

STATE COUNCIL FOR TECHNICAL EDUCATION AND VOCATIONAL TRAINING, ODISHA

**TEACHING AND EVALUATION SCHEME FOR 4th Semester( Architecture Assistantship)(wef 2019-20)**

Subject Number	Subject Code	Subject	Periods/week			Evaluation Scheme			
			L	T	P	Internal Assessment/ Sessional	End Sem Exams	Exams (Hours)	Total
<b>Theory</b>									
Th.1		Analysis of Structure	4		-	20	80	3	100
Th.2		Estimation and Specification	4		-	20	80	3	100
Th.3		Building and Environmental Science	4		-	20	80	3	100
Th.4		Building Services	4			20	80	3	100
		<i>Total</i>	16			80	320	-	400
<b>Practical</b>									
Pr.1		Architectural Design-I	-	-	5	50	50	6	100
Pr.2		Landscape Design	-	-	3	25	25	6	50
Pr.3		Working Drawing-I	-	-	5	50	50	6	100
Pr.4		Descriptive Geometry	-	-	4	25	25	4	50
Pr.5		AutoCAD-II	-	-	5	25	25	-	50
		Student Centred Activities(SCA)			1	-	-	-	-
		<i>Total</i>	-	-	23	175	175	-	350
		<b>Grand Total</b>	<b>16</b>		<b>23</b>	<b>255</b>	<b>495</b>	<b>-</b>	<b>750</b>

Abbreviations: L-Lecturer, T-Tutorial, P-Practical . Each class is of minimum 55 minutes duration

**Minimum Pass Mark in each Theory subject is 35% and in each Practical subject is 50% and in Aggregate is 40%**

**SCA shall comprise of Extension Lectures/ Personality Development/ Environmental issues /Quiz /Hobbies/ Field visits/ cultural activities/Library studies/Classes on MOOCS/SWAYAM etc. ,Seminar and SCA shall be conducted in a section.**

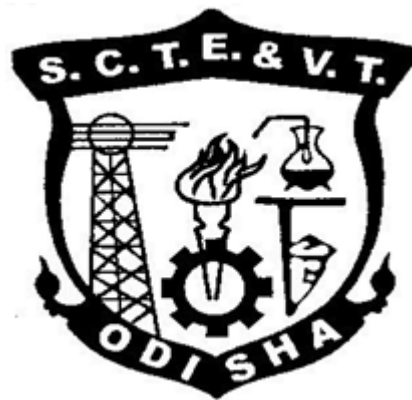
**There shall be 1 Internal Assessment done for each of the Theory Subject. Sessional Marks shall be total of the performance of individual different jobs/ experiments in a subject throughout the semester**

# **CURRICULLUM OF 4<sup>th</sup> SEMESTER**

**For**

## **DIPLOMA IN ARCHITECTURE ASSISTANTSHIP**

**(Effective FROM 2019-20 Sessions)**



**STATE COUNCIL FOR TECHNICAL  
EDUCATION & VOCATIONAL TRAINING,  
ODISHA, BHUBANESWAR**

# Th1. Analysis Of Structure

Name of the Course: Diploma in Architecture Assistantship			
Course code:		Semester	4th
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination :	80

## A. RATIONALE:

This course is designed to give basic inputs about the structural behavior of different structural member which are essential and prerequisite for design of structure.

## B. OBJECTIVE:

By studying this subject students will able to find out how a structural member behaves when subjected to certain excitation.

## C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	Introduction	5
2	Solution of determinate beams.	15
3	Shear force and bending moment, Bending of beams, Bending stress formula, Simple problems	15
4	Slope and deflection by double integration method	25
	<b>Total:</b>	<b>60</b>

## D. COURSE CONTENTS

### Course Content:

#### 1.0 Introduction:

Aim, object and scope of study the subject.

#### 2.0 Solution of determinate beams.

2.1 Define a beam

2.2 Explain various types of supports.

2.3 Explain various types of beams.

2.4 State and illustrate the concept of shear force, bending moment, shear force and bending moment diagram in case of cantilever and simply supported beam subjected to concentrated load and U.D.L acting separately.

#### 3.0 Bending stress in beams.

3.1 Show the use of pure bending equation (No derivation) for followings.

a. Rectangular solid.

b. Circular, solid.

#### 4.0 Slope and deflection of beams by double integration method.

4.1 State and explain the differential equation of elastic curve (expression only).

4.2 State and explain the sign conventions for slopes and deflection.

4.3 State and explain the slope and deflection calculation for simply supported beam subject to single concentrated load at mid span and U.D.L over entire span.

**Syllabus coverage up to Internal assessment**

Chapters: 1 & 2

<b>Learning Resources:</b>			
<b>Sl.No</b>	<b>Title of the Book</b>	<b>Name of Authors</b>	<b>Name of Publisher</b>
1.	Strength of materials	R.S. Khurmi	S Chand & Co Ltd
2.	Structural Analysis-II	S.S. Bhavikatti	Vikash Publishing House Pvt Ltd

## Th2. ESTIMATION AND SPECIFICATION

Name of the Course: <b>Diploma in Architecture Assistantship</b>			
Course code:		Semester	4 <sup>TH</sup>
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination :	80

### A. RATIONALE:

This course is designed to give basic inputs about the cost analysis of different buildings.

### B. OBJECTIVE:

Students will be able to prepare detailed estimate of a building and find out the cost & bill of quantities of different items of work.

### C. Topic wise distribution of periods:

Sl. No.	Topics	Period
1	Introduction	05
2	Units of measurement of different items of work	02
3	Methods of building estimates	10
4	Estimate of buildings	20
5	Analysis of rate	08
6	Specifications	15
<b>Total:</b>		<b>60</b>

### D. COURSE CONTENTS

#### 1.0 Introduction:

State and explain the aim and objective of the subject.

1.1 Discuss what an estimate is.

1.2 Explain in detail different types of estimate: Rough estimate, detailed estimate, quantity estimate.

1.3 Explain the methods used in plinth area calculation with an example.

#### 2.0 Units of measurement.

#### 3.0 Method of building estimates.

State and explain the **centerline method of** estimation of a building.

#### 4.0 Estimate of buildings.

4.1 Estimate the detailed quantity of a single roomed building.

4.2 Estimate detailed quantity of a single roomed building with provision for one kitchen, one toilet and front verandah.

**5.0 Analysis of rate.**

- 5.1 Analyse the rates of cement concrete work (1:4:8 and 1:2:4).
- 5.2 Analyse the rates of Brick work with (1:6) cement mortar.

**6.0 Specifications.**

- 6.1 Plain cement concrete in foundation.
- 6.2 Brick work in foundation and super structure.
- 6.3 R.C.C work in foundation and super structure.
- 6.4 Plastering.
- 6.5 Flooring (A.S flooring, terrazzo flooring, marble, tile)
- 6.6 Painting.

**Syllabus coverage up to Internal assessment**

Chapters: 1, 2, 3

<b>Learning Resources:</b>			
<b>SI.No</b>	<b>Title of the Book</b>	<b>Name of Authors</b>	<b>Name of Publisher</b>
1.	Estimate and valuation	B.N. Dutta	UBS Publishers' Distributors Ltd.
2.	Estimating & costing	M. Chakraborti	M. Chakraborti

## Th3. BUILDING AND ENVIRONMENTAL SCIENCE

Name of the Course: <b>Diploma in Architecture Assistantship</b>			
Course code:		Semester	4th
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination :	80

**RATIONALE:**

This course is designed to give basic inputs about environmental aspect of building design.

**Objective:**

Knowledge of Building and Environmental Science is required to apply in architectural design and develop climatically and ecologically sustainable architecture. Understanding of building systems like acoustics, electrical and air conditioning are pre-requisites for a comprehensive building design.

<b>A. Topic wise distribution of periods:</b>		
<b>Sl. No.</b>	<b>Topics</b>	<b>Period</b>
1	Climatic condition	12
2	Climatic control in building	16
3	Introduction to landscape design	08
4	Principles of landscape design	06
5	Different landscape style and historic landscape	08
6	Properties and Behaviour of sound	10
	<b>Total:</b>	<b>60</b>

**1.0 Climatic condition.**

- 1.1 Introduction to Climatology and its effect on human comfort.
- 1.2 Brief study of world climatic zones, tropical climate in particular.
- 1.3 Elements of climate:  
Solar Radiation, Temperature, Humidity, Wind and Precipitation data and measurement
- 1.4 Influence of topography and vegetation on climatic design

**2.0 Climatic control in building.**

- 2.1 Shading devices: vertical devices and horizontal devices.
- 2.2 Ventilation and air flow principles, principles of natural ventilation
- 2.3 Design and Orientation of building, building material and construction in warm humid climate.
- 2.4 Brief idea about different means of mechanical control for heating, ventilation, cooling, air-conditioning.

### 3.0 Introduction to landscape design.

- 3.1 Definitions(Different types of Open spaces, e.g. Park, Natural Green areas, Playground)
- 3.2 Factors that influence landscape design.

### 4.0 Principles of landscape design.

### 5.0 Different landscape style and historic landscape(only sketch.)

- 5.1 Japanese
- 5.2 Mughal
- 5.3 English

### 6.0 Properties and Behaviour of sound

- 6.1 Brief Introduction to architectural acoustics-characteristics and measurement of sound, frequency, intensity, decibel scale(only definition).
- 6.2 Source, path receiver, reflection and absorption.
- 6.3 Reverberation time calculations using Sabine's formula. (with the example of an auditorium)
- 6.4 Definition of dead room, live room and diffusion.
- 6.5 Definition of echo, flutter echo, creep and focusing.
- 6.6 General brief description of acoustical materials –acoustical tiles, fibre board, acoustic plaster and composite materials

### Syllabus coverage up to Internal assessment

Chapters: 1, 2

<b>Learning Resources:</b>			
<b>Sl.No</b>	<b>Title of the Book</b>	<b>Name of Authors</b>	<b>Name of Publisher</b>
1.	Manual of Tropical housing and building (Part-I)	O. H. Koenigsberger & others	University press



## Th4. BUILDING SERVICES

Name of the Course: <b>Diploma in Architecture Assistantship</b>			
Course code:		Semester	4th
Total Period:	60	Examination :	3 hrs
Theory periods:	4P / week	Internal Assessment:	20
Maximum marks:	100	End Semester Examination :	80

### RATIONALE:

This course is designed to give basic inputs about different services of building design.

### Objective:

This course imparts knowledge and skill for handling building services like water supply and sanitation and their integration with architectural design.

<b>B. Topic wise distribution of periods:</b>		
<b>Sl. No.</b>	<b>Topics</b>	<b>Period</b>
1	Water supply	20
2	Sanitation	25
3	House drainage and Sewerage	15
	<b>Total:</b>	<b>60</b>

### Details of Topics:

#### 1.0 Water supply:

- 1.1 Principles of water supply system (Standards adopted for water supply as per NBC recommendation.)
- 1.2 Basic idea of water treatment process.
- 1.3 Water distribution system from reservoirs (Methods of laying out of distribution pipes).
- 1.4 Municipal connections and positions
- 1.5 Elements of domestic water supply (sump, overhead tank, types of taps, types of valves, pipe size and pipe fittings)

#### 2.0 Sanitation:

- 2.1 Importance of sanitation in relation to public health.
- 2.2 Refuse types, collection and disposal Separate, combined and partially separated methods.
- 2.3 Elements of domestic sanitation.
- 2.4 Septic tank.
  - 2.4.1 Types of septic Tank
  - 2.4.2 construction of septic tank
  - 2.4.3 Volume calculation
- 2.5 Soak Pit
- 2.6 Manhole

- 2.7 Inspection chamber
- 2.8 Sanitary connections and fittings (wash basin, showers, kitchen sink, water closet, Flushing cistern, Bidets and Urinals)
- 2.9 Traps (P-trap, Q-trap and S-trap)
- 2.10 Anti siphon and ventilation pipes, Soil pipe and waste pipe

**3.0 House drainage and Sewerage**

- 3.1 Laying of simple house drainage systems and sub-soil drains.
- 3.2 Laying of sewers

**Syllabus coverage up to Internal assessment**

Chapters: 1, 2

<b>Learning Resources:</b>			
<b>Sl.No</b>	<b>Title of the Book</b>	<b>Name of Authors</b>	<b>Name of Publisher</b>
1.	Water supply and sanitation	B.C. Punmia	Charotar publishing house pvt.ltd
2	Water supply and sanitation	G.S. Biridi	Dhanpat Rai Publishing co pvt.ltd

## Pr1. ARCHITECTURAL DESIGN-I

Name of the Course: <b>Diploma in Architecture Assistantship</b>			
Course code:		Semester	4th
Total Period:	75	Examination :	6 hrs
Practical periods:	5P / week	Sessional Assessment:	50
Maximum marks:	100	End Semester Examination :	50

### **RATIONALE:**

This course is designed to give basic inputs about different aspects of architectural planning of buildings.

### **Objective:**

The course is designed to develop designing and drafting ability beginning with basic need of human being that is shelter. Different aspect of shelter designing from function to form is studied by presenting scaled drawings.

<b>A. Topic wise distribution of periods:</b>		
<b>Sl. No.</b>	<b>Topics</b>	<b>Period</b>
1	Design a small single family residence (single storied)	35
2	A duplex bungalow	40
	<b>Total:</b>	<b>75</b>

### **Details of Topics:**

#### **1.0 Design a small single family residence (single storied)**

- 1.1 Background study (Self Study)- anthropometrics, activity analysis, bubble diagram, functional requirement, area analysis.
- 1.2 Single line conceptual drawing.
- 1.3 Double line plan and elevations (preliminary drawings).
- 1.4 Presentation drawings.
  - Site Plan
  - Ground Floor Plan
  - Two Elevations
  - Two Sections
  - Terrace Plan

#### **2.0 A duplex bungalow.**

Design to include all the above steps of chapter -I

- 2.1 Site analysis
- 2.2 Presentation drawing
  - Site plan
  - Ground floor plan showing interior arrangement
  - First Floor Plan
  - Two Elevations

- Two sections
- Terrace Plan

**NB:** Students are to work in the studio under the guidance of the teacher and to be evaluated at every stage. Students are required to conduct case study by visiting different buildings related to the assigned design.

<b>Learning Resources:</b>			
<b>Sl.No</b>	<b>Title of the Book</b>	<b>Name of Authors</b>	<b>Name of Publisher</b>
1.	Time saver standard for Building types	J.De Chiara & J. Callender	McGraw-Hill International Book Company.
2.	Neufert Architect's Data	John Thackara & Richard Miles	Granada, London

## Pr2. LANDSCAPE DESIGN

Name of the Course: <b>Diploma in Architecture Assistantship</b>			
Course code:		Semester	4th
Total Period:	45	Examination :	3 hrs
Practical periods:	3P / week	Sessional Assessment:	25
Maximum marks:	100	End Semester Examination :	25

### A. RATIONALE:

This course is designed to give basic inputs about blending of the built environment with nature.

### B. OBJECTIVE:

Students will be able to design the exterior and interior space with different types of landscape elements to make the built environment lively.

A. Topic wise distribution of periods:		
Sl. No.	Topics	Period
1	Fundamentals of site planning	5
2	Landscape Details	25
3	Design of Parking lots	5
4	Design of Open Spaces	10
<b>Total:</b>		<b>45</b>

### Fundamentals of site planning

Explain with drawings and sketches.

#### 1. Landscape Details.

- 1.1. Paving
- 1.2. Boundary wall with entrance gate
- 1.3. Retaining wall
- 1.4. Water body
- 1.5. Planter box
- 1.6. Lamp post
- 1.7. Seating

#### 2. Design of Parking lots

#### 3. Design of Open Spaces

- 3.1. Parks (Neighborhood or city level)
- 3.2. Boulevards and pavement

Scaled drawings to be prepared in the class.

Learning Resources:			
Sl.No	Title of the Book	Name of Authors	Name of Publisher
1.	Time saver standard for Landscape Architecture.	Charles W. Harris & Nicholas T. Dines.	McGraw-Hill International edition

## Pr3. WORKING DRAWING-I

Name of the Course: <b>Diploma in Architecture Assistantship.</b>			
Course code:		Semester	4th
Total Period:	75	Examination :	6 hrs
Theory periods:	5P / week	Sessional Assessment:	50
Maximum marks:	100	End Semester Examination :	50

### Topic wise distribution of periods:-

<b>A. Topic wise distribution of periods:</b>		
<b>Sl. No.</b>	<b>Topics</b>	<b>Period</b>
A	Working drawing of a Residential building Sketch plan to be supplied by the teacher.	
1	Excavation plan and section.	4
2	Foundation plans and sections.	8
3	Ground floor plan in detail.	8
4	First floor plan in detail	8
5	Lintel level plan of all the floors(showing details of lintel and chhaja	8
6	Second floor plan (if necessary).	8
7	Roof / Terrace plan.	3
8	Four sides working elevation	8
9	Sections (through staircase and toilet)	6
10	Plumbing/sanitary lay out with specification	3
11	Electrical layout	3
12	Local authority approval drawing as per the building Bye-Laws	8
	<b>Total:</b>	<b>75</b>

## Pr4. DESCRIPTIVE GEOMETRY

Name of the Course: <b>Diploma in Architecture Assistantship</b>			
Course code:		Semester	4th
Total Period:	60	Examination :	6 hrs
Theory periods:	4P / week	Sessional Assessment:	25
Maximum marks:	100	End Semester Examination :	25

### A. RATIONALE:

This course is designed to give basic inputs about Sciography and 3D view of buildings&Objects.

### B. OBJECTIVE:

Students will be able to apply sciography to plan and elevation of building and prepare 3D views of building designs.

### Topic wise distribution of periods:-

A. Topic wise distribution of periods:		
Sl. No.	Topics	Period
1	Surface development of solids.	15
2	Isometric view	15
3	Axonometric view	15
4	Perspective view	15
	<b>Total:</b>	<b>60</b>

### Details of Topics.

#### 1.0 Surface development

- 1.1 Development of the surface of geometrical solids  
(Cube, Cuboids, Pyramid, Prism, Cylinder and Cone.)
- 1.2 Development of the surface of geometrical solids cut by sectional planes

#### 2.0 Isometric view of the following

- 2.1 Geometrical forms.
- 2.2 Cubical forms.
- 2.3 Complex forms

#### 3.0 Axonometric view of the following

- 3.1 Group of solids
- 3.2 Interior view of a small building.

#### **4.0 Perspective view**

- 4.1 One point perspective.  
Interior of a kitchen or any other room
- 4.2 Two point perspectives of solid geometrical forms
- 4.3 Measuring point method of solid geometrical forms



## Pr5. AUTO CAD-II

Name of the Course: Diploma in Architecture Assistantship			
Course code:		Semester	4th
Total Period:	75	Examination :	6 hrs
Theory periods:	5P / week	Sessional Assessment:	25
Maximum marks:	100	End Semester Examination :	25

### A. RATIONALE:

This course is designed to give basic inputs on the use of software on computer aided design to prepare 3D views of buildings.

### B. OBJECTIVE:

This course make the students able to produce 3D views of architectural buildings by using AUTOCAD software.

A. Topic wise distribution of periods:		
Sl. No.	Topics	Period
1	Project on 2D.	15
2	Introduction to 3D-Modelling	5
3	Isometric VIEW/perspective VIEW	5
4	Co-ordinate system	5
5	3D entities and commands	15
6	3D viewing and editing	10
7	Rendering	5
8	Project	15
<b>Total:</b>		<b>75</b>

**1.0** Students have to prepare complete working drawing of a duplex bungalow

**2.0** Introduction to 3D Modeling

2.1 State and explain wire frame model

2.2 State and explain solid modeling

**3.0** Isometric VIEW/perspective VIEW

3.1 Isometric drawings

3.2 NE – Isometric view

3.3 NW – -do-

3.4 SE – -do-

3.5 SW- -do-

3.6 Top view

3.7 Bottom view

3.8 Perspective drawing

**4.0** Coordinate System.

4.1 WCS

4.2 UCS

4.3 UCS ICON

**5.0** 3D entities and commands

- 3D PLAN

- 3D ELEVATION
- 3D LINE
- 3D FACE
- 5.1 3D SOLIDS
- 5.2 BOOLEAN operation
- 5.3 Union subtraction and intersection
- 5.4 ROTATE.
  - a. REVOLVE
  - b. REGION
  - c. EXTRUDE

## 6.0 3D Viewing & Editing

- 6.1 HIDE, SHADE, V POINT PLAN VIEW
- 6.2 3D VIEW CAMERA
- 6.3 SOLID EDITING

## 7.0 RENDERING

Illustrate with light and shade, sky, background and trees.

## 8.0 PROJECT

The students will have to create a rendered perspective view of any small residential building using AutoCAD.

<b>Learning Resources:</b>			
<b>Sl.No</b>	<b>Title of the Book</b>	<b>Name of Authors</b>	<b>Name of Publisher</b>
1.	Mastering AutoCAD 2016 and AutoCAD LT 2016	George Omura	Sybex
2.	AutoCAD 2016® and AutoCAD LT® 2016: ESSENTIALS	ESSENTIALS	Sybex
3.	AutoCAD	Sham Tickoo	BPB Publications