	GOVERNMENT POLYTECHNIC, KORAPUT **DEPARTMENT CIVIL ENGINEERING**	
Discipline: **CIVIL ENGG**	Semester: **3rd**	Name of the Teaching Faculty: **SUCHITRA LENKA , PTGF**
Subject: **GEOTECHNICAL ENGINEERING**	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 Engineering mechanics,som	
COURSE OUTCOMES	**CO1:** Comprehend design philosophies and compare those **CO2:** Refer the design codes **CO3:** Design simple R.C. structural elements **CO4:** Draw structural details for construction **CO5:** Analyze and design structural elements such as beams, columns, staircase etc	

Week	Class Day	Theory / Practical Topics
1ST	1ST	**Introduction** .1 Soil and Soil Engineering
	2ND	Scope of Soil Mechanics
	3RD	Origin and formation of soil
	4TH	**Preliminary Definitions and Relationship**
	5TH	Soil as a three Phase system.
2ND	1ST	Water Content, Density, Specific gravity, Voids ratio, Porosity
	2ND	Percentage of air voids, air content, degree of saturation, density Index, Bulk/Saturated/dry/submerged density, Interrelationship of various soil parameters
	3RD	**Index Properties of Soil**
	4TH	Water Content , Specific Gravity
	5TH	Particle size distribution: Sieve analysis, wet mechanical analysis, particle size distribution curve and its uses
3RD	1ST	Consistency of Soils, Atterberg's Limits, Plasticity Index, Consistency Index, Liquidity Index
	2ND	**Classification of Soil:** General
	3RD	I.S. Classification, Plasticity chart
	4TH	Revision of concepts
	5TH	**QUIZ**
4TH	1ST	**Permeability and Seepage**
	2ND	Concept of Permeability, Darcy's Law, Co-efficient of Permeability
	3RD	Factors affecting Permeability.
	4TH	Constant head permeability and falling head permeability Test.
	5TH	Seepage pressure, effective stress, phenomenon of quick sand
5TH	1ST	**Compaction and Consolidation**
	2ND	Compaction: Compaction, Light and heavy compaction Test, Optimum Moisture
	3RD	Content of Soil, Maximum dry density, Zero air void line, Factors

		affecting Compaction, Field compaction methods and their suitability
	4TH	Consolidation: Consolidation, distinction between compaction and consolidation.
	5TH	Terzaghi's model analogy of compression/ springs showing the process of consolidation – field implications
6TH	1ST	**QUIZ**
	2ND	**Shear Strength**
	3RD	Concept of shear strength, Mohr- Coulomb failure theory, Cohesion, Angle of internal friction
	4TH	Revision of concepts
	5TH	strength envelope for different type of soil, Measurement of shear strength
7TH	1ST	Direct shear test, triaxial shear test, unconfined compression test and vane-shear test
	2ND	**Earth Pressure on Retaining Structures**
	3RD	Active earth pressure
	4TH	Passive earth pressure
	5TH	**QUIZ**
8TH	1ST	Earth pressure at rest
	2ND	Use of Rankine's formula
	3RD	(cohesion-less soil only)
	4TH	(i) Backfill with no surcharge
	5TH	(ii) backfill with uniform surcharge
9TH	1ST	**Foundation Engineering**
	2ND	Functions of foundations, shallow and deep foundation
	3RD	Different type of shallow and deep foundations with sketches.
	4TH	Types of failure (General shear, Local shear & punching shear)
	5TH	Bearing capacity of soil
10TH	1ST	**QUIZ**
	2ND	Bearing capacity of soils using Terzaghi's formulae
	3RD	IS Code formulae for strip
	4TH	Circular and square footings
	5TH	Revision of concepts
11TH	1ST	Circular and square footings.
	2ND	Further explanation
	3RD	Effect water table on bearing capacity of soil
	4TH	Load Carrying capacity of soil
	5TH	Further explanation
12TH	1ST	**QUIZ**
	2ND	Introduction to reinforced concrete, grades of concrete and steel, advantages of reinforced cement concrete, concept of under reinforced, balanced & over reinforced section
	3RD	Assumptions in working stress method, derivation of formula for balanced design
	4TH	Assumptions in working stress method, derivation of formula for balanced design
	5TH	Problem discussion on design of the section using WSM
13TH	1ST	**QUIZ**
	2ND	**Revision**
	3RD	**Revision**
	4TH	**Revision**
	5TH	**Revision**

LEARNING RESOUCES:

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

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GOVERNMENT POLYTECHNIC, KORAPUT
DEPARTMENT CIVIL ENGINEERING

Discipline: **CIVIL ENGG.**	Semester: **3rd**	Name of the Teaching Faculty: **AKHIL KUMAR SAHU , PTGF**
Subject: **STRUCTURAL MECHANICS**	No. of days/perweek class allotted: **05**	Semester From date: **01.10.2021** To Date:**30.01.2022** No. of Weeks: **13**
PRE-REQUISITE	Basic knowledge about physics & Engineering mechanics.	
COURSE OUTCOMES	**CO1:** Analyze solid states under uniaxial loading and plane stress conditions. **CO2:** compression members and simple beams **CO3** Draw shear force and bending moment diagrams of simple statically determinate beam **CO4:** Obtain slope and deflection profiles of statically determinate simple structural members. **CO5:** Compute forces in members of a truss	

Week	Class Day	Theory / Practical Topics
1ST	1ST	**Review Of Basic Concepts;** Basic Principle of Mechanics: Force, Moment, support conditions, Conditions of equilibrium, C.G & MI, Free body diagram
	2ND	Review of CG and MI of different sections
	3RD	**Simple And Complex Stress, Strain**
	4TH	**Simple Stresses and Strains**
	5TH	Introduction to stresses and strains: Mechanical properties of materials
2ND	1ST	Rigidity, Elasticity, Plasticity, Compressibility, Hardness, Toughness, Stiffness, Brittleness, Ductility, Malleability, Creep, Fatigue, Tenacity, Durability, Types of stresses -Tensile,
	2ND	Compressive and Shear stresses, Types of strains - Tensile, Compressive and Shear strains, Complimentary shear stress - Diagonal tensile / compressive Stresses due to shear, Elongation and Contraction
	3RD	Longitudinal and Lateral strains, Poisson's Ratio, Volumetric strain, computation of stress, strain, Poisson's ratio, change in dimensions and volume etc, Hooke's law - Elastic Constants, Derivation of relationship between the elastic constants.
	4TH	**Application of simple stress and strain in engineering field**:
	5TH	Behavior of ductile and brittle materials under direct loads
3RD	1ST	Stress Strain curve of a ductile material, Limit of proportionality, Elastic limit, Yield stress, Ultimate stress, Breaking stress,
	2ND	Percentage elongation, Percentage reduction in area,
	3RD	Significance of percentage elongation and reduction in area of cross section,
	4TH	Revision of concepts
	5TH	Deformation of prismatic bars due to uniaxial load, Deformation of prismatic bars due to its self weight.
4TH	1ST	Complex stress and strain

	2ND	Principal stresses and strains: Occurrence of normal and tangential stresses,
	3RD	Concept of Principal stress and Principal Planes,
	4TH	major and minor principal stresses and their orientations,
	5TH	Mohr's Circle and its application to solve problems of complex stresses
5TH	1ST	Stresses In Beams and Shafts
	2ND	Stresses in beams due to bending: Bending stress in beams – Theory of simple bending – Assumption
	3RD	Moment of resistance – Equation for Flexure– Flexural stress distribution – Curvature of beam
	4TH	Position of N.A. and Centroidal Axis – Flexural rigidity – Significance of Section modulus
	5TH	Shear stresses in beams: Shear stress distribution in beams of rectangular, circular and standard sections symmetrical about vertical axis.
6TH	1ST	**QUIZ**
	2ND	Stresses in shafts due to torsion: Concept of torsion, basic assumptions of pure torsion,
	3RD	torsion of solid and hollow circular sections, polar moment of inertia, torsional shearing stresses,
	4TH	Revision of concepts
	5TH	Angle of twist, torsional rigidity, equation of torsion
7TH	1ST	Combined bending and direct stresses: Combination of stresses, Combined direct and bending stresses,
	2ND	Maximum and Minimum stresses in Sections, Conditions for no tension, Limit of eccentricity,
	3RD	Revision of concepts
	4TH	Middle third/fourth rule, Core or Kern for square, rectangular and circular sections, chimneys, dams and retaining walls
	5TH	**QUIZ**
8TH	1ST	Columns and Struts
	2ND	Columns and Struts, Definition, Short and Long columns,
	3RD	End conditions, Equivalent length / Effective length,
	4TH	Slenderness ratio, Axially loaded short and long column,
	5TH	Euler's theory of long columns, Critical load for Columns with different end conditions
9TH	1ST	Shear Force and Bending Moment
	2ND	Types of loads and beams:
	3RD	Types of Loads: Concentrated (or) Point load,
	4TH	Uniformly Distributed load (UDL), Types of Supports: Simple support,
	5TH	Roller support, Hinged support, Fixed support,
10TH	1ST	**QUIZ**
	2ND	Types of Reactions: Vertical reaction, Horizontal reaction, Moment reaction
	3RD	Types of Beams based on support conditions:
	4TH	Calculation of support reactions using equations of static equilibrium.
	5TH	**Shear force and bending moment in beams:**
11TH	1ST	Shear Force and Bending Moment: Signs Convention for S.F. and B.M, S.F and B.M of general cases of determinate beams
	2ND	S.F and B.M diagrams for Cantilevers,
	3RD	Simply supported beams and Over hanging beams, Position of maximum BM
	4TH	Point of contra flexure, Relation between intensity of load, S.F and B.M.
	5TH	**Slope and Deflection**

12TH	1ST	Introduction: Shape and nature of elastic curve (deflection curve): Relationship between slope, deflection and curvature (No derivation). Importance of slope and deflection.
	2ND	Slope and deflection of cantilever and simply supported beams under concentrated and uniformly distributed load (by Double Integration method, Macaulay's method).
	3RD	**QUIZ**
	4TH	Indeterminate Beams
	5TH	Indeterminacy in beams, Principle of consistent deformation/compatibility, Analysis of propped cantilever
13TH	1ST	Trusses
	2ND	Introduction: Types of trusses, statically determinate and indeterminate trusses, degree of indeterminacy, stable and unstable trusses, advantages of trusses
	3RD	Analysis of trusses: Analytical method (Method of joints, method of Section)
	4TH	**QUIZ**
	5TH	Revision of concepts

LEARNING RESOUCES:

1 R.Subramanian Strength of Materials Oxford Publication
2 S.Rammrutham. Theory of structure Dhanpat Rai Publications
3 V.N.Vazirani&M.M. Rathwani Analysis of Structures-Vol.I&II Khanna Publication.

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GOVERNMENT POLYTECHNIC, KORAPUT
DEPARTMENT CIVIL ENGINEERING

Discipline: **CIVIL ENGG**	Semester: **3rd**	Name of the Teaching Faculty: **MADHUSMITA DEHURI, HOD**
Subject: **ESTIMATING & COST EVALUATION - I**	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 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
1ST	1ST	1. **Introduction** 1.1.Types of estimates – Plinth area, floor area / carpetarea
	2ND	1.2. Units and modes of measurements as per IS1200
	3RD	1.2. Units and modes of measurements as per IS1200
	4TH	1.3. Accuracy of measurement for different item ofwork
2ND	1ST	**2.0.Quantity Estimate of Building** 2.1.Short wall long wall method and centre line method
	2ND	**2.0.Quantity Estimate of Building** 2.1.Short wall long wall method and centre line method
	3RD	2.1. Short wall long wall method and centre line method
	4TH	2.1.deductions in masonry, plastering, white washing, painting etc.,
3RD	1ST	2.1. multiplying factor (paint coefficients) for painting of doors and windows (paneled/glazed), grillsetc.
	2ND	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	3RD	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	4TH	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
4TH	1ST	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	2ND	2.2. Detailed estimate of single storied flat roof building with shallow foundation & RCC roof slab with leak proof treatment over it including staircase and mumty room.

	3RD	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room..
	4TH	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
5TH	1ST	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	2ND	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	3RD	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	4TH	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
6TH	1ST	**QUIZ**
	2ND	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	3RD	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	4TH	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
7TH	1ST	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	2ND	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	3RD	2.2. Detailed estimate of single storied flat roof building with shallow foundation and RCC roof slab with leak proof treatment over it including staircase and mumty room.
	4TH	**3.0. Analysis of Rates and Valuation** **3.1.**Analysis of rates for cement concrete, brick masonry in Cement Mortar, laterite stone masonry in Cement Mortar ,cement plaster, white washing, Artificial Stone flooring
8TH	1ST	INTERNAL ASSESSMENT
	2ND	INTERNAL ASSESSMENT
	3RD	3.1. Analysis of rates for Tile flooring, concrete flooring, R.C.C. with centering and shuttering, reinforcing steel
	4TH	3.1. Analysis of rates for Painting of doors and windows etc. as per OPWD.
9TH	1ST	3.2. Calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Orissa P.W.D. system (Concept of C.P.W.D./Railways provisions)
	2ND	3.2. Calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Orissa P.W.D. system (Concept of C.P.W.D./Railways provisions)
	3RD	3.2. Calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Orissa P.W.D. system (Concept of C.P.W.D./Railways provisions)
	4TH	3.2. Calculation of lead, lift, conveyance charges, royalty of materials, etc. as per Orissa P.W.D. system (Concept of C.P.W.D./Railways provisions)
10TH	1ST	3.3. Abstract of cost of estimate.

	2ND	**QUIZ**
	3RD	3.3. Abstract of cost ofestimate.
	4TH	3.4. Valuation- Value and cost, scrap value, salvage value, assessed value, sinking fund
11TH	1ST	3.4. depreciation and obsolesce
	2ND	3.4. Methods of valuation
	3RD	4. **Administrative Set-Up of engineering Organisations:** 4.1. Administrative set-up and hierarchy of Engineering department in State Govt./Central Govt./PSUs/Private Sectors etc
	4TH	4.1. Administrative set-up and hierarchy of Engineering department in State Govt./Central Govt./PSUs/Private Sectors etc
12TH	1ST	4.1 .Duties and responsibilities of Engineers at different positions /levels
	2ND	4.1 .Duties and responsibilities of Engineers at different positions /levels
	3RD	**QUIZ**
	4TH	Previous year question discussion
13TH	1ST	Previous year question discussion
	2ND	**Revision**
	3RD	**Revision**
	4TH	**Revision**

LEARNING RESOUCES:

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.

30/9/21

Sign. of Faculty concerned

30/9/21

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Madhusmita Deburi

GOVERNMENT POLYTECHNIC, KORAPUT
DEPARTMENT CIVIL ENGINEERING

Discipline: **CIVIL ENGG**	Semester: **3rd**	Name of the Teaching Faculty: **AKHIL KUMAR SAHU**
Subject: **BUILDING MATERIALS AND CONSTRUCTION TECHNOLOGY**	No. of days/per week class allotted: **05**	Semester From date: **01.10.2021** To Date: **30.01.2022** No. of Weeks: **14**
PRE-REQUISITE	Basic knowledge about Engineering Construction materials	
COURSE OUTCOMES	**CO1:** Realize the role of rock, bricks, cement, concrete, timber and steel in construction **CO2:** Classify buildings on occupancy and comprehend different components **CO3:** Understand the glossary of terms involved in foundation, masonry, wood works **CO4:** Grasp the construction details involved in a building **CO5:** Adopt necessary practices towards green construction	

Week	Class Day	Theory / Practical Topics
1ST	1ST	Classification of rock
	2ND	Uses of stone, natural bed of stone
	3RD	Qualities of good building stone
	4TH	Dressing of stone
	5TH	Characteristics of different types of stone and their uses
2ND	1ST	Brick earth – its composition
	2ND	Brick making – Preparation of brick earth
	3RD	Moulding, Drying, Burning in kilns
	4TH	Classification of bricks
	5TH	Size of traditional and modular bricks
3RD	1ST	Qualities of good building bricks
	2ND	Cement: Types of cements, Properties of cements, Manufacturing of cement
	3RD	Importance and application of blended cement with fly ash and blast furnace slag.
	4TH	Mortar: Definition and types of mortar
	5TH	Sources and classification of sand, Bulking of sand
4TH	1ST	Use of gravel, morrum and fly ash as different building material
	2ND	Concrete: Definition and composition- Water cement ratio- Workability
	3RD	Mechanical properties and grading of aggregates, mixing, placing, compacting and curing of concrete
	4TH	Timber: Classification and Structure of timber
	5TH	Seasoning of timber – Importance.
5TH	1ST	Characteristics of good timber

	2ND	Clay products and refractory materials – Definition and Classification
	3RD	Properties and uses of refractory materials- tiles, terracotta, porcelain glazing
	4TH	Uses of cast iron, wrought iron,
	5TH	Mild steel and tor steel
6TH	1ST	Composition of Paints
	2ND	Enamels
	3RD	Varnishes
	4TH	Types and uses of surface protective materials
	5TH	Distempers, Emulsion, French polish and Wax Polish
7TH	1ST	Buildings and classification of buildings based on occupancy
	2ND	Different components of a building.
	3RD	Site investigation – objectives, site reconnaissance and explorations.
	4TH	Concept of foundation and its purpose
	5TH	Types of foundations – shallow and deep
8TH	1ST	Shallow foundation-constructional details of : Spread foundations for walls, thumb rules for depth and width of foundation and thickness of concrete block
	2ND	Deep foundations: Pile foundations-their suitability, classification of piles based on materials, function and method of installation.
	3RD	Purpose of walls
	4TH	Classification of walls – load bearing, non-load bearing walls, retaining walls.
	5TH	Classification of walls as per materials of construction: brick, stone, reinforced brick, reinforced concrete, precast, hollow and solid concrete block and composite masonry walls
9TH	1ST	Partition Walls : Suitability and uses of brick and wooden partition walls
	2ND	Brick masonry : Definition of different terms
	3RD	Bond – meaning and necessity: English bond for 1and 1-1/2 Brick thick walls. T, X and right angled corner junctions. Thickness for 1and 1-1/2 brick square pillars in English bond
	4TH	Stone Masonry
	5TH	Glossary of terms –String course, corbel, cornice, block-in-course, grouting, mouldings, templates, throating, through stones, parapet, coping, pilaster and buttress
10TH	1ST	Glossary of terms used in doors and windows
	2ND	Doors – different types of doors
	3RD	Windows – different types of windows
	4TH	Purpose of use of arches and lintels
	5TH	Floors: Glossary of terms ,Types of floor finishes
11TH	1ST	Cast-in-situ, concrete flooring(monolithic, bonded), terrazzo tile flooring, cast in situ Terrazzo flooring, timber flooring
	2ND	Roofs: Glossary of terms, Types of roofs, concept and function of flat, pitched, hipped and Sloped roofs
	3RD	Stairs: Glossary of terms; Stair case, winder, landing, stringer, newel, baluster, rise, tread, width of stair case, hand rail, nosing, head room, mumty room.
	4TH	Various types of stair case – straight flight, dog legged, open well, quarter turn, half turn

	5TH	Bifurcated stair, spiral stair, cantilever stair, tread riser stair
12TH	1ST	Plastering – purpose – Types of plastering
	2ND	Types of plaster finishes – Grit finish, rough cast, smooth cast, sand faced, pebble dash, acoustic plastering and plain plaster etc.
	3RD	Proportion of mortars used for different plasters, preparation of mortars, techniques of plastering and curing
	4TH	Pointing – purpose – Types of pointing
	5TH	Painting – objectives – method of painting new and old wall surfaces, wood surface and metal surfaces – powder coating and spray painting on metal surfaces.
13TH	1ST	White washing – Colour washing – Distempering – internal and external walls.
	2ND	Damp and Termite proofing – Materials and Methods
	3RD	Concept of green building
	4TH	Introduction to Energy Management and Energy Audit of Buildings.
	5TH	Aims of energy management of buildings.
14TH	1ST	Types of energy audit, Response energy audit questionnaire
	2ND	Energy surveying and audit report.
	3RD	**QUIZ**
	4TH	**REVISION**
	5TH	**DOUBT CLEARING CLASS**

LEARNING RESOUCES:

1 Building materials & Construction by N. Subramanian
2 Engineering Materials by Rangwala
3 Building Construction by Rangwala
4 Construction Technology by Sarkar & Saraswati

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	GOVERNMENT POLYTECHNIC, KORAPUT DEPARTMENT CIVIL ENGINEERING	
Discipline: **CIVIL ENGG**	Semester: **5TH**	Name of the Teaching Faculty: **SUCHITRA LENKA , PTGF**
Subject: **ENVIRONMEN--TAL STUDIES**	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 environmental factors.	
COURSE OUTCOMES	**CO1:** The Multidisciplinary nature of environmental studies **CO2:** Natural Resources **CO3:** Systems **CO4:** Biodiversity and it's Conservation **CO5:** Environmental Pollution **CO6:** Social issues and the Environment **CO7:** Human population and the environment	

Week	Class Day	Theory / Practical Topics
1st	1st	**The Multidisciplinary nature of environmental studies:** Definition, scope and importance.
	2nd	Need for public awareness
	3rd	**Natural Resources:** Renewable and non renewable resources:
	4th	Natural resources and associated problems.
2nd	1st	**Forest resources:** Use and over-exploitation, deforestation, case studies
	2nd	Timber extraction mining, dams and their effects on forests And Tribal people.
	3rd	**Water resources:** Use and over-utilization of surface and ground water
	4th	floods, drought, conflicts over water, dam's benefits and problems.
3rd	1st	**Mineral Resources:** Use and exploitation, environmental effects of extracting and using mineralresources.
	2nd	**Food Resources:** World food problems, changes caused by agriculture and over grazing
	3rd	effects of modern agriculture, fertilizers- pesticides problems, water logging, salinity
	4th	**Energy Resources:** Growing energy need, renewable andnon-renewable energy sources, use of alternate energy sources, case studies.
4th	1st	**Land Resources:** Land as a resource, land degradation, man induceslandslides, soil erosion, anddesertification.
	2nd	Role of individual in conservation of natural resources.
	3rd	Equitable use of resources for sustainable life styles.
	4th	**Systems:** Concept of an eco system.
5th	1st	Structure and function of an eco system. Producers, consumers, decomposers.
	2nd	Energy flow in the eco systems.
	3rd	Ecological succession.
	4th	Food chains, food webs and ecological pyramids

6th	1st	Introduction, types, characteristic features, structure and function of the following eco system:
	2nd	Forest ecosystem: Aquatic eco systems (ponds, streams, lakes, rivers, oceans, estuaries).
	3rd	**Biodiversity and it's Conservation:** Introduction-Definition:
	4th	genetics, species and ecosystem diversity
7th	1st	Biogeographically classification of India.
	2nd	Value of biodiversity: consumptive use, productive use, social ethical, aesthetic and optin values
	3rd	Biodiversity at global, National and local level.
	4th	Threats to biodiversity: Habitats loss, poaching of wild life, man wildlife conflicts
8th	1st	**Environmental Pollution:** Definition Causes, effects and control measures of: Air pollution.
	2nd	Water pollution.
	3rd	Soil pollution
	4th	Marine pollution
9th	1st	Noise pollution.
	2nd	Thermal pollution
	3rd	Nuclear hazards.
	4th	**Solid waste Management:** Causes,
10th	1st	effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution.
	2nd	Disaster management: Floods, earth quake, cyclone and landslides.
	3rd	**Social issues and the Environment:** Form unsustainable to sustainable development, Urban problems related to energy
	4th	Water conservation, rain water harvesting, water shed management.
11th	1st	Resettlement and rehabilitation of people; its problems and concern
	2nd	Environmental ethics: issue and possible solutions.
	3rd	Climatechange, globalwarming,acidrain,ozonelayerdepletion, nuclear accidents and holocaust, case studies.
	4th	Air (prevention and control of pollution) Act.
12th	1st	Water (prevention and control of pollution) Act
	2nd	Public awareness.
	3rd	**Human population and the environment:** Population growth and variation among nations
	4th	Population explosion, family welfare program, Environment and human health.
13th	1st	Human rights.
	2nd	Value education, Role of information technology in environment and human health.
	3rd	**REVISION**
	4th	**QUIZ**

Learning Resources:

1. Textbook of Environmental studies Erach Bharucha # UGC
2. Fundamental concepts in EnvironmentalStudies D.D. Mishra S.Chand & Co-Ltd
3. TextbookofEnvironmental Studies K.RaghavanNambiar SCITECHPublicationPvt. Ltd
4. Environmental Engineering V.M.Domkundwar Dhanpat Rai & Co.

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	GOVERNMENT POLYTECHNIC, KORAPUT **DEPARTMENT CIVIL ENGINEERING**	
Discipline: CIVIL ENGINEERING LABORATORY I	Semester: **3rd**	Name of the Teaching Faculty: **AKHIL KUMAR SAHU , PTGF**
Subject: **CIVIL**	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 building material and concrete structure.	
COURSE OUTCOMES	**CO1.** Use Universal testing machine to determine the stress-strain relation in steel. **CO2.** Carry out tests to determine cement characteristics and strength. **CO3.** Investigate properties of aggregates **CO4.** Conduct tests to determine concrete workability and compressive strength **CO5.** To perform non-destructive tests on concrete **CO6.** To conduct strength tests on different types of bricks	

Week	Class Day	Theory / Practical Topics
1ST	1ST	Determination of Young's Modulus of steel in a tensile testing machine.
	2ND	Do
	3RD	Do
	4TH	Determination of fineness of Cement by sieving.
	5TH	Do
	6TH	Do
2ND	1ST	Determination of normal Consistency, initial and final setting time of Cement
	2ND	Do
	3RD	Do
	4TH	Determination of soundness of Cement by Le-Chatelier apparatus.
	5TH	Do
	6TH	Do
3RD	1ST	Determination of Compressive Strength of cement.
	2ND	Do
	3RD	Do
	4TH	Determination of Compressive Strength of Burnt clay, Fly Ash Bricks and Blocks.
	5TH	Do
	6TH	Do.
4TH	1ST	Grading of Fine & Coarse aggregate by sieving for concrete .

	2ND	Do
	3RD	Do
	4TH	Determination of Specific Gravity and Bulking of sand.
	5TH	Do
	6TH	Do
5TH	1ST	Determination of Specific Gravity and Bulk density of coarse aggregate.
	2ND	Do
	3RD	Do
	4TH	Grading of Road Aggregates.
	5TH	Do
	6TH	Do
6TH	1ST	Determination of Flakiness, Elongation of Road aggregates.
	2ND	Do
	3RD	Do
	4TH	Determination of Crushing Value Test of aggregates
	5TH	Do
	6TH	Do
7TH	1ST	Los-Angeles Abrasion Test of aggregate.
	2ND	Do
	3RD	Do
	4TH	Impact test of aggregate.
	5TH	Do
	6TH	Do
8TH	1ST	Determination of soundness test of road aggregates.
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
	6TH	Do
9TH	1ST	Determination of Compressive Strength of concrete cubes
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
	6TH	Do
10TH	1ST	Determination of Workability of concrete by: a) Slump Cone method,
	2ND	Do
	3RD	Do
	4TH	b) Compaction Factor method.
	5TH	Do
	6TH	Do
11TH	1ST	Demonstration on Rebound hammer
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
	6TH	Do
12TH	1ST	Ultrasonic Pulse Velocity measuring Instrument.
	2ND	Do
	3RD	Do

	4TH	Do
	5TH	Do
	6TH	Do
13TH	1ST	**Record marking and final viva**
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
	6TH	Do

LEARNING RESOUCES :

1. Concrete Manual-A Laboratory Manual For Quality of Concrete, M. L. Gambhir # Dhanpat Rai & Co. Pvt. Ltd.
2. Cement,Aggregate and concrete Laboratory Manual, Dr. M.Chakraborty
3. Highway material testing Laboratory manua, S.K.Khanna & C.E.G.Justo

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	GOVERNMENT POLYTECHNIC, KORAPUT DEPARTMENT CIVIL ENGINEERING	
Discipline: **CIVIL ENGG**	Semester: **3rd**	Name of the Teaching Faculty: **AKHIL KUMAR SAHU , PTGF**
Subject: **ESTIMATION PRACTICE-1**	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.	
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 Preparation of plinth area estimate & detailed estimate for the following ; 1.1 Single storeyed two roomed building with specification as per Orissa P.W.D. schedule of rates and analysis of rates
	2nd	**Practice**
	3rd	**Practice**
2nd	1st	**Practice**
	2nd	**Practice**
	3rd	**Practice**
3rd	1st	**Practice**
	2nd	**Practice**
	3rd	**RECORD CHECKING & TEST**
4th	1st	1.2 A two storeyed pucca Building with specification as per Orissa P.W.D. schedule of rates and analysis of rates
	2nd	**Practice**
	3rd	**Practice**
5th	1st	**Practice**
	2nd	**Practice**
	3rd	**Practice**
6th	1st	**Practice**
	2nd	**Practice**
	3rd	**Practice**
7th	1st	**Practice**
	2nd	**Practice**
	3rd	**RECORD CHECKINF & TEST**

8th	1st	Analysis of rates in detail for the above items of works basing on Orissa Govt. analysis of rate with help of MS Excel software
	2nd	**Practice**
	3rd	**Practice**
9th	1st	**Practice**
	2nd	**Practice**
	3rd	**RECORD CHECKING &TEST**
10th	1st	Calculation of dry materials for different items of building basing On Orissa Govt. analysis of rate with help of MS Excel software.
	2nd	**Practice**
	3rd	**Practice**
11th	1st	**Practice**
	2nd	**Practice**
	3rd	**RECORD CHECKING &TEST**
12th	1st	Preparation of abstract of cost and bill of quantities of the estimates as per item no. 1.0 above with help of MS Excel software
	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 Pv. Ltd
4. Latest Orissa PWD Schedule of Rates & Analysis of rates , Govt. of Odisha #Govt. of Odish

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GOVERNMENT POLYTECHNIC, KORAPUT
DEPARTMENT CIVIL ENGINEERING

Discipline: **CIVIL ENGG.**	Semester: 3rd	Name of the Teaching Faculty: **AKHIL KUMAR SAHU , PTGF**
Subject: **STUDENT CENTRED ACTIVITIES**	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 English language and technical concepts.	
COURSE OUTCOMES	**CO1:** **CO2:** **CO3:** **CO4**	

Week	Class Day	Theory / Practical Topics
1ST	1ST	**Behavioural skills**
	2ND	Practice
	3RD	Practice
2ND	1ST	**Tell me about yourself.**
	2ND	Practice
	3RD	Practice
3RD	1ST	Writing Skills
	2ND	Practice
	3RD	Practice
4TH	1ST	How to write a formal mail
	2ND	Practice
	3RD	Practice
5TH	1ST	How to write a memo & script wrtting
	2ND	Practice
	3RD	Practice
6TH	1ST	**Developing visualizing skills**
	2ND	Practice
	3RD	Practice
7TH	1ST	**Communication and verbal ability**
	2ND	Practice
	3RD	Practice
8TH	1ST	How to make a CV
	2ND	Practice

	3RD	Practice
9TH	1ST	How to make a Resume
	2ND	Practice
	3RD	Practice
10TH	1ST	Making of a story
	2ND	Practice
	3RD	Practice
11TH	1ST	Making of PPT (power-point presentation)
	2ND	Practice
	3RD	Practice
12TH	1ST	Debate
	2ND	Practice
	3RD	Practice
13TH	1ST	Role play
	2ND	Practice
	3RD	Practice

LEARNING RESOUCES :

1. Business Communication- concepts, cases & applications,Chaturvedi & Chaturvedi
2. Soft Skills K Alex, S Chand
3. Business Communication for Managers, P. Mehra, Pearson

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	GOVERNMENT POLYTECHNIC, KORAPUT **DEPARTMENT CIVIL ENGINEERING**	
Discipline: **CIVIL ENGG.**	Semester: **3rd**	Name of the Teaching Faculty: **SUCHITRA LENKA , PTGF**
Subject: CIVIL ENGINEERING DRAWING I	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 Engg. Drawing & AutoCAD	
COURSE OUTCOMES	**CO1:** Use AutoCAD modules to prepare engineering drawings **CO2:** Comprehend various drawing commands available in CAD software **CO3:** Prepare plan, elevation and section views of flat roof buildings **CO4:** Prepare plan, elevation and section views of inclined roof buildings **CO5:** Generate drawings of building citing material differences	

Week	Class Day	Theory / Practical Topics
1ST	1ST	1. AutoCAD SOFTWARE. 1.1 Recap of the Draw, Format, Edit, Dimension, Modify commands
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
2ND	1ST	1.2 Draw 2D drawings of the following Building Components - Doors, Windows, Cross section through wall, Spread footing, Column footing, Stairs case, R.C.C. T-beam and slab
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
3RD	1ST	1.3 Develop Isometric drawings of simple objects
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
4TH	1ST	1.4 Develop 3D drawings of simple objects.

	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
5TH	1ST	2 PLAN, ELEVATION AND SECTIONAL ELEVATION OF FLAT ROOF BUILDING FROM LINE DIAGRAM AND GIVEN SPECIFICATIONS with use of AutoCAD software. 2.1 Plan at window sill level of a single storeyed R.C. roof slab building with elevation and sectional views form given line diagram and specification.
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
6TH	1ST	2.2 Detail drawing of Double storeyed pucca building with R.C.C. stair case from line diagram and given specification.
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
7TH	1ST	2.3 Preparation of approval drawing of a residential building as per the norms of local approving authority with site plan, index plan etc
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
8TH	1ST	3 PLAN, ELEVATION AND SECTION OF INCLINED ROOF BUILDING WITH AC SHEET/GCI/TILES ON WOODEN STRUCTURE with use of AutoCAD Commands Detail drawing of inclined roof building from given line diagram and specification. (gabbled / hipped)
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
9TH	1ST	4. BUILDING PLANNING 4.1 Planning of buildings for specific cost based on approximate plinth area rate.
	2ND	Do
	3RD	Do

	4TH	Do
	5TH	Do
10TH	1ST	4.2 Orientation of buildings, location of openings and living areas.
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
11TH	1ST	4.3 Line plan of School, hostel, market complex and dispensary building. E. RECOMMENDED
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
12TH	1ST	Record checking and test
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do
13TH	1ST	Final viva
	2ND	Do
	3RD	Do
	4TH	Do
	5TH	Do

LEARNING RESOUCES :

1. M.Chakrobarty , Civil Engg. Drawing , M.Chakrobarty.
2. B.P.Verma, Civil Engineering drawing &House Planning , Khanna Publishers
3. V.Thanikachalama & K.V Natarajan, Civil Engineering drawing Manual, S Chand & Co Pvt Ltd

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