GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN CIVIL ENGINEERING

TEACHING SCHEME (w.e.f. 18th July '2011)

SEMESTER- V

SR. NO	SUB. CODE	SUBJECT	TEACHING SCHEME (HOURS)			CREDITS
			THEORY	TUTORIAL	PRACTICAL	
1	2350601	Design of Concrete Structure	2	0	0	2
2	2350602	Quantity Survey and Valuation	2	0	0	2
3	2350603	Construction Works Management	2	0	2	4
4	2350604	Water Supply and Sanitary Engineering	2	0	2	4
5	2350605	Quality Control and Monitoring	3	0	2	5
6	2350606	Water Resource Management	3	0	0	3
7	2350607	Quantity Survey and Valuation Practice	0	0	2	2
8	2350608	Practices of Design of Concrete Structure	0	0	2	2
9	2350609	Water Resource Management Practice	0	0	2	2
10	2350610	Project - I	0	0	4	4
		Total	**14**	**0**	**16**	**30**

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN CIVIL ENGINEERING
Semester – V

Subject Code **: 2350601**
Subject Name **: Design of Concrete Structure**

Sr. No.	Subject Content	Hrs.
1.	**Introduction to is – 456:2000** 1.1. Importance of use of steel as reinforcement 1.2. Limit state design method 1.3. Limit state of collapse and serviceability 1.4. Characteristic strength of concrete and grades of concrete 1.5. Characteristic strength of steel and grades of steel 1.6. Partial safety factors for material 1.7. Types of loads, load combinations and partial safety factors for loads 1.8. Limit state of collapse – FLEXURE and its assumptions 1.9. Limit state of collapse – SHEAR and its assumptions 1.10. Limit state of collapse – COMPRESSION and its assumptions 1.11. Limit state of serviceability – DEFLECTION 1.12. Limit state of serviceability – CRACKING	**2**
2.	**General is Requirements for Design According to is - 456:2000** 2.1 Exposure conditions and minimum cover to the reinforcement, spacing of bars in a layer and different layers 2.2 Define effective depth 2.3 Effective span for different support conditions 2.4 Basic factors for control of deflection and different modification factors 2.5 Requirements of minimum and maximum flexural reinforcement in beam 2.6 Requirement of minimum flexural reinforcement, maximum diameter and maximum spacing of reinforcement in slab 2.7 Requirements of minimum shear reinforcement in beam 2.8 Short column, minimum eccentricity and requirements of longitudinal and lateral reinforcement in column 2.9 Bond stress: τ_{bd} and development length of bar	**2**
3.	**Beam and Lintel:** 3.1 Classification of rectangular beam according to reinforcement: balanced section, under reinforced section, over reinforced section, singly reinforced section and doubly reinforced section 3.2 Singly reinforced rectangular beam: (Annexure-G, IS – 456:2000) 3.2.1. Depth of neutral axis: Xu_{max}, Xu 3.2.2. Limiting percentage of steel: pt_{lim} 3.2.3. Moment of resistance factor: Q 3.2.4. Use of SP-16 tables for $\frac{Xu_{max}}{d}$, pt_{lim} and Q	**8**

	3.2.5. Limiting moment of resistance: Mu_{lim} 3.2.6. Moment of resistance: Mu 3.2.7. Design of tension reinforcement: A_{ST} for given Mu, its check against requirement of reinforcement 3.2.8. Use of SP-16 tables for A_{ST} 3.3 Doubly reinforced rectangular beam: (Annexure-G, IS – 456:2000) 3.3.1. Need of doubly reinforced section 3.3.2. Moment of resistance: Mu 3.3.3. Design of tension reinforcement: A_{ST} and compression reinforcement: A_{SC} for given Mu, its check against requirement of reinforcement 3.3.4. Use of SP-16 tables for A_{ST} and A_{SC} 3.4 Singly reinforced flanged (TEE and ELL) beam: 3.4.1 IS criteria for effective width of flange: BF 3.4.2 Limiting moment of resistance: Mu_{lim} (Annexure-G, IS – 456:2000) 3.4.3 Moment of resistance: Mu 3.5 Shear reinforcement 3.5.1. Nominal shear stress: τ_V 3.5.2. Design shear strength of concrete without shear reinforcement: τ_C 3.5.3. Maximum shear strength of concrete shear reinforcement: τ_{Cmax} 3.5.4. Correction factor: k according to depth of concrete 3.5.5. Contribution of bent-up bars in shear 3.5.6. Design of shear reinforcement with and without bent-up bars 3.6 Development length of bar at support 3.7 Lintels: Load calculations according to height of masonry above lintel, design of flexural and shear reinforcement in lintel, check for reinforcement	
4.	**Slab and Staircase:** 4.1 Classification of slab panel according to span ratio: One way slab and Two way slab 4.2 Live Load on slab according to IS – 875:1987 (Part-II) 4.3 Effective span for One way simply supported slab 4.4 Design of One way simply supported slab with checks for flexure, shear, bond, deflection and cracking 4.5 Shear force and bending moment coefficient for One way continuous slab 4.6 Effective span for One way continuous slab 4.7 Design of One way continuous slab with checks for flexure, shear, bond, deflection and cracking 4.8 Provisions for Two way slab (Annexure-D, IS – 456:2000) 4.9 Design of Two way simply supported slab with torsion reinforcement with checks for flexure, shear, bond, deflection and cracking 4.10 Design of Two way simply supported slab without torsion reinforcement with checks for flexure, shear, bond, deflection and cracking 4.11 Design of waist slab for stair without stringer beam with checks for flexure, shear, bond, deflection and cracking	**6**

5.	**Axially Loaded Short Column:** 5.1 Effective length of column 5.2 Check for eccentricity 5.3 Factored/Design load capacity: Pu for different types of cross-section for given percentage of A_{SC} 5.4 Increase in factored load capacity for helically reinforced circular column 5.5 Design of longitudinal and lateral reinforcement for axially loaded short column	**3**
6.	**Isolated Column Footing:** 6.1 Bearing capacity of soil 6.2 Types of footing 6.3 Critical sections for flexure and shear 6.4 Bearing stress at junction of column and footing, provision of dowel bars 6.5 Design of rectangular pad footing with checks for flexure, One way and Two way shear, bearing, bond and cracking 6.6 Design of rectangular slopped footing with checks for flexure, One way and Two way shear, bearing, bond and cracking	**4**
7.	**Ductile Detailing of Structures Subjected to Seismic Forces in Accordance With is – 13920:** 7.1 Definition: ductility, space frame, moment resisting frame, shear wall, soft storey and weak storey, space frame 7.2 Terminology: cross tie and hoop its IS requirement 7.3 Necessity of ductility in structure 7.4 Scope of ductile detailing 7.5 Methods of improving ductility of structure 7.6 Force-displacement response of ductile and brittle materials 7.7 Ductility requirements for beam section and steel provision 7.8 Ductility requirements for column section and steel provision 7.9 Requirements for special confining reinforcement	**3**
	Total	**28**

Laboratory Experiences:

1. IS – 456:2000, IS – 875:1987, IS – 13920-1993
2. SP-16: Design Aids to IS – 456
3. SP-34: Reinforcement detailing
4. Limit state design of RC structures (Vol.-I) by H J Shah
5. Limit state design of RC structures by A K Jain
6. Limit state design of RC structures by B C Punmia
7. Limit state design of RC structures by P C Verghese
8. Limit state design of RC structures by P Dayaratnam

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN CIVIL ENGINEERING
Semester – V

Subject Code **: 2350602**
Subject Name **: Quantity Survey and Valuation**

Sr. No.	Subject Content	Hrs.
1.	**Introduction: (Considering Residential Building)** 1.1 Meaning & objectives of estimating & costing. 1.2 Skills required for a good estimator. 1.3 Interpretation of drawing.	1
2.	**Mode of measurement : (Considering Residential Building)** 2.1 Purpose, accuracy, units, Rules. 2.2 Mode of measurements for content related items (as per I.S.)	1
3.	**Specifications: (Considering Residential Building)** 3.1 Definition, purpose & importance of specifications 3.2 Types of specifications 3.3 Design and drafting of specifications 3.4 Specification writing for some useful items viz. Brick masonry, stone masonry, Excavation, Concrete etc.	2
4.	**Rate Analysis: (Considering Residential Building)** 4.1 Definitions, importance, purpose & factors affecting the rate analysis. 4.2 Task work, Rate of materials and Labours, water charges etc. 4.3 Rate analysis of important items from excavation to completion of work of Civil Engineering Structure. (also use Computer software). 4.5 Rate analysis of the special items such as carving works, Anti-termite treatment, etc. 4.6 Study of S.O.R. and market rates.	2
5.	**Estimating : (Considering Residential Building)** 5.1 Types of estimates, purpose. 5.2 **Methods of computing the quantities** (i) Centerline method (ii) Long wall and short wall method	12

	5.3 **Detailed estimate of :** (i) Compound wall (ii) Two room up to plinth (ii) Single storey and two- storey (G+1) residential building, 5.4 **Detail estimate of RCC** (i) Beam, column with footing , slab , weather shed 5.5 RCC retaining wall.	
6.	**Valuation:** 6.1 Define terms : Cost, Price, Value, Real estate , Personal estate 6.2 Objects of valuation 6.3 Mortgage, freehold property, lease-hold property 6.4 Property income, gross income, net income, outgoing 6.5 Depreciation and obsolescence 6.6 **Explain:** Market value, book value, distress value, monopoly value, scrap value, salvage value, accommodation value, replacement value, sentimental value, speculative value. 6.7 Factors affecting the value of a property. 6.8 Characteristics of good valuer . 6.9 **Sinking fund :** its computation and application 6.10 Valuation table and their use. 6.10.1 Table 1 Fixed Deposit Formula (amount accumulated at compound interest "i" after "n" years. $A = (1 + i)^n$ 6.10.2 Table 2 Present value of Rs. 1 after n nos of years $A= (1+i)^{n-1}$ 6.10.3 Table 3 Coefficient of Sinking Fund $S= [i / (1+i)^{n-1}]$ 6.11 Valuation methods for property & land. (i) Rental Method (ii) Land and Building Method (iii) Profit and Loss Method (iv) Developmental Method 6.12 Installments for repayment of loan. 6.13 Valuation report- case study 6.14 Types of rent 6.15 Procedure of fixing standard rent	**10**
	Total	**28**

References Books:

1. I.S 1200 Part I to XXV (Revised) B.I.S. Publication
2. Estimating & Costing in Civil Engg. B.N. Dutta
3. Estimating & Costing (Civil Engg.) S.C.Rangwala
4. Estimating & Costing M.C.Chakraborthy
5. A text book of Estimating & Costing G.S.Birdie
6. Estimating & Costing Vazirani & Chandola
7. Theory & Practice of Valuation Roshan H. Namavati
8. Valuation of Real properties Roshan H. Namavati
9. Valuation of Real properties S.C.Rangwala

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN CIVIL ENGINEERING

Semester – V

Subject Code **: 2350603**
Subject Name **: Construction Works Management**

Sr. No.	Subject Content	Hrs.
1	**Introduction:** 1.1 Definition of management, & construction management. 1.2 Object & types of management. 1.3 Modern behavioral management science.	1
2	**Construction Team:** 2.1 The engineers Contractors and Owners. 2.2 Their role in construction management process 2.3 Construction works manager & skills required for managers at different level.	1
3	**Scientific Management & Its Function:** 3.1 Definition 3.2 Planning of projects like Dams, Highways, Bridges, Railways etc. 3.3 Organizing 3.4 Directing and motivating	1
4	**Construction Planning Scheduling & Controlling:** 4.1 Pre and Post tender planning. 4.2 Planning process, Survey Collection and analysis of data. 4.3 Interpretation of plans, Maps, Drawings and Specifications. 4.4 Identification of activities, their execution, and requirement of resources. 4.5 Introduction to CPM & PERT 4.6 Network Compression.	6
5	**Organizations:** 5.1 Definition and function 5.2 Principles of organization 5.3 Basics components of organizing process 5.4 Primary means of departmental responsibilities, authority, and accountability in PWD .	4

	5.5 Organizational practices in Public works department (PWD). 5.6 Tendering process in PWD ,	
6	**Material Management:** 6.1 Identifications of scare materials and preparing schedule for material. 6.2 Cost Index Layout. 6.3 Material handling Storage and safety precautions.(IS-7969, 1975& IS 4082 1977) 6.4 Economic quantity of Oder and purchase procedure. 6.5 Inspection & testing the quality of material.	**3**
7	**Labour Management:** 7.1 Essential steps for Optimum labour output and preparation of schedule. 7.2 Labour characteristics Wages and their payment. 7.3 Labour incentives &motivations. 7.4 Relevant labour laws and case studies related to labour disputes.	**3**
8	**Equipment Management:** 8.1 Identifications of different alternative equipment and preparing schedule. 8.2 Importance of Owning & Operating costs in making decisions for Hiring & purchase of equipment. 8.3 Inspection, testing and maintenance of equipment. 8.4 safety considerations.	**3**
9	**Safety Management in Construction Work:** **Study the following BIS codes**. 9.1 IS 3969(I) -1966 for Scaffoldings 9.2 IS 3696(II)-1966 for Ladders 9.3 IS 3764 1966 for Execution 9.4 IS 4130 1976 for Demolition of Building 9.5 IS 7205 1974 for Erection of steel structure 9.6 IS 5121 1969 for pilling and other deep foundation 9.7 IS 5916 1970 for construction involving hot bituminous material 9.8 IS 8969 1978 for Erection of Concrete Framed Structure.	**2**
10	**Management information system:** 10.1 Purpose and needs. 10.2 System of Management Information System. 10.3 Format of Management Information System. 10.4 Implementation of Management Information System.	**2**
11	**Disaster management:** 11.1 Introduction. 11.2 Pre- Disaster Management. 11.3 Management During and after Disaster.	**2**

	Total	**28**

Lab.Exercise:

No	Exercise	Student activity	Hrs.
Assignments:			
1	Preparing structure charts of different organization.	Student will prepare assignment as per instructions.	**2**
2	Job layout for different construction sites formats of material schedule.		**2**
3	Labour laws study & preparation of labour schedule.		**2**
4	Equipment schedule.		**2**
5	Material schedule		**2**
6	Safety precautions.		**2**
7	Management Information System.		**2**
Tutorials:			
8	C.P.M.	Student will be given data and asked to draw C.P.M. network with necessary calculation	**6**
9	Tender	Student will be given task to collect different tender notices in Newspaper, and analyze them.	**2**
Visits:			
10	Major Construction site nearby.	Student will submit the detailed report on visits carried out. Enforce the knowledge what they got.	**4**
11	**Seminar:** Presentation in form of a seminar with report about the different equipment and their utility.		**2**
	Total		**28**

References Book:

No.	Name	Author
1	Professional construction management	Donald S Berry
2	Construction Planning & Management	PS Gahlot & BM Dhir Willey Eastern Ltd.
3	Construction Management and Accounts	Harpalsingh Tata McGraw Hill
4	Construction Equipment and its Management	SC Sharma Khanna Publishers.
5	Construction Planning Equipment & Methods	Robert Peurifoy & Willium Ledbetter
6	Management in Construction Industry	PP Dharwadkrer
7	A management guide to PERT/CPM	
8	Construction Management Practice	VK Raina Tata MeGraw Hill
9	Construction Management and Planning	Sengupta & Guha Tata MeGraw Hill
10	Construction of Structures Management & Works	S.C. Rangwala
11	Project Planning by CPM & PERT	B.C. Punmia & Khandelwal

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN CIVIL ENGINEERING
Semester – V

Subject Code **: 2350604**
Subject Name **: Water Supply and Sanitary Engineering**

(A) Water Supply:

Sr. No.	Subject Content	HRs.
1.	**Introduction :** 1.1 Importance and necessity 1.2 Sources of water 1.3 Suitability of water 1.4 Choice of source	1
2.	**Quantity and Quality of Water:** 2.1 Types of demand 2.2 Population forecast 2.3 Computation of quantity of water 2.4 Fluctuation in demand 2.5 Factors affecting demand 2.6 Impurities in water 2.7 Collection of water sample 2.8 Physical Chemical and Biological tests 2.9 Standards of quality of water	4
3.	**Treatment of Water:** 3.1 Objects of water treatment 3.2 Location of treatment plant 3.3 Layout of treatment plant 3.4 Basic principles of working of treatment plant 3.5 Functioning of Coagulation treatment plant 3.6 Sedimentation 3.7 Filtration 3.8 Disinfection 3.9 Water Softening	4

4.	**Conveyance of Water:** 4.1 Types of pipes used for conveyance 4.2 Pipe joints 4.3 Laying of Pipes 4.4 Distribution system	3
5	**Valves and Fittings:** 5.1 Types of valves 5.2 Meters 5.3 Pipe fittings and fixtures	1
6	**Maintenance of Water Supply Means:** 6.1 Necessity 6.2 Methods of prevent leaks 6.3 Measures for conservation of water	1

(B) SanitaryEngineering

Sr. No.	**Subject Content**	
1	**Sanitation System:** 1.1 Definitions 1.2 Objective of sewage disposal 1.3 Methods of sewage collection 1.5 Conservancy system 1.5 water carriage system	2
2	**Drains and Sewers:** 2.1 Classification of Drains 2.2 Sewer section 2.3 Sewer joint 2.4 Manholes 2.5 Flushing tank 2.6 Catch basin 2.7 Center line of sewer 2.8 Appurtenances and its locations 2.9 Hydraulic testing of sewer pipe 2.10 aintenance of sewer	4
3	**Sewage Disposal:** 3.1 Characteristics of sewage	3

	3.2 Sampling of sewage 3.3 Natural processes of treatment of sewage 3.4 B.O.D. Test 3.5 Methods of sewage disposal	
4	**House Plumbing:** 4.1 Technical terms 4.2 Plumbing tools 4.3 Pipes and pipe fittings 4.4 Fixing and jointing pipes and accessories 4.5 Traps 4.6 House drainage plant 4.7 Plumbing practice and operations 4.8 Safety and precautions 4.9 Sanitary fittings	2
5	**Maintenance of Sewage System:** 5.1 Procedure for maintenance of sewerage system 5.2 Causes of trouble and odor 5.3 Sewer cleaning operations 5.4 Requirements of maintenance 5.5 Functions of each maintenance equipments and tool 5.6 Selection of equipment for given maintenance job. 5.7 Explosives in sewers. 5.8 afety measures for sewer men	2
6	**Recycling of Waste Water and Solid Waste** 6.1 Different method with respect to quality of waste water 6.2 Utilization and management of solid waste	1
	Total	28

Laboratory Experiences:

No	Exercise	Student Activity	Hrs.
01	**Numerical Example:** 1 Examples on prediction of population. 9 Calculation of hardness	Student will calculated problem. **Home Assignment.**	00
02	**Sketches :** 1 Layout of Water treatment plant 2 Layout of Sewage treatment plant 3 Sedimentation tank 4 Filters 5 Pipe Joint 6 Distribution System 7 Pipe Fittings 8 Manholes 9 Flushing Tank 10 Catch basin 11 Sanitary fittings 12 Water sampler 13 House Drainage Plant	Student will draw the sketches in separate sketches book. **Home Assignment.**	00
03	**Design:** 1 Design of septic tank	Student will be given data, I.S. 2470(II) and handouts on septic tank, and he should be asked to design the septic tank. **Preparation of model. (Home Assignment)**	2
04	**Laboratory Experiments:** 1. pH value 2. Hardness of water 3. Residual chlorine 4. Turbidity 5. B.O.D. 6. C.O.D. 7. S.V.I.&S.D.I. using Imhoff cone	Student will perform the practical. He will take reading, prepare observation table, and put necessary calculation. There must be comment on findngs.	14
05	**Visits:** 1. Water Treatment Plant 2. Sewage Treatment Plant **3.** Maintenance work of water supply mains and sewage system	He will submit detailed report on visits carried out.	8
06	**Seminar:**	The topic for the seminar should be given to the group of three students and they	4

		shall be asked to defend the seminar in presence of teacher and other students. Each student is required to defend the seminar indidually.	
		Total	28

Reference Book:

No	Name of book	Author	Publisher
1	Test book of water supply & Sanitary Engg.	S.K.Hussain	Oxford & IBH
2	Elements of Public Health Engineering	K.N.Duggal	S.Chand & Co.
3	Water supply & Sanitary Engg.	Vazirani & Chandola	Khanna Publishers
4	A Text book of water supply & Sanitary Engg.	S.K.Garg	Khanna Publishers
5	Water supply & Sanitary	Birdie G.S.	Dhanpatrai &Sons
6	A Text book of water supply engineering	V.N. Gharpure	Allied Book Stall, Baroda
7	A Text book of sanitary engineering	V.N. Gharpure	Allied Book Stall, Baroda
8	Water pollution & Disposal of Waste Water on Land	U.N.Mahida	Tata McGraw Hill
9	Municipal and Rular Sanitation	Ehlers & Steel	Mc Graw hill book
10	Water and Waste water Engineering	Gorden ,Fair& Gayer Okun	John willey& Sons

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN CIVIL ENGINEERING
Semester – V

Subject Code **: 2350605**
Subject Name **: Quality Control and Monitoring**

Sr. No.	Subject Content	Hrs.
1.	**Introduction to Construction Quality:** 1.1 Quality of Materials 1.2 Quality of Pre-construction preparation 1.3 Quality of construction: Length, line, alignment, width, height thickness, right angles, size, shape, geometry, finishing, security, protection, wastage, sequence, gap etc. 1.4 Quality of post construction treatment, setting, protecting, curing, removal of temporary structure etc. 1.5 Quality of maintenance measurement, material, replacement, finishing.	**4**
2	**Total Quality Management(Tqm) in Constrution:** 2.1 Form development and design concept 2.2 Quality in observation, reading theodolite and digital theodolite, precision, accuracy, calibration, least count etc. 2.3 Quality in calculation, finding area, volume using planimeter, Simpson's rule. 2.4 Quality in Material, construction procedure and inspection. 2.5 Non destructive and destructive testing for quality check-ups. 2.6 Quality control check lists: materials, methods, measurements, processes, finishing etc.	**4**
3	**Sampling and Test of Significance:** 3.1 Testing samples, purpose and speed 3.2 Testing hypothesis 3.3 Estimation 3.4 Procedure for testing hypothesis and steps, (a) Set up a hypothesis (b) Set up a suitable significance level (c) Setting a test criteria (d) Doing computation (e) Making decisions 3.5 Type of errors in testing hypothesis 3.6 Standard errors and sampling distribution	**14**

	3.7 Limitations of tests of significance.	
4	**Statistical Quality Control :** 4.1 Different methods of controlling the quality (a) 100% inspection (b) Sampling techniques, random sampling. (c) Control charts, types X, R , C, P _ & combinations. (d) Setting up control limits (e) Setting up the control procedure 4.2 Benefits and limitations of SQC.	**14**
5	**Quality References :** 5.1 National Building code (NBC) 5.1.1 Why to refer & How to refer 5.1.2 Methods of referring it & application. 5.2 Indian Standard Code 5.2.1 Methods of referring it 5.2.2 Use of IS for quality references 5.3 International Organization for Standardization (ISO) 5.3.1 ISO-9000 and others 5.3.2 When, why and How to refer them for quality parameters-explain. 5.4 Advantages of refering these codes in improving the quality as a whole.	**6**
	Total	**42**

Laboratory Exercise: Practice : 2 hours / week

Exercise No.	Topic of Exercise	Action	Hrs.
1	**Accuracy , Precision and Errors :**	Definition, difference , and problems	**2**
2	**Hypothesis : Theory of estimation :**	Problems	**4**
3	**Quality Definitions, Techniques and Terms:**	Write definitions from various sources	**2**
4	**Quality Control of Construction Works :** • Construction Materials • Construction Processes • Inspection	Material testing and processes, List different construction processes.	**2**

	• Post construction treatment		
5	**Quality References: NBC and ISO:** • ISO 9000 • NBC standards	Definitions and features.	**2**
6	**Total Quality Management : (TQM):** • Every one and every activity • Quality to customer requirement • Management of quality • Principles • Tools of TQM	Collect content material and its importance in construction	**2**
7	**Statistical Quality Control Methods , Control Charts**	Problems Draw control charts SQC methods	**8**
8	**Construction Safety**	List the safety tools at Construction site.	**2**
9	**Sampling and Sampling Plan:** • Types of sampling • Diff. in sample and population • Advantages and disadvantages • Criteria's for selection of sample plan	Problems.	**4**
10	**Assignments :**	Two previous Paper solution.	**Home work**
		Total	**28**

Note: Prepare the File Which Contains all Above Exercises.

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN CIVIL ENGINEERING

Semester – V

Subject Code **: 2350606**
Subject Name **: Water Resource Management**

Sr. No	Subject Content	Hrs.
1	**Introduction: (Water as Vital Resource and Its Management)** 1.1 Scope of W.R.M. 1.2 Necessity of W.R.M. 1.3 Role of various agencies in W.R.M.: - Agriculturists - Meteorologists - Geologists - Industrialists - Scientists - Water quality Control (Authority) - Biologists - Mechanical Engg. - Electrical engg. - Economists - Social workers - NGO's - Politicians - General Public 1.4 Water Resource Projects in Gujarat (Focus on Technical Aspects) -Kalpasar -Sujalam Sufalam -Sardar Sarovar (Narmada Project)	2
2.	**Hydrology : (Water, its existence, distribution ,and Movement Throughout the Earth)** 2.1 Define Hydrology 2.2 Hydrological cycle 2.3 Forms of precipitation 2.4 Precipitation occupancy & its types. 2.5 Measurement of rain fall 2.5.1 Rain gauges. a. Non Recording – Symon's type b. Recording - Float type automatic rain gauges - Tipping bucket 2.5.2 Methods of determining average rain fall a. Arithmatic average method b. Theissen's polygon method c. Isohytel method 2.5.3 Determine No. of rain gauges for given catchment area.	9

	(Data to be given: (i) C. A. (ii) Coefficient of variance of rainfall (Cv) (iii)E = Allowable percentage error. 2.5.4 Define: Evaporation, Transpiration & Evapo -transpiration 2.5.4.1 Enlist factors affecting evaporation.	
3.	**Runoff : (Rainfall Excess on the Surface of Earth)** 3.1 Compute runoff by various methods. 3.2 Factors affecting runoff. 3.2.1 (a) Coefficient method/ Rational method (b) Formula (i) Dicken's formula (ii) Ryve's formula (iii) Inglis formula (iv) Nawab – Jung Bahadur formula 3.3 Calculate run off by Index. (w-index and ϕ-index) 3.3.1 Unit Hydrograph - Enlist assumptions of unit hydrograph. - Construct unit hydrograph from a given storm hydrograph data (rainfall & stream - flow data) - Construct flood hydrograph from given unit hydrograph for two or more periods of rainfall. 3.3.2 Compute flood discharge from unit hydrograph	7
4.	**Advance Water Application Methods : (Micro Level Irrigation Methods)** 4.1 (a) Soil water plant relation-ship (i) Classes of soil water (ii) Compute field capacity (iii) Classes of different crops with root-zone depth. (iv) Compute the water requirement of crop with effective root zone depth. (v) Drip irrigation (vi) Sprinkler irrigation (Enlist and briefly explain the suitability , Design layout parameters, components of above (b) & (c) methods, Advantages & Disadvantages of above methods.) 4.2 Water logging and drainage. 4.2.1 Define water logging and ill effects of water logging. 4.2.2 Surface and sub-surface drainage. 4.2.3 Salt efflorescence	7
5.	**Ground Water : (Water Below the Earth Surface)** 5.1 Importance of ground water and present scenario 5.2 Necessity of recharging 5.2.1 Artificial recharging as today's need. 5.2.2 Types of artificial recharge	7

	a. Spreading method. 5.3 Pit method / khet talavadi 5.4 Induced recharge method 5.5 Recharge well method. 5.6 Sub surface dam. 5.7 Check dam series 5.8 Ponds 5.9 Unlined canals Case studies for above all. 5.10 Suitability of artificial recharging method w.r.t. different regions in Gujarat State. 1.11 Methods of water-drawls of various strata	
6.	**Sea Water Intrusion : (Land Area Under Salinity)** 6.1 Enlist Ill effects of sea water intrusion 6.2 Discuss following remedial measures to control sea water intrusion. 6.2.1 Modification of pumping. 6.2.2 Artificial recharge by spreading area. 6.2.3 Pumping trough. 6.2.4 Pressure ridge. 6.3 Compute depth of Interface and draw the sketch	3
7.	**Watershed Management:(Rainwater + Land + Management)** 7.1 Explain watershed concept 7.2 Characteristics of watershed:- Size, shape, physiography, slope, climate, drainage, land use, vegetation, geology, soil type, hydrology, hydrogeology, socio-economics. 7.3 Watershed management & People's participation.. 7.3.1 Conserving Soil ,Water & Energy 7.3.2 Improving ability of land to hold water 7.3.3 Rain water harvesting, by - Check dams - Nala / Gully plugging - Percolation tank - Khet talawadi - Roof harvesting - Vegetation and plantation 7.4 Interlinking of village ponds - Dressing of Natural Drains - Check dams at the pond overflow section and within the drains (Feasibility, Design and advantages) 7.5 Role of co-operative society in watershed management.	7
	Total	42

References Books:

1. Irrigation, Water Resources & Water Power Engg.	Dr. P.N. Modi	Standard Book House, Delhi.
2. Hydrology & Water Resources	R.K. Sharma	Dhanpat Rai & Sons, Delhi.
3. Ground water	H.M.Ragunath	New Age international Ltd., New Delhi.
4. Ground water assessment, Development & management	K.R. Karanth	Tata Mc Graw Hill Pub. Co. Ltd., New Delhi.
5. Principle & Practice of Irrigation Engg.	S.K.Sharma	S.Chand & Co, Delhi.
6. Hydrology & Water Resources Engg.	S.K.Garg.	Khanna Pub., Delhi.
7. Watershed management in India	J.V.S. Moorthy	Willey Eastern Ltd. New Age international Ltd., New Dilhi.
8. Design of small dams.	U.S.B.R.	
9. Irrigation theory & practice Delhi.	A.M.Mitchel	Vikas Pub. House Pvt. Ltd,
10. Water vision 2050	Narmada, W.R. & water supply deptt., Gandhinagar	
11. Techno economic letter Vol.-107 & 108		Gram technology Institute-Gujarat Secort.12, Gandhinagar.
12. Irrigation & water power engg.	B.C. Punmia	
13. Water Resources Engg.- Principles & Practice	C. Satyanarayan Murthy.	New Age International Ltd., New Delhi
14. Relevant IS codes		

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN CIVIL ENGINEERING

Semester – V

Subject Code **: 2350607**

Subject Name **: Quantity Survey and Valuation Practice**

Expt. No.	Description of the Experiment	Action	Hrs.
1	Rate analysis for at least ten items of construction	Home work	-
2	Specifications for at least ten items of construction	Home work	-
3	Drawing of one room is to be provided to guide the students for the interpretation of drawing.	Interpretation of drawing.	2
4	List of different items is to be provided. The modes of measurements according to prevailing I.S.	Prepare a list of construction Items & mode of measurement	2
5	Detailed estimate of a small residential building having two rooms, w.c; bath, verandah, passage etc. from a given working drawing. (centre line and Long wall ,short wall method)	Work out estimate in the class.	2
6	Detailed estimate of a two- storey residential building having drawing room, two bed rooms, kitchen, store, W.C. bath, staircase, verandah, balcony, passage from given working drawing.	Students have to work out the estimate by themselves, with help of faculty. (Incorporate field visit)	6
7	Detailed estimate of R.C.C. framework consisting beam, column and slab and weather shed.	Work out estimate in the class. (Incorporate field visit)	6
8	Detailed estimate of R.C.C. retaining wall.	Work out estimate in the class.	4
9	**Valuation :** Valuation : Tables I, II , III i) Calculation of Sinking fund ii) Calculating values of different types of Civil engineering buildings using appropriate	Minimum two problems for each topic.	6

	Valuation methods. iii) Calculation of Installment for Loan iv) Fixing of standard Rent		
		Total	28

References Books:

1. I.S 1200 Part I to XXV (Revised) B.I.S. Publication
2. Estimating & Costing in Civil Engg. B.N. Dutta
3. Estimating & Costing (Civil Engg.) S.C.Rangwala
4. Estimating & Costing M.C.Chakraborthy
5. A text book of Estimating & Costing G.S.Birdie
6. Estimating & Costing Vazirani & Chandola
7. Theory & Practice of Valuation Roshan H. Namavati
8. Valuation of Real properties Roshan H. Namavati
9. Valuation of Real properties S.C.Rangwala

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN CIVIL ENGINEERING
Semester – V

Subject Code **: 2350608**

Subject Name **: Practices of Design of Concrete Structure**

(2Hrs/week = Total , 28 Hrs.)

Sr. No.	Subject Content	Hrs.
1.	**Singly Reinforced Beam** (10 Problems) 1.1 Select and solve at least three problems for finding Mu of rectangular beams 1.2 Select and solve at least three problems for design and detailing of flexural reinforcement 1.3 Select and solve at least three problems for design and detailing of shear reinforcement with and without bent up bars 1.4 Select and solve a problem for Design and detail cantilever balcony	
2.	**Doubly Reinforced Beam** (6 Problems) 2.1 Solve at least three problems for finding Mu of rectangular beams 2.2 Solve at least three problems for design and detailing of flexural reinforcement	
3.	**Tee Beam** (4 Problems) 3.1 Solve at least three problems for finding Mu of TEE beams (Problems are so selected that cases of Xu ≤ Df, Df ≤ $\frac{3}{7}$ Xu and Df > $\frac{3}{7}$ Xu each is included) 3.2 Select and solve a problem for Design and detail a TEE beam	
4.	**One Way Slab** (3 Problems) 4.1 Select a problem on design and detail of One way simply supported slab with all necessary provisions of flexure, shear, bond, deflection and cracking 4.2 Select a problem on design and detail of One way continuous slab with all necessary provisions of flexure, shear, bond, deflection and cracking 4.3 Select a problem on design and detail of waist slab for stair without stringer beam with all necessary provisions of flexure, shear, bond, deflection and cracking	
5.	**Two Way Slab** (2 Problems)	

	5.1 Select a problem on design and detail of Two way simply supported slab with torsion reinforcement and all necessary provisions of flexure, shear, bond, deflection and cracking 5.2 Select a problem on design and detail of Two way simply supported slab without torsion reinforcement and all necessary provisions of flexure, shear, bond, deflection and cracking	
6.	**Axially Loaded Short Column** (5 Problems) 6.1 Select at least three problems (one each for square, rectangular and circular section) for finding Pu of columns 6.2 Select Two problem on design and detail of axially loaded short column with all necessary provisional checks	
7.	**Isolated Column Footing** (2 Problems) 7.1 Select a problem for isolated pad footing and all necessary provisions of flexure, one way and two way shear, bearing, bond and cracking 7.2 Select a problem for isolated slopped footing and all necessary provisions of flexure, one way and two way shear, bearing, bond and cracking	
8.	**Miscellaneous Structures** (Sketches on A_4 size papers) 8.1 Details the reinforcement of One way simply supported slab, One way continuous slab, Two way simply supported slab with and without torsion steel, Short columns (Rectangular and Circular), Pad footing, Sloped footing 8.2 Detail the reinforcement for cantilever bus stop shed 8.3 Detail the reinforcement for Circular water tank with flexible base 8.4 Detail the reinforcement for Circular water tank with rigid base 8.5 Detail the reinforcement for Rectangular water tank vessel 8.6 Detail the reinforcement for Cantilever retaining wall 8.7 Detail the reinforcement for Counterfort type retaining wall 8.8 Detail the reinforcement for beam and intermediate column joint for ductility 8.9 Detail the reinforcement for beam and end column joint for ductility 8.10 Special confining reinforcement detail for beam and column ductility	
	Total	**28**

Note:

1. Student shall use uniform ruled pages for calculations for problems and blank A4 size papers for sketches.
2. Student shall furnish detailed drawings on three A2 size drawing sheets containing details of One way simply supported slab, One way continuous slab, Two way slab with and without torsion reinforcement, column and column footing.

Laboratory Experiences:

1. IS – 456:2000, IS – 875:1987, IS – 13920-1993
2. SP-16: Design Aids to IS – 456
3. SP-34: Reinforcement detailing

GUJARAT TECHNOLOGICAL UNIVERSITY

DIPLOMA IN CIVIL ENGINEERING
Semester – V

Subject Code **: 2350609**
Subject Name **: Water Resource Management Practice**

Sr. No.	Work Details	Hrs.
1	**Numerical Examples :** **(a) Hydrology** - Average rain-fall by all three methods - Determination of No. of rain gauge stations for given C.A. **(b) Runoff** - Compute run off by various methods for given catchment. (use formulae) - Calculate runoff by Index (w-index and ϕ-index) - Construct unit hydrograph from a given storm hydrograph (rainfall & stream flow data to be given) - Construct flood hydrograph from a given unit hydrograph for two or more periods of rainfall - Compute flood discharge from flood hydrograph. **(c) Advance Water Application Methods** - Compute Field Capacity - Compute Water Application Efficiencies - Compute water requirement of crop with effective root zone depth. **(d) Sea Water Intrusion** - Compute depth of interface & DRAW the sketch.	**10**

2	**Sketch work and Data collection :** **(a) Introduction:** - Collect the data regarding available W.R. of your district/state and Compare & Conclude **(b) Hydrology:** - Draw Hydrologic cycle Runoff - Draw unit hydrograph - Draw flood hydrograph **(c) Advance Water Application Methods:** - Classes & availability of soil water - Draw the graph of application of water V/S optimum plant growth - Layout of drip irrigation - Layout of sprinkler irrigation **(d) Groundwater:** - Draw diagram of Structures for various methods of artificial recharge **(e) Seawater Intrusion:** - Draw interface diagram and its stages **(f) Water Shed Management:** - Draw the sketches of - Rain water harvesting structures. - Roof top water harvesting in urban area. - Cheek dam - Nala / gully plugging - Percolation tank - Recharge well bore.	**Home work** Neat and clean with detailing, in sketch book)

3	**Designs:** **(a) Advance Water Applicationmethods:** - Enlist and briefly explain the Design Steps and parameters of Drip OR Sprinkler irrigation method - Enlist and briefly explain the Design Steps and parameters of surface drainage for given discharge **(b) Watershed Management:** - Compute Dimensions of check dam(gravity type) across a natural drain (Max. Height =3.0 m.) -Design of a Recharge Bore well.	10
4	**Visits :** **(a) Introduction:** -Visit to any W.R. Project . -Visit to W.R. department for collecting existing W.R. data of a district Hydrology - Visit of meteorological department to collect data, observe, and interpret rainfall data. (b) **Advance Water Application Methods:** - Visit the farm field where Drip OR Sprinkler irrigation method is implemented. **(c) Watershed Management:** - Visit to any rainwater harvesting/recharging structure	As per convenience of Staff and College .
5	**Seminar:** Select any one topic with the guidance of teacher & present the Seminar for at least 15 to 20 minutes, before teachers & students.	**8**
	Total	**28**

Note:

(1) Above visits should be arranged according to the convenience.
(2) Visits should be associated with the **detailed report** of the visited site.

Term Work :

1. Term work should also include certification by subject teacher and counter signed by HOD. With all above exercises sr.no. 1 to 5.
2. Viva is to be defended (along with term work) with practical examination by external and internal examiners .Practical examination will include followings:

Viva
Explanation of terminologies associated with Water Resources Management.

GUJARAT TECHNOLOGICAL UNIVERSITY
DIPLOMA IN CIVIL ENGINEERING
Semester – V

Subject Code **: 2350610**
Subject Name **: Project - I**

General Guidelines for the

Project – I & II (Diploma Engineering Semester 5th & 6th)

Each final year Project will be a Major Project. It will be divided into two Semesters of work and having total marks of 450 .

1) **Project – I: (Marks: 150) , Credits : 0 – 0 – 4**

Semester 5th, teaching scheme is 0-0-4, with 4 credits worth of 150 marks

(Out of 150 marks, 50 marks are to be given for Problem Definition. The college, through internal evaluation, will assess the Industry Defined problems, submitted by students during the third week of the fifth semester. The remaining 100 marks are for the practical exam, to be conducted by the University.)

2) **Project – II (Marks:300) , Credits : 0 – 0 – 12 or 0 – 0 – 14 (As specified in the programme structure)**

Semester 6th, teaching scheme for the project is 0-0-12 or 0-0-14,having 12 or 14 credits according to the branch. During the 6th semester, the project will carry 300 marks out of that 200 marks for External University Examination and 100 Marks for Internal Evaluation.

a) Each defined project needs to be from Industry/Research organization/Govt .organization /socio-technical/technology transfer/application or action research based issues and according to the need of time for solving real life problems.

b) Project identification should be based on "Shodh-Yatra" carried out by the students just after completion of Diploma Engg. Semester 4th Examination. It should be completed till the end of Second week of August-2011 (5th semester).

c) Problem definition for the project needs to be submitted by every student in THIRD week of the August (5th Semester) to his/her college.

d) Each definition will be evaluated during FOURTH week of August-11(5th semester) itself by the College.

e) Every College should send all the Problem Definitions in the specified format to GTU before **5th[h] September, 2011.**

Facilitation:

You may contact your Udisha Club Co-ordinator/Faculty/Department/Principal or Chairman/TPO of your Sankul for arranging "Shodh-Yatra" to the industries.

Guidelines for the students:

1. The students are required to identify their problem during break between fourth and fifth semester and they are required to follow all the rules and instructions issued by department, for safety and other requirements.

2. Each student or student group would work under the guidance of the Faculty from the College. In case any problem/other issue arises for the smooth progress of IDP discovery/Practical Training, it should be immediately brought to the notice of the Udisha Club Co-ordinator /Faculty /Department/Principal or Chairman of your Sankul.

3. The students are required to submit the Problem Definition (in the specified format) to their Head of the Department in their College latest during the THIRD week of August-2011

The project report shall be in the following format:

1. Topic and objectives
2. Selection of Site / Place
3. Collection of data, required survey work and Leveling

Learning Resources:

1) Civil Engineering Hand Books / Reference books.

2) Civil Engineering Magazines

3) Relevant IS / International codes.

4) PWD Handbooks

5) Material / Machinery / Product Catalogue.

LIST OF CIVIL ENGINEERNG PROJECTS CAN BE :

1) Khet Talavadi / Weir
2) Lift Irrigation scheme.
3) Micro irrigation –Drip / Sprinkler Irrigation.
4) Junction planning for city roads/planning for roads for congested area/parking Studies etc.
5) Water shed development of small catchments.
6) Rain water harvesting for domestic or public building.
7) Campus development.
8) Interior decoration.
9) Concrete mix design.
10) Bridge design.
11) Non Destructive Testing of any RCC building.
12) Solid waste management.
13) Hospital waste disposal.
14) Recycling of resources.
15) Manufacturing of Pre cast concrete products.
16) Pre stressed concrete.
17) Non conventional sources of energy.
18) Concrete pipe manufacturing unit.
19) Advance construction techniques.
20) Transfer of technology to villages.
21) Planning and design for residential colony, apartments or commercial complex.
22) Planning and design of water treatment plant for given data / site.
23) Planning and design of water supply scheme for given lay out / site.
24) Planning and design of sewage treatment plant for given data / site.
25) Planning and design of sanitary scheme for given lay out / site.

Any other similar project can be selected.

5th semester :Problem definition , prepare the draft project report. in so that can be submitted in 6th semester.: Survey and analysis and design along with Final report drawing etc.