

West Bengal State Council of Technical &
Vocational Education and Skill
Development
(Technical Education Division)



Syllabus
of

Diploma in Architecture [ARCH]

Part-II (3rd Semester)

Revised 2022

Committee for Model Curriculum of full time Diploma Course in Architecture

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DETAIL CURRICULUM

SEMESTER-III

Sl No	Category of Course	Code No	Course Title	L	T	P	Total contact hrs/week	Credits	Marks
THEORY SUBJECTS									
1	Programme Core Course	ARPC 201	Strength of Material	2	0	0	2	2	100
2	Programme Core Course	ARPC 203	Materials and Methods of Construction-I	2	0	0	2	2	100
3	Programme Core Course	ARPC 205	History of Architecture-I	2	0	0	2	2	100
4	Programme Core Course	ARPC 207	Building services & Equipments-I	2	0	0	2	2	100
5	Programme Core Course	ARPC 209	Architectural Design -I	0	1	0	1	1	100
SESSIONAL SUBJECTS									
6	Programme Core Course	ARPC 211	Architectural Drawing-III	0	0	4	4	2	100
7	Programme Core Course	ARPC 213	Architectural Design -I	0	0	4	4	2	100
8	Programme Core Course	ARPC 215	Working Drawing-I	0	1	4	5	3	100
9	Programme Core Course	ARPC 217	Computer Lab-I	0	0	4	4	2	100
10	Internship-I	SI 201		-	-	-	-	1	100
Total				08	02	16	26	19	1000
L:-Lecturer				T:-Tutorial		P:-Practical			

EVALUATION SCHEME:

A. For Theory Courses:

- (i) The weightage of internal assessment is 40% and for End Semester Examination is 60%
- (ii) The student has to obtain at least 40% marks individually both in internal assessment and end semester examination to pass for the subject.

Examination Scheme: Theoretical subject (Full Marks=100)

Sl No	Internal assessment		End Semester Exam	
	Type	Marks	Question Type	Marks
1	Mid Semester Tests (Two best out of three)	10x2=20	(a) MCQ type questions carrying 1 mark, Question to be set=15 and question to be answered=10 (b) Fill-in the blanks type questions carrying 1 mark. To be set=15 and to be answered=10 (c) Short answer type questions carrying 1 mark. To be set 15 and to be answered=6	1x30=30
2	Quizzes, viva-voce, Assignments	10	Subjective type Question carrying 2 marks. Question to be set=10 and Question to be answered=6	2x6=12
3	Class Attendance*	10	Subjective type Question carrying 6 marks. Question to be set=9(3 each for 3 modules) and Question to be answered=3	6x3=18
	Total	40		60

Note: While setting the question papers it has to be ensured that there will be a mix-up of questions in the category route, application, understanding and analysis in equal proportion.

(b) For Sessional Courses:-

- The weight age of Internal assessment is 60% and for End Semester Exam is 40%.
- The student has to obtain at least 40% marks individually both in internal assessment and end semester exams to pass for each subject.

Marks Distribution: Full Marks =100

Sl No	Internal assessment		End Semester Exam	
	Type	Marks	Question Type	Marks
1	Continuous Evaluation	50	Assignments on the day of exam(by External Evaluator) and class work submission	20
2	Class Attendance	10	Viva-voce (by External Evaluator)	20
	Total	60		40

Allotment of attendance marks as follow:

Class Attendance (in %)	Marks to be awarded for class attendance
80% and above	10.0
75% to below 80%	8.0
70% to below 75%	6.0
65% to below 70%	4.0
60% to below 65%	2.0

Note: The internal assessment is based on the student's performance in mid semester tests (two best out of three), quizzes, assignments, class performance, attendance, viva-voce in practical, lab record etc.

Mapping of Marks to Grades

Each course (Theory/Practical) is to be assigned 100 marks, irrespective of the number of credits, and the mapping of marks to grades may be done as per the following table:

Range of marks	Assigned Grade
90 to 100	AA/A+
80 to below 90	AB/A
70 to below 80	BB/B+
60 to below 70	BC/B
50 to below 60	CC/C+
45 to below 50	CD/C
40 to below 45	DD/D
<40	FF/F(Fail due to less marks)
-	F ^R (fail due to shortage of attendance and therefore, to repeat the course)

THEORY SUBJECTS

Course Code	:	ARPC 201
Course Title	:	Strength of Material
Number of Classes	:	2(L-2,T-0,P-0)
Number of Credit	:	2
Prerequisites	:	1)Elementary knowledge on engineering mechanics 2)Differential and integral calculus
Course offered in	:	Third Semester
Course Duration	:	17 weeks
Course Category	:	PC
Full Marks	:	100

Aim: -

1. To study and realize the effect of deformable body under various loading conditions.
2. To study the concept of Moment of Inertia of various cross section.
3. To study the various mechanical properties and stress – strain diagram of different materials.
4. To prepare the students for further understanding of other allied subjects (e.g. TOS and Design of structure).

Course Objectives: - The students will be able to,

1. Define mechanical properties of materials and understand and analyze stress-strain diagram of engineering materials
2. Determine normal stress, shear stress etc.
3. Calculate moment of inertia of different cross sections of various engineering body.

Modular Division of Syllabus:

Unit	Topic	Lecture
1	Mechanical Properties of Materials, Simple stresses & Strain	6
2	Shear force & Bending moment	9
3	Moment of inertia	6
4	Deflection of beam	2
5	Bending stress of beam	7
	Total	30
CONTACT PERIODS:30		INTERNAL ASSESSMENT:4
TOTAL PERIODS:34		

Semester Examination Scheme:-

Module	OBJECTIVE QUESTIONS				SUBJECTIVE QUESTIONS							
	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS
1	3	Any thirty	ONE	1 x 30 = 30	1	Any six	TWO	2x6=12	1	Any three	SIX	6x3=18
2	14				3				3			
3	14				3				2			
4	10				2				2			
5	4				1				1			

DETAIL COURSE CONTENT

Unit No.	Topic	Contents	Number of Classes
Unit 1	Mechanical Properties of Materials, Simple stresses & Strain	Definition of Elasticity, plasticity, ductility, malleability, hardness, fatigue, creep, brittleness. Types of loads, Types of stress – normal stress (tensile stress & compressive stress) & shear stress, Strain – longitudinal & lateral strain, Poisson ratio, Hooke's law, Young's modulus, Modulus of rigidity, Stress- strain curves for ductile material (MS) and brittle material (CI)- discussion on salient points on the stress – strain diagram, working stress, Factor of safety. (simple problems on normal stresses and longitudinal strain, no discussion on composite section).	6

Unit 2	Shear force & Bending moment.	Definition of Shear force & bending moment, sign convention, Relation between shear force & bending moment, Shear force and bending moment diagrams for simply supported beam, overhanging beam and cantilever subjected to point loads & uniformly distributed load, location of point of contra flexure. (Problems to be based on simply supported beam, overhanging beam & cantilever beam)	9
Unit 3	Moment of inertia	Definition of area and mass moment of inertia, Parallel and perpendicular axes theorem (no derivation), Moment of inertia about centroidal axis of solid sections – Square, rectangular, circular, semicircular, Triangular section, Hollow sections – square, rectangular and circular cross section only. Moment of Inertia of angle section, channel, Tee, I section about centroidal axis and any other axis parallel to centroidal axis.	6
Unit 4	Deflection of beam	Concepts of deflection, Maximum deflection and slope of simple supported beam subjected to point load at mid span and / or uniformly distributed load on entire span and cantilever beam subjected to point load at free end and / or uniformly distributed load on entire length. (No deduction). Simple problem on maximum Deflection and slope of beam.	2
Unit 5	Bending stress of beam	Definition of bending stress, Explanation of pure bending, Assumptions in simple bending, Deduction of $M/I = \sigma/y = E/R$, Moment of resistance & section modulus, Numerical Problem.	7

Text Books		
Name of Author	Name of Book	Name of Publisher
R.S.Khurmi	Strength of Materials	S. Chand & Co
S.S.Bhavikatti	Strength of Materials	Vikas publishing House Pvt. Ltd. S
S. Ramamrutham & R. Narayanan	Strength of Materials	Dhanpat Rai & Publication
R.K. Rajput	Strength of Materials	S. Chand & Co
B.K.Sarkar	Strength of Materials	Tata McGraw Hill
R.K.Bansal	Strength of Materials	Laxmi Publication Pvt. Ltd.
M. Chakraborty	Strength of Materials	S.K. kataria

Reference Books		
Name of Author	Name of Book	Name of Publisher
S.P. Timoshenko, D.H. Young	Elements of Strength of materials	West Press Pvt. Ltd.
D. S. Prakash Rao	Strength of Materials – A Practical Approach	Universities Press
Egor P Popov	Engineering Mechanics of Solid	Prentice Hall of India
R. Subramanian	Strength of Materials	Oxford Press
Pranab Majumdar	Learning Strength of Materials	Knowledge Kit publication

Course Code	:	ARPC 203
Course Title	:	Materials and Methods of Construction-I
Number of Classes	:	2(L-2,T-0,P-0)
Number of Credit	:	2
Prerequisites	:	NIL
Course offered in	:	Third Semester
Course Duration	:	17 weeks
Course Category	:	PC
Full Marks	:	100

Course Objective:-

On satisfactory completion of the course, the students will: —

- (i) Understand the characteristics of good building stone & brick, and, the general principles to be followed in stone & brick masonry construction;
- (ii) Have idea regarding the common clay products like burnt clay hollow brick, clay tiles, terracotta, porcelain, stoneware and earthenware glazing;
- (iii) Have idea regarding the characteristics of good timber and understand the properties & uses of common wood products like veneer, plywood, fibreboard, particle board, block board, batten board and laminated board;
- (iv) Understand the properties and use of common available varieties of iron & steel, and, that of non-ferrous metals aluminum and brass, as building materials;
- (v) Understand the properties, merits, demerits and use of different types of plastics and commercially available forms of glass as building material; have knowledge regarding different types of doors & windows, and, different building hardware for fixing & fastening them.

Modular Division of Syllabus:

Group	Module	Topic	Lecture
Group-A	1	STONE MASONRY	3
	2	CLAY PRODUCTS: BRICK MASONRY	5
	3	WOOD & WOOD PRODUCTS	3
	4	METALS – FERROUS & NON FERROUS METALS	4
	5	PLASTICS	2
	6	GLASS	3

Group-B	7	BUILDING	1
	8	HARDWARE	4
	9	DOORS & WINDOWS	5
		Total	30
CONTACT PERIODS:30		INTERNAL ASSESSMENT:4	TOTAL PERIODS:34

Semester Examination Scheme:-

Module	OBJECTIVE QUESTIONS				SUBJECTIVE QUESTIONS							
	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS
1,2,3	15	Any thirty	ONE	1 x 30 = 30	3	Any six	TWO	2x6=12	3	Any three	SIX	6x3=18
4,5,6	15				3				3			
7,8,9	15				4				3			

DETAIL COURSE CONTENTS

GROUP - A

MATERIALS

20 PERIODS

1. STONE MASONRY

3

Classification of Rocks: Igneous, Sedimentary, Metamorphic (Definitions with examples)
 Characteristics of good building stone
 Technical terms associated with stone masonry
 General principles to be followed in stone masonry
 Types of stone masonry: (i) Rubble work, (ii) Ashlars (Concepts only)

2. CLAY PRODUCTS – BRICK MASONRY

5

Technical terms associated with brickwork — Sizes of bricks-Classification of bricks
 General principles to be followed in brickwork
 Bonds in brickwork: English, Flemish, Rat-Trapped
 Burnt-clay hollow brick (definitions and uses), Fly Ash Brick, Autoclaved Aerated Concrete (AAC)Blocks
 Clay tiles: Flat & curved pan tiles – Half-round country tiles – Mangalore tiles (definitions and uses) Terracotta – Porcelain – Stoneware – Earthenware (definitions and uses)

3. WOOD AND WOOD PRODUCTS

3

Classification of trees: Exogenous & Endogenous — Structure of timber
 Characteristics of good timber — names of commonly used good quality timber
 Defects in timber
 Wood products: Veneer – Plywood – Laminated board – Block board – Batten board – Composite boards – Fiberboard – Particleboard (definitions and uses).

4. METALS –

4

General characteristics of metals: Ductility – Elasticity – Malleability – Toughness – Weld ability **FERROUS METALS– IRON & STEEL** Definitions & uses, average chemical composition with specific reference to carbon content and properties of pig iron, cast iron, wrought iron, mild steel (plain carbon steel), alloy steel (hard steel), HYSD or high tensile steel

NON-FERROUS METALS – ALUMINIUM & BRASS Properties and different uses of Aluminum & Brass

5. PLASTICS -

2

Properties, merits & demerits of plastics

Various types of plastics – PVC, Epoxy, Polyvinyl acetate, Polystyrene phenolic, Polypropylene — their applications as building materials.

6. GLASS -

3

Definition of glass

Principal constituents of glass: silica, sodium or potassium carbonate (or sulphate), lime, lead, manganese dioxide, pigments, cullet

Classification of glass based on composition: Soda lime glass – Potash lime glass – Potash lead glass – Boro-silicate glass (properties & uses)

Classification of glass according to commercial forms: Sheet glass – Plate glass – Obscured glass – Wired glass – Structural glass – Laminated glass – Glass wool – Foam glass (properties & uses)

GROUP - B

CONSTRUCTION

10 PERIODS

7. BUILDING HARDWARE

1

Fixing and fastening for doors and windows: Nails – Screws – Hinges – Bolts – Rivets – Handles

8. DOORS

4

Types of doors based on operation (concepts only): Swing door – Revolving door – Sliding door – Sliding-folding door – Collapsible door – Rolling shutter door – Fire door

Doors of timber (in detail): Panelled & glazed door – Flush door: solid & hollow-core

Doors of steel (in detail): Rolling shutter door, Collapsible door

9. WINDOWS

5

Types of windows based on operation (concepts only): Fixed window – Casement window – Sliding window – Pivoted window – Louvered (or Venetian) window – Bay window – Clerestory window – Corner window – Dormer window

Windows of timber (in detail): Panelled & glazed timber casement window

Windows of steel (in detail): Glazed fixed & casement steel window

Windows of aluminium (in detail): Sliding aluminium window

Windows of UPVC (in detail)

REFERENCE BOOKS

1. Building Construction Volume I, II, III & IV (Metric Ed.) / J. K. MCKay & W. B. MCKay / Orient Longman
2. The Construction of Buildings Volume 1, 2, 3, 4 & 5 / R. Barry / English Language Book Society
3. A Text Book of Materials and Construction / TTTI
4. A Text Book of Building Construction / S. P. Aurora & S. P. Bindra
5. Building Construction / Sushil Kumar / Standards Publishers Distributors, Delhi
6. Building Materials / P.C. Varghese / PHI Learning Private Ltd., New Delhi
7. Building Material / Satish Agarwal / Dhanpat Rai & Co., New Delhi

Course Code	:	ARPC 205
Course Title	:	History of Architecture-I
Number of Classes	:	2(L-2,T-0,P-0)
Number of Credit	:	2
Prerequisites	:	NIL
Course offered in	:	Third Semester
Course Duration	:	17 weeks
Course Category	:	PC
Full Marks	:	100

Modular Division of Syllabus:

Module	Topic	Lecture	Marks
1	Architecture of the Ancient Egypt	4	8
2	Architecture of the ancient west Asia	2	4
3	Classical Architecture of Greece	4	8
4	Classical Architecture of Rome	4	8
5	Early Christian architecture	2	4
6	Byzantine Architecture	4	8
7	Romanesque Architecture	4	8
8	Gothic Architecture	4	8
9	Renaissance Architecture	2	4
	TOTAL	30	60
CONTACT PERIODS:30		INTERNAL ASSESSMENT:4	TOTAL PERIODS:34

Examination Scheme:-

Module	OBJECTIVE QUESTIONS				SUBJECTIVE QUESTIONS							
	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS
1,2	10	Any thirty	ONE	1 x 30 = 30	2	ANYSIX, TAKING AT LEAST ONE FROM EACH GROUP	TWO	2x6=12	2	ANY FIVE, TAKING AT LEAST ONE FROM EACH GROUP	THREE	6x3=18
3,4	15				3				2			
5,6,7,8,9	20				5				5			

Course Objectives:

To convey comprehensive knowledge to students about the Architecture of ancient west, classical Europe and the evolution of church Architecture.

Course Content:

Unit 1: Architecture of the Ancient Egypt

4 Periods

Belief in after-life, powerful priesthood, abundant labour- Study of tomb architecture, monumental scale – Study with sketch of Great Pyramid of Cheops, Gizeh showing entrance, subterranean chamber, queen’s chamber, grand gallery, king’s chamber, air-shaft- Brief idea about the mastabas, rock-hewn tombs, pylons, obelisks and sphinx.

Unit 2: Architecture of the ancient west Asia

2 Periods

Plentiful supply of soil in the alluvial plains of Tigris & Euphrates, knowledge of kiln-fire, scarcity of stone & timber, availability of bitumen from natural springs - Architectural elements and construction materials – Introduction of Arch –Arcuated architecture – Study of the Ziggurat of Urnammu at UR: core of mud brick covered with a skin of convex burnt brickwork, weeper holes.

Unit 3: Classical Architecture of Greece

4 Periods

Abundance of high quality limestone & marble, scarcity of hardwood, restriction on building spanning; expression of direct democracy; Mediterranean climate - Columnar and trabeated architecture, human scale, and extrovert space - Orders: Doric, Ionic and Corinthian - Elements of urban architecture: Acropolis at Athens with idea about agora, stoa, bouleutorion, theatre, odeion, stadium, hippodrome and gymnasia – Study of the Parthenon, Athens with sketch with emphasis on facade treatment, proportion (Golden section, optical correction), pronaos, naos & statue and opisthodomos or epinaos.

Unit 4: Classical Architecture of Rome**4 Periods**

Introduction of fired brick, improved mortar, stucco & marble veneering; true arch, barrel & cross vaults, cupola and coffer ceiling - Arcuated architecture, monumental scale, grandeur, introvert space - Orders added: Tuscan and Composite or Roman - - Brief idea about the temples, forum, basilicas, thermae&balneae, theatre, amphitheatre, circuses, triumphal arches & columns, aqueducts & bridges - Study of the Pantheon, Rome with sketch with emphasis on section through its great dome.

Unit 5: Early Christian architecture**2 Periods**

Acceptance of Christianity by Constantine, need for enclosed religious congregational space; lack of resources & skilled craftsmen, adaptation of existing building elements - Features of Basilican Churches - Study of the Basilica of St. Peter, Rome with sketch with emphasis to its Plan: single axis from entrance to the apse through nave & aisle.

Unit 6: Byzantine Architecture**4 Periods**

Orthodox Churches & Greek Cross - Spanning square plan with pendentives - Study of the Hagia Sophia, Constantinople with sketch.

Unit 7: Romanesque Architecture**4 Periods**

Consolidation of Papal hierarchy; desire to articulate, to stress or underline every structural division in order to produce unified compositions - Stone vaulting into groined systems - Development of church plan as a Latin cross with addition of transepts, extension of aisles carried round apsidal sanctuary to form ambulatory, figurative & non-figurative sculptures designed and integrated with structure& construction - Study of the Pisa Cathedral with Baptistery & Campanile with sketch

Unit 8: Gothic Architecture**4 Periods**

Medieval age, supremacy of religion, desire to create lofty towered cathedrals, mystic interiors; knowledge to cut & shape stone, entire structure conceived as framework of organised coherent system - Pointed arches, flying buttresses, vaults, tracery, triforium – Study of the Notre Dame, Paris with sketch showing nave & choir, pointed arch, flying buttress, nave arcade and triforium.

Unit 9: Renaissance Architecture**2 Periods**

Reformation movement in Christianity, decline of temporal power of the Church - Revival of classical learning - Use of stucco - Study of the Cathedral of St. Peter, Rome with sketch- BAROQUE: movement, spatial invention, drama and freedom of detail - Study of Piazza of St. Peter, Rome with sketch

- **Assignment** – Sketch book consisting Great Pyramid of Cheops, Gizeh;Ziggurat of Urnammat UR;Parthenon,Athens;Columns of different orders;Pantheon,Rome;Basilica of St. Peter, Rome;Hagia Sophia, Constantinople;Pisa Cathedral with Baptistery& Campanile; Notre Dame, paris;Cathedral of St.Peter, Rome; Piazza of St.Peter, Rome.

Learning Outcomes:

On satisfactory completion of the course, the students will understand the contextual factors of,

(i) Architecture of ancient Egypt and West Asia;

(ii) Classical European architecture of Greece & Rome

(iii) Evolution of Church Architecture through the medieval European times to the Renaissance period covering the change of features during the Early Christian, the Byzantine, the Romanesque and the Gothic periods.

References:

1. A History of Architecture (Century Edition) / Sir Banister Fletcher / Butterworth Heinemann (Hb), CBS Publishers & Distributors (Pb)
2. The Story of Architecture FROM ANTIQUITY TO THE PRESENT / Jan Gympel / KÖNEMANN (Pb)
3. CRASH COURSE IN ARCHITECTURE / Eva Howarth / Caxton Editions
4. The Great Ages of World Architecture / G. H. Hiraskar / Dhanpat

Course Code	:	ARPC 207
Course Title	:	Building services & Equipments-I
Number of Classes	:	2(L-2,T-0,P-0)
Number of Credit	:	2
Prerequisites	:	NIL
Course offered in	:	Third Semester
Course Duration	:	17 weeks
Course Category	:	PC
Full Marks	:	100

COURSE OBJECTIVES:- On satisfactory completion of the course, the students should be in a position to understand the basic principles of water supply system, sanitation & drainage system and materials, fittings & appliances of the water supply and drainage systems and can draw the plumbing layout of a small building.

Modular Division of Syllabus:

Module	Topic	Lecture
1	WATER SUPPLY	9
2	SANITATION & DRAINAGE	16
3	MATERIALS, FITTINGS & APPLIANCES	5
	Total	30
CONTACT PERIODS:30		INTERNAL ASSESSMENT:4
TOTAL PERIODS:34		

Examination Scheme:-

Module	OBJECTIVE QUESTIONS				SUBJECTIVE QUESTIONS							
	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS
1	10	Any thirty	ONE	1 x 30 = 30	3	Any six	TWO	2x6=12	3	Any three	SIX	6x3=18
2	24				4				3			
3	11				3				3			

MODULE - 1 WATER SUPPLY

9 PERIODS

1.1-WATER SUPPLY: SOURCES & REQUIREMENTS

3 Periods

GROUND WATER — SPRINGS: Gravity Springs, Artesian Springs – WELLS: Open Wells, Artesian Wells, Tube Wells (Shallow / Deep) – INFILTRATION WELLS & GALLERIES — SURFACE WATER (Brief description with sketch)— WATER SUPPLY REQUIREMENTS for — ‘residences’, ‘restaurants’, ‘cinemas & theatres’, ‘day schools’, ‘boarding schools’, ‘hostels’, ‘hospitals (including laundry)’, ‘offices’ [per capita per day consumption value only as per NBC]-POTABLE WATER (Brief idea)

1.2-WATER TREATMENT

1Period

Screening – Plain Sedimentation – Coagulation & Sedimentation – Filtration – Disinfection –Softening – Aeration [Definitions & Sequence only]

1.3-SYSTEM & PERIOD OF WATER SUPPLY

1 Period

DIRECT & INDIRECT SYSTEM — CONSTANT OR CONTINUOUS & INTERMITTENT SUPPLY

1.4-DESIGN OF WATER DISTRIBUTION SYSTEMS

2 Periods

GENERAL REQUIREMENTS OF WATER DISTRIBUTION SYSTEM — ESTIMATE OF DEMAND LOAD: Occupant Load, Fire Protection — BASIC PRINCIPLES OF WATER DISTRIBUTION WITHIN THE PREMISES — WATER MAIN -SERVICE PIPE: Ferrule, Goose-neck, Stop-cock box, Water-meter box – Communication Pipe –Consumer’s Pipe

1.5-STORAGE OF WATER & DOWNTAKE DISTRIBUTION PIPES

2 Periods

REQUIREMENT for storage — QUANTITY to be stored — MATERIALS used — UNDERGROUND &OVERHEAD RESERVOIRS — DOWNTAKE TAPS (COLD WATER DROPS)

MODULE - 2 SANITATION & DRAINAGE

16 PERIODS

2.1 SANITATION REQUIREMENTS

4 Periods

WASH BASINS (flat-back) — CLEANER’S SINK — DRINKING WATER FOUNTAIN — WATER CLOSETS (WC): Squatting type (Indian style) & Sitting type (European style) — URINAL – MALE: Bowl type (flat back or angle back), Slab type, Stall type – FEMALE: Squatting plate type — FLUSHING CISTERNS — BATHS —SHOWERS — NUMBER OF SANITATION REQUIREMENTS for ‘residences’, ‘office buildings’, ‘cinemas & theatres’, ‘hotels’, ‘restaurants’, ‘hostels’ — LAYOUT DRAWINGS: Students should be able to read orthographic & isometric projections of toilets-kitchens-WCs etc (supplied by the teachers) fitted with the above mentioned sanitations

2.2 HOUSE DRAINAGE PIPES

1 Period

SOIL PIPE (SP): Main Soil Pipe (MSP), Branch Soil Pipe (BSP) — WASTE PIPE (WP): Main Waste Pipe(MWP), Branch Waste Pipe (BWP), Rain Water Pipe (RWP) — MAIN SOIL WASTE PIPE (MSWP), BRANCH SOIL WASTE PIPE (BSWP) — VENTILATING PIPE (VP): Main Ventilating Pipe (MVP), Branch Ventilating Pipe (BVP), Drain Ventilating Pipe (DVP), Anti Siphonage Pipe (ASP) — VENT PIPE — JUNCTION PIPE [Definitions only]

2.3-PLUMBING SYSTEM

2 Periods

TWO-PIPE SYSTEM — ONE-PIPE SYSTEM — SINGLE STACK SYSTEM — PARTIALLY VENTILATED SINGLE STACK SYSTEM — CHOICE OF PLUMBING SYSTEM

2.4-TRAPS

2 Periods

TRAP: Water seal, Essentials of a good trap, Causes of loss or breaking of water seal — CLASSIFICATION OF TRAPS: Based on shape (P, Q, S); Based on use/ location (Floor trap, Gully trap, Intercepting trap, Grease trap, Silt trap)

2.5-CHAMBERS

2 Periods

INVERT — COLLECTION CHAMBER — GULLY CHAMBER — INSPECTION CHAMBER — MANHOLE — DROP MANHOLE — INCEPTOR MANHOLE OR INTERCEPTOR MANHOLE — MANHOLE CHAMBER [Definitions & sketches only]

2.6-DESIGN CONSIDERATIONS FOR DRAINAGE SYSTEM

2 Periods

SEWAGE: soil waste, waste water (sullage), storm water (rain water) — SOLID REFUSE — CHANNEL — DRAIN — DRAINAGE — SEWER — SEWERAGE — AIMS OF DESIGNING A DRAINAGE SYSTEM & REALIZATION OF THE SAME — SIZING OF RAIN WATER PIPES

2.7-DISPOSAL OF SEWAGE FROM ISOLATED BUILDINGS

2 Periods

SEPTIC TANK: sludge & scum — DESIGN CONSIDERATIONS: Capacity (detention period, sludge removal, consumption of water) – shape & dimensions; inlet & outlet; baffle wall; cover & manholes; ventilation lining — DISPOSAL OF SEPTIC TANK EFFLUENT: CHLORINATION CHAMBER – SOAK PIT (LINED & UNLINED); DISPERSION CHAMBER & TRENCH

2.8-INFORMATION TO BE PROVIDED IN SUBMISSION PLANS-INTRODUCTION TO RAIN WATER HARVESTING

1 Period

MODULE - 3 MATERIALS, FITTINGS & APPLIANCES

5 PERIODS

3.1-PIPE MATERIALS

1 Period

SUPPLY PIPES: Cast Iron, Steel, Reinforced concrete, Prestressed concrete, Galvanized Mild Steel tubes, Copper, Brass, Wrought Iron, Asbestos Cement, Lead, Polythene, Unplasticized PVC — DRAINAGE PIPES: Salt Glazed Stoneware, Cast Iron, Asbestos Cement, Lead, Unplasticized PVC

3.2-JOINTING OF PIPES

1 Period

Names of different type of joints for different pipe materials with detail reference to SPIGOT & SOCKET JOINTS, FLANGED JOINTS AND CEMENT MORTAR JOINTS — LAGGING OF PIPES

3.3-VALVES, COCKS, TAPS, FIRE HYDRANTS & OTHER FITTINGS

3 Periods

VALVES: Air valves or air relief valves, Reflux valves or check valves or non-return valves or flap valves or foot valves, Safety valves or pressure relief valves, Sluice valves or gate valves or stop valves, Scour valves or wash-out valves or blow-off valves, Mixing valves — STOP COCKS — TAPS: Bib taps, Self-closing taps — FIRE HYDRANTS — FITTINGS: Bends or elbows, Tees, Crosses, Wyes, Reducers, Increases, Flanges, Caps, Plugs, Back Nuts [Definitions, sketches & applications]

ASSIGNMENT:

Prepare water supply and sanitary design project for a small building such as residence or primary school showing water connection, underground water tank, wet riser, overhead tank, down comer, toilet and kitchen fixtures, waste pipe, soil pipe, rainwater pipe, traps, inspection chamber, septic tank and soak pit. Draw plan and sections.

REFERENCE BOOKS

1. SP 7 (5): 2005 NATIONAL BUILDING CODE OF INDIA GROUP 5 – PART IX PLUMBING SERVICES /Bureau of Indian Standards
2. A Text Book of Water Supply and Waste Engineering / TTTI
3. Text Book of WATER SUPPLY AND SANITARY ENGINEERING / S.K. Hussain / Oxford & IBHPublishing Co. Pvt. Ltd.
4. Solid Waste Management / Sasil kumar & Gopi Krishna / PHI Learning Pvt. Ltd., New Delhi
5. Hand Book of Water Supply & Drainage Engineering / S. K. Sharma / Dhanpat Rai & Co., New Delhi.

Course Code	:	ARPC 209
Course Title	:	Architectural Design -I
Number of Classes	:	1(L-0,T-1,P-0)
Number of Credit	:	1
Prerequisites	:	Knowledge of Basic design
Course offered in	:	Third Semester
Course Duration	:	17 weeks
Course Category	:	PC
Full Marks	:	100

Note: A six-hour end semester examination of 60 marks is to be held during end of 3rd Semester on the syllabus of “Architectural Design – I”.

The Municipal Building Rules and the National Building Code of India are allowed during the examinations.

Course Objectives: - On successful completion of the course,

- 1) To understand basic terminologies related with architectural design.
- 2) To understand the architectural design process.

Modular Division of Syllabus:

UNIT	TOPIC	Tutorial
1	INTRODUCTION	7
2	ARCHITECTURAL DESIGN PROCESS	8
	Total	15
CONTACT PERIODS:15 INTERNAL ASSESSMENT:2 TOTAL PERIODS:17		

Examination Scheme:-

Module	OBJECTIVE QUESTIONS				SUBJECTIVE QUESTIONS			
	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS	TO BE SET	TO BE ANSWERED	MARKS PER QUESTION	TOTAL MARKS
1	10	Any ten	ONE	1 x 10 = 10	2	1	50	50
2	6							

DETAIL COURSE CONTENT

UNIT NO.	TOPIC	CONTENTS	NUMBER OF SHEETS & SHEET SIZE
UNIT-1	INTRODACTION	1.1) Introduction to architectural design. 1.2) Introduction to the building elements, basic “BALCONY”, “CHAJJA”, “CHOWK OR COURTYARD”, “CHOWK, INNER”, “CHOWK, OUTER”, “COVERED AREA”, “GARAGE, PRIVATE”, “GARAGE, PUBLIC”, “OPEN SPACE”, “OPEN SPACE, FRONT”, “OPEN SPACE, REAR”, “OPEN SPACE, SIDE”, “PARAPET”, “PARKING SPACE”, PARTITION”, “PLINTH”, “PLINTH AREA”, “STOREY”, “STOREY, TOPMOST”, “VERANDAH”, “WATER-CLOSET”, “WINDOW”, ETC as per the NBC. 1.3) Introduction to the building Standards, Codes & Regulation (By- laws) like – FAR, FAR CALCULATION, GROUND COVERGE, CARPET AREA, BUILT UP AREA, SUPER BUILT UP AREA, BUILDING HEIGHT, BUILDING SETBACKS, ETC.	_____
UNIT-2	ARCHITECTURAL DESIGN PROCESS	2.1) Architectural design of any one of the following topics – i) Small residence, ii) Primary school, iii) Canteen / Restaurant, Or any other topic of equivalent weight age. Standards, Codes & Regulation (By- laws) study of theselected topic (KMC/ West Bengal by-laws). Literature study, Site study, Case study, Area programming and development of the design concept.	ONE / TWO (A1)

SESSIONAL SUBJECTS

Course Code	:	ARPC 211
Course Title	:	Architectural Drawing-III
Number of Classes	:	4(L-0,T-0,P-4)
Number of Credit	:	2
Prerequisites	:	Knowledge of Architectural drawing-II
Course offered in	:	Third Semester
Course Duration	:	17 weeks
Course Category	:	PC
Full Marks	:	100

Course Objectives: On satisfactory completion of the course, the students will be able to: —understand the basic principles of sciography. Draw sciography on the orthographic projections of three dimensional objects like right regular solids, buildings etc.

Course Outcome: Students will develop basic graphic skills so as to enable them to use these skills in the preparation, interpretation and understanding of architectural design drawings. Students should develop an unambiguous and clear visualization with sound pictorial intelligence to interpret architectural drawings.

THEORY COURSE CONTENT			
Unit No.	Topic	Contents	Contact Hours
			P
Unit 1	BASIC PRINCIPLES OF SCIOGRAPHY	1.1 TERMINOLOGIES: Altitude – Azimuth – Sun Path – Angle of Incidence of Solar Ray — Methods of Sciography	1
Unit 2	ORTHOGRAPHIC PROJECTIONS OF POINTS AND STRAIGHT LINES WITH SCIOGRAPHY	2.1 POINTS in different quadrants - LINES: Parallel to both the planes – perpendicular to one plane & parallel to the other – Inclined to one or both the planes	3
Unit 3	ORTHOGRAPHIC PROJECTIONS OF LAMINA WITH SCIOGRAPHY	3.1 LAMINA: Triangular – Square – Rectangular – Pentagonal – Hexagonal – Circular in perpendicular & oblique positions	6
Unit 4	ORTHOGRAPHIC PROJECTIONS OF RIGHT REGULAR SOLIDS WITH SCIOGRAPHY	SOLIDS – Regular Polyhedra – Prisms – Pyramids – Solids of Revolution: Cylinder & Cone (in simple positions only) COMPOSITION OF SOLIDS - any two of the above mentioned solids in such COMBINATION THAT ONE CASTS SHADOW ON THE OTHER, being positioned concentrically and in isolation	30
Unit 5	ORTHOGRAPHIC PROJECTIONS OF A BUILDING WITH SCIOGRAPHY	5.1 SITE PLAN with FRONT and SIDE ELEVATION of a Building with Sciography (1:50); the plan & elevation of the building may be supplied by the teacher concerned or may be the one designed by the student in the Subject Architectural Design Drawing(third semester)	20
Total			60
CONTACT PERIODS:60 INTERNAL ASSESSMENT:8 TOTAL PERIODS:68			

PRACTICAL COURSE CONTENT

Unit No.	Contents	Sheet size	No. of Sheets	MARKS
Unit 1	1.1 BASIC PRINCIPLES OF SCIOGRAPHY:TERMINOLOGY	-	-	-
Unit 2	2.1 ORTHOGRAPHIC PROJECTIONS OF POINTS AND STRAIGHT LINES WITH SCIOGRAPHY	A2	1	05
Unit 3	3.1 ORTHOGRAPHIC PROJECTIONS OF LAMINA WITH SCIOGRAPHY	A2	1	05
Unit 4	4.1 ORTHOGRAPHIC PROJECTIONS OF REGULAR SOLIDS WITH SCIOGRAPHY	A2	1	05
	4.2 ORTHOGRAPHIC PROJECTIONS OF REGULAR SOLIDS IN COMBINATION WITH SCIOGRAPHY	A2	1	10
Unit 5	5.1 ORTHOGRAPHIC PROJECTIONS OF A BUILDING WITH SCIOGRAPHY(Roof plan & Elevations)	A1	2	5+5+5
TOTAL		-	6	40

REFERENCE BOOKS:

1. Geometrical Drawings for students/L.H. Morris
2. Manual of Rendering with Pen & Ink/Robert W. Gill/Thames & Hudson
3. Art of Perspective drawing/Simon Graco

Course Code	:	ARPC 213
Course Title	:	Architectural Design -I
Number of Classes	:	4(L-0,T-0,P-4)
Number of Credit	:	2
Prerequisites	:	Knowledge of Basic design
Course offered in	:	Third Semester
Course Duration	:	17 weeks
Course Category	:	PC
Full Marks	:	100

Course Objectives: - On successful completion of the course,

- 1) To understand architectural design of a small single or two-storey structure in sketch-wise phases.
- 2) To understand presentation of architectural design.

UNIT	TOPIC	CONTACT PERIODS		NO OF SHEETS
		Tutorial	Sessional	
1	ARCHITECTURAL DESIGN DRAWINGS & PRESENTATION	0	60	5 or 6
	Total	0	60	
CONTACT PERIODS:60 INTERNAL ASSESSMENT:8 TOTAL PERIODS:68				

DETAIL COURSE CONTENT

The drawings should be suitably rendered in pen and ink or colour or any other suitable medium manually on opaque sheets in a suitable scale.

UNIT-1	ARCHITECTURAL DESIGN DRAWINGS & PRESENTATION	3.1)	The design should be presented through a set of architectural drawings in a suitable scale :—	FIVE / SIX (A1)
		i)	Site layout showing approach roads to the site, internal road approaching the designed space(s), open parking spaces (if any), planting and landscaping. [ONE (A1) sheet]	
		ii)	Ground Floor Plan showing furniture layout, parking spaces (if any). [ONE (A1) sheet]	
		iii)	First Floor Plan showing furniture layout & Roof Plan. [ONE (A1) sheet]	
		iv)	Front Elevation, Rear Elevation, Side Elevations. [ONE (A1) sheet]	
		v)	Minimum two sectional elevations cutting at least the toilet(s), stairs and any other service area (if any). [ONE (A1) sheet]	
		vi)	Block Model & 3D views.	
		3.2)	Make a portfolio of the entire design project of the selected topic.	

Course Outcome: At the end of the course the students will be in a position to prepare a set of Architectural presentation drawing of a Small residence, Primary school, Canteen / Restaurant, or any other topic of equivalent weightage manually following building bye laws.

Course Code	:	ARPC 215
Course Title	:	Working Drawing-I
Number of Classes	:	5(L-0,T-1,P-4)
Number of Credit	:	3
Prerequisites	:	Student should able to draw, read and interpret the basic architectural design drawings(Plan, Elevation)
Course offered in	:	Third Semester
Course Duration	:	17 weeks
Course Category	:	PC
Full Marks	:	100

Course Objectives: - On successful completion of the course, The students will be in a position to prepare a set of working drawing of a simple doublestoried load bearing structure drawn manually.

UNIT	TOPIC	CONTACT PERIODS		NO OF SHEETS
		Tutorial	Sessional	
1	Introduction	2	0	0
2	Trench Plan	2	10	1
3	Ground Floor Plan	3	12	1
4	First Floor Plan	2	12	1
5	Roof Plan	1	6	1
6	Elevation	2	10	1
7	Sectional Elevation	3	10	1
	Total	15	60	6
CONTACT PERIODS:75 INTERNAL ASSESSMENT:10 TOTAL PERIODS:85				

DETAIL COURSE CONTENT

A set of working drawings in 1: 50 scale drawn manually based on a simple double storied loadbearing structure. Relevant drawings are to be supplied by teacher.

Unit No.	Topic	Contents	Number of sheets & sheet size
Unit 1	Introduction	1.1) Discuss the term 'Working Drawings' and its application 1.2) Discuss the about load bearing structure and its Construction method and its application	_____
Unit 2	Trench Plan	Showing plot line, width of foundation trench, construction of wall, proper dimensions. Footing detail of steps (in 1 : 20 scale) from Ground Level to Plinth Level, staircase, toe beam, load bearing brick wall, schedule of windows – same as that of door with addition of sill height.	ONE (A1 or A2)
Unit 3	Ground Floor Plan	Showing dimensions of all walls, door & windows, width of flight, tread, landing, number of treads, width of stairwell (if any), inner & outer plaster line, overall dimension	ONE (A1 or A2)
Unit 4	First Floor Plan	Same as above.	ONE (A1 or A2)
Unit 5	Roof Plan	Showing <i>ghundi</i> , ridgeline, slope line, position & size of RainWater Pipe, thickness of parapet wall, roof Projection (if any), sectional plan of stair room with its roof projection (if any).	ONE (A1 or A2)

Unit 6	Elevation	TOPIC A: ONE ROAD SIDE ELEVATION TOPIC B: ONE LATERAL ELEVATION Showing Ground Level, Plinth Level, First Floor level, Roof level, Mummy Room Roof level, Sill & Lintel levels in one storey only, Height of parapet wall – specification of all other non-structural elevation feature.	ONE (A1 or A2)
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Unit 7	Sectional Elevation	Two sectional elevations through staircase, kitchen, toilet & front window or veranda – showing Ground Level, Plinth Level, First Floor level, Roof level, Entrance to roof, Sills, Lintel, Floor slabs at all levels, Flat Brick Soling, Damp Proof Course, Parapet wall. roof, Sills, Lintel, Floor slabs at all levels, Flat Brick Soling, Damp Proof Course, and Parapet wall.	ONE (A1 or A2)
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Course Outcome: At the end of the course student will be in a position to prepare a set of working drawing of a simple double storied load bearing structure drawn manually.

References Books		
Name of Author	Name of Book	Name of Publisher
J. K. MCKay & W. B. MCKay	Building Construction Volume I, II, III & IV (Metric Ed.) /	Orient Longman
Sushil Kumar	Building Construction	Standards Publishers Distributors, Delhi
Francis D. K. Ching	Building Construction Illustrated	Wiley

Course Code	:	ARPC 217
Course Title	:	Computer Lab-I
Number of Classes	:	4(L-0,T-0,P-4)
Number of Credit	:	2
Prerequisites	:	Knowledge of Basic on Auto Cad
Course offered in	:	Third Semester
Course Duration	:	17 weeks
Course Category	:	PC
Full Marks	:	100

Course Objective: On successful completion of the course the students should be in a Position to solve two dimensional drafting and design problems.

UNIT	TOPIC	CONTACT PERIODS		ASSIGNMENTS
		SESSIONAL		
1	INTRODUCTION	1		-
2	REVISION OF DRAW & MODIFY COMMAND	17		4
3	MENU BARS & TOOL BARS (EXCEPT DRAW & MODIFY)	2		-
4	TEXT COMMAND	4		1
5	EDIT TEXT COMMAND	2		-
6	DIMENSION COMMAND	4		1
7	EDIT DIMENSION COMMAND	2		-
8	INQUIRY COMMAND	2		1
9	PLOTING DRAWING	4		
10	DRAW A TOTAL BUILDING DRAWING	22		1
	TOTAL	60		
CONTACT PERIODS :60		INTERNAL ASSESSMENT :8		TOTAL PERIODS :68

DETAILS COURSE CONTENT			
UNIT	TOPIC	CONTENTS	NO OF SHEET
1	INTRODUCTION	Discuss about AUTOCAD , Screen layout, Open drawing, Save drawing, Close & Quit drawing	-
2	REVISION OF DRAW & MODIFY COMMAND	Object selection methods, Line- describe various methods, Construction line, Ray, Multiline, Poly line, Rectangle, Polygon, Circle, Ellipse, Arc, Point, Helix, Block, Hatch, Donut, Spline .Erase, Copy, Move, Off set, Mirror, Rotate, Trim, Extend, Break, Join, Chamfer, Fillet, Rotate, Scale, Stretch, Array, Properties, Match properties.	4 (A4)
3	MENU BARS & TOOL BARS (EXCEPT DRAW & MODIFY), LAYER COMMAND	Cut, Copy, Paste, Redo, Undo Redraw, Regen, Regen all, Zoom, Pan	-
4	TEXT COMMAND	Single line text, Multi line text, Difference between them	1 (A4)
5	EDIT TEXT COMMAND	Edit text style, Height, Size, Colour Symbol etc.	
6	DIMENSION COMMAND	Details of dimension menu bar	1 (A4)
7	EDIT DIMENSION	Dimension line, Extension line, Arrow heads, Dimension text, Dimension technics etc.	
8	INQUIRY COMMAND	Distance, Angle, ID point, Area, List, DB list, Drawing properties	1 (A4)
9	PLOTTING DRAWING	Plot configuration, Paper size, Plotting area, Potrait & land scape, Scale.	
10	DRAW A TOTAL BUILDING DRAWING (PLANS, ELEVATIONS, SECTIONS)	Each students is required to prepare a set of building drawing , design by own or any other design approved by the teacher-in charge	1 (A2/A1)

COURSE OUTCOME:

At the end of the course students will be able to solve two dimensional drafting and design problems by being able to use AutoCAD commands to make a drawing, create text, dimension a drawing, hatch patterns and make & insert symbols. They will also be able to plot drawings.

REFERENCE BOOKS:

1. AUTO CAD INSTANT REFERANCE BY George Omura & B. Robert Callori / BPB publications
2. Auto CAD 2004 for Architecture by Alan Jefferis, Michel Jones & Teresa Jefferies
3. Mastering Auto CAD by George Omuva
4. Engineering Drawing by N.D. Bhatt

Course Code	:	SI 201
Course Title	:	Internship-I
Number of Classes	:	NIL
Number of Credit	:	1
Prerequisites	:	NIL
Course offered in	:	At the end of Second Semester
Course Category	:	SI
Full Marks	:	100

Note:- Assessment of 100 marks will be done internally.

After the 2nd Semester for Internship-I, students are required to be involved in Construction site visit or study tour to places related to the curriculum of Architecture.

After completion of Internship the student should prepare a comprehensive report to indicate what he/ she has observed and learnt in the training period. The student may contact Industrial Supervisor/ Faculty Mentor/ TPO for assigning topics and problems and should prepare the final report on the assigned topics. The training report should be signed by the Industrial Supervisor/ Internship Faculty Mentor, TPO and HOD.