

STATE BOARD OF TECHNICAL EDUCATION, BIHAR

Scheme of Teaching and Examinations for

IIIRD SEMESTER DIPLOMA IN ARCHITECTURAL ASSISTANTSHIP

(Effective from Session 2020-21 Batch)

THEORY

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME							Credits
			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	
1.	Perspective, Sciography & Free hand Sketch	2037301	03	03	10	20	70	100	28	40	03
2.	Building Materials	2037302	03	03	10	20	70	100	28	40	03
3.	Architectural Design & Drawing-I	2037303	03	04	10	20	70	100	28	40	03
4.	Computer Application in Architecture	2037304	03	03	10	20	70	100	28	40	03
5.	Climatology	2037305	03	03	10	20	70	100	28	40	03
		Total: -	15				350	500			15

PRACTICAL

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHINGS SCHEME	EXAMINATION – SCHEME					Credits
			Periods per Week	Hours of Exam.	Practical (ESE)		Total Marks (A+B)	Pass Marks in the Subject	
					Internal (A)	External (B)			
6.	Free Hand sketching Lab.	2037306	06 50% Physical 50% Virtual	03	30	70	100	40	03
7.	Computer Application in Architecture Lab.	2037307	06 50% Physical 50% Virtual	03	15	35	50	20	03
		Total:-	12				150		06

TERM WORK

Sr. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME	EXAMINATION – SCHEME				Credits
			Periods per week	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject	
8.	Architectural Design & Drawing-I (TW)	2037308	04	23	52	75	30	02
9.	Python / Others	2000310	02	07	18	25	10	01
		Total- 06				100		03
		Total Periods per week Each of duration one Hours = 33				Total Marks = 750		24

PERSPECTIVE, SCIOGRAPHY & FREE HAND SKETCH

Subject Code 2037301	Theory			No of Periods in One Session: 60			Credits		
	No. of Periods Per Week			Full Marks				:	100
	L	T	P/S	ESE				:	70
	03	-	-	TA				:	10
	-	-	-	CT				:	20

Rationale: -

The Subject will help the students to understand various facts, concepts and procedures of perspective drawing. The subject will also help in making models of different materials, free hand sketching of monuments etc.

Objective :-

The Student will be able to :-

- 1) Understand different methods of drawing perspective views
- 2) Understand free hand coloured drawings of buildings and monuments
- 3) Make models
- 4) Sketch free hand coloured perspective.

CONTENTS : (THEORY)

	Name of the Topic	Hrs	Marks
UNIT – 1	Perspective :- 1.1 Characteristics of perspective construction, determining vanishing points 1.2 Two point perspective - Two point perspective of a simple building with or without overhang roof, two points perspective of a small house 1.3 Relationship between station point (spectator), picture plane and perspective. Comparative study of perspective by changing position of station point from one side and front of picture plane 1.4 Shadows in perspective – Front lighting, side lighting, back lighting, point lighting from one light source and reflections in perspective 1.5 Only simple square edge figures not to include rounded or curved bodies 1.6 Birds eye view	[13]	[20]

UNIT – 2	Water Colour Washes:- 2.1 Washes – i) Flat Wash ii) Graded washes Colour iii) Graded Washes (Two Colour) iv) Grades Washes (Three Colour) v) Grades washes with a vertical shine in the center vi) Grades washes with diagonal shine vii) Glare wash viii) Two glare washes – one over the other 2.2 Skies – Three types 2.3 Architectural trees 2.4 Simple building landscapes	[13]	[20]
UNIT – 3	Mural Design :- 3.1 Mural design and collage	[06]	[10]
UNIT – 4	Free Hand Sketching :- 4.1 Free hand exercise of different types of lines (horizontal, vertical, diagonal grid) 4.2 Free hand sketching of sets of figures and objects. 4.3 Free hand sketching of human figures, trees, and vehicals etc. 4.4 Free hand sketching of small building with shade and shadow. 4.5 Free hand sketches of various scenes such as railway station, Parking, bus stand, market place etc.	[10]	[15]
UNIT – 5	Human anthropometry :- 5.1 Sketching of different posture of humans with standard Dimensions. 5.2 Sketch different furniture’s	[08]	[05]
Total -		[50]	[70]

Books :-

1.	Philip J Lawson, Practical Perspective Drawing, Mc Graw Hill Book Corporation, London
2.	W. Abbott, Theory and practice of perspectives, Balckie & sons Ltd. London
3.	Civil A Farey Architectural Drawing Perspective & rendering B.T. BAtsford Ltd. London
4.	James More head Hadnbook of Perspective drawing Elsever Press, Inc. Texas
5.	Robert W. Gill Rendering with pen and ink Thames & Hudson Ltd. London
6.	Bernaud Atkines The water colour techniques of Architectural rendering Walter T. Foster
7.	Shah, Kale, Patki Perspective Drawing Tata Mc Graw Hill Publication Ltd. Delhi

BUILDING MATERIALS

Subject Code 2037302	Theory			No of Periods in One Session : 60			Credits 03
	No. of Periods Per Week			Full Marks			
	L	T	P/S	ESE	:	100	
	03	-	-	TA	:	70	
	-	-	-	CT	:	10	

Rationale: -

This subject will help the students to make aware of the primary and modern building materials used in construction, their properties, types and common usage

Objective: -

The student will be able to: -

- 1) Understand different methods of drawing perspective views
- 2) Understand free hand-colored drawings of buildings and monuments
- 3) Make models
- 4) Sketch free hand colored perspective.

CONTENTS : (THEORY)

	Name of the Topic	Hrs	Marks
UNIT – 1	BRICK :- Composition, Sizes, Properties and Classification of bricks, Tests for bricks. Substitutes for bricks.	[06]	[07]
UNIT – 2	STONES :- Classification of stones. Common building stones used in India. Characteristics and use of stones.	[04]	[05]
UNIT – 3	METALS :- Pig iron, cast iron, wrought iron – types, properties, steel-properties, types, market form of steel and uses of steel in construction, properties of mild steel and hard steel, defects in	[06]	[06]
UNIT – 4	TIMBER :- Qualities of timber for construction. Seasoning, Storage and Preservation of timber. Use of different types wood in various parts of building. Industrial timber. Veneers, plywood, fibreboard, etc. - SUSTAINABLE BUILDING MATERIALS- Bamboo / Local available materials.	[08]	[10]
UNIT – 5	LIME :- Classification of lime. Fat and hydraulic lime – properties and use. CEMENT : Composition of ordinary cement. Function of cement cement mortar. Different grades of mortar, their compositions & properties.	[06]	[06]
UNIT – 6	SAND :- Sources of Sand, Classification, Test of Sand. Grades of sand and their uses	[08]	[10]

	MORTAR : Types of mortar – lime mortar, mud mortar, lime surkhi mortar, cement mortar. Different grades of mortar, Preparation of cement mortar. Use and selection of mortar for different construction work.		
UNIT – 7	CONCRETE :- Compositions and grades of concrete. Various steps in concrete construction – batching, mixing, transporting, compacting, curing, shuttering, jointing. Tests and quality control of concrete. Design Mix of concrete.	[10]	[10]
UNIT – 8	Polymer's Plastic properties of plastic, Types and use of Plastics in building construction. Miscellaneous materials–Glass, Fibre glass, cork, linoleum, Gypsum, ceramic products.	[08]	[10]
UNIT – 9	NON-FERROUS METAL :- Aluminium, copper and important alloys like brass, bronze etc-brief description of uses, corrosion or both ferrous and non-ferrous metals, types and preventive measures.	[04]	[06]
	Total-	[60]	[70]

Books :

1.	B. C. Punmia – Building Materials and Construction.
2.	Bindra & Arora – Building Materials and Construction.
3.	S. C. Rangwaala – Building Materials

ARCHITECTURAL DESIGN & DRAWING-I

Subject Code 2037303	Theory			No of Periods in One Session : 60			Credits 03
	No. of Periods Per Week			Full Marks			
	L	T	P/S	ESE	:	100	
	03	-	-	TA	:	10	
	-	-	-	CT	:	20	

RATIONALE: -

Freehand sketching, colouring and rendering like sketching, shades and shadows, lettering and printing forms important components of Architecture discipline. Graphic presentation forms a core subject for preparing perspective drawings, scale drawings, three dimensional views, furniture drawings and layouts. Therefore, this course aims at equipping the students with the skills of graphic presentation and other above mentioned areas. Teachers are expected to lay considerable stress on practical work so that students attain sufficient skills in sketching, lettering and printing and desired competencies for preparing good quality perspectives of interior and exterior of buildings in different media.

Teachers are also expected to stress upon appropriate line work, properties, dimensioning lettering and printing. Diploma holders in Architectural Assistantship find employment with private architects and also majority of them go for Self-employment. Therefore, they are required to develop aptitude / skills to design residential, commercial and other public buildings.

Teachers while imparting instruction / giving assignments to students are expecting to teach various elements of design like form function, balance, light of shadow, shape plane, volume, line, rhythm, proportions, textures and other such related elements. Teachers are also expected to show various types of designs of small building to develop and appreciation for this subject.

Teachers should also motivate students to maintain sketch book / portfolio of all the assignments given to the students.

CONTENTS : (THEORY)

Name of the Topic		Hrs	Marks
UNIT – 1	Drawing Techniques :- 1.1 Use of Architectural Instruments 1.2 Use of Pencil – tones – texture 1.3 Use of Colour – tones - texture	[06]	[07]
UNIT – 2	Composition of 2D & 3D :- 2.1 Composition of 2D surfaces in tone, colours and textures 2.2 Principles of design 2.3 Elements of design	[12]	[15]

	2.4 Composition of 3D surfaces 2.5 Problems based on principles & elements of Architecture		
UNIT – 3	Proportion of Components of Human Body :- The proportions of the different components of the human body; Examples from Le Corbusier Modular Man, Vaastu Pursha Mandala	[06]	[07]
UNIT – 4	Human Activities :- Requirement of space (2-D, 3-D) for various human activities (Single and multiple uses of spaces such as queues etc.	[06]	[07]
UNIT – 5	Furniture Standards :- Furniture standards (sizes of domestic and public furniture); Toilet and Kitchen equipment – sizes and standards; Doors and windows – sizes, standards and locations.	[06]	[07]
UNIT – 6	Vehicles :- Vehicles in motion, parking along with turning radii for two-wheelers, cars, buses, vans etc. Standard road width.	[04]	[04]
UNIT – 7	Furniture :- Standards for drinking fountains, waiting queues at bus stops, garden seats, waste bins, telephone booths, street lights, foot paths, public walkways, railing etc.	[06]	[07]
UNIT – 8	Graphic Representation of plant material (ground cover, foliage, shrubs, trees) human figures and vehicles.	[04]	[04]
UNIT – 9	Development of architectural drawing from given sketch design of building involving two or more floors and split levels.	[04]	[04]
	Total-	[60]	[70]

RECOMMENDED BOOKS :-

1.	Time Saver Standards for Building Types by Josaeph De Chiara and John Callendera
2.	Architects Data by Neufert
3.	Space, Time and Order by DK Ching
4.	Time Sever Standards for Building Types by Joseph De Chiara and John Callendera
5.	Architects Data by Neufert
6.	Space, Time and Order by DK Ching

COMPUTER APPLICATION IN ARCHITECTURE

Subject Code 2037304	Theory			No of Periods in One Session : 60			Credits 03
	No. of Periods Per Week			Full Marks			
	L	T	P/S	ESE	:	70	
	03	-	-	TA	:	10	
	-	-	-	CT	:	20	

RATIONALE: -

In the present times an architectural assistant should be capable of drafting drawings on the computer as most of the architects lay greater stress on computerized drawings for their ease of drafting, editing, managing and presentation. At the end of the course the students should be able to make 2-D & 3-D architectural drawings for presentation and construction purposes. The student should get familiar with the latest Auto CAD software

Note: Relevant theory may be taught along with practical exercises as sessional records in each topic.

CONTENTS : (THEORY)

	Name of the Topic	Hrs	Marks
UNIT – 1	Introduction to 2-D CAD / 3-D Basic :- <ul style="list-style-type: none"> • Input Devices • Auto CAD basic introduction & Starting Auto CAD • Sketch UP Basic introduction 3D • Graphics & Inside the drawing editor • Commands in the menus (Tool bars) • Accessing Commands • Entity Selection • Entering Coordinates • Folders for organizing drawings and files 	[08]	[09]
UNIT – 2	Introduction to 3-D basic software Sketch UP :- <ul style="list-style-type: none"> • Toolbars & Camera controls – Pan, Zoom & orbit • Basic tools – Rectangle, Circle, Select pencil, push / pull, groups, Components, Move, Rotate, Copy, Paint bucket, Offset, Array & Polar array • Modelling practice – Walls + floor, Windows & Doors etc. • Warehouse • Structures phase • Section Basic Render and print settings • Shadows, views, V-ray plugin 	[14]	[17]

UNIT – 3	Drawing Commands in Auto CAD :- <ul style="list-style-type: none"> • Line • Poly line / Double line. • Circle & Arc • Ellipse • Polygon & SP line • Rectangle • Dimension style & Option • Drafting settings • Group & Ungroup • Hatch • Donuts 	[08]	[09]
UNIT – 4	Viewing an Existing Drawing :- <ul style="list-style-type: none"> • Zoom • Pan • Redraw and Regen all • Regen Auto • View, Lwdisplay, & Insert block 	[08]	[09]
UNIT – 5	Modifying an Existing Drawing :- <ul style="list-style-type: none"> • Undo Redo / Oops • Trim & Extend • Move & Table • Offset & Point • Rotate & Ortho mode • Array & Centre mark • Stretch • Divide • Champher • Erase 	[14]	[17]

	<ul style="list-style-type: none"> • Dimension & Mtext • Copy, Multiple Copy • Mirror (Mirror test) • Change (Change properties) • Plot, Save & Save as, • Explode • Block • Scale & Multileader • Fillet 		
UNIT – 6	<p>Making and Inserting Blocks :-</p> <ul style="list-style-type: none"> • Blocks • Insert block • Tool palettes • Using library for blocks • W-block • X-ref • Explode 	[08]	[09]
	Total-	[60]	[70]

CLIMATOLOGY

Subject Code 2037305	Theory			No of Periods in One Session: 60			Credits 03
	No. of Periods Per Week			Full Marks			
	L	T	P/S	ESE	:	70	
	03	-	-	TA	:	10	
	-	-	-	CT	:	20	

RATIONALE: -

Understanding of the basic principles of climatology and environment are very important for diploma holders in Architectural Assistantship. The knowledge of this subject will be very useful in the design of buildings.

Teachers are expected to impart instructions of the above course keeping in view the effect of above course in the design of buildings.

CONTENTS : (THEORY)

	Name of the Topic	Hrs	Marks
UNIT – 1	Earth and Global Climate :- <ul style="list-style-type: none"> • Introduction to climatology • Elements of climate (Wind, temp, humidity, precipitation, pressure). • Different climate zones & Classification of tropical climate 	[12]	[14]
UNIT – 2	Relationship of Climate and Comfort :- <ul style="list-style-type: none"> • Micro-Macro climatic effects. • Concept of comfort zone and bio climatic chart. • Relation of climatic elements to comfort 	[10]	[12]
UNIT – 3	Sun & Building Design :- <ul style="list-style-type: none"> • Orientation for Sun • Sun Chart (sun-path diagram) • Design of louvers (horizontal & Vertical) • Natural lighting / Day lighting • Introduction and objectives of solar passive design and thermal comfort. 	[14]	[16]
UNIT – 4	Wind & Building Design :- <ul style="list-style-type: none"> • Orientation for Wind & Wind scaping of building. • Ventilation Technique • Stack effect and thermally induced air current • Passive Solar Cooling • Air movement around the building 	[14]	[16]

UNIT – 5	Architectural Application :- <ul style="list-style-type: none"> • Building orientation & Placement, According to Sun & Wind direction consideration. • Effect of Landscaping • Site selection and site planning 	[10]	[12]
	Total-	[60]	[70]

REFERENCE BOOKS :-

1.	Tropical Architecture by CP Kukreja.
2.	Environmental Engg. And Management by Suresh K. Dhameeja.
3.	Ecology by E.P. Odem.
4.	Design with climate by Arvind Krishan and others.

FREE HAND SKETCHING LAB

Subject Code 2037306	Practical			No of Periods in One Session : 50			Credits 03
	No. of Periods Per Week			Full Marks			
	L	T	P/S	ESE	:	100	
	-	-	06	Internal	:	30	
	-	-	-	External	:	70	

RATIONALE: -

CONTENTS : (PRACTICAL)

List of Experiment		Hrs	Marks
UNIT – 1	Introduction of Free hand Sketching of Monuments and buildings in different techniques and medium	[10]	[]
UNIT – 2	India Gate, Red Fort, Taj Mahal & Kailash Temple Any one historical monument.	[10]	[]
UNIT – 3	Scribble	[10]	[]
UNIT – 4	Doodle	[05]	[]
UNIT – 5	Toran (Gateway)	[05]	[]
UNIT – 6	Architectural Elements & Conceptual Views	[10]	[]
	Total-	[50]	[]

COMPUTER APPLICATION IN ARCHITECTURE LAB.

Subject Code 2037307	Practical			No of Period in one session: 50			Credits 03
	No. of Periods Per Week			Full Marks			
	L	T	P/S	ESE	:	50	
	—	—	06	Internal	:	15	
	-	-	-	External	:	35	

RATIONALE

In the present times an architectural assistant should be capable of drafting drawings on the computer as most of the architects lay greater stress on computerized drawings for their ease of drafting, editing, managing and presentation. At the end of the course the students should be able to make 2-D architectural drawings for presentation and construction purposes. The student should get familiar with the latest Auto CAD software

Contents: Practical

List of Experiment: -		Hrs/week	Marks
Unit -1	Introduction to 2-D CAD Exercise: Creating folders and sub folders	8	8
Unit -2	Creating and saving a new Drawing Exercise: Setting up a new drawing with units, limits etc	7	7
Unit -3	Drawing Commands Exercise: Making a composition of different geometrical shapes using various drawing commands	10	10
Unit -4	Viewing an Existing Drawing Exercise: Viewing, zooming of existing drawing made in section3.	10	10
Unit -5	Modifying an Existing Drawing Exercise: a) Modifying composition made in Section 3 b) Making plan, elevation and section of simple building	8	8
Unit -6	Making and Inserting Blocks Exercise Inserting furniture, fixtures, trees etc. in the plans, sections and elevations made in section 5.	7	7
Total		50	50

ARCHITECTURAL DESIGN & DRAWING-I - TW

Subject Code 2037308	Term Work			No of Period in one session: 60			Credits 02
	No. of Periods Per Week			Full Marks			
	L	T	P/S	Internal	:	23	
	—	—	04	External	:	52	

RATIONALE

Architectural Designs drawing is basic of architecture. It prepares the students to become a good architectural assistant. It helps in learning further aspects of architectural drawings. Also, this subject will help the students to understand and attain basic skills of Architectural Drawing in order to graphically represent what they learn in other subjects.

Objectives:

The students will be able to:

- 1) Understand drafting skills and techniques
- 2) Develop the given sketch design in to final drawing
- 3) Develop bubble diagram in to final drawings
- 4) Prepare various types of 2 Dimensional drawings in CAD
- 5) Design simple buildings as per requirements

DETAILED CONTENTS

- Note:**
- a) All dimensions in all segments to be related to human figures.
 - b) Dimensions should be resolved from actual measurements.
 - c) Minimum of 10 sheets should be made in the semester

CONTENTS: TERM WORK

List of Term Work		Hrs/week	Marks
Unit -1	Drawing Techniques 1.4 Use of Architectural Instruments 1.5 Use of Pencil – tones – texture 1.6 Use of Color – tones – texture	08	09
Unit -2	Composition of 2D & 3D 2.1 Composition of 2D surfaces in tone, colors and textures 2.2 Principles of design 2.3 Elements of design 2.4 Composition of 3D surfaces 2.5 Problems based on principles & elements of Architecture	07	09
Unit -3	Proportion of Components of Human Body The proportions of the different components of the human body; Examples from Le Corbusier Modular Man, Vitruvius Marco Pollione, Vastu Pursha Mandala	05	06
Unit -4	Human Activities Requirement of space (2-D, 3-D) for various human activities (Single and multiple uses of spaces such as queues etc.)	05	06
Unit -5	Furniture Standards Furniture standards (sizes of domestic and public furniture); Toilet and Kitchen equipment - sizes and standards; Doors and windows - sizes, standards and locations.	05	06
Unit -6	Vehicles Vehicles in motion, parking along with turning radii for two-wheelers, cars, buses, vans etc. Standard road width.	08	09

Unit -7	Street furniture Standards for drinking fountains, waiting queues at bus stops, garden seats, waste bins, telephone booths, street lights, foot paths, public walkways, railing etc.	07	08
Unit-8	Graphic Representation of plant material (ground cover, foliage, shrubs, trees) human figures and vehicles.	08	09
Unit -9	Development of architectural drawing from given sketch design of building involving two or more floors and split levels	07	08
Total		60	70

RECOMMENDED BOOKS

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2. Architects Data by Neufert
3. Space, Time and Order by DK Ching
4. Time Saver Standards for Building Types by Joseph De Chiara and John Callendera
5. Architects Data by Neufert
6. Space, Time and Order by DK Ching

PYTHON/Others - TW

Subject Code 2000310	Term Work			No of Period in one session: 30			Credits
	No. of Periods Per Week			Full Marks			01
	L	T	P/S	Internal			
	—	—	02	External			

CONTENTS		Hrs.	Marks
UNIT – 01	Write a program to demonstrate basic data type in python.		
UNIT – 02	Write a program to compute distance between two points taking input from the user (Pythagorean Theorem)		
UNIT – 03	Write a python program Using for loop, write a program that prints out the decimal equivalent of $1+\frac{1}{2}+\frac{1}{3}+\dots+\frac{1}{n}$		
UNIT – 04	Write a Python program to find first n prime numbers. Write a program to demonstrate list and tuple in python.		
UNIT – 05	Write a program using a for loop that loops over a sequence. Write a program using a while loop that asks the user for a number and prints a countdown from that number to zero.		
UNIT – 06	Write a Python Program to add matrices. Write a Python program to multiply matrices.		
UNIT – 07	Write a Python program to check if a string is palindrome or not.		
UNIT – 08	Write a Python program to Extract Unique values dictionary values		
UNIT – 09	Write a Python program to read file word by word Write a Python program to Get number of characters, words.		
UNIT – 10	Write a Python program for Linear Search		