## STATE BOARD OF TECHNICAL EDUCATION, BIHAR

## Scheme of Teaching and Examinations for IV<sup>th</sup> SEMESTER DIPLOMA IN ARCHITECTURAL ASSISTANTSHIP (Effective from Session 2020-21)

### **THEORY**

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME							
			Periods per Week	Hours of Exam.	Teacher's Assessment (TA) Marks (A)	Class Test(CT) Marks (B)	End Semester Exam. (ESE) Marks (C)	Total Marks (A+B+C)	Pass Marks ESE	Pass Marks in the Subject	Credits
1.	Building Construction-I	2037401	03	03	10	20	70	100	28	40	03
2.	History of Architecture	2037402	03	03	10	20	70	100	28	40	03
3.	Ecology & Environment	2037403	03	03	10	20	70	100	28	40	03
4.	Building Services, Sanitation & Air Conditioning	2037404	03	03	10	20	70	100	28	40	03
5.	Interior Design & Rendering	2037405	03	03	10	20	70	100	28	40	03
		Total: -	15		3	50		500			15

### **PRACTICAL**

Sr. No.	SUBJECTS	SUBJECT	TEACHING SCHEME	EXAMINATION – SCHEME					
		CODE	Periods per	Hours of	Practic	al (ESE)	Total Marks	Pass Marks	Credits
			week	Exam.	Internal(A)	External(B)	(A+B)	Subject	
6.	Construction Practice Lab-I	2037406	04 50% Physical 50% Virtual	04	15	35	50	20	02
7.	Model Making Lab-I	2037407	06 50% Physical 50% Virtual	06	15	35	50	20	03
		Total: -	10				100		05

## TERM WORK

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME			E	
			Periods per week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	Credits
8.	Model Making (TW)	2037408	02	15	35	50	20	01
9.	Interior Design (TW)	2037409	02	15	35	50	20	01
10.	Course Under Moocs / Swayam / Others (T.W)	2037410	04	15	35	50	20	02
		Total	:- 08			150		04
Total Pe	eriods per week Each of duration	on One Hour	33	Total Ma	rks = 750			24

## **BUILDING CONSTRUCTION-I**

	Theory			No of Periods in O	Credits		
Subject Code	No. of	No. of Periods Per Week			:	100	
	L	Т	P/S	ESE	:	70	02
2037401	03	-	-	ТА	:	10	03
	-	-	-	СТ	:	20	

#### **Rationale:**

The aim is to develop an understanding of the behavior and function of various components of buildings. For this it is essential that the student are taught the various components of the buildings such as foundations, floors, super structure, joints, openings, roofs etc.

Teachers must supplement their lectures with models, audio-visuals and on-site study of various building components.

	Name of the Topic	Hrs	Marks
UNIT – 1	Brick Masonry :-	[08]	[09]
	i) Brick Bond (Different types of brick bond)		
	a) English		
	b) Flemish		
	c) Rat trap bond		
	ii) Wall Junction		
	a) T-Junction		
	b) Cross Junction		
	iii) Arches & Lintels in brick / stone		
UNIT – 2	Stone Masonry / Marble, Kota, Parquettle tiles :-	[08]	[09]
	Rubble Masonry		
	Random Rubble		
	Course Masonry		
UNIT – 3	Openings :-	[14]	[16]
	Different types of Doors – Panelled door, Metal doors, Rolling door, Revolving, Collapsible,		
	Sliding, Revolving door.		
	Different types of Windows – glazed, louvered, corner and bay window,		
	Ventilators & North light.		
UNIT – 4	Interior:-	[14]	[16]
	Partition Wall (Different types of partition wall)		
	a) Brick, metal, stone, PVC / Plastic		
	b) Timber Panel and Soft board Partition		
	c) Partition using Aluminium and Timber Section		
	d) Glass block Partition		
	False Ceiling		
	Materials & Fixtures		

UNIT – 5	Flooring:-	[16]	
	Types of Flooring, Method of Laying		
	Different Floor finishes with stones, Cement, Colored Cement, mosaic, Terrazzo,		
	Tiles, Wooden, Bamboo, Cork, Stone, Ceramic, Tiles & Vinyl flooring		
	Total	- [60]	

### **Books Recommended :-**

1.	Sushil Kumar, Building Construction, Standard Publishers, Distrubutors, Delhi
2.	Mitchell, Mitchell's Elementary Building Construction, Bombay Allied Publishers
3.	S.C.Rangwala, Building Construction, Charotar Publishing House Anand

## HISTORY OF ARCHITECTURE

		Theory		No of Periods in O	Credits		
Subject Code	No. of	<b>Periods</b> Per	Week	Full Marks	:	100	
	L	Т	P/S	ESE	:	70	02
2037402	03	-	-	ТА	:	10	03
	-	-	-	СТ	:	20	

### **Rationale:**

The Course on History of Architecture develops appreciation regarding past and current trends in the field of architecture. The knowledge of this course will help the students to understand how political, physical, social, Economical and technological change affects the architecture, materials and construction techniques. The course covers broad topics like: pre-historic architecture, important civilizations (Indian, Egyptian, Greek and Roman), medieval architecture in Europe and temple architecture and Buddhist architecture in India.

The teacher should try to create interest among the students for this course by organizing site visits to the local old monuments. Audio-visual aids should also be used to explain various architectural developments. While imparting instructions, teachers should stress upon the context of form and space, construction methods structural systems and materials. The teacher should motivate the students to take general reference for form, drawings, structural solutions and materials from the history while designing their project.

	Name of the Topic	Hrs	Marks
UNIT – 1	- Pre Historical Architecture and introduction to History of Architecture.	[10]	[11]
	- Indian Ancient Civilization.		
	- Indus valley Civilization : Form of Harappan city, location and role of public buildings.		
	- Architecture of the typical Harappan dwelling, Granary and Bath.		
	- The Vedic Village, building typology and construction.		
UNIT – 2	Hindu Architecture	[12]	[13]
	- Elements of Hindu Temple		
	- Orissan Style (Sun Temple Konark / LIngraj Temple / Bhubaneshwar / Puri		
	- South Indian Style (Madurai)		
	- Khajuraho Group (Kandarya Mahadeva)		
UNIT – 3	Buddhism / Jainism	[12]	[13]
	- Stupas (Sanchi Stupa)		
	- Chaitya & Viharas		
	- Jain Temple, Dilwara, Mt. Abu		
UNIT – 4	Rise of Indo-Islamic Architecture	[08]	[11]
	- Use of Arches, Vaults, Jali, Minarets, Squinches		
	- Study of Architectural Design and feature of Qutub minar, Taj Mahal, Fatehpur Sikri, Jama		
	Masjid.		

UNIT – 5	Greek Architecture	[08]	[10]
	- Ionic, Doric and Corinthan order		
	- Characteristics feature of temple Design		
	- The Parthenon at Athens		
	- Public Building and spaces : Theatre an Agora		
UNIT – 6	Roman Architecture	[10]	[12]
	- Ionic, doni and Corinthian order		
	- Characteristics feature of temple Design		
	- The Parthenon at Rome		
	- Basillica of Trajan, Rome,		
	- Colloseum at Rome		
	Total-	[60]	[70]

### **Books Recommended :-**

1.	Urban Pattern	Cyallion B Fischer
2.	History Builds the Town	Arthur Koher
3.	A History Architecture : Settings and Rituals	Spiro Kostof.
4.	Town Building in History	Hirons
5.	World Architecture	Michael Raeburn

Internet Sources / Various search engineers may also be bio used for additional information on some topics.

## **ECOLOGY & ENVIRONMENT**

		Theory			No of Periods in One Session : 60			
Subject Code	No. of	f Periods Per	Week	Full Marks	:	100		
	L	Т	P/S	ESE	:	70	0.2	
2037403	03	-	-	ТА	:	10	05	
	-	-	-	СТ	:	20		

#### **Rationale :**

A diploma holder must have knowledge of different types of pollution caused due to industries and constructional activities so that he may help in balancing the eco system and controlling pollution by pollution control measures. He should also be aware of environmental laws related to the control of pollution.

Lectures will be delivered on following broad topics.

	Name of the Topic	Hrs	Marks
UNIT – 1	- Ecology and Environment	[10]	[14]
	- Brief Introduction to direct and indirect factors of environment, concept of an ecosystem,		
	structure and function of an ecosystem, food chain, food web, ecological pyramid		
UNIT – 2	- Environmental Pollution	[20]	[30]
	- Air / Water / Noise pollution-their causes and its Effect		
	- Acid Rain		
	- Ozone layer depletion		
	- Global Warming and Green House effect		
UNIT – 3	- Conservation of Land and water	[07]	[09]
	- Green House Effect, Rain Water Harvesting		
	- Solid Waste management		
UNIT – 4	- Natural Resources	[08]	[10]
	- Forest resources & Water resources		
	- Consequences of deforestation, floods and draughts, Energy Resource, Renewable Sources-		
	Solar Energy, Wind Energy, Hydropower, Biomass Energy (Bio gas an Bio fuels)		
	- Non renewable resource : Coal, Petroleum, natural gas Land Resource, Soil Erosion-causes		
	and Effect		
UNIT – 5	Sustainable development, equitable use of resources for sustainable development.	[05]	[07]
	Total-	[50]	[70]

## **BUILDING SERVICES SANITATION & AIR CONDITIONING**

Subject Code		Theory			No of Periods in One Session : 60		
	No. o	No. of Periods Per Week Full Marks : 100					
	L	Т	P/S	ESE	:	70	0.2
2037404	03	-	-	ТА	:	10	05
	-	-	-	СТ	:	20	

### **Rationale :**

Students of Architectural Assistantship at diploma level are expected to prepare working drawings of various fittings and fixtures and water supply and sanitary installations. Also students should be well conversant with electrical and mechanical installations in the buildings. For this purpose, it is essential that the students are taught various aspects of building services like : sanitation, domestic water supply, electrical layout and air conditioning. Therefore, the subject of building services is very important for students undergoing diploma courses in Architectural Assistantship.

### **Objectives :**

The Student will be able to :-

- 1) Understand the commonly used methods of water supply.
- 2) Know terms and principles in air conditioning.
- 3) Drainage System.

	Name of the Topic	Hrs	Marks
UNIT – 1	Domestic Water Supply :	[08]	[09]
	Sources of water supply, standards of purity and treatment of water, qualities of potable water.		
	Domestic water demand, capacity of over head tanks and calculation of water consumption.		
UNIT – 2	Domestic Water Piping Systems :	[10]	[11]
	Water distribution networks. Cold and Hot water distribution within the building.		
	Specifications and sketches of various plumbing fittings for buildings. Uses of valves, taps and		
	their different types. House / Service connection. Layout of water supply lines in a domestic		
	house.		
UNIT – 3	Sanitation :	[08]	[11]
	Definition of different terms related to sanitation, Basic principles of sanitation and disposal of		
	waste matter from building. Brief description of various systems of sewage disposal and their		
	principles. Details of a Septic tank and capacity calculation.		
UNIT – 4	Sanitary fittings & Fixtures :	[10]	[11]
	Definition of water seal, Breaking of water seal, Anti siphonage, Inspection Chamber define		
	trap and its different types (P-trap, Q-trap, S-trap), Gully trap, floor trap intercepting trap and		
	their uses.		
	Fittings & Fixture – Water closets (Indian & European types) flushing cistern, urinals, Bath		
	tub, wash Basin, Inspection, Testing and maintenance.		
	Plumbing work – Main soil pipe, branch soil pipe, vent pipe Rain water pipe, sketch of		
	plumbing work of building.		

UNIT – 5	HVAC (Heating, ventilation, and air conditioning)	[08]	[09]
	Introduction, Need & History		
	- Types of HVAC		
	- Distribution & Components of Air Conditioning		
	- Applications		
	- Air Conditioning process		
	- Cooling load Calculation		
	- Major equipment used in Air conditioning – their characteristics & suitable place for		
	location, consideration for reduction of heat gain and economic layout of supply and		
	return air ducts.		
UNIT – 6	<u>Fire Safety :</u>	[10]	[11]
	-Introduction & Types of fire		
	- Fire safety equipment's		
	- Role and Importance, Fire safety design, planning for fire protection.		
	- Fire detection & fire fighting		
	- Different fire fighting methods to be adopted in buildings.		
UNIT – 7	Drainage system Sanitation :	[06]	[08]
	Glossary of drainage terms-		
	-Surface drainage : Systems of drainage, combined and separate systems. Open drains in small		
	towns, shape of street drains. Storm overflow, self cleaning velocities, domestic drains,		
	flushing of drains.		
	-Sewers : Sewers for different systems, standard type of drains, R.C. drain sewers, making		
	sewers, cement concrete, asbestos cement concrete, earthen ware pipes, cast iron pipes, Test of		
	pipes, Masonry sewers, setting out sewer out sewer line excavation, laying and joining pipes,		
	sewers crossings, branch connections of sewers.		
	- Manholes : Spacing, Size, Covers, Lamp Holes, Ventilation of sewers		
	- House Drainage : Trap Types, Intercepting traps, gully traps, grease traps, Trap material and		
	functions, Inspection chambers, Ventilation of House drains, Antisyphonage, vent pipes, one		
	and two pipe system, Sanitary fitting, Sinks, bath, water closet, closet ranges, Flushing cisterns,		
	ninais, laboratory basilis, bluets, size of pipes and traps for nouse drainage testing drainage,		
	iron and steel and pipes, P.V.C. pipes.		
	- Plumbing and Internal Fixtures : Joints for various type of nines. Sentic tanks, cess pools and		
	seepage pits.		
	Total.	[60]	[70]
	10/41-	[00]	[, 0]

#### Book :-

1.	Rangwala S.C., Water Supply and Sanitary Engineering Charotar Publishing House, Anand
2.	I.S.I National Building Code B.I.S. Publication
3.	J.S. Birdie G.S. Birdie Water Supply and Sanitary Engineering Dhanpatrai Publication Co., New Delhi
4.	S.L. Uppal Electrical Wiring Estimating & costing Khanna Publication, New Delhi
5.	V.N. Gharpure Water Supply engineering Engineering Book Publication, C.O.Pune
6.	I.S.I Code of basic requirement for Water Supply I.S1172B.I.S.

### **Books Recommended :-**

1. Handbook of Designing and Installation of Services in Building Complex – High-rise Buildings by VK Jain, Publication, Khanna Publishers, New Delhi Khanna Publishers, New Delhi.

## **INTERIOR DESIGN & RENDERING**

	Theory			No of Periods in One Session : 50			Credits
Subject Code	No. of Periods Per Week			Full Marks	:	100	
2027405	L	Т	P/S	ESE	:	70	0.2
2037405	03	-	-	ТА	:	10	05
	-	-	-	СТ	:	20	

### **Rationale :**

Students of Architectural Assistantship at the diploma level are expected to know, design and execute building interiors. Therefore, the basic knowledge of building construction and detailed knowledge of building materials is required with the knowledge of this subject the students can help in handling interior projects from the concept stage to the project implementation stage. Also this exercise is necessary since the interiors are becoming more integral part of architecture and considerable stress is being laid in interior design.

Teachers while imparting instructions are expected to explain concepts and principles introducing various building finishing materials. The course would be supplemented with literature and samples of materials.

	Name of the Topic	Hrs	Marks
UNIT – 1	Introduction to Interior Designing.	[05]	[07]
UNIT – 2	Principles of Interior Designing.	[05]	[07]
UNIT – 3	Principle of lines, wall composition guidelines.	[03]	[05]
UNIT – 4	Colum for interior, hue, chroma and tonal values, Effect of light on colours, various colour scheme, colour planning process.	[05]	[04]
UNIT – 5	Presentation of interior design schemes-		
	a) Drawing Room, Family Room	[05]	[07]
	b) Kitchen	[03]	[07]
	c) Bed Room	[05]	[07]
	d) Toilet	[02]	[05]
	e) Restaurant	[03]	[07]
	f) Office	[03]	[07]
	g) Shop / Show Rooms Interior	[05]	[07]
	Rendering with Hand / Computer Software using V-Ray or any other plugins	[06]	[]
	Total -	[50]	[70]

# **CONSTRUCTION PRACTICE LAB-I**

Subject Code	Practical			No of Periods in One Session : 50			Credits
	No. of Periods Per Week			Full Marks		50	
	L	Т	P/S	ESE		50	02
203/406	-	-	04	Internal	:	15	02
	-	-	-	External	:	35	

	List of Experiments :-		Hrs	Marks
UNIT – 1	Brick bond (English & Flemish)	- 2 Sheet	[02]	[13]
UNIT – 2	Wall Junction (T & Cross Junction)	- 2 Sheet	[02]	[13]
UNIT – 3	Stone Masonry	- 1 Sheet	[01]	[06]
UNIT – 4	Door / Window	- 1 Sheet	[01]	[06]
UNIT – 5	Floor	- 1 Sheet	[01]	[06]
UNIT – 6	DPC (Exp joint / Water proofing )	- 1 Sheet	[01]	[06]
		Total-	[08]	[50]

#### CONTENTS : (Practical)

# **MODEL MAKING LAB-I**

	Practical			No of Periods in One Session : 60			Credits
Subject Code	No. of Periods Per Week			Full Marks	••	50	
	L	Т	P/S	ESE	:	50	0.2
2037407	-	-	06	Internal	:	15	03
	-	-	-	External	:	35	

## **Rationale :**

Students of Architectural Assistantship at diploma level are expected to assist in the preparation of architectural models of various kinds in their professional career. This skill can also form a basis of self-employment. Architecture models as three- dimensional representations are made in different mediums. The students should be acquainted with all of these mediums / materials.

	List of Experiments: -	Hrs	Marks
UNIT – 1	Model of Building Using Mount Board	[12]	[ 10 ]
UNIT – 2	Block Model Using Thermocol / Wood	[12]	[ 10 ]
UNIT – 3	Clay Modeling	[12]	[ 10 ]
UNIT – 4	Plaster of Paris	[12]	[ 10 ]
UNIT – 5	Model of Gril / Railings / Gates	[12]	[ 10 ]
	Total-	[60]	[ 50 ]

Materials Supplied	Thermocol, Mount Board, Adhessives, Hard Board
In Examination	Materials & Drawing Sheet of <sup>1</sup> / <sub>2</sub> imperial size

## **MODEL MAKING-TW**

		Term Work No of Per			)ne Se	Credits	
Subject Code	No. of	Periods Per	Week	Full Marks : 50			
2037408	L	Т	P/S	Internal	:	15	01
	-	-	02	External	:	35	

## **Rationale:**

Students of Architectural Assistantship at diploma level are expected to assist in the preparation of architectural models of various kinds in their professional career. This skill can also form a basis of self-employment. Architecture models as three- dimensional representations are made in different mediums. The students should be acquainted with all of these mediums / materials.

Contents: Term Work

1.	Model of Residential Block	(Block model using thermocol and Mount Board with hard board base)
2.	Model of Commercial Block	(Mount Board with hard board base)

# **INTERIOR DESIGN-TW**

	Term Work			No of Periods in One Session : 60			Credits
Subject Code	No. of	<b>Periods Per</b>	Full Marks	:	50		
2037409	L	Т	P/S	Internal	:	15	01
	-	-	02	External	:	35	

### Contents: Term Work (8 Sheets)

List of Term Work:-

UNIT – 1	Bed Room Interior (Pencil)	2 Sheet.	[12]
UNIT – 2	Kitchen (Using Ink)	1 Sheet.	[12]
UNIT – 3	Drawing Room Dining & WC (Pencil)	3 Sheet.	[12]
UNIT – 4	Restaurant	1 Sheet.	[12]
	View of Interior, Using Perspective		
	(Using water color two point)		
UNIT – 5	Office Shop /Show room	1 Sheet	[12]

# COURSE UNDER MOOCS/SWAYAM / OTHERS –TW

	Term Work						Credits
Subject Code	No. of Periods Per Week			Full Marks	:	50	
2037410	L	Т	P/S	Internal	:	15	02
	-	-	04	External	:	35	