TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

CURRICULUM OUTLINE

SIXTH SEMESTER (FULL TIME)

Subject Code	Subject Name	Hours Per Week			
		Theory	Drawing	Practical	Total
4010610	Construction Management	6	-	-	6
4010620	Estimation, Costing and Valuation	6	-	-	6
	Elective Theory–II	5	-	-	5
4010631	Sustainable and Green Building Technology				
4010632	Urban Planning and Development				
4010633	Water Resources Engineering				
4010640	Computer Applications in Civil Engineering Practice	-	-	5	5
	Elective Practical – II	-	-	4	4
4010651	Estimation and Costing Laboratory				
4010652	Highway Engineering Laboratory				
4010653	Water Resources Engineering Laboratory				
4010660	Project Work and Internship	-	-	6	6
Co-curriculur activities	Physical Education	-	-	-	2
	Library	-	-	-	1
	TOTAL	**17**	-	**15**	**35**

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

CURRICULUM OUTLINE

SIXTH SEMESTER (PART TIME)

Subject Code	Subject Name	Hours Per Week			
		Theory	Drawing	Practical	Total
4010410	Theory of Structures	5	-	-	5
4010620	Estimation, Costing and Valuation	4	-	-	4
4010540	Civil Engineering Drawing and CAD Practical – II	-	2	2	4
4010550	Environmental Engineering Laboratory	-	-	3	3
4010450	Material Testing Laboratory-II	-	-	2	2
	TOTAL	**9**	**2**	**7**	**18**

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

Course Name : 1010: DIPLOMA IN CIVIL ENGINEERING

Subject Code : 4010610

Semester : VI Semester

Subject Title : **CONSTRUCTION MANAGEMENT**

TEACHING AND SCHEME OF EXAMINATION

No of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	End Semester Examination	Total	
CONSTRUCTION MANAGEMENT	**6 Hrs.**	**96 Hrs.**	**25**	**100***	**100**	**3 Hrs.**

*Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit	Topics	Hours
I	Construction sector in India Feasibility study, planning of Civil Engineering Project and Contract Management	18
II	Construction Organisation and their Superintendence, Departmental procedure and Accounting	18
III	Scheduling and Time Management Resource Management	18
IV	Quality Management and Safety, Construction Disputes and their Settlement, Construction Labour and Legislation Ethics in Engineering	18
V	Entrepreneurship, Information Management and Computers and Financial Management	17
	Test & Model Exam	7
	Total	**96**

RATIONALE:

This is an applied engineering subject. The subject aims at imparting basic knowledge about construction planning and management, site organisation, construction labour, control of work progress, inspection and quality control, accidents and safety and heavy construction equipment.

A good percentage of diploma engineers start working as small contractors. They require the knowledge of contractorship, tendering and preparation of specifications for various types of jobs. Also diploma holders adopt valuers as their profession. To promote entrepreneurship amongst these engineers, knowledge and associated skills in the above field becomes essential. Hence this subject is of great importance to diploma engineers.

OBJECTIVES:

On completion of the course, the students will be able to:

- Describe the Role of government and construction agencies in the field of housing
- Describe the organization set up of PWD
- Mention the construction activity and fixing the construction agency.
- Describe the aspects of inspection and quality control methods
- Describe the banking system.
- Carryout the Feasibility study of a project
- Understand the process of Planning for civil engineering projects.
- Explain the significance of CPM and PERT Techniques.
- Understand the types of contract system
- Study the organization chart of a construction company.
- Understand the concepts and requirement of Entrepreneurship
- Perform the Computation of Net present value.

DETAILED SYLLABUS

4010610 - CONSTRUCTION MANAGEMENT

Contents: Theory

Unit	Name of the Topics	Hours
I	**CONSTRUCTION SECTOR IN INDIA** Construction Management – Definition- Need – Scope - Objectives and & functions - Role of government and private construction agencies – Types of construction sectors - Public and Private functions of construction management in national development - Construction practice:- the owner, consultant, and contractor - Duties and responsibilities - Various stages of a construction project.	5
	FEASIBILITY STUDY Study of necessity of project- Technical feasibility, Financial feasibility, Ecological feasibility, Resource feasibility, Recovery from the project, Economical Analysis -Building Economics – Preliminary studies- Analysis – valuation.	4
	PLANNING OF CIVIL ENGINEERING PROJECT Objectives of planning – Public Project - Preliminary planning – Design factors – Site utilization- – Reconnaissance survey – Preliminary survey – Analysis and plotting of data – Estimate : preliminary and detailed estimate – Project report – Land acquisition – Administrative approval – Technical sanction – Budget provision- Private project – Advantages of planning to client and engineer – limitations -Stages of planning by owner and contractor.	5
	1.4 CONTRACT MANAGEMENT Types of contracts - Contract documents - Contractual obligations - Specifications - Tender notice – Types - Tender documents - Earnest Money Deposit (EMD) and Security Deposits (SD) - Scrutiny and acceptance of a tender - Contract agreement – Contractual changes and termination of contract – Work order – Execution of agreement – Sub contract - Rights and duties of sub-contractor.	4

II	**2.1 CONSTRUCTION ORGANISATIONS AND THEIR SUPERINTENDENCE** Forms of business organizations - sole proprietorship – Partnership - Joint stock company,- Co-operative society,- and State enterprises- Advantages and Disadvantages -delegation of responsibility, personnel requirements and division of works – Decentralization - Construction supervision and Superintendence – Requirements and Responsibilities of Executives of the project – Qualities of Efficient construction Manager - Pay rolls and Records - Purchase and delivery of construction materials and equipments – Percentage completion report - Insurance record - Project office requirement - Organisation chart of a small / medium / large construction company (broad outline only). **2.2 DEPARTMENTAL PROCEDURE AND ACCOUNTING** Organisation of P.W.D. - Responsibilities of officers - Accounting procedure (administrative sanctions, technical sanctions, payment of bills) – Imprest and Temporary accounts – Cash book - Works register - Accounting for consumable materials - Record for tools and plants – Importance of M-book and its entries – Work charged establishment – Nominal Muster Roll (N.M.R) – Daily Labour Reports (D.L.R)	**10** **8**
III	**3.1 SCHEDULING AND TIME MANAGEMENT** Scheduling – Definition – Preparation of Schedule – uses and advantages – Classification of Schedules – Methods of scheduling – Bar chart – Job layout – Work breakdown chart(WBC) – Network for projects management – Activity – Event – Dummies – Basic assumptions in creating a network – Rules for developing networks – Fulckerson‟s rule for numbering the events - Critical Path Method Critical and Subcritical paths – Critical and Non critical activities/ events – Significance of critical path – Simple Problems - PERT – Time estimate – EST, EFT, LST, LFT - Earliest expected time – Latest allowable occurrence time -Floats - Slack. Standard deviation - Variance – Simple problems.	**10**

	3.2 RESOURCE MANAGEMENT Definition – Need for resource management – Optimum utilization of resources- finance, materials, machinery, human resources - Resource planning – Resource levelling and its objectives – Construction planning – Stages – Operations – Schedule –Crashing – Need for crashing an activity – Methods and tips for crashing – Time Vs Cost optimization curve – Cost slope and its significance in crashing – simple problem on resource levelling (Description only)	**8**
IV	**4.1 QUALITY MANAGEMENT AND SAFETY** Importance of quality – Elements of quality – Quality assurance techniques (inspection, testing, sampling) Importance of safety – Causes of accidents – Role of various parties (designer / employer / worker) in safety management – Benefits – Approaches to improve safety in construction. **4.2 CONSTRUCTION DISPUTES AND THEIR SETTLEMENT** Introduction – Development of disputes – Categories of disputes – Modes of settlements - Arbitration. **4.3 CONSTRUCTION LABOUR AND LEGISTATION** Need for legislation - Payment of wages Act - Factories Act – Contract labour(Regulation and abolition) Act – Employees Provident Fund (EPF) Act. **4.4 ETHICS IN ENGINEERING** Human values - Definition of Ethics - Engineering ethics - Engineering as a profession - Qualities of professional - Professional institutions - Code of ethics - Major ethical issues - Ethical judgement - Engineering and management decision - Value based ethics.	**6** **3** **4** **5**
V	**5.1 ENTREPRENEURSHIP** Definition – Role and Significance – Risks and Rewards – Concepts of Entrepreneurship – Profile and requirement of entrepreneur - Programmes existing in India – SISI, DIC, TANSIDCO – Funding and technical assistance to Entrepreneurship- NIDCO,ICICI,IDBI,IFCI,SFC.	**5**

	5.2 INFORMATION MANAGEMENT AND COMPUTERS Introduction – Definition of MIS – Out lines of MIS – Use of computers in construction industry – Requirements of MIS – A data base approach – Definition – Benefits - A data base approach to contractor‟s account and its advantage – Basic concepts of estimation – Project management and operations simulation packages – Construction automation and Robotics. **5.3 FINANCIAL MANAGEMENT** Elements of cash flow – Time value of money – Interest rate of capital – Present value computation - NPV method – IRR method – simple problems - Global banking culture - Types of banks –Activities of Banks – Corporate finance – Personal, retail and rural banking – Treasury management.	6 6
	Test & Model Exam	**7 Hrs.**

Reference Books

1. Sanga Reddy. S, “Construction Management”,Kumaran Publications, Coimbatore.
2. Sengupta.B, &H.Guha. “Construction Management and Planning ”,Tata McGraw Hill Publishing Company Ltd., New Delhi
3. Seetharaman. S, ” Construction Engineering & Management “,Umesh Publications, NaiSarak, New Delhi
4. Boyd.C. & Paulson Jr, “Computer Applications in Construction ”,Tata McGraw Hill Publishing company Ltd., New Delhi.
5. Rangwala.S.C.,”Construction of Structures and Management of Works” Charotar Publishing House, Anand 388 001, 2000
6. B C Punmia, “ Project Planning and control with PERT and CPM”, Laxmi Publications.

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

Course Name : 1010: DIPLOMA IN CIVIL ENGINEERING

Subject Code : 4010620

Semester : VI Semester

Subject Title : **ESTIMATION, COSTING AND VALUATION**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	End Semester Examination	Total	
ESTIMATION, COSTING AND VALUATION	**6 Hrs.**	**96 Hrs.**	**25**	**100***	**100**	**3 Hrs.**

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Topics and Allocation of Hours

Unit	Topics	Hours
I	Introduction, Approximate Estimates, Measurements and Material Requirement and Specifications	15
II	Preparation of Data and Rate Analysis	16
III	Detailed Estimate : Taking of quantities by Trade System	20
IV	Detailed Estimate : Taking of quantities by Group System	20
V	Report Writing, Valuation and Rent Calculation	18
	Test & Model Exam	7
	Total	**96**

RATIONALE:

Diploma holders in Civil Engineering are supposed to prepare material estimates and cost estimates for various Civil Engineering works namely; buildings, irrigation works, public health works and roads etc. In addition, they must have basic knowledge regarding analysis of rates and contracting principles of valuation. Therefore, this subject has great importance for diploma holders in Civil Engineering.

OBJECTIVES:

On completion of the course, the students will be able to:

- Learn the procedure for estimating and costing of Civil Engineering works. To write specifications for various materials and for different items of works.
- Perform rate analysis for various items of works using Standard data and Schedule of Rates.
- Prepare detailed estimate of quantities of various items of works
- Write Technical reports on the proposed projects
- Calculate the value of a building / property; to fix rent for a building adopting suitable method.

DETAILED SYLLABUS

4010620 - ESTIMATION, COSTING AND VALUATION

Contents: Theory

Unit	Name of the Topics	Hours
I	**1.1 INTRODUCTION:** Estimation – Definition of Estimate – Approximate estimate – Detailed estimate - Main estimate - Revised estimate – Supplementary estimate – Sub estimate – Annual maintenance estimate – Repair estimate – Complete estimate.	3
	APPROXIMATE ESTIMATES: Necessity – Types – Plinth area method – Cubical content method – Service unit method – Typical bay method – Simple problems on preliminary estimate of a building project.	3
	MEASUREMENTS & MATERIAL REQUIREMENTS: Units of measurements for works and materials – Degree of accuracy in measurements - Deduction for openings in masonry, plastering and white washing area – Painting co- efficient – out turn of works - working out of materials requirements – cement, sand, bricks, aggregates etc based on thumb rules for different works.	4
	SPECIFICATIONS: Specification – Necessity – Types of specifications – Essential requirements of specifications – Specification for various materials like Cement, Sand, Brick, Timber, Reinforcement Steel, Stone Aggregate, Water - Specifications for various items of works – General Specifications for a building - Culvert - Concrete Roads - Detailed specifications for works such as, earthwork excavation, foundation concrete, Reinforcement cement concrete in column, beam and slab - Weathering course - Steps involved in writing standard specifications.	5

II	**PREPARATION OF DATA** Data – Types – Main and sub data – Observed data – lead statement - Schedule of rates – Standard data book – Sundries – Lump sum provision – Preparation of data using standard data and schedule of rates. **RATE ANALYSIS:** Brick and stone masonry – Plain cement concrete in foundation – Cement concrete for flooring works - Weathering course – R.C.C works for slab, sunshade, beam and column – Partition wall – Form works for beams and slabs – Road works, WBM and surface dressing – White washing and painting works – A.C. sheet roofing – Apron and revetment works in canals – Wall plastering – Ceiling plastering – Pointing – Plumbing and sanitary works in buildings.	**4** **12**
III	**3.1 TRADE SYSTEM:** Introduction - Taking off Quantities: Systems – Trade system – Group system – Methods – Long wall and Short wall method – Centre line method – Preparation of data – Lump sum provision and contingencies – Quantity surveyor – Duties – Essential Qualities. **3.2 TAKING OFF QUANTITIES USING TRADE SYSTEM:** Prepare detailed estimate using Trade system and Take off quantities for all items of works in the following types of buildings: **i.** A small residential building with two rooms with RCC roof. **ii.** Industrial buildings with AC/GI sheet roof with steel trusses. **iii.** Community Hall with R C C columns and T- beams **iv.** Septic tank with dispersion trench / soak pit **v.** R.C.C slab culvert **vi.** Water bound Macadam Road	**2** **18**

IV	**4.1 GROUP SYSTEM:** Advantages of group system – Taking off and Recording Dimensions – Squaring Dimensions – Abstracting or Working up – Billing – Abbreviations. Dimension paper – Timesing, Dimension, Squaring, Descriptive column – Cancellation of Dimensions – Descriptions – Spacing of Dimensions – Order of taking off – Squaring the Dimensions - Method of Squaring – Checking the Squaring – Casting up the dimensions. Function of the Abstract – Order in the Abstract – Preparing the abstract – Casting and reducing the Abstract – Method of writing Bill – Checking the Bill. **TAKING OFF QUANTITIES USING GROUP SYSTEM:** Prepare detailed estimate using Group system and Take off quantities for all items of works in the following types of buildings: i. A single roomed building using Group system ii. A small residential building with two/three rooms with RCC roof.	**10** **10**
V	**5.1 REPORT WRITING:** Report writing – Points to be considered while writing a report – writing typical reports for works such as i. Buildings – Residential / Hospital / School ii. Laying a village road iii. Construction of a bridge iv. Water supply system for a village **5.2 VALUATION** Purpose of valuation – Types – Book value – Market value – Salvage value – Scrap value – Depreciation – Obsolescence – Sinking fund – Land valuation – Mortage & Lease – Problems on valuation – Annuity – Definition & types only. **5.3 RENT CALCULATION** Fixation of rent – Outgoing – Gross & Net income – Years" Purchase – Capital cost – Standard rent – Market rent – Economical rent – Problems on rent calculation.	**4** **8** **6**
	Test & Model Exam	**7 Hrs.**

Reference Books:

1. Rangawala, “Estimating & Costing” , Charotor Publishing;
2. N.A.Shaw, “Quantity Surveying & Valuation”, Khanna Publishers;
3. L.N.Dutta, “Estimating & Costing”, Dhanpat Rai & Sons
4. Bridie, “Estimating & Costing”
5. Civil Estimating, Casting and Valuation – Kalson Publication, Ludhiana.
6. Vazirani & Chandola,” Estimating and Costing” 2001.
7. IS:1200 - Methods of Measurement of Building and Civil Engineering works.

4010631 - SUSTAINABLE AND GREEN BUILDING TECHNOLOGY

Contents: Theory

Unit	Name of the Topics	Hours
I	**INTRODUCTION TO GREEN BUILDING AND DESIGN FEATURES** Definition of Green Building, Benefits of Green Building, Components/ features of Green Building, Site selection, Energy Efficiency, Water efficiency, Material Efficiency, Indoor Air Quality. Site selection strategies, Landscaping, building form, orientation, building envelope and fenestration, material and construction techniques, roofs, walls, fenestration and shaded finishes, advanced passive heating and cooling techniques, waste reduction during construction.	**15**
II	**ENERGY AUDIT AND ENVIRONMENTAL IMPACT ASSESSMENT (EIA)** **ENERGY AUDIT**: Meaning, Necessity, Procedures, Types, Energy Management Programs. **ENVIRONMENTAL IMPACT ASSESSMENT (EIA):** Introduction, EIA regulations, Steps in environmental impact assessment process, Benefits of EIA, Limitations of EIA, Environmental clearance for civil engineering projects.	**7** **8**
III	**ENERGY AND ENERGY CONSERVATION** **ENERGY:** Renewable Energy Resources: Solar Energy, Wind Energy, Ocean Energy, Hydro Energy, Biomass Energy. Non-renewable Energy Resources: Coal, Petroleum, Natural Gas, Nuclear Energy, Chemical Sources of Energy, Fuel Cells, Hydrogen, Biofuels. **ENERGY CONSERVATION** Introduction, Specific objectives, present scenario, Need of energy conservation, LEED India Rating System and Energy Efficiency.	**8** **7**

	Energy-saving houses, Green House, Passive house, Passive house construction, Low-energy house, Zero-energy house, Energy consulting, Energy efficiency:	
IV	**PRINCIPLES AND PLANNING OF GREEN BUILDING** Features: Salient features of Green Building, Environmental design (ED) strategies for building construction. Process: Improvement in environmental quality in civil structure Materials: Green building materials and products- Bamboo, Rice husk ash concrete, plastic bricks, Bagasse particle board, Insulated concrete forms. reuse of waste material-Plastic, rubber, Newspaper wood, Nontoxic paint, Green roofing. Housing modernization and management (building and construction safety, energy efficiency in housing, Property Refurbishment / Upgrade / Modernization / Renovation - Modular kitchens, bathrooms,	**14**
V	**RATING SYSTEM** Introduction to (LEED) criteria, Indian Green Building council (IGBC) Green rating, Green Rating for Integrated Habitat Assessment. (GRIHA) criteria Heating Ventilation Air Conditioning (HVAC) unit in green Building Functions of Government organization working for Energy conservation and Audit(ECA) - National Productivity council(NPC) Ministry of New and Renewable *Energy* (MNRE) Bureau of Energy efficiency (BEE) - BER (Building Energy Rating) - Certificates – Plumbing and Electrical to heating efficiency	**14**
	Test & Model Exam	**7 Hrs.**

Reference Books

1. Kibert, C.J., Sustainable construction: Green Building design and Delivery, John Wiley Hobouken, New Jersey.
2. Chauhan, D S Sreevasthava, S K., Non-conventional Energy Resources, New Age International Publishers, New Delhi.
3. O.P. Gupta, Energy Technology, Khanna Publishing House, New Delhi
4. Jagadeesh, K S, Reddy Venkatta Rama & Nanjunda Rao, K S., Alternative Building Materials and Technologies, New Age International Publishers, Delhi.
5. Sam Kubba., Handbook of Green Building Design and Construction, Butterworth-Heinemann.
6. Means R S, Green Building - Project Planning and Cost Estimating, John Wiley & Sons
7. Sharma K V, Venkataseshaiah P., Energy Management and Conservation, IK International.

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

Course Name **:** 1010: DIPLOMA IN CIVIL ENGINEERING

Subject Code **:** 4010632

Semester **:** VI Semester

Subject Title **: URBAN PLANNING AND DEVELOPMENT**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours/ Week	Hours/ Semester	Marks			Duration
			Internal Assessment	End Semester Examination	Total	
URBAN PLANNING AND DEVELOPMENT	5 Hrs.	80 Hrs.	25	100*	100	3 Hrs.

*Examinations will be conducted for 100 marks and it will be reduced to 75 Marks.

Topics and Allocation of Hours

Unit	Topics	Hours
I	Town planning Principles, Surveys and Zoning	15
II	Housing and Slums	15
III	Public Buildings, Parks, Play Grounds, Master Plan and Re-planning Existing Towns	15
IV	Urban Roads and Traffic Management	14
V	Building Bye-Laws and Miscellaneous Topics	14
	Test & Model Exam	7
	Total	**80**

RATIONALE:

Considerable employment opportunities are available in urban sector. This subject aims at imparting knowledge and skill in the Town Planning and surveys, urban roads and Traffic management, Master plan and Building bye laws which can be promoted for upgrading standards of life in urban areas.

OBJECTIVES:

On completion of the course, the students will be able to:

- Understand the principle of Town Planning and surveys.
- Know the requirements of housing and slum clearance.
- Learn the requirement of Public buildings, parks and play grounds.
- Understand the requirements and types of Urban roads and Traffic management
- Know the Importance of housing and slum clearance programmes
- Prepare Master plan and for Re-planning of existing Towns.
- Learn the Building bye laws and other miscellaneous topics.

DETAILED SYLLABUS

4010632 - URBAN PLANNING AND DEVELOPMENT

Contents: Theory

Unit	Name of the Topics	Hours
I	**1.1 TOWN PLANNING PRINCIPLES** General - Evolution of planning - Objects of town planning – Economic justification for town planning - Principles of Town planning - Necessity of town planning - Origin of towns - Growth of towns – Stages in town development - Personality of town - Distribution of land - Forms of planning - Site for an ideal town - Requirements of new towns - Planning of a modern town - Powers required for enforcement of Town planning scheme - Cost of Town planning - Present position of Town Planning in India.	7
	SURVEYS General – Necessity - Collection of Data - Types of surveys for planning a new town - Uses of surveys.	3
	ZONING Meaning of the term - Uses of land, objects and Principles of Zoning - Advantages of Zoning - Importance of Zoning - Aspects of Zoning – Transition Zone – Economy of Zoning – Special Economic Zone (SEZ) - Zoning powers - Maps for Zoning.	5
II	**HOUSING** General - Importance of housing - Demand for houses - Building site - Requirements of residential buildings -Classification of residential buildings - Design of residential areas - Rural Housing - Agencies for housing -Investment in housing - HUDCO – CIDCO - Housing problems in India.	7
	SLUMS General - Causes of slums - Characteristics of slums - Effects of	8

	slums - Slum clearance - Problems in removing slums - Improvement Works - Open plot scheme - Slum clearance and rehousing - Prevention of slum formation - Resources for slum clearance programmes - The Indian slums.	
III	**3.1 PUBLIC BUILDINGS** General – Suitable Location of Public Buildings – Classification of Public Buildings - Principles of design of public buildings - Town centres - Grouping of public buildings – Requirements of Public buildings – Green House– Civic aesthetics. **3.2 PARKS AND PLAY GROUNDS** General – Types of recreation - Necessity of open spaces - Location of urban green spaces - Classification of parks - Park systems - Park design – Finance for parks – Parkways – Playgrounds - Space standards - Landscape architecture. **3.3 MASTER PLAN** General – Objects – Necessity - Factors to be considered - Data to be collected - Drawings to be prepared - Features of master plan - Planning standards – Report – Stages of preparation – Method of Execution - Conclusion. **3.4 RE-PLANNING EXISTING TOWNS** General - Objects of re-planning – Analyzing the defects of existing towns - Data to be collected –difficulties in Master Planning existing towns / cities - Urban renewal projects- merging of suburban areas – Decentralization - Satellite Towns – Smart cities- definition and features- Surface drains – Refuses of Towns – Refuse disposal methods.	**3** **4** **4** **4**
IV	**4.1 URBAN ROADS** General - Objects - Requirements of good city road – Factors to be considered – Classification of urban roads – Types of street systems - Through and By-pass roads – Outer and inner ring roads - Expressways – Freeways – Precincts - Road aesthetics.	**6**

	4.2 TRAFFIC MANAGEMENT General - Object – Traffic survey - Traffic congestion – Traffic control - Traffic diversion - Road junction –Parking - Traffic capacity of road - One way traffic - Road traffic problems – Use of islands and flyovers at crossings – causes of road accidents - Traffic signal – Advantages and disadvantages of Automatic Light signals – Road sign – Road marking - Name boards of streets - Direction boards - Street lighting in a town – Traffic problem of existing towns – Peculiarities of traffic.	**8**
V	**5.1 BUILDING BYE -LAWS** General - Objects of bye-laws - Importance of bye-laws - Function of local authority - Responsibility of owner - Applicability of bye-laws - Set-backs to buildings – Necessity of setbacks - Light plane – Plot coverage - Floor space index- Maximum Height of buildings - Off-street parking – Fire protection - Minimum width of streets and plot sizes – Some other terms - Principles underlying in framing building bye- laws – Building bye-laws for residential area of a typical town planning scheme – Building bye-laws for other types of buildings -Development control rules - General rules of metropolitan Area - CMDA rules. **5.2 MISCELLANEOUS TOPICS** Airports – Location - size - Noise control - Parts of an airports - Betterment and compensation – City blocks –Conurbations - Cul-de-sac streets - Focal point - Green belt - Public utility services - Rapid transit –Remote sensing application – Urban planning using remote sensing – Site suitability analysis Location of Bus Terminus, Whole sale markets, Exhibition Centres etc., – Location for water/sewage treatment plants, location for waste disposal etc.,– Transportation planning.	**8** **6**
	Test & Model Exam	**7 Hrs.**

Reference Books

1. Town Planning - S.C. Rangwala,: Charotar Publisher (2011), Publisher
2. K.S.Rangwala and P.S.Rangwala,. „Town Planning ",Charotar Publishing House,15th Edition,1999.
3. Michael Hord, R. Remote sensing methods and application, John Wiley and Sons, NewYork, 1986.
4. National Building Code of India- Part-III.(2005).
5. Municipal and Panchayat bye-laws, CMDA Rules and Corporation bye-laws.
6. KA. Ramegowda, Urban and regional planning , University of Mysore
7. Principles and practice of town and country planning Lewis B. Keeble, Estates Gazette, University of Michigan, 2010

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

Course Name : 1010: DIPLOMA IN CIVIL ENGINEERING

Subject Code : 4010633

Semester : VI Semester

Subject Title : **WATER RESOURCES ENGINEERING**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	End Semester Examination	Total	
WATER RESOURCES MANAGEMENT	**5 Hrs.**	**80 Hrs.**	**25**	**100***	**100**	**3 Hrs.**

*Examinations will be conducted for 100 marks and it will be reduced to 75 Marks.

Topics and Allocation of Hours

Unit	Topics	Hours
I	Introduction and Hydrology	15
II	Ground Water and Management of Ground Water	15
III	Rivers and River Training Works, Storage Works	15
IV	Distribution Works and Management of Canal Irrigation	14
V	Water Shed Management and Water Harvesting and Recycling	14
	Test & Model Exam	7
	Total	**80**

RATIONALE:

Diploma holders in civil engineering have to supervise the construction, repair and maintenance of canals, head works, river training works, cross drainage works, regulatory and other works. Some of the diploma holders are also engaged for preventing water logging and irrigation by tubewells. This subject imparts knowledge regarding hydrology, flow irrigation – storage and distribution system, constructional features of head works, river training works, cross drainage works, causes and prevention of water logging and construction of tube wells.

OBJECTIVES:

On completion of the course, the students will be able to:

- Understand water resource potential in India and need for water resource management.
- Understand the components of hydrological cycle and hydrograph.
- Understand the occurrence of ground water and ground water explorationmethods.
- Understand the ground water basin management concept.
- Learn the classification of rivers and river training works.
- Know the different types of storage works and dam structures.
- Understand the distribution system of canals and management of canalirrigation.
- Understand the concept of water shed management including GISapproach.
- Learn the types of detention basins and reclamation of water logged lands.

DETAILED SYLLABUS

4010633 - WATER RESOURCES ENGINEERING

Contents: Theory

Unit	Name of the Topics	Hours
I	**INTRODUCTION** Water resources – world water inventory - Importance of water resources - Necessity for conservation and development of water resources – water resources of India - water resources management - purpose - factors involved in water resources management.	7
	HYDROLOGY Introduction – Definition - Application of Hydrology in engineering - Hydrological cycle - Precipitation – forms of Precipitation - measurements of rain fall - Rain gauge - types of rain gauges - rain gauge network – mean rainfall over a drainage basin – methods - Radar and Satellite Measurements of rainfall - runoff - Estimation of runoff - losses – Hydrograph – Unit Hydrograph - uses	8
II	**GROUND WATER** Ground water resources- zones of Ground water-Aquifer - types-terms used -porosity, permeability, yield, specific yield, specific retention, coefficient of storage, specific capacity – Darcy‟s law- measurement of yield of well -pumping test- recuperation test- ground water exploration -geo physical methods -Electrical resistivity method – seismic resistivity method- logs.	8
	MANAGEMENT OF GROUND WATER Concept of basin management - Ground water basin investigations - data collection and field work -mining yield - perennial yield - salt balance - basin management by conjunctive use - artificial recharge of Ground water - recharge methods.	7

III	**RIVERS AND RIVER TRAINING WORKS** Classification of river - Major rivers in India and Tamil Nadu -Inter linking of rivers in India and its importance – flood - flood forecasting - flood control in India. River training - objectives of river training - classification of river training - methods of river training – levees - guide banks – spurs – types - artificial cut-offs – launching apron - pitching of banks - pitched islands - miscellaneous methods. **STORAGE WORKS** Surface storage - purpose of surface storage – tanks – types - tank weirs – tank outlet – reservoirs – types - storage capacity of reservoir - methods of determination of storage capacity of reservoir – reservoir losses – dams - classification of dams - selection of dam site - Earth dams – types - methods of construction- causes of failure of earth dam - remedial measures – spillway - types - spillway crest gates- types – sluiceway - types.	**7** **8**
IV	**4.1 DISTRIBUTION WORKS** Irrigation Canal - Typical cross section of canal - components of canal section - classification of canal -alignment of canal - canal head works – types - components of diversion head works - cross drainage works – types - canal losses - lining of canal – necessity - types of lining. **4.2 MANAGEMENT OF CANAL IRRIGATION** Canal irrigation system - Need for canal irrigation management - objectives of canal irrigation management - methods of improvingcanal irrigation management - cropping pattern - need for crop rotation - crop water requirement - water delivery system - irrigation scheduling - frequency of irrigation - optimum use of irrigation water - irrigation efficiencies - conservation of water on the field - farmer‟s participation - irrigation manager.	**7** **7**

V	**WATER SHED MANAGEMENT** Water shed - classification of water sheds - integrated approach for water shed management - role of remote sensing and GIS in water shed management - soil and water conservation – Necessity - soil erosion – causes - effects – remedial measures against erosion - contour bunding - strip cropping - bench terracing – check dams - vegetated water way – afforestation - crop residue - land drainage - surface drains - sub surface drains. **WATER HARVESTING AND RECYCLING** water harvesting - runoff collection - onsite detention basin - ponds - types - Seepage control – methods -evaporation control - Recycling of harvested water - waste water recharge for reuse – methods -water logging-remedial measures-soil reclamation.	**8** **6**
	Test & Model exam	**7 Hrs.**

Reference Books :

1. Santhosh Kumar Garg, Hydrology and Water Resources Engineering, Khanna Publishers, Delhi.
2. G.L.Asawa, Irrigation and Water Resources Engineering, New ageinternational(p) Ltd., Publishers, New Delhi.
3. David Keith Todd., Ground water Hydrology,John wiley &sons,Singapore.
4. Dilip Kumar Majumdar, Irrigation Water Management - Principles and Practice, PHI Pvt.Ltd. NewDelhi-1.
5. Madan Mohan Das & Mimi Das Saikia, Irrigation and water power Engineering,PHI learning pvt. Ltd., NewDelhi-1
6. K.Subramanya, Engineering hydrology, Tata McGraw-Hill publishing company ltd., New Delhi.

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

Course Name : 1010 : DIPLOMA IN CIVIL ENGINEERING

Subject Code : 4010640

Semester : VI Semester

Subject Title : **COMPUTER APPLICATIONS IN CIVIL ENGINEERING PRACTICE**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hour / Week	Hours / Semester	Marks			Duration
			Internal Assessment	End Semester Examination	Total	
COMPUTER APPLICATIONS IN CIVIL ENGINEERING PRACTICE	**5 Hrs.**	**80 Hrs.**	**25**	**100***	**100**	**3 Hrs.**

*Examinations will be conducted for 100 marks and it will be reduced to 75 marks

RATIONALE:

Computers play a very vital role in present day life, more so, in all the professional life of engineering. In order to enable the students use the computers effectively in problem solving, this course offers various engineering applications of computers in civil engineering.

OBJECTIVES:

After completing this course, students will be able to:

- Prepare the estimate and abstract estimate using Electronics Spread sheet software.
- Know the RCC detailihng using software.
- Analyse the simple frame structure using software.
- Use the Construction Project Management Software to develop the CPM/PERT network.
- Practice the Aerial Map using GIS software.

DETAILED SYLLABUS

4010640 - COMPUTER APPLICATIONS IN CIVIL ENGINEERING PRACTICE

Contents: Practical **Total: 80 Hrs.**

PART - A

LIST OF EXPERIMENTS

I ELECTRONIC SPREAD SHEET USING SOFTWARE **20 Hours**

Solving problems involving estimation, analysis and design using any one of the available packages mentioned below or any other suitable packages for the following exercises.

1. Prepare the Estimate sheet with given data (provide all the measurement details) and calculate the quantity using formula bar.
2. Prepare the Abstract sheet for the given data and calculate Amount and Total Amount using Formula bar (Use separate column for rates and units)
3. Design and Analysis problems
4. Calculate Area and Elongation using Formula bar
5. Calculate Effective depth„d‟ and Area of Steel „A_{st} ‟using Formula Bar for given singly reinforced section.
6. For given dimension of Masonry/R.C.C Dam ie. top width, bottom width, height of Dam , height of water, Specific weight of masonry/R.C.C. , Sp.wt of Water etc,. Find the base pressure and check the stability of the dam.
7. Finding centre of gravity; I_{xx} and I_{YY} of I, L, T and channel sections.

Note : In addition to the above, similar exercises may be given for practice

Commercial Software	Similar Open source	Download Link
Microsoft Office	Open office	http://download.openoffice.org/
	LibreOffice	http://www.libreoffice.org/

PART B

II RCC DETAILING USING SOFTWARE 20 Hours

Generation of detailed drawings for the given specification and Preparation of Bar Bending schedule using any one of the software packages for the following exercises.

Cross section and longitudinal section of:

1. Continuous one way slab (with three equal spans)
2. Simply supported two-way slab
3. Restrained two - way slab
4. Singly reinforced rectangular beam
5. Doubly reinforced continuous rectangular beam with two equal span
6. Dog-legged staircase
7. R.C.C Column with square Isolated footing

III RCC STRUCTURES - ANALYSIS USING SOFTWARE 20 Hours

1. Carry out the analysis and design of simple RCC structures using any one of the available packages like STAADPRO, ETAB, CADS3D or any other suitable packages.

IV. CONSTRUCTION PROJECT MANAGEMENT USING SOFTWARE 12 Hours

1. Develop the CPM / PERT Network for the proposed simple building project using any one of the available packages mentioned below or any other suitable packages.

Commercial Software	Similar Open source	Download Link
Microsoft Project	GANTT PROJECT	http://www.ganttproject.biz/

V. DRAWING MAPS USING GIS SOFTWARE 8 Hours

(Demonstration and Practice only)

1. Develop Aerial map of given area using **any one** of the available packages mentioned below or any other suitable packages.

Commercial Software	Similar Open source	Download Link
ARCGIS	QGIS	http://www.qgis.org/en/site/
	GRASS GIS	http://grass.osgeo.org/

SCHEME OF EXAMINATION:

In the examination the students have to be given two experiments one from Part A and another from Part-B.

DETAILED ALLOCATION OF MARKS

S.No	Description	Part - A Max.Marks (40)	Part - B Max.Marks (55)
1.	Procedure	5	5
2	Tabulation and Observation	15	25
3	Calculations	10	15
4	Sketch / Graph	5	5
5	Accuracy of result	5	5
	Viva Voce	5	
	Total	**100**	

LIST OF EQUIPMENTS (for a batch of 30 students):

S.No.	List of the Equipments	Quantity Required
1.	Computers	30 Nos.
2.	Suitable Software for Electronic Spread Sheet	30 Users
3.	Suitable RCC Detailing Software	30 Users
4.	Suitable Structural Analysis Software	30 Users
5.	Suitable Project Management Software	30 Users
6.	Suitable GIS Software	30 Users

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

Course Name : 1010: DIPLOMA IN CIVIL ENGINEERING

Subject Code : 4010651

Semester : VI Semester

Subject Title : **ESTIMATION AND COSTING LABORATORY**

TEACHING AND SCHEME OF EXAMINATION:

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	End Semester Examination	Total	
ESTIMATION AND COSTING LABORATORY	4 Hrs.	64 Hrs.	25	100*	100	3 Hrs.

*Examinations will be conducted for 100 marks and it will be reduced to 75 marks

RATIONALE:

EstimatIon and Costing Lab deals with the procedure for estimating and costing of Civil Engineering works and to perform rate analysis for different items associated with construction projects.

OBJECTIVES:

After completing this course, students will be able to:

- Select modes of measurements for different items of works.
- Prepare detailed estimate of a civil engineering works.
- Use relevant software for estimating the quantities and cost of items of works.
- Justify rate for given items of work using rate analysis techniques

DETAILED SYLLABUS

4010651 - ESTIMATION AND COSTING LABORATORY

Contents: Practical Total: 64 Hrs.

List of Experiments

1. Prepare the list of items to be executed with units for detailed estimate of a given structure from the given drawing.
2. Prepare a report on market rates for given material, labour wages, hire charges of tools & equipments required to construct the given structure as mentioned in at Serial number 1 above.
3. Recording in Measurement Book (MB) for any four items
4. Prepare bill of quantities of given item from actual measurements. (any four items).
5. Prepare approximate estimate for the given engineering works.
6. Calculate the quantity of items of work from the given set of drawings using standard measurement sheet for load bearing residential structure using description of item from (1BHK Building with staircase).
7. Prepare detailed estimate from the given set of drawings using “standard measurement and abstract format” for RCC framed structure using description of item (G+1 Building)
8. Calculate the reinforcement quantities from the given set of drawings for a room size of 3 m x 4m with bar bending schedule.
9. Prepare detailed estimate of bitumen road of one kilometre length from the given drawing.
10. Prepare detailed estimate of small Septic tank from the given set of drawings.
11. Prepare bar bending schedule for the given singly reinforced and doubly reinforced beams
12. Prepare bar bending schedule for the given continuous beam
13. Prepare bar bending schedule for the given one way slab
14. Prepare bar bending schedule for the given two way slab
15. Prepare bar bending schedule for the given square column and square footing

Reference Books:

1. Datta, B.N., Estimating and Costing in Civil engineering, UBS Publishers Distributors
2. Rangwala,S.C., Estimating and Costing, Charotar Publishing House, Anand.
3. Birdie,G.S., Estimating and Costing, Dhanpat Rai Publishing Company(P) Ltd. Delhi.
4. Patil,B.S., Civil Engineering Contracts and Estimates, Orient Longman, Mumbai.. Monojit Chakraborti, Kolkata.
5. PWD Schedule of Rates.

4010651 - ESTIMATION AND COSTING LABORATORY

DETAILED ALLOCATION OF MARKS

S.No	Description	Marks
1.	Tabulation and Observation	50
2.	Calculations	35
3.	Accuracy of result	10
4.	Viva-Voce	5
	Total	**100**

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

Course Name : 1010: DIPLOMA IN CIVIL ENGINEERING

Subject Code : 4010652

Semester : VI Semester

Subject Title : **HIGHWAY ENGINEERING LABORATORY**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hour/ Week	Hours / Semester	Marks			Duration
			Internal Assessment	End Semester Examination	Total	
HIGHWAY ENGINEERING LABORATORY	4 Hrs.	64 Hrs.	25	100 *	100	3 Hrs.

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

RATIONALE:

In this course, the students learn about testing of aggregates, bitumen and preparing a report about roadworks.

OBJECTIVES:

After the completion of this course, the students will be able to:

- Identify the types of roads as per IRC recommendations.
- Understand the geometrical design features of different highways.
- Perform different tests on road materials.

DETAILED SYLLABUS

4010652 - HIGHWAY ENGINEERING LABORATORY

Contents: Practical Total:**64 Hours**

LIST OF EXPERIMENTS

Exercises:

1. Draw the sketches showing standard cross sections of Expressways, Freeways, NH/SH, MDR/ODR
2. Flakiness and Elongation Index of aggregates.
3. Angularity Number of aggregates.
4. Los Angeles Abrasion test
5. Softening point test of bitumen.
6. Penetration test of bitumen.
7. Ductility test of Bitumen.
8. Study of dense Bituminous macadam design
9. Visit the constructed road for visual inspection to identify defects and suggest remedial measures.
10. Prepare the photographic report containing details for exercise No.9
11. Visit the hill road constructed site to understand its components.
12. Prepare the photographic report containing details for exercise No.11
13. Visit the road of any one type (flexible or rigid) to know the drainage condition.

Reference Books:

1. L.R. Kadiyali, Transportation Engineering, Khanna Book Publishing Co., New Delhi (ISBN:978-93-82609-858) Edition 2018
2. Khanna S.K., Justo, C E G and Veeraragavan, A., Highway Engineering, Nem Chand and Brothers,Roorkee.
3. Arora, N. L., Transportation Engineering, Khanna Publishers, Delhi.
4. Saxena S C and Arora S P, A Textbook of Railway Engineering, Dhanpat Rai Publication.
5. Birdi, Ahuja, Road, Railways, Bridge and Tunnel Engg , Standard Book House, Delhi.
6. Sharma, S.K., Principles, Practice and Design of Highway Engineering,, S. Chand
7. Duggal, Ajay K. and Puri, V. P., Laboratory Manual in Highway Engineering, New Age International (P) Limited, Publishers, New Delhi.
8. Subramanian, K.P., Highway, Railway, Airport and Harbour Engineering, Scitech Publications, Hyderabad.

4010652 - HIGHWAY ENGINEERING LABORATORY

DETAILED ALLOCATION OF MARKS

S.No	Description	Marks
1.	Procedure	15
2.	Tabulation and Observation	40
3.	Calculations	30
4.	Accuracy of result	10
5.	Viva-Voce	5
	Total	**100**

LIST OF EQUIPMENTS (for a batch of 30 students):

S. NO.	LIST OF EQUIPMENTS	QUANTITY REQUIRED
1.	Sieve test for coarse aggregate made of brace 200mm dia complete set	2 sets
2.	Length gauge and Thickness gauge	2 Nos.
3.	Los Angeles Abrasion testing equipment	1 no.
4.	Viscometer	1 no.
5.	Ductility testing machine, briquette mould, water bath	1 No.
6.	Flash and Fire point apparatus	1 set
7.	Bitumen Penetro meter	1 No.
8.	Weigh balance-digital upto 10kg capacity with 1gm accuracy battery backup	1No

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

Course Name : 1010: DIPLOMA IN CIVIL ENGINEERING

Subject Code : 4010653

Semester : VI Semester

Subject Title : **WATER RESOURCES ENGINEERING LABORATORY**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hour/ Week	Hours / Semester	Marks			Duration
			Internal Assessment	End Semester Examination	Total	
WATER RESOURCES ENGINEERING LABORATORY	**4 Hrs.**	**64 Hrs.**	**25**	**100***	**100**	**3 Hrs.**

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks

RATIONALE:

Diploma holders in civil engineering have to supervise the construction, repair and maintenance of canals, head works, river training works, cross drainage works, regulatory and other works. Some of the diploma holders are also engaged for preventing water logging and irrigation by tubewells. This subject imparts knowledge regarding hydrology, flow irrigation – storage and distribution system, constructional features of head works, river training works, cross drainage works, causes and prevention of water logging and construction of tube wells.

OBJECTIVES:

The following are the objectives of this course:

- To learn estimation of hydrological parameters.
- To understand water demand of crops and provisions to meet the same.
- To know planning of reservoirs and dams.
- To design irrigation projects, canals and other diversion works.

DETAILED SYLLABUS

4010653 - WATER RESOURCES ENGINEERING LABORATORY

Contents: Practical **Total : 64 Hrs.**

LIST OF EXPERIMENTS

EXERCISES

1. Calculate average rainfall for the given area using arithmetic mean method.
2. Calculate average rainfall for the given area using isohyetal, Theissen polygon method.
3. Delineation of contributory area for the given outlet from the given topo-sheet.
4. Estimate crop water requirement for the given data.
5. Estimate capacity of the canal for the given data.
6. Calculate reservoir capacity from the given data.
7. Calculate control levels for the given data for a given reservoir.
8. Draw a labeled sketch of the given masonry/earthen dam section.
9. Draw the theoretical and practical profile of the given gravity dam section.
10. Prepare a presentation on the technical details of any one micro or minor irrigation scheme.
11. Prepare a model of any irrigation structure using suitable material.
12. Prepare a maintenance report for any major/minor irrigation project site in the vicinity of your area, based on field visit.
13. Prepare summary of the technical details of any existing water resource project in the vicinity of your area.
14. Draw a labeled sketch of the given diversion head works and Cross Drainage works.
15. Design a canal section for the given conditions with estimation of the quantity of material required for lining.

Reference Books

1. Punmia, B.C., Pande, B, Lal, Irrigation and water power engineering, Laxmi Publications
2. Subramanayan, Engineering Hydrology, McGraw Hill.
3. Mutreja K N, Applied Hydrology, McGraw Hill
4. Sharma, R.K. and Sharma, T.K., Irrigation Engineering, S.Chand and Company
5. Basak, N.N., Irrigation Engineering, McGraw Hill Education India Pvt. Ltd.
6. Asawa, G.L., Irrigation and water resource Engineering, New Age International(P)
7. Dahigaonkar, J.G., Irrigation Engineering, Asian Book Pvt. Ltd., New Delhi.
8. Garg, S K, Irrigation and Hydraulic structures, Khanna Publishers, Delhi.
9. Priyani V.B., Irrigation Engineering, Charotar Book Stall, Anand.

DETAILED ALLOCATION OF MARKS

S.No	Description	Marks
1.	Tabulation and Observation/ Procedure	35
2.	Calculations	45
3.	Accuracy of result	15
4.	Viva-Voce	5
	Total	**100**

TAMILNADU GOVERNMENT POLYTECHNIC COLLEGE, (Autonomous), MADURAI- 11

N - 20 SCHEME

DIPLOMA IN CIVIL ENGINEERING

(Implemented from the Academic Year 2021 – 2022 onwards)

Course Name : 1010: DIPLOMA IN CIVIL ENGINEERING

Subject Code : 4010660

Semester : VI Semester

Subject Title : **PROJECT WORK AND INTERNSHIP**

TEACHING AND SCHEME OF EXAMINATION

No. of weeks per semester: 16 weeks

Subject	Instructions		Examination			
	Hours / Week	Hours / Semester	Marks			Duration
			Internal Assessment	End Semester Examination	Total	
PROJECT WORK AND INTERNSHIP	**6 Hrs.**	**96 Hrs.**	**25**	**100***	**100**	**3 Hrs.**

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

Minimum marks for Pass is 50 out of which minimum 50 marks should be obtained out of 100 marks in the Autonomous Examination alone.

RATIONALE:

The students of all the Diploma Courses have to do a Project Work as part of the Curriculum and in partial fulfillment for the award of Diploma by the State Board of Technical Education and Training, Tamil Nadu. In order to encourage students to do worthwhile and innovative projects, every year prizes are awarded for the best three projects i.e. institution wise, region wise and state wise.

As far as possible, the students should be given live project problems with a view to:

i) Develop understanding regarding the size and scale of operations and nature of field work in which students are going to play their role after completing the courses of study.

ii) Develop understanding of subject based knowledge given in the classroom in the context of its application at work places.

iii) Develop first and experience and confidence amongst the students to enable them to use and apply polytechnic/institute based knowledge and skills to solve practical problems of the world of work.

iv) Develop special skills and abilities like interpersonal skills, communication skills, attitudes and values

OBJECTIVES:

The objective of the project work is to enable the students to work in convenient groups of not more than six members in a group on a project involving theoretical and experimental studies related to Civil Engineering. Every Project Work shall have a Guide who is a member of the faculty of Civil Engineering of the college. The hours allotted for this course shall be utilized by the students to receive directions from the Guide, on library reading, laboratory work, computer analysis or field work and also to present in periodical seminars the progress made in the project. Each student shall finally produce a comprehensive report covering background information, literature Survey, problem statement, Project work details and conclusions.

This experience of project work shall help the student in expanding his / her knowledge base and also provide opportunity to utilise the creative ability and inference capability.

- Implement the theoretical and practical knowledge gained through the curriculum into an application suitable for a real practical working environment preferably in an industrial environment
- Get exposure on industrial environment and its work ethics.
- Understand what entrepreneurship is and how to become an entrepreneur.
- Learn and understand the gap between the technological knowledge acquired through curriculum and the actual industrial need and to compensate it by acquiring additional knowledge as required.
- Carry out cooperative learning through synchronous guided discussions within the class in key dates, asynchronous document sharing and discussions, as well as to prepare collaborative edition of the final project report.

WORKS INVOLVED IN PROJECT WORK:

Collection of Data from various Journals and Civil Engineering Magazines about the list of Projects given below- Select a suitable project based on the data collected and available resources in your locality -Surveyed Site Plan – Site particulars – Preparation of Architectural Drawings – soil type in the location – Specification for materials & construction procedure - Structural design – Preparation of Detailed Estimate, Data as per Current schedule of Rates - Abstract Estimate – Structural Drawings – Preparation of Report about the project.

IMPORTANT DOCUMENTS TO BE REFERRED FOR THE ABOVE ACTIVITIES:

S.No	Activity	Reference
1.	Preparation of Architectural Drawings	1. Building Regulations of Locality 2. National Building Code of India, etc
2.	Structural design, Concrete Reinforcement, Steel etc.	1.Relevant IS code for Masonry, Structures 2. IS 456 for Reinforced Cement Concrete 3. Hand book on Concrete Reinforcement and Detailing (SP-34)
3.	Specification of material and work procedure as per State Govt. Highways, Central Govt. Railways, etc	1. Construction procedure by organization, viz. PWD 2. Construction procedure by organization viz. CPWD 3. Specification by Architect etc.,

The Project work must be reviewed twice in the same semester. The project work is approved during the V semester by the properly constituted committee with guidelines.

a) INTERNAL ASSESSMENT:

The internal assessment should be calculated based on the review of the progress of the work done by the student peridocially as follows:

Details of assessment	**Period of assessment**	**Max.Marks**
First Review	6th Week	10
Second Review	12th week	10
Attendance	Entire semester	5
Total		**25**

b) Allocation of Marks for Project Work and Intership in Autonomous Examinations:

Details of Mark allocation	Max. Marks
Demostration/Presentation	25
Report	25
Viva Voce	30
Internship report	20
Total	**100***

*Examination will be conducted for 100 marks and will be converted to 75 marks.

c) Internship Report:

The internship training for a period of two weeks shall be undergone by every candidate at the end of IV / V semester during vacation. The certificate shall be produced along with the internship report for evaluation. The evaluation of internship training shall be done along with final year “Project Work & Internship" for 20 marks. The internship shall be undertaken in any industry / Government or Private certified agencies which are in social sector / Govt. Skill Centres / Institutions / Schemes.

A neatly prepared PROJECT REPORT as per the format has to be submitted by individual student during the Project Work & Internship Autonomous examination.

LIST OF SUGGESTED PROJECTS

- **COMPARATIVE STUDY**

  Conventional and Composite concrete mixtures Light weight construction materials

  Prefabricated and R.C.C. Structures

  Cost and construction procedures for steel and R.C.C. Structures

  Cost and Construction procedures for Prestressed and R.C.C. Structures

- **ADMIXTURES**

  Economy of using flyash in concete

- **MIX DESIGN**

  Comparative study of mix design by different methods

- **STUDY OF SPECIAL TYPES OF CONCRETE IN CONSTRUCTION BY EXPERIMENTS**
  - Bamboo as a reinforcing material
  - Baggase ash concrete
  - Flyash concrete
  - Concrete with Natural vegetative materials
  - Concrete using Plastic waste
  - Concrete using Steel slag
  - Concrete using factory wastes
  - Self Compacting concrete, Fibre reinforced concrete, Ferro cement products,

- **PAPER PROJECTS**

- Residential Houses, Primary Health center, School Buildings, Guest House
- Panchayat Union Office Building, Bank Building
- Post Office Building, College Building, Hospital Building, Hotel Building, Hostel Building, Factory Building, Auditorium, Shopping Centre, Community Hall, Theatre
- Market Building, Multistoried Car park, Rural Bus Stand , Stadium
- Swimming Pool
- Over head tank for a village, New village road with culvert, Small Bridge
- Plate girder bridge
- Septic Tank for a Colony
- Other Civil Engineering related structures

- **ENVIRONMENTAL MANAGEMENT PROJECTS**
  - Treatment of Wastewater and recirculation for a Colony.
  - Solid waste management in a Colony.
  - Hydrological data Collection for a river basin/water shed Industrial effluent Collection and analysis .
- **MISCELLANEOUS**
  - Rain water Harvesting system for buildings
  - Rain water Harvesting system for a small colony
  - Low cost Housing techniques
  - Rehabilitation of structures

FORMAT FOR PREPARATION OF PROJECT REPORT

1. ARRANGEMENT OF CONTENTS:

The sequence in which the project report material should be arranged and bound should be as follows:

1. Cover Page & Title Page
2. Bonafide Certificate
3. Abstract
4. Table of Contents
5. List of Tables
6. List of Figures
7. List of Symbols, Abbreviations and Nomenclature
8. Chapters
9. Appendices
10. References

The table and figures shall be introduced in the appropriate places.

2. PAGE DIMENSION AND BINDING SPECIFICATIONS:

The dimension of the project report should be in A4 size. The project report should be bound using flexible cover of the thick white art paper. The cover should be **printed in black letters** and the text for printing should be identical.

3. PREPARATION OF FORMAT:

Cover Page & Title Page – A specimen copy of the Cover page & Title page of the project report are given in **Appendix 1.**

Bonafide Certificate – The Bonafide Certificate shall be in double line spacing using Font Style Times New Roman and Font Size 14, as per the format in **Appendix 2.**

The certificate shall carry the guide‟s signature and shall be followed by the guide‟s name, academic designation (not any other responsibilities of administrative nature), department and full address of the institution where the supervisor has guided the student. The term **‘GUIDE’** must be typed in capital letters between the guide‟s name and academic designation.

Abstract – Abstract should be one page synopsis of the project report typed double line spacing, Font Style Times New Roman and Font Size 14.

Table of Contents – The table of contents should list all material following it as well as any material which precedes it. The title page and Bonafide

Certificate will not find a place among the items listed in the Table of Contents but the page numbers of which are in lower case Roman letters. One and a half spacing should be adopted for typing the matter under this head. A specimen copy of the Table of Contents of the project report is given in **Appendix 3.**

List of Tables – The list should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head.

List of Figures – The list should use exactly the same captions as they appear below the figures in the text. One and a half spacing should be adopted for typing thematter under this head.

List of Symbols, Abbreviations and Nomenclature – One and a half spacing should be adopted or typing the matter under this head. Standard symbols, abbreviations etc. should be used.

Chapters – The chapters may be broadly divided into 3 parts

(i) Introductory chapter,

(ii) Chapters developing the main theme of the project work such as

1. Objectives
2. Collection of data and required survey work
3. Management and construction procedure
4. Resources scheduling and networking
5. Design details
6. Required drawing set
7. Utility to society if any and Conclusion

The main text will be divided into several chapters and each chapter may be further divided into several divisions and sub-divisions.

- Each chapter should be given an appropriate title.
- Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.
- Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page, which refers to the material they annotate.

Appendices – Appendices are provided to give supplementary information, which is included in the main text may serve as a distraction and cloud the central theme.

- Appendices should be numbered using Arabic numerals, e.g. Appendix 1, Appendix 2, etc.
- Appendices, Tables and References appearing in appendices should be numbered and referred to at appropriate places just as in the case of chapters.
- Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.

List of References –The listing of references should be typed 4 spaces below the heading “REFERENCES” in alphabetical order in single spacing left – justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details.

A typical illustrative list given below relates to the citation example quoted above.

Reference:

1. Code of practice for plain and reinforced concrete (fourth edition), IS456:2000, Bureau of India Standard, New Delhi
2. Neville, A. M., Concrete Technology, Fourth edition, Pearson Education, New Delhi.
3. Handbook on concrete mixes (based on Indian Standards), SP: 23- 1988, Bureau of Indian Standards, New Delhi, India

3.10.1 Table and figures - By the word Table, is meant tabulated numerical data in the body of the project report as well as in the appendices. All other non- verbal materials used in the body of the project work and appendices such as charts, graphs, maps, photographs and diagrams may be designated as figures.

Typing Instructions:

The impression on the typed copies should be black in colour.

One and a half spacing should be used for typing the general text. The general text shall be typed in the Font style „Times New Roman" and Font size 12.

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Autonomous Examination :

DETAILED ALLOCATION OF MARKS

S.No	Description	Marks
1.	Presentation about Industrial Training	30
2.	Comprehensive Training Report	40
3.	Viva-voce	30
	Total	**100***

* Examinations will be conducted for 100 marks and it will be reduced to 75 marks.

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