting**
   - 7.1 Introduction to outdoor lighting,
   - 7.2 Common fixtures and fittings.
   - 7.3 Water lighting

8. **Introduction to sustainable landscaping-** need, definition, explanation of - green roofs, green walls, xeriscaping, energy efficient landscapes, permeable paving, use of renewable energy in landscaping, native plant selection, enhancing natural habitats for wildlife etc

9. **Students shall prepare study report of a small landscaping project as part of assignment**

AA-533 BUILDING SERVICES

	L	T	P
Hours/week	3	-	1

1. Introduction

1.1 General Introduction to building services specially in reference to residences

2. Sanitation and House Drainage

2.1 Glossary of drainage terms such as Storm overflow, Self Cleansing Velocity etc.
2.2 Systems of drainage - Combined and separate systems
2.3 Trap-sizes, types and functions
2.4 Inspection chambers- sizes, spacing & their construction (sketches only)
2.5 Ventilation of house drainage
2.6 Intercepting traps, gully traps and their functions and sizes
2.7 House drainage systems such as One and two pipe systems
2.8 Preparing layout plan for disposal of sewerage in domestic buildings up to the connection with the public sewer

3 Plumbing and Internal Fixtures

3.1 Joints for various types of pipes.
3.2 Sewage Disposal - Septic tanks, Aqua Privy and soak pits

4 Domestic water supply

4.1 Consumption or demand of water for domestic purposes.
4.2 Leakage and wastage of water and its preventive measures.
4.3 Different methods of water distribution, gravity pressure and dual methods.
4.4 Different Water Layout systems such as tree, grid iron, radial etc.
4.5 Laying and jointing cast iron water mains; different types of joints.
4.6 Service connection for mains.
4.7 Preparing water supply layout for domestic building

5 Introduction to rain water harvesting/ water table recharging-

5.1 Introduction, needs and issues in water harvesting;
5.2 basics of hydrology, water harvesting, conservation and utilization;
5.3 some methods of recharging and conserving water

6 Electrical

6.1 Principles of electrical layout, selection and placement of fittings
6.2 Quality of light - mercury lamps, incandescent lamps, fluorescent tubes and CFLs
6.3 Thumb rule for calculating illumination level
6.4 Various systems of wiring and their suitability
6.5 Lifts
6.6 Precaution to avoid electrical accidents
6.7 Fire caused by electricity and the fighting arrangements
6.8 Preparing electric layout plan for domestic building

7 Introduction to Air Conditioning and ventilation

7.1 Principles of Air conditioning
7.2 Different system of ducting and distribution
7.3 Window units (Package units)
7.4 Split Air conditioners
7.5 Introduction to Air Conditioning Layout of small residences in plan

8 Introduction to Energy efficient heating, cooling & ventilation, their design implications

8.1 Solar air conditioning
8.2 Solar water heating
8.3 Solar lighting etc.

AA- 534 STRUCTURAL DESIGN

	L	T	P
Hours/week	3	2	

Note: IS 800, IS: 456 and steel tables are allowed in the examination

1. RCC Structural elements.

1.1 Reinforced concrete materials and properties, grades of concrete,

1.2 Comparison between working stress and limit state method.

1.3 Reinforcing Materials

1.3.1 Suitability of steel as a reinforcing material

1.3.2 Different types of reinforcing materials including cold twisted deformed bars

1.3.3 Loads as per IS- 875

1.4 Theory of R.C.C beams

1.4.1 Assumption in theory of simple bending in RCC beams

1.4.2 Flexural strength of reinforced concrete beams

1.4.3 Flexural members' Neutral axis, critical neutral axis, balanced, under reinforced, over-reinforced section, lever arms, resisting moment of sections.

1.4.4 Shear in beams

- Effects of shear stresses, permissible shear stresses
- Vertical stirrups and inclined bars as reinforcement for shear and diagonal tension as per IS provision
- Length of embedement and anchorage as per IS code provisions.

1.5 Singly reinforced beams

1.5.1 Calculation of moment of resistance of a simply supported beam for given data as load, span and properties of materials used

1.5.2 Design of singly reinforced rectangular simply supported beam as per IS code from the given data as per span and properties of material used; with structural drawings.

1.5.3 Design of cantilever beams and its drawings

1.5.4 Design of lintel with or without sunshade

1.5.5 T-Beam (singly reinforced only), position of neutral axis, depth of T-Beam width of flange, design of T-Beams as per IS- 456. Drawing of T- Beams

1.6 Slabs

1.6.1 Design of one way simply supported slab with drawing

1.6.2 Design of two way slab with the help of IS- 456 - Design coefficients for simply supported or continuous with drawings

1.7 Columns

1.7.1 Concepts of long and short columns as per IS 456 Provisions. Effective length of columns.

1.7.2 Design of axially loaded long and short columns as per IS provision.

1.7.3 Drawing of reinforcement of columns

1.7.4 Drawing of isolated footing for a column.

2. **Steel Structural elements.**

2.1 Comparison of steel and RCC structure in building.
2.2 Structural steel and steel sections, study of steel tables and reading of data for steel sections, knowledge of IS: 800.
2.3 Structural connections – Types of riveted connections with sketches (Drawing only)
2.4 Welded connections, types of welds, forces in welds, types of welded connections with sketches. (Drawing only)
2.5 Beams: Design of laterally restrained beams with simple Rolled Steel section as per :800 and steel tables
2.6 Design of axially loaded struts.
2.7 Axially-loaded ties.

3. **Introduction to seismic zone considerations on high rise structures.**

4. **Introduction to design implications to disasters.**

AA - 535 FIELD BASED MAJOR PROJECT I

	L	T	P
Hours/week	-	-	2

Objective: To expose students to the real world of building construction and design. Students get valuable practical exposure to the dynamics of implementation of building projects, which can complement and supplement their theoretical knowledge. It also helps in development of observation, analytical and evaluative skills of students. This kind of exposure will be of immense value in enhancing the market value of the students.

Methodology

- The student shall buy a scrap book (10" x 8") of about100 pages
- The student shall identify simple residential building(s) under construction near his/her houses for the purpose of the study.
- The student shall be in constant touch with the faculty/guide, owner of the residence and the contractor working on the site.
- The student shall make regular, ongoing recordings about the following and get them countersigned weekly.
- The students should observe all the stages of construction.
- The students should take information about the building materials and their rates.
- Sketches shall be free hand but to the scale.
- Students should also study the code of practice of Bureau of Indian Standards for various topics that they study in the project work to get an understanding of the correct field practice that should be followed on site.

Contents

1. **Sanitary / plumbing layouts**
   - Plumbing layouts at site
   - Sizes/ materials of pipe available in market
   - Pipe joinery and finishing
   - Study and use of fixtures, such as elbows, T junctions, cross junctions, Y junctions Tools & equipments required.
   - Precautions

2. **Electrical layouts**
   - Laying out of cables, electrical fittings during construction
   - When is the cable layout done in the sequence of work
   - Basics of electrical circuitry followed at site
   - What kinds of fixtures / wiring are available in market and their advantages & disadvantages so as to choose among them?
   - Tools & equipments required and precautions to be followed.
   - Material used/ costing of material

3. **Roof terracing**
   - Type of terracing
   - Procedure of terracing
   - Precautions to be followed while laying terracing
   - How is the slope measured and provided during terracing
   - Mix of mortar being used in the construction
   - Different tools used for terracing
   - Different materials used in terracing/ their cost per unit

AA-536 COMPUTER GRAPHICS – III

	L	T	P
Hours/week	-	-	4

OBJECTIVE : To teach students to prepare advanced 2D and 3D drawings, including architectural rendering, shading, perspective drawing etc. To prepare students in making presentation drawings of the architectural projects along with building views.

1. **Google Sketch-Up Basics**
   - 1.1. Basic drawing in 3D – lines, rectangles, circles
   - 1.2. Push-Pull – converting shapes from 2D to 3D
   - 1.3. Selection and Inference
   - 1.4. Move, Copy, Offset & Mirror
   - 1.5. Working with groups/ components
   - 1.6. Getting models from 3D warehouse
   - 1.7. Use of different styles
   - 1.8. Importing CAD drawings
   - 1.9. Introduction to other new softwares

2. **2D Image Import**
   - 2.1. Google Earth images
   - 2.2. Tracing the Image
   - 2.3. Using Push-Pull to Make a Building

3. **Photo Import & 3D Perspective Drawing**
   - 3.1. Photo Import
   - 3.2. Aligning the Image
   - 3.3. Drawing Edges & Faces

4. **Building Orientation and Shading**
   - 4.1. Orienting the drawing to true north
   - 4.2. Lighting model in Google Sketch-Up

5. **Practical Exercises**

   5.1 Preparation of drawing through the use of graphics package such as ACAD. I t is recommended that the student be made to practice on the latest release of graphics package. The following drawings should be made as exercises.

   - Site plan with plants & other details
   - Floor plans
     Sections
     Elevations
   - printing of the above exercises on available printer

(ELECTIVE I)

AA-540 MODEL MAKING

	L	T	P
Hours/week	-	-	2

OBJECTIVE: To enable students to make models as 3D visualization tool for designing as well as presentation

1. **Uses of Different Materials:**
   - 1.1 Wood
   - 1.2 Thermocol
   - 1.3 Cork
   - 1.4 Plaster of Paris
   - 1.5 Paper sheets of various kinds
   - 1.6 Mount board
   - 1.7 Balsam wood
   - 1.8 Acrylic sheet

2. **Site presentation**
   - 2.1 Ground surface,
   - 2.2 Human figures,
   - 2.3 Vegetation,
   - 2.4 Vehicles

3. **Detailed Study**
   - 3.1 Jaali details
   - 3.2 Grill details
   - 3.3 Gate details
   - 3.4 Railing details

4. **Preparation of Model**
   - 4.1 Students will prepare a model of one of their projects done earlier.

(ELECTIVE – I)

AA-541 URBANISATION AND TOWN PLANNING

	L	T	P
Hours/week	2	-	-

1 **Introduction to Dimension of Urbanization-** definition and brief explanation of

- 1.1 Causes of urbanisation
- 1.2 Impact of urbanisation
- 1.3 Advantages and disadvantages of urbanisation
- 1.4 Growth of cities and classification of towns and cities as per population
- 1.5 Urban migrants, reason for migration
- 1.6 Urban poor

2 **Town Planning (physical)**

- 2.1 Introduction and need of town planning
- 2.2 Principles of town planning,
- 2.3 Density - High and low
- 2.4 Relationship between ground coverage, density and FAR
- 2.5 Low rise high density development and high rise low/high density development
- 2.6 Land use planning
  - Residential area
  - Industrial landuse
  - Semipublic/public places
  - Commercial
  - Roads
  - Parks and playgrounds
  - Vacant land
  - Land use planning and Delhi Master Plan provisions

3 **Relationship between transport, infrastructure and housing**

4 **Town Planning standards for neighbourhood-** need, reasons, special areas

5 **Urban Planning Issues**

- 5.1 Land use patterns- problems and prospects
- 5.2 Urban Poverty- reasons, manifestations, growth of slum, growth of informal sector, underdeveloped labour, pressure on services, effect on education and health, increase in crime etc
- 5.3 Issues in physical infrastructure – Energy, water supply and sanitation
- 5.4 Tranport Planning- issues, relationship between town growth and traffic, low cost transport, need for mass transport systems, importance of pedestrianization

6 **Inclusive Development**

SIXTH SEMESTER

AA - 630 ARCHITECHTURAL DESIGN V

	L	T	P
Hours / Week	2	-	11

1. **Design of a public building on two or more floors/ split-levels such as hostel, club, group housing (limited to four floors), nursing home, holiday resort, cultural centre, motel, Old age home, Delhi haat etc.**

1.1 Study report of an existing building including:

- Site study,
- Analysis of area requirements of different spaces and activities,
- Circulation
- Parking
- Critical Analysis

1.2 Presentation drawing:

- Preparation of concept note
- Site analysis
- Floors plans,
- Site plan,
- Elevations,
- Sections,
- Views

1.3 Detailed Model

2. **Two time Problem on Public Building Design on above mentioned topics**

AA – 631 WORKING DRAWING AND DETAILING- II

	L	T	P
Hours/week	3	-	7

DETAILED CONTENTS

To prepare a complete set of working drawing for a public building dealt in earlier Semester

S. No.	Detail of Drawings	No. of sheets to be prepared.
1.	Site plan showing the building and the point of demarcation for getting out the excavation mark.	1 Sheet
2.	Foundation plan and details including excavation plans	2 Sheet
3.	All upper floor plans as per design	1 Sheet each
4.	Ground floor plan with surface and soil waste drainage services.	Drawings as per requirement
5.	Terrace floor plan showing rain water drainage and disposal	1 Sheet
6.	Elevation- all elevations as required for explaining the scheme.	Drawings as per requirement
7.	Sections- as many sections as required for explaining the scheme.	Drawings as per requirement
8.	Doors and windows details	Drawings as per requirement
9.	Staircase details	1 Sheet
12.	Kitchen details including plan and internal sectional elevation	Drawings as per requirement
13.	Complete toilet details	Drawings as per requirement
14.	Entrance gate, boundary wall, external paving and railing details	Drawings as per requirement
16.	Electrical layout plans	Drawings as per requirement
17	Any other drawing necessary to explain the scheme.	

AA - 632 ARCHITECTURAL PROFESSIONAL PRACTICE

	L	T	P
Hours / Week	2	-	-

1. **Tenders**
   - 1.1 Essential characteristics of a tender notice,
   - 1.2 Types of tenders and tender documents.
   - 1.3 single and limited tenders
   - 1.4 open and e - tenders
   - 1.5 Dual tendering – technical and financial bids.

2. **Contract**
   - 2.1. General principles of a contract.
   - 2.2. Types of contract:
   - 2.3. Architect duties and liabilities under the contract.
   - 2.4. Duties and liabilities from contract documents.
   - 2.5. Contractor's duties and liability.
   - 2.6. Architect's liabilities to the contractor.
   - 2.7. Employer's duties and liabilities.

3. **Architect and his work**
   - 3.1. Structure of an architect's office.
   - 3.2. Office and management.
   - 3.3. Architect duties to his employees under the labor welfare provision.

4. **Code composition and fees-**
   4.1 Architectural competitions, professional conduct, conditions of engagement and scale of professional fees and charges.

5. **Awareness about architect Act, 1972, National Building Codes, Delhi Master plan and Building Byelaws.**

6. **Entrepreneurship**
   - 6.1. Concepts of Entrepreneurship.
   - 6.2. Need of entrepreneurship in the context of prevailing employment and economic conditions of the country.
   - 6.3. Successful entrepreneurship.
   - 6.4. Training for entrepreneurship development.
   - 6.5. Basics resources
     - Financial
     - Technical
     - Human and Information recourses
   - 6.6. Human relations and relations with subordinates, equals and supervisors,
   - 6.7. Characteristics of group behaviour.

AA – 633 ENVIRONMENT AND ECOLOGY

Hours / Weeks 2

Objective

To develop the awareness in students that buildings have a huge environmental impact, accounting for an estimated 48% of all green house emissions. To develop the understanding in students that, with such an alarming figure, the architectural community should awaken to its responsibilities. To build awareness that challenge of sustainable architecture is to improve climatic comfort while simultaneously reducing energy expenses, consumption of fossil fuels and resulting generation of greenhouse gases. In the future there will not be sustainable/ non sustainable architecture, but there will be only responsive design.

Contents:

1. **Environment and Ecology**: Definition, Scope and Importance, ecosystem, balanced ecosystem, energy flow in ecosystem, Human activities and their impact on environment
2. **Natural resources**: Water resources, mineral resources, forest resources, energy resources, food resources etc. Definition, extent, importance, associated problems and issues.
3. **Energy**- different types of energy, conventional and non conventional energy sources. Their importance and advantages.
4. **Environmental pollution and their effects**- Water pollution, land pollution, noise pollution, air pollution, solid waste management
5. **Current environmental issues of Importance**- Population growth, climate change, global warming, acid rain, loss of bio diversity, depletion of resources etc
6. **Environmental protection**: Sustainable development, conservation of resources, alternative sources of energy, etc.
7. **Sustainable Architecture**

   7.1 Importance and Fundamentals of sustainable architectural design- economy of resources, life cycle design, cost effective design, humane design

   7.2 Introduction to active strategies - solar power, wind power, other renewable energy sources. – Need, issues and examplers.

   7.3 Introduction to Passive strategies of cooling and heating of building- needs, issues and exemplars

   - 7.3.1 Orientation and configuration of spaces
   - 7.3.2 Built-form- size and shape of building, design of openings
   - 7.3.3 Building envelope- materials and construction techniques- walls, roof, ceiling, terraces, surface finishes, building services
   - 7.3.4 Landscaping

   7.4 Introduction to ecofriendly building materials and construction techniques- need, characteristics, some exemplars of eco friendly materials/techniques for walls, roof, flooring, finishing, doors and windows, foundation, building services

   7.5 Introduction to the concept of LEED and GRIHA ratings

AA - 634 ESTIMATION AND SPECIFICATION WRITING

	L	T	P
Hours / Week	3	--	-

1. **Specification writing**: principles of specification writing, writing broad specification of items with special reference to two-storey building.
   - plain cement concrete of different proportions,
   - brick masonry in cement and lime mortar
   - stone masonry in cement and lime mortar,
   - plastering and pointing with cement mortar in different proportions,
   - white washing.

2. **Introduction to estimating.** Types of estimates.

3. **Different methods of taking out quantities**- centrelines, in to in, out to out.

4. **Units of measurement and units of payment of different items of work including building services**

5. Preparation of a rough cost estimate, detailed estimate, abstract of cost and material statement for a small residential building with a flat roof.

6. **Calculation of material and analysis of rates for**
   - plain cement concrete of different proportions,
   - brick masonry in cement and lime mortar
   - stone masonry in cement and lime mortar,
   - plastering and pointing with cement mortar in different proportions,
   - White washing.

7. **Exercise involving choosing of relevant specifications**

8. **Accounts,** explanation of ordinary terms used in bookkeeping, cashbook, work order, measurement book, petty cash and imprest.

AA – 635 FIELD BASED MAJOR PROJECT II

L T

Hours/Week -

OBJECTIVE: To expose students to the real world of building construction and design. Students get valuable practical exposure to the dynamics of implementation of building projects, which can complement and supplement their theoretical knowledge. It also helps in development of observation, analytical and evaluative skills of students. This kind of exposure will be of immense value in enhancing the market value of the students.

METHODOLOGY

- The student shall buy a scrap book (10" x 8") of about100 pages
- The student shall identify simple residential building(s) under construction near his/her houses for the purpose of the study.
- The student shall be in constant touch with the faculty/guide, owner of the residence and the contractor working on the site.
- The student shall make regular, ongoing recordings about the following and get them countersigned weekly.The students should observe all the stages of construction.
- The students should take information about the building materials and their rates.
- Sketches shall be free hand but to the scale.
- Students should also study the code of practice of Bureau of Indian Standards for various topics that they study in the project work to get an understanding of the correct field practice that should be followed on site.
- The submission of the project shall be in the form of a report enhanced with sketches/ photographs etc. Marks shall be rewarded for periodic reviews

CONTENTS

Students ahall be given a project brief at the start of the semester

1. **Doors and windows**
   - When is the door and window frame fixed in the sequence of works being followed on site?
   - Precautions being followed in the fixing of door and window frame on site
   - Procedure followed in fixing the door and window shutters to the frame
   - Hardware and fixtures being used in door and windows fabrication and their fixing
   - Finishing of doors and windows
   - Materials used in the construction of doors and windows and what are their specifications/ cost per unit of the materials
   - Tools and equipments being used
2. **Plasters and finishes**
   - When is the internal and external plastering done in the sequence of work being followed on site
   - Precautions being followed in the plastering of walls on site
   - Measuring and maintaining thickness of plaster measured on the site
   - Materials used in the plastering and what are their specifications/ cost per unit of the materials
   - Tools and equipments being used
3. **RCC work**
   - Shuttering, scaffolding of beams, columns and slabs
   - Fixing of reinforcement
   - Concrete mixes are used on site/ cost per unit
   - Precautions being followed on site

4. RCC Staircase

- How are the markings for the staircase made on the site?
- Procedure of marking staircase on site
- Fixing of railings to the tread/ riser. Fixing of balustrade to the railing
- Precautions to be followed while making staircase on the site
- materials being used for making staircase/ cost per unit of the materials being used on site
- Tools and equipments being used on the site for making staircases

AA-636 COMPUTER GRAPHICS IV

	T	P
Hours/ week	-	4

1. **Preparation of drawings through the use of a graphics package such as ACAD. It is recommended that the students be made to practice on the latest release of the graphic package(ACAD) .**

2. **Working Drawings**
   - 2.1 Dimensioning
   - 2.2 Detailing

3. **Presentation Drawings**
   - 3.1 Site plan
   - 3.2 Floor plans
   - 3.3 Sections
   - 3.4 Elevations

4. **Generating of Views by 3D softwares (latest software in the market).**
   - 4.1 Use of 3D softwares for generating views of simple buildings
   - 4.2 Use of 3D softwares for generating views of any relevant project

5. **Printing of Drawings on different scales.**
   - 5.1 Submission will be printed drawings

(ELECTIVE II)

AA-640 INTERIOR DESIGN

	L	T	P
Hours/week	2	-	-

1. **Importance of Interior Design in buildings**

2. **Principles and elements of Design as applied to Interiors -** Line, plane, color, texture, pattern, shape etc unity, rhythm, proportion, balance, harmony, contrast etc

3. **Psychology and application of colour, light, form and texture in interiors**

4. **Lighting in interior,**

   4.1 Light as a design element
   4.2 artificial and natural lighting,
   4.3 requirement of light for specific purpose,
   4.4 different types of lighting and their effects,
   4.5 planning lighting layouts

5. **Interior Designing of**
   5.1 house
   5.2 Small public spaces like shops, clinics, eating joints, etc

6. **Considerations of design in interiors**
   6.1 Interior surface and materials- wall, floor, ceiling surface materials
   6.2 Structures
   6.3 Lighting
   6.4 Design themes
   6.5 Functional aspects
   6.6 Budget

7. **Role of plant material in design of interiors.**

8. **Role of art work in the enhancement of interiors in domestic and commercial areas**

9. **Role of drapery and furniture in the design of interiors of buildings.**

(ELECTIVE II)

AA - 641 HOUSING

	L	T	P
Hours/week	2	-	-

1 **Introduction to housing**

1.1 Definition of Housing
1.2 Types of housing – as per Delhi city
1.3 Population Growth and Migration
1.4 Traditional housing and its relevance to mass housing
1.5 Housing density and related terms

2 **Rural and Urban Housing**

2.1 Introduction to urban and rural housing
2.2 Impact of high density development
2.3 Housing need and demand
2.4 Slums and Squatters
2.5 Group housing and Flatted development

3 **Types of Housing**

3.1 Housing Typology
3.2 Types based on social, economic mixing. Their merits and demerits.
3.3 Mass housing (group housing of various income groups) - their advantages and disadvantages
3.4 Plotted development,

4 **Physical layout**

4.1 Linear cluster (row housing)
4.2 Chowk cluster
4.3 Open court cluster
4.4 Neighbourhood concept

5 **Introduction to housing policies and programmes of the government.**

6. **Introduction to housing finance**

7. **Low cost housing**

8. **Low income housing and housing for urban poor**

9 **Definition of slums. Difference between slums and squatters.**

STUDY AND EVALUATION SCHEME

STUDY AND EVALUATION SCHEME ARCH ASSTT 2013
I SEMESTER

Sn	Subject Code	Subject	Teaching Load			Evaluation Scheme					Total Marks
			L	T	P	Internal		External		Hrs	
						Theory	Practical	Theory	Practical		
1	AA-130	Art Appreciation & Graphics I	2	-	7		50		100	6	150
2	AA-131	Graphic Presentation	2	-	9		50		100	3	150
3	AA-132	Building Materials I	3	-	--	50		100		3	150
4	AA-133	Workshop Practice	--	-	3		50		50	3	100
5	AA-134	Applied Mathematics I	3	2	--	50		100		3	150
6	AA--135	Communication Techniques I	2	-	--	50		100		3	150
7	AA -136	Applied Physics	2	-	-	50		100		3	150
8	AA- 137	Introduction To Computers I	-	-	3		50		50	6	100
9	AA-138	Portfolio & Viva I				AAG 100, GP 100 .				6	200
10		Outdoor/ Library Exposure			2						
			14	2	24						1300

Portfolio & Viva will be jointly conducted by internal and external examiners and will consist of equal weightage of portfolio and viva in each subject

STUDY AND EVALUATION SCHEME ARCH ASSTT 2013
II SEMESTER

Sn	Subject Code	Subject	Teaching Load			Evaluation Scheme					Total Marks
			L	T	P	Internal		External		Hrs	
						Theory	Practical	Theory	Practical		
1	AA-230	Architectural Design I	2	-	8		100		100	6	200
2	AA-231	Building Construction I	2	-	6		50		100	3	150
3	AA-232	Art Appreciation & Graphics II	2	-	6		50		100	6	150
4	AA-233	Communication Techniques II	2	-	--	50		100		3	150
5	AA-234	Applied Mathematics II	3	2	--	50		100		3	150
6	AA-235	Applied Chemistry	2	-	--.	50		100		3	150
7	AA-236	Introduction to Computers II	--	-	3		50		100	6	150
8	AA-238	Portfolio & Viva II				A Design 100, BC 50, AAG 50				6	200
9		Outdoor/ Library Exposure			2						
			13	2	25						1300

Portfolio & Viva will be jointly conducted by internal and external examiners and will consist of equal weightage of portfolio and viva in each subject

STUDY AND EVALUATION SCHEME ARCH ASSTT 2013
III SEMESTER

Sn	Subject Code	Subject	Teaching Load			Evaluation Scheme					Total Marks
			L	T	P	Internal		External		Hrs.	
						Theory	Practical	Theory	Practical		
1	AA-330	Architectural Design II	2	-	8		100		100	12	200
2	AA-331	Building Construction II	2	-	6		50		100	3	150
3	AA-332	Building Materials II	3	-	--	50		100		3	150
4	AA-333	History of Architecture I	3	-	1	50		100		3	150
5	AA-334	Climatology	2	-	--	50		100		3	150
6	AA-335	Surveying I	3	-	2	50	50	100	50	3	250
7	AA-336	FB Minor Project	--	-	2		50				50
8	AA-337	Computer Graphics I	--	-	4		50		50	6	100
9	AA-338	Portfolio & Viva III			Design 100, BC 100, FBP 50, MD 50					6	300
10		Outdoor/ Library Exposure			2						1500
			15	-	25						

Portfolio & Viva will be jointly conducted by internal and external examiners and will consist of equal weightage of portfolio and viva in each subject

STUDY AND EVALUATION SCHEME ARCH ASSTT 2013
IV SEMESTER

Sn	Subject Code	Subject	Teaching Load			Evaluation Scheme					Total Marks
			L	T	P	Internal		External		Hrs.	
						Theory	Practical	Theory	Practical		
1.	AA-430	Architectural Design III	2	-	7		100		100	12	200
2.	AA-431	Building Construction III	2	-	6		50		100	3	150
3.	AA-432	Working Drawing I	1	-	4		100				100
4.	AA-433	Building Byelaws & MDrg.	2	-	1	50		100		3	150
5.	AA-434	History of Architecture II	3	-	–	50		100		3	150
6.	AA-435	Surveying II	2	-	1	50		100		3	150
7.	AA-436	Theory of Structures	3	-	–	50		100		3	150
8.	AA-437	Computer Graphics II	–	-	4		50		100	6	150
9.	AA-438	Portfolio & Viva IV	A Design 100, BC 100,WD 50, BBL 50							6	300
10		Outdoor/ Library Exposure			2						
			15	-	25						1500

Portfolio & Viva will be jointly conducted by internal and external examiners and will consist of equal weightage of portfolio and viva in each subject

STUDY AND EVALUATION SCHEME ARCH ASSTT 2013
V SEMESTER

Sn	Subject Code	Subject	Teaching Load			Evaluation Scheme					Total Marks
			L	T	P	Internal		External		Hrs.	
						Theory	Practical	Theory	Practical		
1	AA-530	Architectural Design IV	2	-	9		100		100	18	200
2	AA-531	Building Construction IV	2	-	6		50		100	3	150
3	AA-532	Landscaping	2	-	-	50		100		3	150
4	AA-533	Building Services	3	-	1	50		100		3	150
5	AA-534	Structural Design	3	2	–	50		100		3	150
6	AA-535	FB Major Project I	–	-	2		50				50
7	AA-536	Computer Graphics III	–	-	4		50		50	6	100
8	AA-540	Elective I–Model Making	2	-	-		50		100	3	150
	AA-541	Elective I- Urbanisation and town planning	-	-	2	50		100		3	150
9	AA-538	Portfolio & Viva V				A Design 150, BC 150,LS 50, FBP 50				6	400
10		Outdoor/ Library Exposure			2						
			14	2	24						1500

Portfolio & Viva will be jointly conducted by internal and external examiners and will consist of equal weightage of portfolio and viva in each subject

STUDY AND EVALUATION SCHEME ARCH ASSTT 2013
VI SEMESTER

Sn	Subject Code	Subject	Teaching Load			Evaluation Scheme					Total Marks
			L	T	P	Internal		External		Hrs.	
						Theory	Practical	Theory	Practical		
1	AA-630	Architectural Design V	2	-	11		100		100	18	200
2	AA-631	Working Drawing II	3	-	7		100				100
3	AA-632	Architectural Prof Practice	2	-	--	50		100		3	150
4	AA-633	Environment and ecology	2	-	-	50		100		3	150
5	AA-634	Estimation & Specification Writing	3	-	--	50		100		3	150
6	AA-635	FB Major Project II	--	-	2		50				50
7	AA-636	Computer Graphics IV	--	-	4		50		100	6	150
8	AA-640 AA-641	Elective II- Interior Design Elective II- Housing	2	-	--	50		100		3	150
9	AA-638	Portfolio & Viva V				A Design 200, WD 100, FBP 100				6	400
10		Outdoor/ Library Exposure			2						
			14	-	26						1500

Portfolio & Viva will be jointly conducted by internal and external examiners and will consist of equal weightage of portfolio and viva in each subject