

**MODEL CURRICULUM FOR**

**D. VOC**

**IN**

**ARCHITECTURE ASSISTANTSHIP**

**Model Curriculum for D. Voc in Architecture Assistantship**

Level	Code	Educational Component	Credit	Marks
<b>3</b> <b>Semester I</b>	<b>Theory</b>			
	3.GE.01	Communication Skills	3	50
	3.GE.02	Basic Design	3/1	50
	3.GE.03	Basic Building Material & Technology - I	3/1	50
	3.GE.04	Architectural Graphics	3	50
	<b>Lab/Practical</b>			
	3.GP.01	Basic Design	1/3	25
	3.GP.02	Basic Building Material & Technology - I	1/3	25
	3.VP.01	Workshop	1/3	50
	<b>Suggested On-Job-Training (OJT)/Qualification Packs</b>			
Mason General (CON/Q0103)			15	200
<b>3</b> <b>Semester II</b>	<b>Theory</b>			
	3.GV.01	Basic Architecture Design	3	50
	3.GV.02	2 D Drawing in CAD	3/1.5	50
	3.GV.03	Basic Building Material & Technology - II	3	50
	3.GV.04	Surveying & Levelling	3	50
	<b>Lab/Practical</b>			
	3.VP.02	2 D Drawing in CAD	1.5/3	50
	3.VP.03	Surveying & Levelling	1.5	50
	<b>Suggested On-Job-Training (OJT)/Qualification Packs</b>			
	Draughtsman (CON / Q1301) (part-1)		(Any one)	15
<b>4</b> <b>Semester I</b>	<b>Theory</b>			
	4.GV.01	Architecture Design – I (Residential)	3	50
	4.GV.02	3 D Drawing in CAD	3/1.5	50
	4.GV.03	Basic Building Material & Technology -III	3/1.5	50
	4.GE.01	Building Services - I	3	50
	<b>Lab/Practical</b>			
	4.VP.01	3 D Drawing in CAD	1.5/3	50
	4.VP.02	Basic Building Material & Technology -III	1.5/3	50
	<b>Suggested On-Job-Training (OJT)/Qualification Packs</b>			
	Construction Laboratory & Field Technician (CON/Q0402)		(Any one)	15
Doors and window Fixer (CON/Q1105)				

Level	Code	Educational Component	Credit	Marks
<b>4 Semester II</b>	<b>Theory</b>			
	4.GV.04	Architectural Design –II (Commercial)	3	50
	4.GV.05	BIM / Revit	3/1.5	50
	4.GV.06	Basic Building Material & Technology -IV	3/1.5	50
	4.GV.07	Building Services -II	3	50
	<b>Lab/Practical</b>			
	4.VP.03	BIM / Revit	1.5/3	50
	4.VP.04	Basic Building Material & Technology -IV	1.5/3	50

	<b>Suggested On-Job-Training (OJT)/Qualification Packs</b>			
	Construction Electrician CON/Q0603	(Any one)	15	200
<b>5 Semester I</b>	<b>Theory</b>			
	5.GV.01	Design & Innovation	3/1.5	50
	5.GV.02	Sustainable Material	3	50
	5.GV.03	Working Drawing - I	3/1.5	50
	5.GV.04	Estimating & Costing	3	50
	<b>Lab/Practical</b>			
	5.VP.01	Working Drawing - I	1.5/3	50
	5.VP.02	Design & Innovation - Lab	1.5/3	50
	<b>Suggested On-Job-Training (OJT)/Qualification Packs</b>			
	Draughtsman (CON / Q1301) ( Part –II) – L4		15	200

<b>5 Semester II</b>	<b>Theory</b>			
	5.GV.05	Building Bye-laws	3	50
	5.GV.06	Town Planning / Specification & Tendering	3	50
	5.GV.07	Entrepreneurship	3/1.5	50
	<b>Lab/Practical</b>			
	5.VP.03	Project	1.5/3	150
	<b>Suggested On-Job-Training (OJT)/Qualification Packs</b>			
			(Any one)	15
	NIL			

**Detailed Curriculum**  
**Level 3 (Semester - I)**  
**(3.GE.01) Communication Skills**

**1. RATIONALE**

English language has become a dire need to deal successfully in the globalized and competitive market and hence this curriculum aims at developing the functional and communicative abilities of the students in English. Proficiency in English is one of the basic needs of technical students. A technician has to communicate all the time with peers, superiors, subordinates and clients in his professional life. Hence this course is being offered.

**2. COMPETENCIES**

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competencies:

- i. Communicate verbally and in writing in English.**
- ii. Comprehend the given passages and summarize them.**

**3. DETAILED COURSE CONTENTS**

**Unit – I Introduction to Communication**

Definition, need & Importance, Elements of Communication cycle (process), Principles of effective Communication barriers & how to overcome them

**Unit – II Essay Writing**

Descriptive (Architectural point of view)

**Unit – III Précis writing**

Importance & Technique of précis writing

**Unit – IV Types of professional correspondence.**

Application Letter, Inquiry & replies, order & complaint

**Unit – V Paragraph writing**

Techniques of paragraph writing

**Unit – VI Correction of sentences**

Correction of common errors

**Unit – VI Do as directed**

Remove too, active / passive, voice, direct/ indirect, Affirmative, Negative, Assertive, Exclamatory Question tag, Use articles, preposition, Conjunction, Change the Degree, Use Proper tense,

**Unit – VII Use pairs of word in sentences**

## **Unit – VIII Use phrases and idioms in sentences**

### **Unit- IX Transcription (language grammar)**

Transcribe the words (with the help of phonetic keys.)

#### **4. Assignments (Term Work)**

- 1) Types of communication Formal/ informal, verbal/ non verbal
- 2) Communication situation
- 3) Advantage and disadvantages of oral comm. / written communication.
- 4) Vocabulary exercise on phonetics and grammar.

#### **5. Reference Books:-**

- 1) High School English Grammar- S. Chand & Co. Ltd.
- 2) English Grammar at Glance- S. Chand & Co. Ltd.
- 3) Effective English- Pearson, E. Suresh Kumar & Others.
- 4) English Communication for Polytechnics- Orient Black Swan.
- 5) English Fluency Step 1 & 2- Macmillan.
- 6) Active English Dictionary- Longman.

#### **6. List of Software/Learning Websites:-**

- 1) <http://www.free-english-study.com/>
- 2) <http://www.english-online.org.uk/course.htm>
- 3) <http://www.english-online.org.uk/>
- 4) <http://www.talkenglish.com/>
- 5) <http://www.learnenglish.de/>

## **(3.GE.02) Basic Design**

### **1. RATIONALE**

Basic Design has its importance in introducing the student to free-hand drawing of object/ building, with the help of site visits, they are able to express their ideas through free-hand sketches. Knowledge of colour schemes & compositions helps the student to instill life into their drawings/sketches. Basic Design as a whole provides a strong platform to enable the student to develop creative ideas for their architectural design subject. All architectural designs are presented with the help of drawings and model. While drawings like plans, sections & elevations help one to understand the design two-dimensionally, models provide a three dimensional understanding. Hence knowledge and skill of making models with the help of different materials in different scales is very important for architectural presentation. This type of presentation is essential to understand and comprehend the planning & designing of a building.

## **2. COMPETENCY**

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competency:

- i) **Develop model of a given building using different material to an appropriate scale.**

## **3. DETAILED COURSE CONTENTS**

### **Unit – I –Types of lines**

Draw types of lines: - Types of lines and their expressions through use (weight age) in drawing.

### **Unit – II –Sketches**

Prepare sketches from memory: - Sketches of objects/scenes from memory.

### **Unit – III –Sketches of given objects**

Prepare sketches of given objects: - Sketches of given objects to different scale and proportion.

### **Unit – IV –Sketches of buildings**

Prepare sketches of buildings: - Sketches of buildings showing shades, shadows and texture.

### **Unit – V –Colour wheel, colour schemes, etc.**

Prepare colour wheel, colour schemes, etc., Learn visual and psychological effects of colour.

### **Unit – VI -Colour composition**

Prepare a colour composition

### **Unit – VII – Two dimensional compositions**

Prepare a two dimensional composition, Finish it with different textures & colours.

### **Unit – VIII – Models of geometrical objects**

Prepare models of geometrical objects, Use various materials, Prepare given geometrical objects.

### **Unit – IX – Models of buildings**

Prepare models of buildings: - Prepare models of given building components, Prepare a model of a small building to given scale, Prepare models showing landscaping, site detailing, etc.

## **4. Assignments (Practical)**

- 1) Unit – I- Prepare sketches incorporating the lines and shapes, (MIN. 5 Sketches)
- 2) Unit – II- Prepare sketches of trees, human figures, vehicles, etc (MIN. 5 Sketches) and minimum 3 sketches of real life situation like a scene of bus stand, a tea shop, a milk booth, a view outside an ATM booth, etc.
- 3) Unit – III- Prepare sketches of objects and furniture. (MIN.5 Sketches)
- 4) Unit – IV- Prepare sketches of building (MIN. 5 Sketches)
- 5) Unit – V- Draw a colour wheel indicating colour schemes.
- 6) Unit- VI- Prepare a minimum of 5 colour compositions.

- 7) Unit – VII- Prepare a minimum of 5 compositions using various media.
- 8) Unit – VIII- Prepare sketches and models of geometrical composition having 4 to 5 geometrical solids
- 9) Unit –X- Prepare one model of building component like staircase, water tank, balcony, porch, entrance, any other, etc. Prepare one model of small building showing landscape, parking, etc.

#### **5. Reference Books:-**

- 1) Rendering with Pen & Ink- Architecture Book Pub. Co./latest
- 2) Drawing & Painting Course- Pustak Mahal Delhi/latest
- 3) Drawing for Beginners- Herper Collins Publication/latest

### **(3.GE.03) Basic Building Material & Technology –I**

#### **1. RATIONALE**

This course introduces the student to the basic building materials used in the construction industry. It also introduces the student to the manufacturing process and properties of these materials. Factors affecting the relation of materials are also discussed. Hence, this course provides a foundation for this programme.

#### **2. LIST OF COMPETENCIES**

The course content should be taught and implemented with the aim to develop different types of skills leading to the achievement of the following competency:

**i) Select different types of building materials according to requirement of the building elements**

#### **3. DETAILED COURSE CONTENTS**

##### **BUILDING TECHNOLOGY**

###### **Unit – I Soil:**

Different types and their origin, Physical properties and effect of weather, water, temperature etc. on different soil types, bearing capacity of commonly met soil and their role in building foundations, angle of repose ( introductory only)

###### **Unit – II Brick:**

Composition of earths, standard market and I.S.I. size properties as per I.S.I. Brick manufacturing Processes, sundried brick, special types of bricks, Different uses of brick in construction.

###### **Unit – III Stones:**

Building stones, types of rocks, method of quarrying origin and composition of stones, properties of good stones natural bed, various types of stone dressings defects in stone, stones used in construction, uses in construction, aggregates.

#### **Unit – IV Sand:**

Pit, river sea sand, gravel, I.S.I. standards use in mortar and concrete, bulking of sand, impurities in sand their removal, different grades of sand with respective size and their application I.S.I. standard uses in construction.

#### **Unit – V Lime:**

Lime ore stone, quarrying and collection composition and physical properties method of burning of lime ore, quick lime, fat lime, hydraulic lime mortar mix, method of preparation, neeru, plaster, efflorescence, peeling, flaking, blistering, use of surkhi, I.S.I. standards, lime wash, uses in construction.

### **CONSTRUCTION TECHNOLOGY**

#### **Unit – VI Introduction:**

**Foundation:** simple foundation for masonry load bearing walls, piers pillars; in brick and stones load bearing foundation; foundation in black cotton soil; masonry retaining wall.

#### **Unit – VII Superstructure**

**Brick masonry:** tools and equipment's bonding and its principles; types of brick like headers stretchers king and queen closer etc. and their use, English and Flemish bond in straight line for stopped end, corner tee and cross junctions up to thickness on two brick thick wall and its combinations; attached and detached piers, buttresses, pilasters, brick on edge wall, sundried brick construction in mud mortar, soil-cement block, expansion joint in masonry compound wall.

**Stone masonry :** various types of stone dressing, various types stone joint such as plain, beveled, rebated dowel, clamp joint monolithic construction of columns, quoins, header bond of through stones, various types of stone masonry such as ashlar and rubble with their different types, composite wall in brick and stone, compound walls.

#### **Unit – VIII**

Hollow, solid concrete block wall, Brick and stone paving stone

#### **Unit – IX Finish:**

Plastering, sand faced, neeru finish and other finishing types, various types of pointing. Use of scaffolding, single and double scaffolding for masonry work, bamboo, timber and tubular scaffolding, Arches and lintels in bricks, stones and timber. Cornices, Shajja, canopy and porch in brick and stones.



## **Unit – X Doors and windows**

Doors and windows such as ledged, braced, battened, false paneled door, simple timber window.

## **Unit – XI Roof:**

Roof layout ridge, hip valley, gable eaves etc. types of simple pitched roof such as lean to couple, close couple and ,collar and, material and details of roof covering such as thatch manglore and other patent tiles country tiles and shingles.

## **Unit- XII Flooring:**

Precast and in-situ flooring, laying on ground and upper floors, various types of based for flooring

## **4. Reference Books**

- 1) Rangwala S.C.- Engineering Materials- Charotar Publishing House, latest
- 2) Punmia B.C.- Building Construction- Laxmi Publishing, latest
- 3) Arora, S.P. ,Bindra- Building Construction- Dhanpat Rai Publications, latest

## **(3.GE.04) Architectural Graphics**

### **1. RATIOALE**

This is a primary course about learning and applying fundamentals of design. The process of learning to design a single volume building allows a student to express his ability to conceive different types of forms. It facilitates the student to understand and apply the nuances of anthropometry by making a model with furniture layout.

### **2. DETAILED COURSE CONTENT**

#### **Unit – I**

Introduction of drawing instruments such as drawing board set-squares tee-square french curve, stencils, different types of pencils and pens and their uses.

#### **Unit –II**

Lettering, size and notation of drawing, symbolic representation of building, elements and material, other features as per I.S.I and standard practice.

#### **Unit- III**

Introduction of various media of drawing and presentation such as pencil, charcoal crayon, water colour, sketch pens, inks etc and exercise using all these media.

#### **Unit –IV**

Scale drawing, construction of various metric scales, normally used scale, use of metric scale for various purposes.

### **Unit - V**

Introduction and understanding of plain elevation and section developed and inverted plans.

### **Unit- VI**

Measured drawing of small objects, such as building elements, pieces of furniture and small built forms.

### **Unit – VII**

Solid geometry to explain the need of solid geometry in architectural drawings such as techniques of presenting three dimensional drawing into two dimensional objects. Exercise involving geometrical forms, presented in different positions of individual object and then in group.

### **Unit - VIII**

Isometric and Axonometric projections.

### **Unit - VIII**

Interpenetration of forms and section of solids.

### **Unit - IX**

Surface development of simple and complex objects.

### **3. Reference Books**

1. Ching Francis D.K.: Architectural Graphics
2. Kelsey W. E.: Geometrical & Building Drawing
3. Leslie Martin: Architectural graphics:
4. B. James: Essential of Drafting
5. H. Joseph and Morris: Practical plane and solid geometry
6. Gill Robert: Rendering with pen and ink
7. Burden Ernest: Architectural Delineation

### **(3.GP.01) Basic Design- Lab**

- ◆ Design problems dealing with planning for activates such as individual living, units shops, stalls, snacks bars, unilevel activities with three to four functions of total area up to 80 sq. mt.
- ◆ The students should be encouraged to collect their own data experiments and try various alternative before reaching final solution and should also be encouraged to express their ideas with the help of different media and materials

### **(3.GP.02) Basic Building Material & Technology -I Lab**

#### **Studio based on detailing of**

- ◆ **Brick masonry**
- ◆ **Stone masonry**
- ◆ Hollow, solid concrete block wall, Brick and stone paving stone
- ◆ Finish
- ◆ Arches and lintels in bricks, stones and timber. Cornices, chajja, canopy and porch in brick and stones.
- ◆ Doors and windows such as ledged, braced, battened, false paneled door, simple timber window.
- ◆ Roof
- ◆ Flooring:

### **(3.VP.01) Workshop – Lab**

#### **Contents**

- ◆ Introduction of carpentry tools and machines.
- ◆ Different types of joints and their function.
- ◆ Introduction to modeling with paper, paper board, plastics, plaster of Paris, wood and clay.
- ◆ Basic model making technique, different types of material and their techniques.
- ◆ Material collection- timber, sand brick, stone, aggregate etc.
- ◆ Identification and selection of timber, timber operations.
- ◆ Introduction of masonry tools.
- ◆ Demonstration of brickwork, stonework, demonstration of plaster and textured finishes.  
i) Mud ii) Cement iii) Lime.
- ◆ Models for basic design and Architecture design studio work.
- ◆ Study tours to sources of local building materials and to local building under construction to study their actual use.

**Level 3 (Semester II)**  
**(3.GV.01) Basic Architecture Design**

**1. RATIONALE**

This is a primary course about learning and applying fundamentals of design. The process of learning to design a single volume building allows a student to express his ability to conceive different types of forms. It facilitates the student to understand and apply the nuances of anthropometry by making a model with furniture layout.

**2. COMPETENCIES**

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competencies:

- i) **Develop a sketch design based on visualized single volume building according to given requirements and justify its concept and design.**
- ii) **Prepare a model of the designed building.**

**4. DETAILED COURSE CONTENT**

**Unit - I**

Scope of Design, considering methods of construction, structure, site conditions, socio economic factors, form and shapes.

**Unit - II**

Study of planes, mass, forms and shapes.

**Unit - III**

Case study of typical small scale settlement in town or village, for understanding evolution of design, use of material.

**Unit - IV**

Data collection and analysis including circulation.

**Unit - V**

Design problems of medium complex function, low rise buildings.

**Site visits:** Site visits to complete buildings pertaining to design problems, group discussions among students, special discussions shall also be arranged with senior students, students should also play roles of clients, contractors and consultants.

- ◆ Study of groups of objects forms, masses with basic geometric forms, their compositions, for two and three dimensional study in relation with Basic Design.

**5. Assessment:**

1. Continuous assessment and marking system should be followed
2. Block models, preliminary models with site development, human figures with using various model making materials and techniques.

3. Internal and External exams will be based on above understanding of topics.

**6. Reference Books**

- 1) Francis D.K.Ching- Form Space & Order- John Wiley & Sons, Latest
- 2) Rangwala S.C.- Building Construction- Charotar Publishing House, Latest
- 3) Shah, Kale, Patki- Building Drawing- Tata Mcgraw Hill Publishing, Latest

## **(3.GV.02) 2 D Drawing in CAD**

### **1. RATIONALE**

Drafting and development of drawings is an essential skill for a student of architectural assistantship and due to availability of the software the task of drafting has become simplified and easy. Student shall prepare architectural basic drawings, presentation drawings on a computer with CAD as drafting tool. In this course, the student acquires knowledge of CAD - 2D, It is mandatory for the students to possess the above-mentioned skills adding to their proficiency so that they are able to draw 2D drawings using computers as well as create new designs using 2D software.

### **2. COMPETENCY**

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire the following competencies:

- i. Prepare 2D and presentation drawings using CAD software and take print outs to an appropriate scale.**

### **3. DETAILED COURSE OUTLINE**

#### **Unit – I –Introduction**

**Introduction to CAD and relevant software:** - Prepare a new drawing from scratch with the “Create Drawing”

**Computer system and peripherals requirement**

**Simple drawing creation:** - Save created drawing definition as a new drawing

#### **Unit – II –CAD- 2D**

**Use 2D commands to draw building components such as wall, door, window:-** line, poly line, spline, 3d ploy line, rectangle, multi-line, construction line, arc, circle, ellipse, polygon, donut.

**Use Modification commands to alter the existing drawing:** - offset, copy, paste, erase, trim, break, mirror, array, move, rotate, stretch, lengthen, trim, extend, break, chamfer, fillet

**Replication of Drawn Objects:** - Block, Insert block, Edit block, Explode block

#### **Unit – III - Presentation Drawings**

**Make Presentation drawing using 2D commands and add text and dimensioning to them using appropriate commands:-**

**Multi line text and text:-** Writing text, formatting text style, Editing text

**Dimensioning:** - Formatting dimension style, Editing dimension style

**Use of leader**

**Multiple hatch commands**

**Applying components from AutoCAD Libraries (Design Centre) to drawing**

#### **Unit – IV - Plot/Print**

**Print/plot the prepared drawing:** - Plot dialogue box, Printing in PDF and Save as PDF

#### **4. Reference book**

1. Harnessing AutoCAD Release -2012- Thomas A. Stellman, G. V. Krishnan, Robert A. Rhea- Delmar Publication
2. AutoCAD 2011- Ellen Finkelstein- Wiley India Pvt Ltd
3. Engineering Graphics with AutoCad- Kulkarni, D.M.Rastogi, A.P.Sarkar- PHI Learning Pvt. Ltd

### **3.GV.03) Basic Building Material & Technology- II**

#### **1. RATIONALE**

This course deals with some more types of materials used in the construction industry. Various factors affecting the selection of materials for given situations are also discussed. This course, thus, helps the student to understand the application of modern materials.

#### **2. LIST OF COMPETENCIES**

The course content should be taught so that the student understands various materials used for construction of a building and develop different skills so that they are able to acquire following competencies:

- i) **Identify various building materials according to their requirements and applications**
- ii) **Select and apply various building materials according to use, site specifications and available market forms and sizes, colour, etc.**

#### **3. DETAILED COURSE CONTENT**

##### **MATERIALS:**

##### **Unit – I Cement:**

Ingredients and properties of cement, Types of cement, Grades of cement, Initial and final setting time, Test of cements, ISI Standards, Pozolana material and its properties.

##### **Unit – II Mortar:**

Introduction to Mud, Lime and Surkhi Mortar, Cement Mortar- Ingredients, Properties, preparation, mixing and application.

##### **Unit – III Concrete:**

Cement concrete of different sizes of aggregate, proportion, strength. Concrete preparation, mixing, hoisting and depositing, shuttering and centering, types of reinforcement and its laying.

##### **CONSTRUCTION:**

##### **Unit – IV Building structure:**

Framed structure, composite structure, comparison with load bearing structure.

##### **Unit – V Foundation:**

Excavation in various types of soil, Footing, for R.C.C, and masonry columns, isolated footing , combined footing, eccentric footing, strap beam, continuous strip footing, steel grillage foundation ( shallow foundations in hard strata)

##### **Unit – VI Staircase:**

Types of stairs . Tread, riser , flight, hand rails , straight flight , dog legged, open well , quarter turn, triple flight, ramps, , R.C.C. staircase.

### **Unit - VII Flooring:**

R.C.C. slabs, One way, Two way cantilever, columns, beam types, details of reinforcement , Thumb rules and I.S.I standers , form work, etc.

Brick jack arch flooring, filler slab, Ribbed slabs etc.

### **4. Assessment**

- i. Drawing sheets and Notes based on the above topic.
- ii. Continuous assessment and marking system should be followed Internal and External exams will be based on above understanding of topics.

### **5. Reference Books**

1. Engineering Materials (Material Science)- S.C Rangwala- Charotar Publications, Anand
2. Building Construction- B.C.Punmia- Laxmi Publications Pvt Ltd.
3. Indian Architect & Builder- Magazine/Journal- Jasubhai Media Publications Ltd, Mumbai

## **(3.GV.04) Surveying & Levelling**

### **1. RATIONAL**

Surveying is the most important discipline of civil engineering branch. To know, the location and topography of ground is important for any engineering project. There are many methods of surveying. Field data collection is important for any infrastructure project. Moreover data correction and analysis is also a part of surveying. The main objective of surveying is to prepare the plan of study area. Surveying Particularly, Surveying I subject deals with fundamentals of Surveying, Map System, Scale, Linear and Angular measurement, Measurement of area and volume in the field

### **2. COURSE LEARNING OUTCOME**

1. Understand various methods of surveying
2. Estimate distance, angle and height through different instruments
3. Calculate area and volume and to generate maps
4. Adopt appropriate survey method for field problems

### **3. DETAILED COURSE CONTENT**

#### **Unit – I – Introduction**

Explain the basics of surveying: - Objective and uses of surveying, Classification of Survey, Principles of Survey.

Use scales as per requirements: - Types of Scale and selection of scale, Construction of diagonal scale.



## **Unit – II – Chain and tape Survey**

Perform linear measurements using simple tools and equipments:- Instruments used in chain and tape survey, Metric Chain, Tapes, Arrow, Tapes, Ranging rod, Offset rod, Open cross staff, optical square, Technical terms related with chain survey. Survey Station, Base line, Check line, Tie line, Offset, Tie station, Methods of chaining, Errors in chain survey, Obstacles in chaining, Ranging.

Prepare drawing as per recorded measurements: - Recording measurements in a field book.

## **Unit – III – Compass Survey**

Perform angular measurements using appropriate compass:- Introduction Survey & Traversing, Components and functions of Prismatic Compass.

Technical Terms:- True Meridian & Bearing, Magnetic Meridian & Bearing, Arbitrary Meridian & Bearing, Dip of Magnetic needle, Declination, Fore Bearing & Back Bearing, WCB, RB.

Method of finding included angles from bearings examples, Local attraction and Closing error with relevant examples, Errors and its elimination.

## **Unit – IV – Levelling**

Use levels for surveying application:- Introduction, Basic terminology related with levelling like Level surfaces, horizontal & vertical surfaces, Datum, Bench Marks, Reduced Level, Rise, Fall, Line of collimation, Axis of Telescope, Axis of bubble tube, Station, Back sight, Fore sight, intermediate sight, Change point, Height of instruments, Focusing and parallax etc. Dumpy Level & Automatic Level, Components and their functions, Temporary adjustment of Level, Levelling Staff, Folding and Telescopic staff, Examples & methods of finding out the R. L. in Level Book by H.I. Methods & Rise & Fall Methods.

Prepare contour maps by calculating Reduce level: - Contour and uses of contours, Characteristics of contours, Methods of Contouring, Interpolation of contours.

## **4. References Books**

1. R. Subramanian, Surveying and Leveling, Oxford University.
2. B. C. Punmia, A. K. Jain & A. K. Jain, Surveying Vol. I, Laxmi Publications.
3. A. M. Chandra, Plane Surveying, New Age International.
4. S. K. Duggal, Surveying Vol. I, Tata Mcgraw-Hill.

## **(3.VP.02) 2 D Drawing in CAD- Lab**

- ◆ Extension of presentation drawings like
  - Site plan
  - Floor plans
  - Sections
  - Elevations
- ◆ Preparation of basic 3-D drawings
- ◆ Different rendering techniques
- ◆ Architectural drawing
- ◆ Complete a set of working drawing through Auto CAD

### **(3.VP.03) Surveying & Levelling- Lab**

#### **PRACTICAL**

- 1) **Unit- I-** Demonstrate the uses of Survey tools and equipment
- 2) **Unit- II-** Carry out the surveying project on given site to locate surrounding features using Chain and Compass
- 3) **Unit – III-** Carry out levelling project on an undulating ground and prepare the drawing sheet showing ground profile and contours of site

## **Level 4 (Semester I)**

### **(4.GV.01) Architecture Design – I (Residential)**

#### **1. RATIONALE**

Housing design is a multi-layered process which requires recall and application of knowledge of previously covered parameters of architectural design like form and space, spatial organization and relationships. It enables the students to independently design large projects and to handle a large site for designing e.g. dividing it into sectors. It also enables them to design a functional housing layout by simultaneously designing residential units on a given site with respect to climate, site topography, building bye-laws, hierarchy of spaces, etc. Knowledge of structure, building construction and building services is imparted in this semester which is applied by students while preparing individual housing unit designs as well as housing layout designs. During the entire design process, knowledge of different types of openings and their locations in a building with respect to interiors and climatology is also gained by the student which helps them design suitable architectural elements. Knowledge of design parameters, spatial order, structure as order and space–structure-form co-relation is also gained by continuous interaction with concerned faculty during the study of this course. Thus, designing a given housing project enables the students to learn and apply basic architectural designing skills related to residential unit designs as well as to site layout. This course is designed in view of above outlook and for developing the competency mentioned below, accordingly.

#### **2. COMPETENCY**

The course content should be taught and curriculum should be implemented with the aim to develop required skills in students so that they are able to acquire following competencies:

- i) Prepare schematic housing design layout for locating and orienting the designed housing units with regard to site topography, site surroundings and climatic conditions with functional integration of landscaping
- ii) Prepare housing unit designs with complete set of presentation drawings based on given requirements considering integration of interior spaces, lighting, ventilation, structure, materials of construction, building services, building byelaws and finishes.

#### **3. COURSE OUTCOMES**

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- i. Incorporate the knowledge of qualities of architectural spaces both built and open
- ii. Interlock areas linked by common spaces, appropriate grids, radial spaces and clustered spaces
- iii. Design different residential typologies
- iv. Design multi-volume buildings in relation to given site

#### **4. DETAILED COURSE CONTENT**

##### **Unit – I - Data collection & drawing of typical wall section.**

**Draw a typical wall section:** - Typical wall section from foundation to parapet level, Levels and technical terms in the drawing/s.

**Collect data from market for different building materials**

**Conduct market survey and site visits:** - Different building materials

##### **Unit – II – Measured Drawings of a given small building / building unit**

**Prepare measured drawings of a small unit of a public building:** - Plans, elevations and sections, of a small unit of a public building e.g. classroom, library, hall, toilets, etc.

##### **Unit – III – Measured drawings of a given residential building.**

**Prepare measured drawings of a small unit of a residential building:** - Plans, elevations & sections of a small residential building with at least one section each through staircase and toilets and with all relevant dimensions in the drawings.

##### **Unit – IV – Developing given sketches and preparing architectural presentation drawings.**

**Sketch and draw architectural presentation drawings to a given scale:-** Architectural presentation drawings I a given scale showing openings, wall thickness, all relevant dimensions, appropriate line quality and architectural lettering.

#### **5. LIST OF ASSIGNMENTS (PRACTICAL)**

- 1) **Unit-I-** Conduct market survey for building materials and their properties Conduct site visits for studying and understanding use of building materials Use architectural drafting instruments, draw a typical wall section.
- 2) **Unit-II-** Prepare measured architectural drawings of given small building/building unit, including all plans, elevations and sections.
- 3) **Unit-III-**Prepare measured architectural drawings of given residential building, including all plans, elevations and sections.
- 4) **Unit-IV-**Prepare architectural drawings from given sketch with the following details to given scale,
  1. Doors & Windows
  2. Wall thickness
  3. All relevant dimensions
  4. Appropriate line quality
  5. Architectural lettering

#### **6. Reference Books**

1. Architecture –Form, Space & Order- Francis D.K.Ching- John Wiley & Sons
2. Visual Dictionary of Architecture- Francis D.K.Ching- John Wiley & Sons
3. Neufert Data Standards- Ernst Neufert- Archon Books
4. Global Housing Projects since 1980- Mateo- Actar

## **(4.GV.02) 3 D Drawing in CAD**

### **1. RATIONALE**

Drafting and development of drawings is an essential skill for a student of architectural assistantship and due to availability of the software the task of drafting has become simplified and easy. Student shall prepare architectural basic drawings, presentation drawings on a computer with CAD as drafting tool. In this course, the student acquires the basic knowledge of 3D drawing software such as Google Sketch Up and Revit Architecture. This knowledge is very helpful in inculcating essential 3D visualization ability in the student. It is mandatory for the students to possess the above-mentioned skills adding to their proficiency so that they are able to draw 2D drawings using computers as well as create new designs using 3D software.

### **2. COMPETENCY**

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire the following competencies:

- i) **Prepare 2D and presentation drawings using CAD software and take print outs to an appropriate scale.**

### **3. DETAILED COURSE OUTLINE**

#### **Unit – I 3D Foundations**

Why use 3D

Introduction to the 3D Modeling Workspace

Basic 3D Viewing Tools

3D Navigation Tools

Introduction to the User Coordinate System

#### **Unit- II Simple Solids**

Working with Solid Primitives

Solid Primitive Types

Working with Composite Solids

Working with Mesh Models

#### **Unit –III Creating Solids & Surfaces from 2D Objects**

Complex 3D Geometry

Extruded Solids and Surfaces

Swept Solids and Surfaces

Revolved Solids and Surfaces

Lofted Solids and Surfaces

#### **Unit – IV Advanced Solid Editing**

Editing Components of Solids

Editing Faces of Solids

Fillets and Chamfers on Solids

#### **Unit – V Working Drawings from 3D Models**

Creating Multiple Viewports

2D Views from 3D Solids

#### **4. Reference book**

1. Harnessing AutoCAD Release -2012- Thomas A. Stellman, G. V. Krishnan, Robert A. Rhea- Delmar Publication
2. AutoCAD 2011- Ellen Finkelstein- Wiley India Pvt Ltd
3. Engineering Graphics with AutoCad- Kulkarni, D.M.Rastogi, A.P.Sarkar- PHI Learning Pvt. Ltd

### **(4.GV.03) Basic Building Material & Technology –III**

#### **1. RATIONALE**

This course deals with some more types of materials used in the construction industry. Various factors affecting the selection of materials for given situations are also discussed. This course, thus, helps the student to understand the application of modern materials.

#### **2. LIST OF COMPETENCIES**

The course content should be taught so that the student understands various materials used for construction of a building and develop different skills so that they are able to acquire following competencies:

- i) Identify various building materials according to their requirements and applications**
- ii) Select and apply various building materials according to use, site specifications and available market forms and sizes, colour, etc.**

#### **3. DETAILED COURSE CONTENT**

##### **MATERIALS:**

**Timber:** Building timber types and its properties, Defects in timber, Use and application of timber in construction.

**Processed woods:** Plywood and Synthetic boards - properties and application. Use of alternative materials as substitute to wood.

**Flooring:** Natural stones, processed flooring materials- cement based tiles, Ceramic and Vitrified tiles, Wood and rubber based floorings, their properties, application and laying methods.

**Bitumen and waterproofing Materials:** Asphalt and Bituminous materials - properties and application. Use of admixtures and Chemicals for waterproofing.

**Note:** Students should be exposed to on site and Laboratory tests of above materials. Students should conduct market survey of above materials.

##### **CONSTRUCTION**

**TIMBER FLOORING:** Ground and upper floors, types, training of floors joinery details thumb rules, etc.

**TIMBER ROOFING:** Trusses, king post and Queen post roof truss, joinery details, roof covering etc.

**CAVITY WALLS:** Types, constructions details, advantages and disadvantages

**DOOR AND WINDOWS:** - T.W. paneled doors and windows, types, ventilators, details of joinery, steel windows for residences and industrial purpose, method of fixing, ISI standard, section, sizes etc. ironmongery and fixtures of doors, windows, materials types and function.

This subject should be dealt with keeping in mind the fact that construction is a process and understanding the process should be given importance.

Site visits should be conducted for better understanding of construction process. The different situations all for different construction method, techniques there method have certain limitations and advantages.

#### **4. Assessment:**

1. Drawing sheets and Notes based on the above topic.
2. Continuous assessment and marking system should be followed.
3. Internal and External exams will be based on above understanding of topics.

#### **5. Reference Books**

1. Engineering Materials (Material Science)- S.C Rangwala- Charotar Publications, Anand
2. Building Construction- B.C.Punmia- Laxmi Publications Pvt Ltd.
3. Indian Architect & Builder- Magazine/Journal- Jasubhai Media Publications Ltd, Mumbai

### **(4.GV.04) Building Services – I**

#### **1. RATIONALE**

This course focuses on students' acquisition of knowledge, skills & practices of essential building services for proper functioning & utility of building as a 'whole' unit/entity. Knowledge about domestic water supply & sanitation system (external & internal) and house drainage & disposal facilities, ventilation and air conditioning, acoustics and creation of movement provisions is imparted. The knowledge and application of such aspects of building is essential in developing a good architectural assistant who can be useful in creating good functional buildings with right kind of building services requiring least and easy maintenance.

#### **2. LIST OF COMPETENCIES**

The course content should be taught and curriculum should be implemented with the aim to develop required skills so that students are able to acquire following competency:

- i) **Plan buildings applying knowledge of essential building services for effective & efficient functioning of buildings.**

#### **3. COURSE OUTCOME**

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- i. Identify various sources, uses of water, demand of water and factors affecting the rate of demand, and distribution of water for any city/colony/campus.
- ii. Prepare & give water supply layout with details of required water supply and sanitary fittings and fixtures.
- iii. Draw and interpret water supply and drainage plan of building/s.

- iv. Plan comfortable and functional buildings applying principles of ventilation and acoustics.
- v. Develop basic & functional understanding of various kinds of provisions of air conditioning system and movement facilities like ramps, lifts and escalators.

#### **4. DETAILED COURSE CONTENT**

##### **Unit – I**

Design of Drainage system at plot level, Inspection of Site , Locations of fittings. Sanitary fittings, classification and types of waste and soil fittings Working, variations, fitting and connections of different soil and waste fittings, Space requirement and accessories for different fittings, construction of these fittings. Traps of various types, materials etc.

##### **Unit – II**

Pipes of various types, fittings and accessories, workmanship, piping systems thru sunk and core cutting Chambers and manholes of various types, construction, manhole covers.

##### **Unit- III**

Connection to central drainage, drops, alternate systems of digestion, Design of septic tanks, various materials, vertical SUBO septic tank, two pit toilets, biogas plants on night soil, calculations, construction details, Soak pit construction, Construction and maintenance of drains, testing of drains, equipment's, one pipe and two pipe systems, ventilation of drains.

##### **Unit - IV**

Layouts of toilets (attached toilet, public toilets for gents and ladies, ventilation of toilets,

#### **5. Assessment:**

1. Drawing sheets and Notes based on the above topic.
2. Continuous assessment and marking system should be followed Internal assessment will be based on above understanding of topics.

#### **6. Reference Books**

1. Water supply and sanitary Engineering-S.C. Rangwala-Charotar Publications
2. Building Construction-S.P Arora & Bindra-Dhanpatrai Publications
3. Building Construction-Gurucharan Singh-Rajsons Publications
4. Water supply and sanitary Engineering-Gurucharan Singh & Jagdish Singh-Standard Publishers

#### **(4.VP.01) 3 D Drawing in CAD – Lab**

##### **Studio based on detailing of**

- ◆ 3D Foundations
- ◆ Simple Solids
- ◆ Creating Solids & Surfaces from 2D Objects
- ◆ Advanced Solid Editing
- ◆ Working Drawings from 3D Models



## **(4.VP.02) Basic Building Material & Technology – III - Lab**

### **Studio based on detailing of**

- ◆ **TIMBER ROOFING:** Trusses, king post and Queen post roof truss, joinery details, roof covering etc.
  - ◆ **Cavity Walls**
  - ◆ **Door and Window**
  - ◆ **Drawing sheets and Notes based on the above topic.**
4. Continuous assessment and marking system should be followed.
  5. Internal and External exams will be based on above understanding of topics.

## **Level 4 (Semester II)**

### **(4.GV.04) Architectural Design –II ( Commercial)**

#### **1. RATIONALE**

In this course , the knowledge and appropriate application of the relationship between form & space helps the student to design multiple-volume buildings with relation to each other for a given site situation. Knowledge about characteristic of architectural spaces both built & open and their use allows them to create functional 'porosity' within the site. Also knowledge about interlocking spaces & spaces linked by a common space helps the student in spatial organization on site, and knowledge of repetitive spaces, radial spaces & clustered spaces helps the student to functionally organize a layout. Knowledge of disciplines of structure, design parameters, spatial order, structure as order, space –structure- form co-relation. Understanding about suitable structural systems as applicable to kinds of building help the student to know how a building practically stands. Knowledge of different types of openings and their locations in a building with respect to climate helps them to design suitable architectural elements as per provisions of code.

#### **2. LIST OF COMPETENCIES**

The course content should be taught with the aim to develop different types of skills so that students are able to acquire following competency.

- i) **Prepare building sketch based on design parameters, land-building relationship, environmental concerns and energy efficiency.**
- ii) **Develop the sketch design considering integration of space, structure, materials of construction.**

#### **3. DETAILED COURSE CONTENT**

##### **Unit – I– Data Collection**

Study an existing single volume building, Identify problems, functional usability and architectural innovations in real life situations, Analyse the form, functional clarity, furniture

layout and design innovations of the studied buildings, Formulate design requirements for the given design project.

### **Unit – II– Development of Concept and Preparing Sketch Design**

Sketch design alternatives and ideas considering various design fundamentals, Finalize the concept for further design development, Prepare a functional relationship diagram.

### **Unit – III– Preparing Site Plan**

Provide specific site location with reference to the surrounding conditions, topography, landscape, climate, etc.

### **Unit – IV– Design Development Drawings**

Develop the sketch at an appropriate scale as per anthropometric requirements & show furniture layout, Develop the sketch showing façade treatment and massing, Visualize and draw the building to scale in 3D

### **Unit – V– Final Presentation Drawings and model**

Prepare a set of final presentation drawings including all of the above, Make a model of the designed project to a suitable scale with surrounding

### **Unit – VI– Design Project - II**

Sketch design alternatives and ideas considering various design fundamentals, Finalize the design and prepare presentation drawings.

## **4. List of Exercisers /Practical**

- 1) Unit-I - Design Project - I (Design of a Single Volume Building) Collect data related to the given building, select case study and appraise them.
- 2) Unit –II- Prepare conceptual sketches and finalized design for the given requirements.
- 3) Unit –III- Draw site plan, floor plans, sections, elevations and axonometric/isometric view of the design project.
- 4) Unit-IV- Prepare final presentation drawings with one perspective view
- 5) Unit-V- Prepare a model to suitable scale
- 6) Unit –VI-Design project - II (Time problem )

## **5. Reference Books**

1. Architecture – Form, Space & Order - Francis D. K. Ching- John Wiley & Sons
2. Visual Dictionary of Architecture- Francis D.K.Ching- John Wiley & Sons
3. Neufert Data Standards- Ernst Neufert- Archon Books
4. Contemporary Indian Architecture- After the Masters- Bhatt Vikram, Peter Scriver- Mapin Publication
5. Modern Architecture in India - Footprints in the sands of Indian architecture- Bagha Sarbajeet, Bagha Surinder- Galgotia Publication

## **(4.GV.05) BIM / Revit**

### **1. RATIONALE**

Revit software built for BIM (Building Information Modeling), the functionality included in it of all disciplines of construction i.e of architecture, mechanical, electrical, plumbing & structure) in one unified interface. Revit Structure One out of these listed modules deals in modelling structure details of the building design making it easier to further integrate it in project process and also making the analysis job much simpler to handle

### **2. DETAILED COURSE OUTLINE**

#### **Unit - I Introduction**

Building Information Modelling, Revit Architecture, History Features, Revit File Types, Exploring User Interface, Building Elements, Start a New Project

#### **Unit – II To Start a Project**

Drawing Aids, Project Units

Levels:- Adding Levels, Modifying Levels, Creating New Level Element Type, Constrain Level lines, Remove Constrains, Remove Level lines

Drawing a plan as per Dimension:- Walls, Location Line, Creating Walls, Tips for Creating Wall

#### **Unit – III More in Detail – Wall**

Compound Structure, Wall joins, Wall Layer Wrappings, Vertically Compound Walls Layer Assignment Guide Lines, Sweeps and Reveals, Wall Shapes and Openings, Stacked Wall, Guidelines for Vertically Stacked Walls, Construction Modelling Tool, Working with Grids,

#### **Unit – IV Modify Tools**

Move, Copy, Paste, Create Similar, Rotate, Mirror, Array, Scale, Split Element, Trim, Align Offset, Pin, Unpin, Delete, Door, Window, Match Type, Tape Measure

#### **Unit – V Dimensions**

Temporary Dimensions, Permanent Dimension, Creating Custom Dimension, Type Modify Dimensions, Constrains.

#### **Unit – VI Components**

Placing Component, Rehosting, Workplane based and Face based Placement, Working with Modern Medium Library

#### **Managing Views:-**

Floor plan views, Ceiling plan view, View properties, View Range, Plan Region, Elevation view, Cut a view by Far Clip Plane, Section View, Creating Section head, 3D views, Cropping a View, Visibility or Graphics Display.

### **3. Reference Books**

1. Revit 2019 Architecture Training guide
2. BIM & Construction Management
3. Auto Desk Revit 2019

## **(4.GV.06) Basic Building Material & Technology – IV**

### **1. RATIONALE**

This course deals with some more types of materials used in the construction industry. Various factors affecting the selection of materials for given situations are also discussed. This course, thus, helps the student to understand the application of modern materials.

### **2. LIST OF COMPETENCIES**

The course content should be taught so that the student understands various materials used for construction of a building and develop different skills so that they are able to acquire following competencies:

- i) **Identify various building materials according to their requirements and applications**
- ii) **Select and apply various building materials according to use, site specifications and available market forms and sizes, colour, etc.**

### **3. DETAILED COURSE CONTENT**

#### **UNIT- I FERROUS METALS**

- ◆ Introduction
- ◆ Iron ores, selection , varieties of iron ores
- ◆ Pig Iron, manufacture, properties, types, other methods of manufacture
- ◆ Cast Iron, composition , Types, properties, uses
- ◆ Wrought iron, manufacture , properties, Defeats, uses

#### **UNIT- II STEEL**

- ◆ Manufacture of steel, use, factor effecting physical properties magnetic properties, defects in steel, market form of steel, properties mild and hard steel.

#### **UNIT – III NON FERROUS METAL**

- ◆ Aluminum, manufacture, properties, uses, economics of using aluminum , forms of aluminum
- ◆ Copper – Manufacture, properties uses
- ◆ Lead - Manufacture , Properties uses
- ◆ Zinc – Manufacture , Properties uses
- ◆ Asbestos – Properties, use, asbestos cement products
- ◆ Alloy, aluminum, copper alloy

#### **UNIT –IV PLASTICS**

- ◆ History, composition, polymerization, classification resins, molding, compounds, fabrication, properties, uses, PVC AND FRP application in building industry.

#### **UNIT –V CERAMIS**

- ◆ Clay product
- ◆ Tiles, manufacture, characteristics, Types
- ◆ Encaustic tiles
- ◆ Terra – cotta – manufacture, verities, advantage disadvantage use

- ◆ Earthenware
- ◆ Stoneware
- ◆ Porcelain
- ◆ Clay blocks

#### **UNIT –VI GLASS**

- ◆ Introduction
- ◆ Classification , Composition , properties of glass
- ◆ Types of glass
- ◆ Manufacture of glass
- ◆ Treatment of glass, colored glass
- ◆ Special varieties of glass

#### **UNIT - VII INSULATING MATERIAL**

#### **UNIT –VIII SOUND ABSORBENT MATERIAL**

#### **UNIT –IX HEAT INSULATING MATERIAL**

#### **UNIT –X NEW SYNTHETIC MATERIAL IN MARKET**

### **(4.GV.07) Building Services – II**

#### **1. RATIONALE**

This course focuses on students' acquisition of knowledge, skills & practices of essential building services for proper functioning & utility of building as a 'whole' unit/entity. Knowledge about domestic water supply & sanitation system (external & internal) and house drainage & disposal facilities, ventilation and air conditioning, acoustics and creation of movement provisions is imparted. The knowledge and application of such aspects of building is essential in developing a good architectural assistant who can be useful in creating good functional buildings with right kind of building services requiring least and easy maintenance.

#### **2. LIST OF COMPETENCIES**

The course content should be taught and curriculum should be implemented with the aim to develop required skills so that students are able to acquire following competency:

- i) **Plan buildings applying knowledge of essential building services for effective & efficient functioning of buildings.**

### 3. COURSE OUTCOME

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- i. Identify various sources, uses of water, demand of water and factors affecting the rate of demand, and distribution of water for any city/colony/campus.
- ii. Prepare & give water supply layout with details of required water supply and sanitary fittings and fixtures.
- iii. Draw and interpret water supply and drainage plan of building/s.
- iv. Plan comfortable and functional buildings applying principles of ventilation and acoustics.
- v. Develop basic & functional understanding of various kinds of provisions of air conditioning system and movement facilities like ramps, lifts and escalators

### 3. DETAILED COURSE CONTENT

#### Unit –I WATER SUPPLY

Per capita quality and quantity of water supply, sources of water supply at plot level, Municipal water supply system, wells, deep well, shallow well, bore well, rooftop rainwater harvesting, recycling of water.

Metering of water supply, connection to municipal main, water supply layout inside plot, sump and underground water storage tank, construction in various materials, connections, advantages and disadvantages of various types of tanks, Pump, Overhead water storage tank, design, construction in different materials, various connections.

Pipes of different types, materials, fittings, workmanship. Valves, taps.

Layout of water supply inside toilets.

Hot water supply, domestic water heaters of various types, hot water piping, materials, insulation to pipes, layout of hot water piping.

#### Unit – II ELECTRICITY

Generation of electricity, clean and green energy concepts, Small Generators, stand by systems and inverters, UPS etc

Ampere, volts, A. C, D. C supply, three phase, Single phase etc, Supply of electricity to plot, sub station, H T panel and L T panel, Underground and overhead cabling, metering of electricity.

Electric supply at plot level:- Bus Bar; Meter board, earthing, Distribution board, fuse, MCB ULCB etc, switch boards, switches, socket etc, wiring systems, wires and cables, lamps and luminaries, fans, domestic appliances, layout of electricity in a flat, residence

#### 4. Assessment:

- ◆ Drawing sheets and Notes based on the above topic.
- ◆ Continuous assessment and marking system should be followed Internal assessment will be based on above understanding of topics.

#### 5. Reference Books

1. Water supply and sanitary Engineering-S.C. Rangwala-Charotar Publications
2. Building Construction-S.P Arora & Bindra-Dhanpatrai Publications
3. Building Construction-Gurucharan Singh-Rajsons Publications
4. Water supply and sanitary Engineering-Gurucharan Singh & Jagdish Singh-Standard Publishers

### **(4.GP.03) BIM / Rivet - Lab**

- ◆ Components
- ◆ Dimensions
- ◆ Modify Tools
- ◆ More in Detail – Wall
- ◆ To Start a Project

### **(4.GP.04) Basic Building Material & Technology - IV - Lab**

**Studio based on detailing of**

- ◆ FERROUS METALS
- ◆ STEEL
- ◆ NON FERROUS METAL
- ◆ PLASTICS
- ◆ CERAMIS
- ◆ GLASS
- ◆ INSULATING MATERIAL
- ◆ SOUND OBSORBENT MATERIAL
- ◆ HEAT INSULATING MATERIAL
- ◆ NEW SYNTHETIC MATERIAL IN MARKET

### **Level 5 (Semester I)** **(5.GV.01) Design & Innovation**

#### **1. Rational**

The Course on Design and Innovation is intended to introduce ideas, methodologies, principles, and skills that comprise a common knowledge base important to all design disciplines. These fundamental will foster a multidisciplinary design experience to you and will prepare you to move to the next level.

It will provide the participants with foundation and fundamentals skills in design. The program is designed to provide a pathway to a range of vocational qualifications, including diplomas of graphic design, visual merchandising, visual arts, digital design, screen and performing arts. The program provides a comprehensive range of skills and knowledge required as preparation for entry level jobs. The course will benefit applicants who have little or no training or experience in art and design and who wish to begin formal education in this field.

#### **2. DETAILED COURSE CONTENT**

##### **Unit–1: Introduction to Design**

###### **Session–1: Concept of Design**

- Design Definition.
- Design versus Art.
- Design and Environment.
- The basis of Design Process.

- Use Design in today's scenario.

### **Session–2: Design Fundamental**

- Principles of Design.
- Elements of Design.
- Colour Theory.
- Understanding of Color wheel.
- To increase and build sensitivity to the forms around them.
- To identify the revolving still life and outdoor in vicinity of environment.
- To relate the elements of design to understand design process for their projects.

### **Graphics & Multimedia**

- Understanding the colour quality, intensity, relationship with other colours, textures, shape.

## **Unit–2: Design Tools and Techniques**

### **Sessions–1: Produce Drawing**

- Defining Drawing.
- Different techniques of drawing.
- Exploration of medium.
- Compositions and Perspectives.
- Tonal Techniques.
- Use of Dreams and Music for creative Drawing.
- To identify the use of tone and value, Texture/Frottage.
- Identify to use contour line drawing (continuous or cross contour).

## **Unit–3: Occupational Health and Safety**

### **Session–1: Work Safe Review Module**

- Safety and Health responsibility.
- Role of War safe Inspector.
- Hazard identification, Risk assessment and Risk control.
- PPE.
- Dealing with emergency.
- Design a promotional poster advertising what students need to know about Safety and Dangers, or be warned about while working at College.

## **3. Reference Books :**

1. Eppinger, S., & Ulrich, K. (2015). Product design and development. McGraw-Hill Higher Education.
2. Green, W., & Jordan, P. W. (Eds.). (1999). Human factors in product design: current practice and future trends. CRC Press.
3. Sanders, M. S., & McCormick, E. J. (1993). Human factors in engineering and design. McGRAW-HILL book company.
4. Roozenburg, N. F., & Eekels, J. (1995). Product design: fundamentals and methods (Vol. 2). John Wiley & Sons Inc.
5. Lidwell, W., Holden, K., & Butler, J. (2010). Universal principles of design, revised and updated: 125 ways to enhance usability, influence perception, increase appeal, make better design decisions, and teach through design.



## **(5.GV.02) Sustainable Material**

### **1. Rational**

The overarching course objective is to provide students with the knowledge on sustainability and create an awareness of the tools that are needed to apply sustainable material selection practices in their future design work. The teaching pedagogy was designed for problembased learning (PBL) combined with limited conventional classroom instruction at the beginning of each new topic followed by focused reading assignments involving the latest technical literature on the subject. The course was delivered in a highly collaborative learning environment.

### **2. DETAILED COURSE CONTENT**

#### **UNIT - I INTRODUCTION TO SUSTAINABLE BUILDING MATERIALS**

Introduction to sustainable building materials, qualities, use, examples - Natural building materials, locally available and locally manufactured materials, bio materials - Salvaged and recycled materials - Non toxic materials: low VOC paints, coating and adhesives.

#### **UNIT- II CONCEPT OF EMBODIED ENERGY AND CARBON FOOTPRINT**

Idea of embodied energy - Development of the concept, factors to be considered, calculation techniques for embodied energy - Data sets available for calculation of embodied energy - Case studies of embodied energy calculations - Sample embodied energy calculations for a material - Concept of embodied carbon or carbon footprint of material, calculation techniques, methods to off -set high embodied energy - Cradle to cradle material, whole life cycle and life cycle costing analysis techniques.

#### **UNIT – III SUSTAINABLE CONSTRUCTION TECHNIQUES**

Alternative construction techniques such as SMB, CSEB, and steam cured blocks, composite beam and panel, funicular shells, filler slabs, reinforced concrete masonry, vaulted roofs, ferro -cement walls etc., - Case studies

#### **UNIT - IV INNOVATIVE USE OF MATERIALS**

Use of waste materials such as paper, glass bottles, tires, shipping containers - Use of post-consumer and industrial waste such as fly-ash, bags, building demolition waste – use of salvaged materials from flooring, columns, beams, timber, glass, etc.

#### **Reference Books**

1. US EPA (2007), <http://es.epa.gov/ncer/rfa/archive/grants/01/eagle01.html>.
2. UNDP (1987), Our Common Future, Report of the World Commission on Environment and Development, Published as Annex to UN General Assembly document A/42/427, Development and International Cooperation: Environment.
3. Wackernagel, M. , Schulz, N.B., Deumling, D., Linares, A.C., Jenkins, M., Kapos, V., Monfreda, C., Loh, J.,Myers, N., Norgaard, R., and Randers, J. (2002), “Tracking the ecological overshoot of the human economy”,Proceedings, National Academy of Sciences, Vol. 99, No. 14, 9266-71.
4. UN (2005), Millennium Ecosystem Assessment, <http://www.millenniumassessment.org/en/index.aspx>

## **(5.GV.03) Working Drawing – I**

### **1. RATIONALE**

The knowledge and skill of preparing working drawings is very essential for an architect. Designing a building is one thing and proper knowledge of actual execution of the same on site is another. Working drawings are essentially prepared for actual construction of a designed building. Working drawings consist of basic drawings and detailed drawings. The basic set includes all plans, sections & elevation with accurate dimensions while the detail drawings include enlarged details of kitchen, toilets, doors & windows, staircase etc with accurate dimensions. A foundation plan and line out drawing with centre-line dimensions which is part of the basic set of drawings is essential for the line-out of the building on site. Most importantly, the architect gets a opportunity to apply all his knowledge and creative skills for working out architectural details as a part of detail drawings. All finishes are also specified in these details drawings. These drawings also include all dimensions including wall thickness, heights, levels etc. All these put together facilitate in constructing the building on site exactly according to its design. Thus working drawings help site engineers to understand how a building is actually constructed on site. Thus it is important for students to learn to prepare the working drawings as it is the core ability required for architectural assistantship. This course is designed in view of above outlook and for developing the competency mentioned below, accordingly.

### **2. LIST OF COMPETENCY**

The course content should be taught and curriculum should be implemented with the aim to develop required skills in students so that they are able to acquire following competencies:

- i) **Prepare all basic working drawings including site layout and all plans, elevations and sections of a given building**
- ii) **Prepare all detailed working drawings with all specifications and finishes for the given building**

### **3. COURSE OUTCOMES**

The applied theory for this course should be taught and practical should be carried out in such a manner that students are able to acquire required learning out comes in cognitive, psychomotor and affective domain to demonstrate following course outcomes. Students will be able to

- i. Prepare basic working drawings for a given building specification
- ii. Prepare site layout with necessary details based on basic drawings
- iii. Prepare detailed working drawing based on basic drawings
- iv. Incorporate the knowledge of construction, finishes and services for designing details and preparing working drawings
- v. Use CAD software for preparation of basic working drawings.

### **4. COURSE CONTENT DETAILS**

#### **Unit – I - Design development and its finalization for working drawings**

Introduction and study of working drawings of housing projects as follows,

- i) Study of a set working drawings prepared by a practicing architect

- ii) Study of 'Working Drawings' prepared by students of Architecture degree & diploma colleges through students visits and/or presentations by experts from both industry and other institutes
- iii) Site visits to on-going housing construction sites
- iv) The basic building unit drawings should be drawn to appropriate scales e.g. 1:50 or 1:100 (not odd scales like 1:40 or 1:75). However such decisions are best left at the discretion of concerned faculty members.

### **Unit– II - Preparation of site layout with necessary details**

2.1 Site layout including building units, roads and landscaped areas drawn clearly without rendering.

2.2 The drawing format for preparing working drawings, standardized, complete with borderline, notes, revision table and name-plate.

2.3 Draw essential site details like compound wall section, UGWT any one landscape / hard paving detail

### **Unit – III - Preparation of all Basic Drawings**

3.1 All plans

- i) Foundation Plan
- ii) Grid Plan
- iii) All Floor Plans
- iv) Terrace Plan

3.2 All elevations include

- i) North elevation
- ii) South elevation
- iii) West elevation
- iv) East elevation
- v) Any other

3.3 All sections include

- i) Minimum one section through toilets
- ii) Minimum one section through staircase
- iii) Minimum two other sections

### **Unit – IV- Preparation of all Detail Drawings**

4.1 All detailed drawings including at least the following,

- i) Toilet details
- ii) Kitchen details
- iii) Door/Window details
- iv) Staircase details
- v) Railing details
- vi) Flooring details
- vii) Electrical layout
- viii) House Drainage Layout
- ix) Any other

4.2 All detailed drawings should be drawn to a scale of 1:20 or 1:25. However some of the more intricate details should be drawn to an appropriate enlarged scale.

4.3 All details designed and worked out individually by the students under the guidance of the faculty. Detail drawings should be co-related with the basic drawings before finalization.

## **Unit – V- Drawing all working drawings on computer**

5.1 Use the latest version of CAD software to prepare working drawings

5.2 Documentation of the entire set of working drawings should be done with the aim of presenting the same for securing placement for Office Training in Sixth Semester

### **Reference Books**

- 1) 200 Houses- Cleary- Images Publ.
- 2) 21st Century Houses- Robyn Beaver- Images Publ.
- 3) Architect's Drawing A- Smith- Architectural Press
- 4) Architectural Thought- Brawne- Architectural Press

## **(5.GV.04) Estimating & Costing**

### **1. RATIONALE**

Estimating and Costing is a vital part of any construction project after preparation of drawing. No project can begin without total estimation and costing. The entire cost of construction and the infrastructure used for the purpose of construction is estimated and the final costing is done on the basis of which a certain percentage of the project cost is paid to the architect and other consultants involved in the project. This course enables the students to calculate the estimated construction cost of a building. This course also enables the students to know the present material and labour cost and to differentiate between them. To estimate the construction cost of a designed building is very important for an architect as it helps him/her to work within a budget and also helps his/her clients to know the finance he/she would have to arrange at various stages of construction. Thus this course helps the students to work efficiently in the field of architecture.

### **2. COMPETENCY**

The course content should be taught and curriculum should be implemented with the aim to develop required skills in students so that they are able to acquire following competency

- i) **Calculate the estimated construction cost of a given building and prepare different types of detailed estimates through rate analysis.**

### **3. COURSE OUTCOMES**

The applied theory for this course should be taught and practical should be carried out in such a manner that students are able to acquire required learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- 1) Explain types of estimate and duties of an estimator
- 2) Undertake rate analysis of civil engineering works
- 3) Determine the rates of various items of civil works
- 4) Calculate estimated cost of civil construction projects

## **4. COURSE CONTENT DETAILS**

### **Unit – I– Introduction**

- 1.1 Define term Estimating and Costing
- 1.2 Objectives of Estimating
- 1.3 Types of Estimate: - Approximate Estimate, Detailed Estimate
- 1.4 Methods of preparing approximate Estimate: - Service Unit Method, Plinth Area Method, Cubical Content Method, Typical bay Method
- 1.5 Data required to Prepare detailed Estimate
- 1.6 Methods of preparing detailed Estimate: - Long wall-Short wall method, Center line Method

### **Unit – II–Modes of Measurement as per SP: 27**

- 2.1 Introduction
- 2.2 Units of Measurement of Construction Item
- 2.3 Importance of Modes of Measurement
- 2.4 Modes of measurement of various construction items

### **Unit – III–Rate Analysis**

- 3.1 Introduction
- 3.2 Necessity of rate analysis.
- 3.3 Data required for rate analysis.
- 3.4 Factors affecting rate analysis.
- 3.5 Task work.
  - 3.5.1 Factors affecting task work.
  - 3.5.2 Task work of various skilled and unskilled labour.
- 3.6 Schedule of Rate and Market Survey.
- 3.7 Rate analysis of various construction items

### **Unit – IV– Specification**

- 4.1 Definition, purpose & importance of specifications.
- 4.2 Types of specifications.
- 4.3 Design and drafting of specifications.
- 4.4 Specification writing for some useful items

### **Unit – V– Estimating**

- 5.1 Detailed Estimate
  - 5.1.1 Detailed Estimate of Single Story residential building.
  - 5.1.2 Detailed Estimate of R.C.C. Slab
  - 5.1.3 Detailed Estimate of R.C.C. Beam
  - 5.1.4 Detailed Estimate of R.C.C. Column with footing
  - 5.1.5 Detailed Estimate of Septic tank with soak pit.

## **5. List of Exercises/Practical**

- 1) **Unit –I** - Interpret given Civil Engineering Drawing
- 2) **Unit –II** - Measure at least 10 Construction items using different modes
- 3) **Unit-III**- Perform Rate Analysis of at least 10 Construction items
- 4) **Unit-IV**- Draft specification of at least 10 Construction items

- 5) **Unit-V-** Prepare Estimate of following:
- (i) Single Storied Residential building including one bed room hall kitchen, bath and w/c with staircase
  - (ii) Septic Tank with Soak pit
  - (iii) R.C.C. Slab, Beam, Column with footing

**6. Reference Books:-**

- 1) Estimating and Costing- B.N.Dutta- Laxmi publications
- 2) Estimating and Costing- S.C.Rangwala- Charotar Publishing House Private Limited, Anand
- 3) Hand book of Methods of Measurement of building works- SP:27(1987)- BIS
- 4) Schedule of Rates- Local Authority- R&B, PWD, CPWD, Irrigation etc.
- 5) Estimating and Costing- M. C. Chakraborty

**(5.VP.01) Working Drawing- Lab**

**Practical**

**1. Unit- I**

Design and develop plan for given buildings specification and its finalization for working drawings

**2. Unit –II**

Prepare site layout with necessary details for given buildings specification

**3. Unit – III**

Prepare all Basic Drawings for given building specification

**4. Unit – IV**

Prepare all Detail Drawings for given buildings specification

**5. Unit – V**

Drawing all basic working drawings on computer for given buildings specification

**(5.VP.02) Design & Innovation - Lab**

**Practical Workshop**

**Session–1: Knowledge Workshop**

- Source and apply design industry knowledge.
- Source and apply information on the history and theory of design.
- Project 1: Research on a Contemporary designer.
- Project 2: Photograph and Report on Signage and Window display.
- Project 3: Critique the Design of a Product.

**Session–2: Design Concepts Workshop**

- Design concepts workshop road signs.
- Design concepts workshop zoological and botanical logo.
- Design concepts workshop T-shirts design.

**Session–3: Graphic Design Workshop**

- Produce Designs for Clothing Range, Shoes or CD Cover.
- Color zones applied Colour assessment.
- Poster Design for an Opera or Ballet.

**Level 5 (Semester II)**  
**(5.GV.05) Building Bye-laws**

**1. RATIONALE**

This subject prepares the student to embark on his professional career in any capacity, To practice his profession efficiently. and to know - bye-law and regulation of various Public authorities.

**2. COURSE CONTENT DETAILS**

**Unit-1**

Study of the development control regulations, municipal acts, building bye-laws, Indian Standard Codes of Practice related to Design

**Unit-II**

Drawing and procedure for submission to concerned bodies. Fire prevention, safety and security measures and regulations.

**Unit-III**

National Building Codes. Study of building regulations relative to submission drawings for concern bodies. Real Estate Regulations Act (RERA)

**Unit-IV**

Definitions and general principles of Indian Contract Act and building contract documents.

**(5.GV.06) Town Planning/ Specification & Tendering**

**1. RATIONALE**

A properly planned city/town infrastructure helps in utilizing the land capability and its resources to its maximum. These structures include schools, hospitals, market, parks etc., Town residents seeks that all the facilities are in most nearby locations. The town planning includes all these things and suitable selection of land area which is most appropriate for the residential, good environment, location and connecting distance with the roads & highways. The student must have the insight knowledge about city/town planning leading towards the development of a modern town. The course will provide a practical understanding of the basic planning of urban region and the built environment, and their applications and relationships to the planning and management of urban and regional environments and associated land use

**2. COMPETENCY**

The course content should be taught and curriculum should be implemented with the aim to develop required skills in the students so that they are able to acquire following competencies:

- i) **Design architectural projects with respect to the town planning rules and regulations.**

### **3. COURSE OUTCOMES:**

The theory should be taught and practical should be carried out in such a manner that students are able to acquire required learning outcomes in cognitive, psychomotor and affective domain to demonstrate following course outcomes.

- i. Appreciate Town Planning Schemes.
- ii. Explain the tools of town planning
- iii. Explain different components of town and their effect in town planning
- iv. Describe the facts relating to the Industrial areas of a town
- v. Describe the aspects involved in a Development Plan
- vi. Demonstrate different features of Traffic management
- vii. Apply land-use regulation for planning issues

### **3. DETAILED COURSE CONTENT**

#### **Unit – I Introduction to Town Planning and Planning Concepts**

Definitions of town planning, levels of planning and steps for preparation of a town plan, survey techniques in planning, concepts, functions, components and preparation of a development plan. Planning concepts related to garden city, Geddesian triad, neighbourhood planning, radburn layout, ekistics, satellite towns and ribbon development.

#### **Unit – II Ancient System of Town Planning in India**

Indus valley civilization - Mohenjodaro, Harappa, Extracts from Chanakya's Arthashastra, Manasara's Vastushastra, planning thought behind Fatehpur Sikri, Shahjahanabad, Jaipur and Delhi.

#### **Unit – III Modern Planning Concepts**

Concept of Master Plan, Necessity of Master Plan, preparation of Master Plan, Neighborhood Planning, Idea of city planning such as Chandigarh. Islamabad, Gandhinagar.

#### **Unit – IV Urban Roads**

General requirements of a good city road. Classification of urban roads, types of street systems. Through and bypass roads, outer and inner ring roads, express ways, Freeways, Road junctions, parking, Traffic capacity of roads.

#### **Unit – V Zoning and Development Control**

Zoning, regulations and control, the comprehensive role of urban design in town planning process.

#### **Unit – VI Introduction to Human Settlements**

Introduction to human settlements, growth and decay of human settlements, influence of socio-economic factors in the development of human settlements.

#### **Unit – VI Tendering**

Types of tenders, invitation of tender and conditions of tender documents, Condition of contract, Execution of contract, various certifications



#### **4. Reference Books**

1. Town Planning- S.C. Rangwala- Charotar Publications
2. Radiant City- Le Corbusier- Orion Press
3. The Urban Pattern - City Planning & Design- Arthur B. Gallion, Simon Eisner- John Wiley & Sons
4. Town Planning- G.K. Hiraskar- Dhanpat Rai

### **(5.GV.07) Entrepreneurship**

#### **1. RATIONALE**

This course provides business and non-business majors with the skills necessary to succeed as an entrepreneur. The fundamentals of starting and operating a business, developing a business plan, obtaining financing, marketing a product or service and developing an effective accounting system will be covered.

#### **2. COURSE OBJECTIVE:**

Upon completion of the course, the student will be able to demonstrate knowledge of the following topics:

1. Understanding the dynamic role of entrepreneurship and small businesses
2. Organizing and Managing a Small Business
3. Financial Planning and Control
4. Forms of Ownership for Small Business
5. Strategic Marketing Planning
6. New Product or Service Development
7. Business Plan Creation

#### **3. DETAILED COURSE CONTENT**

##### **Unit - I Entrepreneurship and Entrepreneur:**

Need of Employment and Opportunities, Essential Characteristics of a good Entrepreneur, Industrial Policy, Classification of industries- Micro, small scale, Medium scale, Large scale, Type of industries- Production, Job based & Service

##### **Unit - II Entrepreneurial Development:**

Product identification/ selection, Site selection, Plant layout, Institutional support needed, Pre- market survey.

##### **Unit - III Entrepreneurship Support System and Start-ups:**

Introduction to start-up's, Role of District Industries Centre in setting up industry, Function of NSIC, SISI, NISIET, NRDC, SSIC, SIDO, NMTC, KVIC, RSMML, Role of state finance corporation, state electricity corporations, pollution control board, BIS, I.S.O. etc.

##### **Unit - IV Introduction to Tax System, Insurance and Acts:**

Idea of income tax, sales tax, excise duty and custom duty, Industrial and fire insurance, procedure for industrial insurance, Introduction to Industrial acts, factory act,

Workmen's compensation act 1923, Apprentices act 1961, Environmental protection act 1986

**Unit – V Project Report Preparation:**

Procedure of preparing a project report, Format of project report, Preparation of project report, Introduction to ISO: 9000 Series of Quality System

**4. Reference Books**

1. Small Business Management An Entrepreneur's Guidebook 7th ed-McGraw-Hill, Irwin-Byrd Megginson

**(5.VP.03) Project**

On the basis of learning in the vocational diploma, a project to be taken up by the student strengthening his/ her vocational skills.