



**GOVERNMENT POLYTECHNIC, KORAPUT DEPARTMENT CIVIL
ENGINEERING**

Discipline: CIVIL ENGG	Semester: 5TH	Name of the Teaching Faculty: RABINARAYAN HOTA, PTGF
Subject: STRUCTURAL DESIGN- II	No. of days/per week class allotted: 04	Semester From date: 01.10.2021 To Date: 30.01.2022 No. of Weeks: 14
PRE-REQUISITE	Basic knowledge about Engineering mechanics, structural elements and strength of materials.	
COURSE OUTCOMES	<ol style="list-style-type: none"> 1. Design simple steel structure such as tension members, compression members and simple beams. 2. Use standards and design codes. 3. Design of Tubular structures. 4. Design of Masonry structures. 	
Week	Class Day	Theory / Practical Topics
1st	1st	Common steel structures, Advantages & disadvantages of steel structures
	2nd	Types of steel, properties of structural steel.
	3rd	Rolled steel sections, special considerations in steel design.
	4th	Loads and load combinations
2nd	1st	Structural analysis and design philosophy
	2nd	Brief review of Principles of Limit State design
	3rd	Bolted Connections
	4th	Classification of bolts, advantages and disadvantages of bolted connections.
3rd	1st	Different terminology, spacing and edge distance of bolt holes
	2nd	Types of bolted connections.
	3rd	Types of action of fasteners, assumptions and principles of design
	4th	Strength of plates in a joint, strength of bearing type bolts (shear capacity & bearing capacity), reduction factors, and shear capacity of HSFG bolts.
4th	1st	Analysis & design of Joints using bearing type and HSFG bolts
	2nd	Efficiency of a joint
	3rd	Welded Connections
	4th	Advantages and Disadvantages of welded connection
5th	1st	Types of welded joints and specifications for welding
	2nd	Design stresses in welds
	3rd	Strength of welded joints
	4th	QUIZ
6th	1st	REVISION
	2nd	Common shapes of tension members
	3rd	Maximum values of effective slenderness ratio
	4th	Analysis and Design of tension members
	1st	Design steps


7th	2nd	Formula required
	3rd	Numerical problem
	4th	Numerical problem
8th	1st	QUIZ
	2nd	REVISION
	3rd	Common shapes of compression members
	4th	Buckling class of cross sections
9th	1st	slenderness ratio
	2nd	Design compressive stress and strength of compression members
	3rd	Analysis and Design of compression members (axial load only).
	4th	Design steps
10th	1st	Formula required
	2nd	Numerical problem
	3rd	Numerical problem
	4th	QUIZ
11th	1st	REVISION
	2nd	Common cross sections and their classification.
	3rd	Deflection limits
	4th	web buckling and web crippling
12th	1st	Design of laterally supported beams against bending and shear
	2nd	Design problem
	3rd	QUIZ
	4th	REVISION
13th	1st	Round Tubular Sections
	2nd	Permissible Stresses
	3rd	Tubular Compression & Tension Members
	4th	Joints in Tubular trusses
14th	1 st	Design considerations for Masonry walls & Columns
	2nd	Load Bearing & Non-Load Bearing walls
	3rd	Permissible stresses, Slenderness Ratio
	4th	Effective Length, Height & Thickness

LEARNING RESOURCES:

- 1 Design of Steel Structure by B.N.Duggal
- 2 Elements of Steel, Timber & Masonry Design by Samal & Panigrahi
- 3 Steel Tables by Samal & Panigrahi
- 4 I.S 800-Code of practice for General construction in steel

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		GOVERNMENT POLYTECHNIC, KORAPUT DEPARTMENT CIVIL ENGINEERING	
Discipline: CIVIL ENGG	Semester: 5TH	Name of the Teaching Faculty: RABINARAYAN HOTA , PTGF	
Subject: RAILWAY & BRIDGE ENGINEERING	No. of days/per week class allotted: 04	Semester From date: 01.10.2021	To Date: 30.01.2022 No. of Weeks: 13
PRE-REQUISITE	Basic knowledge about Engineering mechanics, and visualization of railway track and bridges, steel structure.		
COURSE OUTCOMES	Section –A : RAILWAYS CO1: Introduction CO2: Permanent way CO3: Track materials CO4: Geometric for Broad gauge CO5: Points and crossings CO6: Laying & maintenance of track Section – B : BRIDGES CO1: Introduction to bridges CO2: Bridge Site investigation, hydrology & planning CO3: Bridge foundation CO4: Bridge substructure and approaches CO5: Culvert & cause ways		
Week	Class Day	Theory / Practical Topics	
1st	1st	1. Introduction : 1.1 Railway terminology 1.2 Advantages of railways 1.3 Classification of Indian Railways	
	2nd	2. Permanent way 2.1 Definition, components of permanent way	
	3rd	Concept of gauge, different gauges prevalent in India, suitability of these gauges under different	
	4th	3. Track materials 3.1 Rails 3.1.1 Functions and requirement of rails	
2nd	1st	3.1.2 Types of rail sections , length of rails 3.1.3 Rail joints – types, requirement of an ideal joint	
	2nd	3.1.4 Purpose of welding of rails & its advantages 3.1.5 Creep definition, cause & prevention	
	3rd	3.2 Sleepers 3.2.1 Definition, function & requirements of sleepers 3.2.2 Classification of sleepers 3.2.3 Advantages & disadvantages of different types of sleepers	
	4th	3.3 Ballast 3.3.1 Functions & requirements of ballast 3.3.2 Materials for ballast	
	1st	3.4 Fixtures for Broad gauge 3.4.1 Connection of rails to rail-fishplate, fish bolts 3.4.2 Connection of rails to sleepers	

3rd	2nd	REVISION
	3rd	QUIZ
	4th	4. Geometric for Broad gauge 4.1 Typical cross – sections of single
4th	1st	double broad gauge railway track in cutting, embankment
	2nd	4.2 Permanent & temporary land width, Gradients for drainage
	3rd	Super elevation – necessity & limiting valued
	4th	Numerical problem
5th	1st	Numerical problem
	2nd	5.0 Points and crossings
6th	3rd	5.1 Definition,
	4th	necessity of Points and crossings
	1st	5.2 Types of points, & types of crossings with tie diagrams, diagrams
	2nd	6.0 Laying & maintenance of track
7th	3rd	6.1 Methods of Laying
	4th	maintenance of track, Details of a permanent way inspector
	1st	REVISION
	2nd	QUIZ
8th	3rd	Section – B : BRIDGES 7.0 Introductions 7.1 Definitions 7.2 Components of a bridge
	4th	7.3 Classification of bridges. 7.4 Requirements of an ideal bridge
	1st	REVISION
	2nd	QUIZ
9th	3rd	8. Bridge Site investigation, hydrology & planning 8.1 Selection of bridge site
	4th	8.2 Bridge alignments
	1st	8.3 Determination of flood discharge
	2nd	8.4 Waterway & economic span
10th	3rd	8.5 Afflux, clearance & free board 8.6 Collection of bridge design data & sub surface investigation
	4th	9. Bridge foundation
	1st	9.1 Scour depth minimum depth of foundation 9.2 Types of bridge
	2nd	pile foundation-, pile driving,
11th	3rd	well foundation – sinking of wells caission foundation
	4th	foundations – spread foundation 9.3 Cofferdams
	1st	REVISION
	2nd	QUIZ
12th	3rd	10. Bridge substructure and approaches 10.1 Types of piers
	4th	10.2 Types of abutments
	1st	10.3 Types of wing walls
	2nd	10.4 Approaches
	3rd	11 Culvert & cause ways 11.1 Types of culvers - brief description
	4th	11.2 Types of causeways - brief description
	1st	REVISION
	2nd	QUIZ

13th	3rd	REVISION
	4th	REVISION

Learning Resources:

Sl No.	Author Name	Name of the Book
1	Chandra & Agrawal	Railway Engineering
2	S.C.Sexena & S.P.Arora	A Text book of Railway Engineering
3	S. C. Rangwala	Railway Engineering

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**GOVERNMENT POLYTECHNIC, KORAPUT
DEPARTMENT CIVIL ENGINEERING**

Discipline: CIVIL ENGG	Semester: 5TH	Name of the Teaching Faculty: RABINARAYAN HOTA, PTGF
Subject: ENTREPRENEURSHIP AND SMART MANAGEMENT & SMART TECHNOLOGY	No. of days/per week class allotted: 04	Semester From date: 01.10.2021 To Date: 30.01.2022 No. of Weeks: 13
PRE- REQUISITE	Basic knowledge about Marketing	
COURSE OUTCOMES	CO1: Entrepreneurship CO2: Market Survey and Opportunity Identification (Business Planning) CO3: Project report Preparation CO4: Management Principles CO5: Functional Areas of Management CO6: Leadership and Motivation CO7: Work Culture, TQM & Safety CO8: Legislation CO9: Smart Technology	
Week	Class Day	Theory / Practical Topics
1st	1st	Entrepreneurship Concept /Meaning of Entrepreneurship Need of Entrepreneurship
	2nd	Characteristics, Qualities and Types of entrepreneur, Functions, Barriers in entrepreneurship, Entrepreneurs vrs. Manager
	3rd	Forms of Business Ownership: Sole proprietorship, partnership forms and others
	4th	Types of Industries, Concept of Start-ups
2nd	1st	Entrepreneurial support agencies at National, State, District Level(Sources): DIC, NSIC, OSIC, SIDBI, NABARD, Commercial Banks, KVIC etc.
	2nd	Technology Business Incubators (TBI) and Science and Technology Entrepreneur Parks
	3rd	Market Survey and Opportunity Identification (Business Planning) Business Planning, SSI, Ancillary Units, Tiny Units, Service sector Units
	4th	Time schedule Plan, Agencies to be contacted for Project Implementation Assessment of Demand and supply and Potential areas of Growth, Identifying Business Opportunity, Final Product selection.
	1st	Project report Preparation Preliminary project report
	2nd	Detailed project report, Techno economic Feasibility

3rd		Project Viability
	3rd	Management Principles Definitions of management Principles of management
	4th	Functions of management (planning, organising, staffing, directing and controlling etc.) Level of Management in an Organisation
4th	1st	Functional Areas of Management a) Production management Functions, Activities, Productivity, Quality control, Production Planning and control
	2nd	Inventory Management Need for Inventory management, Models/Techniques of Inventory management
	3rd	Financial Management Functions of Financial management, Management of Working capital
	4th	Brief idea about Accounting Terminologies: Book Keeping, Journal entry, Petty Cash book, P&L Accounts, Balance Sheets(only Concepts)
5th	1st	Marketing Management Concept of Marketing and Marketing Management
	2nd	Marketing Techniques (only concepts) Concept of 4P s (Price, Place, Product, Promotion)
	3rd	Human Resource Management Functions of Personnel Management
	4th	Manpower Planning, Recruitment, Sources of manpower, Selection process, Method of Testing, Methods of Training & Development, Payment of Wages
6th	1st	Leadership and Motivation a) Leadership Definition and Need/Importance, Qualities and functions of a leader
	2nd	Manager Vs Leader, Style of Leadership (Autocratic, Democratic, Participative)
	3rd	Motivation Definition and characteristics, Importance of motivation
	4th	Factors affecting motivation Theories of motivation (Maslow)
7th	1st	Methods of Improving Motivation Importance of Communication in Business
	2nd	Types and Barriers of Communication
	3rd	Work Culture, TQM & Safety Human relationship and Performance in Organization
	4th	Relations with Peers, Superiors and Subordinates
8th	1st	TQM concepts: Quality Policy, Quality Management, Quality system
	2nd	Accidents and Safety, Cause, preventive measures, General Safety Rules, Personal Protection Equipment(PPE)
	3rd	Legislation a) Intellectual Property Rights(IPR), Patents
	4th	Trademarks, Copyrights
9th	1st	Features of Factories Act 1948 with Amendment (only salient points)
	2nd	Features of Payment of Wages Act 1936 (only salient points)
	3rd	Smart Technology Concept of IOT
	4th	How IOT works

10th	1st	Components of IOT
	2nd	Characteristics of IOT
	3rd	Categories of IOT
	4th	Applications of IOT- Smart Cities, Smart Transportation
11th	1st	Smart Home, Smart Healthcare
	2nd	Smart Industry, Smart Agriculture
	3rd	Smart Energy Management etc.
	4th	REVISION
12th	1st	REVISION
	2nd	QUIZ
	3rd	REVISION
	4th	REVISION
13th	1st	QUIZ
	2nd	REVISION
	3rd	REVISION
	4th	QUIZ

Learning Resources:

1. Entrepreneurship Development and Management by R.K Singhal, Katson Books., New Delhi
2. Entrepreneurship Development and Management by U Saroj and V Mahendiratta, Abhishek Publications, Chandigarh
3. Entrepreneurship Development and Management by Vasant Desai, Himalaya Pub.House
4. Industrial Engineering and Management by O.P Khanna ,Dhanpat Rai and Sons
5. Industrial Engineering and Management by Banga and Sharma, Khanna Publications
6. Internet of Things by Jeeva Jose, Khanna Publications, New Delhi
7. Online Resource on Startups and other concepts
8. <https://www.fundable.com/learn/resources/guides/startup>

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**GOVERNMENT POLYTECHNIC, KORAPUT
DEPARTMENT CIVIL ENGINEERING**

Discipline: CIVIL ENGG	Semester: 5th	Name of the Teaching Faculty: SUCHITRA LENKA , PTGF
Subject: ESTIMATING & COST EVALUATION - II	No. of days/per week class allotted: 04	Semester From date: 31.10.2021 To Date: 30.01.2022 No. of Weeks: 13
PRE-REQUISITE	Basic knowledge about Engg. Drawing, Construction and Rate of materials	
COURSE OUTCOMES	CO1: Understand the significance of accurate estimation practices. CO2: Evaluate and generate component wise estimates for a building CO3: Develop a proper cost estimate for single storeyed building. CO4: Analyse and offer reason behind the costs involved in different components CO5: Prepare abstract of cost estimates in line with prescription by state regulating bodies.	
Week	Class Day	Theory / Practical Topics
1 ST	1 ST	1.0.Detailed estimate of culverts and bridges 1.1. Detailed estimate of a RCC slab culvert with right angled wing walls
	2 ND	1.1.Detailed estimate of a RCC slab culvert with right angled wing walls
	3 RD	1.1.Detailed estimate of a RCC slab culvert with right angled wing walls
	4 TH	1.1.Detailed estimate of a RCC slab culvert with right angled wing walls
2 ND	1 ST	1.1.Detailed estimate of a RCC slab culvert with right angled wing walls
	2 ND	1.1.Detailed estimate of a RCC slab culvert with right angled wing walls
	3 RD	1.1.Detailed estimate of a RCC slab culvert with right angled wing walls.
	4 TH	1.1.Detailed estimate of a RCC slab culvert with right angled wing walls.
3 RD	1 ST	1.1.bar bending schedule.
	2 ND	1.1.bar bending schedule.
	3 RD	1.1.bar bending schedule.
	4 TH	1.2. RCC Hume pipe culvert with splayed angled wing wall
4 TH	1 ST	1.2. RCC Hume pipe culvert with splayed angled wing wall
	2 ND	1.2. RCC Hume pipe culvert with splayed angled wing wall
	3 RD	1.2. RCC Hume pipe culvert with splayed angled wing wall
	4 TH	2.0.Estimate of irrigation structures 2.1. Detailed estimate of simple type of vertical fall to given specification
5 TH	1 ST	2.1. Detailed estimate of simple type of vertical fall to given specification


	2 ND	2.1. Detailed estimate of simple type of vertical fall to given specification
	3 RD	2.1. Detailed estimate of simple type of vertical fall to given specification
	4 TH	2.1. Detailed estimate of simple type of vertical fall to given specification
	6 TH	1 ST
	2 ND	Monthly class test-1
	3 RD	2.2. Detailed estimate of drainage siphon to given specification.
	4 TH	2.2. Detailed estimate of drainage siphon to given specification.

7 TH	1 ST	3.0 Detailed estimate of roads 3.1. Detail estimate of a water bound macadam road
	2 ND	3.1.Detail estimate of a water bound macadam road
	3 RD	3.2. Detailed estimate of a flexible pavement in cutting /filling
	4 TH	3.2. Detailed estimate of a flexible pavement in cutting /filling
8 TH	1 ST	INTERNAL ACCESSIONMENT
	2 ND	INTERNAL ACCESSIONMENT
	3 RD	3.2. Detailed estimate of a flexible pavement in cutting /filling
	4 TH	3.2. Detailed estimate of a flexible pavement in cutting /filling
9 TH	1 ST	3.2. Detailed estimate of a flexible pavement in cutting /filling
	2 ND	3.3.Detailed estimate of septic tank and soak pit for 50 users
	3 RD	4.0.Miscellaneous estimates 4.1 Tube well ,
	4 TH	4.1. . Piles and Pile cap, Isolated and combined footings
10 TH	1 ST	5.0. PWD Accounts works 5.1. Works
	2 ND	QUIZ
	3 RD	5.1.1. Classification of work-original, major, petty, repair work, annual repair, special repair, quadrantal repair.
	4 TH	5.1.2. Concept of Method of execution of works through the contractors and department, contract and agreement, work order, types of contract, piece work agreement.
11 TH	1 ST	5.1.2. Concept of Method of execution of works through the contractors and department, contract and agreement, work order, types of contract, piece work agreement.
	2 ND	5.2 Accounts of works- 5.2.1 Explanation of various terms Administrative approval, technical sanction, tender, preparation of notice inviting tender, quotations, earnest money, E-tendering, security deposit
	3 RD	advance payment, intermediate payment, final payment, running bill, final bill, regular and temporary establishment, cash, major & subhead of account, temporary advance (imprest money),supervision charges, suspense account, debit, credit, book transfer, voucher and related accounts.
	4 TH	5.2.2.Measurement book use & maintenance, procedure of marking entries of measurement of work and supply of materials, labour employed, standard measurement books and common irregularity
12 TH	1 ST	5.2.2.Measurement book use & maintenance, procedure of marking entries of measurement of work and supply of materials, labour

		employed, standard measurement books and common irregularity
	2 ND	5.2.3. Musterroll: Its preparation & use for making payment of pay & wages 5.2.4. Acquittance Roll: Its preparation & use for making payment of pay & wages 5.2.5. Labour & labour report, method of labour payment, use of forms and necessity of Submission
	3 RD	5.2.6. Classification of stores, receipt / issue statement on standard form, method of preparation of stock account, preparation and submission of returns, verification of stocks, shortage and excess
	4 TH	5.3 Building BYLAWS and REGULATORY Bodies, Development authorities, types and their levels, RERA etc.
13 TH	1 ST	QUIZ
	2 ND	Previous year question discussion
	3 RD	Revision
	4 TH	Revision

LEARNING RESOURCES:

1. Dr. B.N.Dutta. Estimating & Costing – UBSPD Publisher
2. Dr. M.Chakraborty. Estimating, Costing, specification & Valuation of Civil Engg. Published by Author
3. Govt. of Odisha. Latest Odisha Schedule of Rates & Analysis of rates.


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GOVERNMENT POLYTECHNIC, KORAPUT DEPARTMENT CIVIL ENGINEERING


Discipline: CIVIL ENGG.	Semester: 5th	Name of the Teaching Faculty: MADHUSMITA DEHURI , HOD CIVIL
Subject: WATER SUPPLY & WASTE WATER ENGG.	No. of days/per week class allotted: 05	Semester From date: 01.10.2021 To Date: 30.01.2022 No. of Weeks: 13
PRE-REQUISITE	Basic knowledge about chemistry & environmental studies.	
COURSE OUTCOMES	CO1: Compute water demand in terms of quantity and quality. CO2: Describe the water sources, conveyance and distribution system CO3: Describe the sewerage system and its components stating the purposes thereof CO4: Comprehend the necessity and method of sewage treatment and disposal	
Week	Class Day	Theory / Practical Topics
1 ST	1 ST	Introduction to Water Supply, Quantity and Quality of water , Necessity of treated water supply
	2 ND	Per capita demand, variation in demand and factors affecting demand
	3 RD	Methods of forecasting population, Numerical problems using different methods 1.4 Impurities in water – organic and inorganic. Harmful effects of impurities
	4 TH	Analysis of water –physical, chemical and bacteriological
	5 TH	Water quality standards for different uses
	6 TH	
2 ND	1 ST	Sources and Conveyance of water 2.1 Surface sources – Lake, stream, river and impounded reservoir
	2 ND	2 Underground sources – aquifer type & occurrence – Infiltration gallery, infiltration well, springs, well
	3 RD	Yield from well- methods of determination, Numerical problems using yield formulae (deduction excluded)
	4 TH	Intakes – types, description of river intake, reservoir intake, canal intake
	5 TH	Pumps for conveyance & distribution – types, selection, installation.
3 RD	1 ST	Pipe materials – necessity, suitability, merits & demerits of each type
	2 ND	Pipe joints – necessity, types of joints, suitability.
	3 RD	Methods of jointing Laying of pipes – method
	4 TH	Revision of concepts
	5 TH	Note: 1. Design of treatment units excluded. 2. Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment
4 TH	1 ST	Field visit to treatment plant, under practical should be arranged after covering this unit.
	2 ND	Flow diagram of conventional water treatment system
	3 RD	Treatment process / units : 3.2.1 Aeration ; Necessity 3.2.2 Plain Sedimentation : Necessity, working principles, Sedimentation tanks –


		types, essential features, operation & maintenance
	4 TH	Sedimentation with coagulation: Necessity, principles of coagulation, types of coagulants, Flash Mixer, Flocculator, Clarifier (Definition and concept only)
	5 TH	Filtration : Necessity, principles, types of filters Slow Sand Filter, Rapid Sand Filter and Pressure Filter essential features
5 TH	1 ST	Disinfection : Necessity, methods of disinfection Chlorination – free and combined chlorine demand, available chlorine,
	2 ND	residual chlorine, pre-chlorination, break point chlorination, superchlorination
	3 RD	Softening of water – Necessity, Methods of softening – Lime soda process and Ion exchange method (Concept Only)
	4 TH	Distribution system And Appurtenance in distribution system
	5 TH	General requirements, types of distribution system-gravity, direct and combined
6 TH	1 ST	QUIZ
	2 ND	Methods of supply – intermittent and continuous 4.3 Distribution system layout – types, comparison, suitability
	3 RD	Valves-types, features, uses, purpose-slucce valves, check valves, air valves, scour valves, Fire hydrants, Water meters
	4 TH	Revision of concepts
	5 TH	W/s plumbing in building : 5.1 Method of connection from water mains to building supply 5.2 General layout of plumbing arrangement for water supply in single storied and multi-storied building as per I.S. code
7 TH	1 ST	SECTION B: WASTE WATER ENGINEERING
	2 ND	Introduction 6.1 Aims and objectives of sanitary engineering
	3 RD	Revision of concepts
	4 TH	Definition of terms related to sanitary engineering 6.3 Systems of collection of wastes– Conservancy and Water Carriage System – features, comparison, suitability
	5 TH	QUIZ
8 TH	1 ST	Quantity and Quality of sewage
	2 ND	Quantity of sanitary sewage – domestic & industrial sewage, variation in sewage flow, numerical problem on computation quantity of sanitary sewage.
	3 RD	Computation of size of sewer, application of Chazy's formula, Limiting velocities of flow : self-cleaning and scouring
	4 TH	General importance, strength of sewage, Characteristics of sewage-physical, chemical & biological
	5 TH	Concept of sewage-sampling, tests for – solids, pH, dissolved oxygen, BOD, COD
9 TH	1 ST	Sewerage system
	2 ND	Types of system-separate, combined, partially separate , features, comparison between the types, suitability
	3 RD	Shapes of sewer – rectangular, circular, avoid-features, suitability
	4 TH	Laying of sewer-setting out sewer alignment
	5 TH	Sewer appurtenances and Sewage Disposal:
10 TH	1 ST	QUIZ
	2 ND	Manholes and Lamp holes – types, features, location, function
	3 RD	Inlets, Grease & oil trap – features, location, function
	4 TH	Storm regulator, inverted siphon – features, location, function
	5 TH	Disposal on land – sewage farming, sewage application and dosing, sewage sickness-causes and remedies
11 TH	1 ST	Disposal by dilution – standards for disposal in different types of water bodies, self purification of stream
	2 ND	Sewage treatment : (Note: 1.Design of treatment units excluded.

		2. Students may be asked to prepare detailed sketches of units, preferably from working drawing, as home assignment. 3. Field visit to treatment plant, under practical should be arranged after covering this unit.)
	3 RD	Principles of treatment, flow diagram of conventional treatment
	4 TH	Primary treatment – necessity, principles, essential features, functions
	5 TH	Secondary treatment – necessity, principles, essential features, functions
12 TH	1 ST	QUIZ
	2 ND	Sanitary plumbing for building :
	3 RD	Requirements of building drainage, layout of lavatory blocks in residential buildings, layout of building drainage
	4 TH	Plumbing arrangement of single storied & multi storied building as per I.S. code practice
	5 TH	Sanitary fixtures – features, function, and maintenance
13 TH	1 ST	QUIZ
	2 ND	Fixing of the fixtures – water closets
	3 RD	Flushing cisterns, urinals, inspection chambers
	4 TH	Anti-syphonage pipe
	5 TH	Revision of concepts

LEARNING RESOURCES:

- 1 G.S. Birdie Text book on water supply and sanitary engineering Dhanpat Rai Publications
- 2 S.K. Garg Water Supply Engineering Khanna Publishers
- 3 S.K. Garg Waste Water Disposal Engg. Khanna Publishers


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Discipline: CIVIL ENGG.	Semester: 5th	Name of the Teaching Faculty: RABINARAYAN HOTA , PTGF
Subject: CIVIL ENGINEERING LABORATORY II	No. of days per week class allotted: 06	Semester From date: 01.10.2021 To Date: 30.01.2022 No. of Weeks: 13
PRE-REQUISITE	Basic knowledge about soil mechanics and fluid.	
COURSE OUTCOMES	CO1: Classify and indentify soil types under different standards CO2: Comprehend significance of permeability and seepage and compute those. CO3: Describe requirement and methodology of compaction and Consolidation CO4: Define terms of foundation engineering and estimate bearing capacity.	
Week	Class Day	Theory / Practical Topics
1 ST	1 ST	Determination of Specific gravity of Soil by Pycnometer / Density bottle.
	2 ND	Do
	3 RD	Do
	4 TH	Determination of Field Density of Soil by Core Cutter Method.
	5 TH	Do
	6 TH	Do
2 ND	1 ST	Wet mechanical analysis using pipette method for clay and silt.
	2 ND	Do
	3 RD	Do
	4 TH	Determination of Liquid Limit by soil by Casagrande's apparatus.
	5 TH	Do
	6 TH	Determination of Plastic limit of soil.
3 RD	1 ST	Do
	2 ND	Determination of Shrinkage limit of soil.
	3 RD	Do
	4 TH	Determination of MDD & OMC of soil by using modified Proctor Test.
	5 TH	Do
	6 TH	Determination of CBR value using Laboratory CBR Testing device.

4 TH	1 ST	Do
	2 ND	Do
	3 RD	Ductility Test of Bitumen
	4 TH	Do.
	5 TH	Do
	6 TH	Do
5 TH	1 ST	Do
	2 ND	Bitumen content by centrifuge extractor.
	3 RD	Do
	4 TH	Do
	5 TH	Determination of Turbidity of water Sample using Turbidimeter/Nephelometer/Jackson's Candle Turbidimeter.
	6 TH	Do
6 TH	1 ST	Do
	2 ND	Do
	3 RD	Do
	4 TH	Determination of Chloride content of a Water sample using method of titration.
	5 TH	Do
	6 TH	Do
7 TH	1 ST	Determination of Coagulant (Alum) dose requirement for a turbid water sample by Jar Test.
	2 ND	Do
	3 RD	Do
	4 TH	Determination of dissolved oxygen in a water sample.
	5 TH	Do
	6 TH	Do
8 TH	1 ST	Determination of pH of Water sample using (a) pH – meter (b) colour Comparator
	2 ND	Do
	3 RD	Do
	4 TH	Penetration Test of Bitumen
	5 TH	Do
	6 TH	Do
9 TH	1 ST	Ductility Test of Bitumen.
	2 ND	Do
	3 RD	Do
	4 TH	Do
	5 TH	Do
	6 TH	Determination of bacteriological quality of water sample by Coliform test.
10 TH	1 ST	Do
	2 ND	Do
	3 RD	Do
	4 TH	Do
	5 TH	Verification of Bernoulli's Theorem
	6 TH	Do
11 TH	1 ST	Determination of coefficient of Discharge of a rectangular notch fitted in open Channel.
	2 ND	Do
	2 ND	Determination of coefficient of Discharge of a Venturimeter, Orificemeter

		fitted in a pipe
	3 RD	Do
	4 TH	Do
	5 TH	Do
	6 TH	Do
12 TH	1 ST	Determination of head Loss due to friction and coefficient of friction for flow through pipe.
	2 ND	Do
	3 RD	Do
	4 TH	Do
	5 TH	Determination of c and ϕ of soil by triaxial testing device.
	6 TH	Do
13 TH	1 ST	Do
	2 ND	Do
	3 RD	Determination of coefficient of permeability of soil by constant head method
	4 TH	Do
	5 TH	Do
	6 TH	Do

LEARNING RESOURCES :

1. Dr. B.C.Punmia , Soil Mechanics & Foundation Engineering Laxmi publications (P) LTD
2. Dr. K.R.Arora , Soil Mechanics & Foundation Engineering Laxmi publications (P) LTD
3. Dr. V.N.S. Murthy , Soil Mechanics & Foundation Engineering, Vol-I UBS Publishers Distributors Ltd.

Rabinarayan HOD
07/10/21
Sign. of Faculty concerned

M.D.
11/10/21
Sign. of HOD

Madhusmita Dehuri
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**GOVERNMENT POLYTECHNIC, KORAPUT DEPARTMENT
CIVIL ENGINEERING**

Discipline: CIVIL ENGG	Semester: 5th	Name of the Teaching Faculty: SUCHITRA LENKA , PTGF
Subject: ESTIMATION PRACTICE-II	No. of days/per week class allotted: 03	Semester From date: 01.10.2021 To Date: 30.01.2022 No. of Weeks: 13
PRE-REQUISITE	Basic knowledge about Engineering drawing and estimation practice 1.	
COURSE OUTCOMES	CO1:- Prepare estimates fir 2 room single storey building CO2:- Prepare estimate for 2 storeyed buildings CO3: Comprehend the schedule and analysis of rates offered by State Work Department CO4: Use MX Excel to prepare analysis of rates CO5: Evaluate dry material list and cost associated using MS Excel CO6: Prepare abstract of costs and bill of materials for single storey and double storey buildings	
Week	Class Day	Theory / Practical Topics
1st	1st	1.0.Detailed estimate of culverts and bridges 1.1. Detailed estimate of a RCC slab culvert-1 with right angled wing walls with bar bending schedule
	2nd	Practice
	3rd	Practice
2nd	1st	Practice
	2nd	1.1.Detailed estimate of a RCC slab culvert-2 with right angled wing walls with bar bending schedule
	3rd	Practice
3rd	1st	Practice
	2nd	Practice
	3rd	RECORD CHECKING & TEST
4th	1st	1.2. Detailed estimate RCC Hume pipe culvert with splayed angled wing wall
	2nd	Practice
	3rd	Practice
5th	1st	Practice
	2nd	2.0.Estimate of irrigation structures 2.1.Detailed estimate of simple type of vertical fall to given specification
	3rd	Practice
6th	1st	Practice
	2nd	Practice
	3rd	Practice
7th	1st	2.2. Detailed estimate of drainage siphon-1 to given specification.
	2nd	Practice
	3rd	RECORD CHECKING & TEST

8th	1st	3. Detailed estimate of roads 3.1. Detail estimate of a water bound macadam road
	2nd	Practice
	3rd	Practice
9th	1st	3.2. Detailed estimate of a flexible pavement in cutting /filling for problem -1
	2nd	Practice
	3rd	Practice
10th	1st	3.2. Detailed estimate of a flexible pavement in cutting /filling for problem -2
	2nd	Practice
	3rd	Practice
11th	1st	3.3. Detailed estimate of septic tank and soak pit for 50 users
	2nd	Practice
	3rd	Practice
12th	1st	4.0. Miscellaneous estimates 4.1. Detailed estimate Tube well, Piles and Pile cap 4.1. Detailed estimate of Isolated and combined footings
	2nd	Practice
	3rd	Practice
13th	1st	RECORD CHECKING & TEST
	2nd	FINAL VIVA
	3rd	FINAL VIVA

Learning Resources:-

1. Estimating, Costing, specification & Valuation in Civil Engineering , M.Chakrobarty #Chakrobarty
2. Estimating & Costing in Civil Engg. B.N.Dutta #UBS Publishers' Distributors Pvt. Ltd
3. Text Book of Estimating & Costing, G.S.Birdie #Dhanpat Rai Publishing Company Pvt. Ltd
4. Latest Orissa PWD Schedule of Rates & Analysis of rates , Govt. of Odisha #Govt. of Odish



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