



GOVERNMENT POLYTECHNIC, KORAPUT DEPARTMENT CIVIL ENGINEERING


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| Discipline: CIVIL ENGG | Semester: 4TH | Name of the Teaching Faculty: ABHISEK MOHANTY, PTGF |
| Subject: STRUCTURAL DESIGN I | No. of days/pe rweek class allotted: 05 | Semester From date: 13.02.2023 To Date: 23.05.2023 No. of Weeks: 13 |
| PRE-REQUISITE | Basic knowledge about Engineering mechanics, som | |
| COURSE OUTCOME S | 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 | Clas s Day | Theory / Practical Topics |
| 1 ST | 1 ST | Working stress method (WSM). Objectives of design and detailing & different methods of design of concrete structure |
| | 2 ND | Introduction to reinforced concrete, grades of concrete and steel, advantages of reinforced cement concrete, concept of under reinforced, balanced & over reinforced section |
| | 3 RD | Assumptions in working stress method, derivation of formula for balanced design |
| | 4 TH | Problem discussion on finding out the design constants and analysis of the section using WSM |
| | 5 TH | Problem discussion on design of the section using WSM |
| 2 ND | 1 ST | Definition, advantages of LSM over WSM, Limit state of collapse & serviceability, Characteristic strength of material |
| | 2 ND | characteristic load, partial safety factor, design load, loading on structure, I.S specification regarding spacing of reinforcement in slab |
| | 3 RD | IS specification regarding cover to reinforcement and minimum reinforcement in slab, beam & column, concept of lapping, anchorage, effective span for beam and slab. |
| | 4 TH | Assumptions, idealised stress - strain curve for steel and concrete |
| | 5 TH | Design stress block parameter, derivation of formula for singly reinforced rectangular beam |
| 3 RD | 1 ST | Finding out M.R, limiting M.R, percentage of steel and limiting percentage of steel |
| | 2 ND | Problem discussion on finding out the type of the beam |
| | 3 RD | Problem discussion on analysis of singly reinforced section |
| | 4 TH | Problem discussion on analysis of singly reinforced section |
| | 5 TH | QUIZ |
| 4 TH | 1 ST | Problem discussion on design of singly reinforced beam |
| | 2 ND | Problem discussion on design of singly reinforced beam |
| | 3 RD | Necessity of providing doubly reinforced beam, stress & strain diagram, finding out depth of N.A and moment of resistance |


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| | 4 TH | Finding out the area of tensile & compression reinforcement, problem discussion on analysis of doubly reinforced beam |
| | 5 TH | Problem discussion on analysis of doubly reinforced beam |
| 5 TH | 1 ST | Problem discussion on design of doubly reinforced beam |
| | 2 ND | Problem discussion on design of doubly reinforced beam |
| | 3 RD | Nominal shear stress, design shear strength of concrete, maximum shear stress, criteria of minimum shear reinforcement and different forms of shear reinforcement |
| | 4 TH | Problem discussion on design of shear reinforcement in beam |
| | 5 TH | Concept of bond, types of bond, bond stress, development length for tension and compression, anchorage values for hook and bend, Problem discussion on checking of development length criteria in beams. |
| 6 TH | 1 ST | QUIZ |
| | 2 ND | General features, advantages, effective width of flange |
| | 3 RD | Finding out position of neutral axis, Analysis of singly reinforced T – beam, stress-strain diagram |
| | 4 TH | Problem discussion on finding moment of resistance of a Tbeam section with N.A lies within the flange. |
| | 5 TH | Derivation of formula for T – beam section when the N.A lies in the web |
| 7 TH | 1 ST | Problem discussion on design of simply supported beam along with provision of check for flexure |
| | 2 ND | Problem discussion on design of simply supported beam along with provision of check for flexure |
| | 3 RD | Design of simply supported beam along with check for deflection and detailing of the beam |
| | 4 TH | Problem discussion on analysis of the T – Beam section |
| | 5 TH | QUIZ |
| 8 TH | 1 ST | Concept of one way and two way spanning slab, reinforcement requirement, shear stress, spacing of reinforcement, cover and development length criteria for slab |
| | 2 ND | Design of simply supported one way slab with design of flexure |
| | 3 RD | Design of slab with check for shear and development length. |
| | 4 TH | Design of slab with check for deflection and detailing of the slab. |
| | 5 TH | Design of cantilever slab with check for flexure, check for shear, development length, deflection and detailing of the slab |
| 9 TH | 1 ST | Design of two way simply supported slab - moment and shear force calculation |
| | 2 ND | Design of two way slab with corners free to lift – design of flexure |
| | 3 RD | Design of two way slab with provision of check for shear and development length |
| | 4 TH | Design of two way slab with check for deflection and detailing of the slab |
| | 5 TH | Types of staircase, structural classification of staircase, Loads and their effect on stair slab |
| 10 TH | 1 ST | QUIZ |
| | 2 ND | Design of stair slab spanning longitudinally – design of main bar, distribution bar and detailing of the staircase |
| | 3 RD | Design of a waist slab type dog legged stair case – load and moment calculation |
| | 4 TH | Design of a waist slab type dog legged stair case – design of main bar, distribution bar and detailing of the slab |
| | 5 TH | definition and classification of column, assumptions in limit state of collapse |
| 11 TH | 1 ST | Effective length of column, specification for longitudinal & transverse reinforcement. |
| | 2 ND | Minimum eccentricity and ultimate load carrying capacity of column |
| | 3 RD | Design of a short axially loaded square column and detailing |

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| | 4 TH | Definition, Types of foundation , Bearing capacity of soil & depth of foundation, determination of area of footing from load and bearing capacity of soil |
| | 5 TH | Analysis of foundation – critical section for bending moment and shear force, transfer of load at base of column |
| 12 TH | 1 ST | QUIZ |
| | 2 ND | Introduction to reinforced concrete, grades of concrete and steel, advantages of reinforced cement concrete, concept of under reinforced, balanced & over reinforced section |
| | 3 RD | Assumptions in working stress method, derivation of formula for balanced design |
| | 4 TH | Assumptions in working stress method, derivation of formula for balanced design |
| | 5 TH | Problem discussion on design of the section using WSM |
| 13 TH | 1 ST | QUIZ |
| | 2 ND | Rivision |
| | 3 RD | Rivision |
| | 4 TH | Rivision |
| | 5 TH | Rivision |

LEARNING RESOURCES:

- 1 N.Subramanian ,Design of Reinforced Concrete Structures (Oxford Pbln)
- 2 N.C.Sinha,S.K.Roy, Fundamentals of Reinforced Concrete (S.Chand)
- 3 H.J Saha., Reinforced Concrete (Charotar Publishing house)
- 4 Pillai & Menon., Reinforced Concrete Structures (Tata McGraw Hill Education Private Limited)


 Sign. of Faculty concerned
 13/02/23


 Sign. of HOD

Madhusmita Dehuri
 HOD, Civil Department
 Govt. Polytechnic, Koraput



**GOVERNMENT POLYTECHNIC, KORAPUT
DEPARTMENT CIVIL ENGINEERING**

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| Discipline: CIVIL ENGG | Semester: 4TH | Name of the Teaching Faculty: SHREEKANTA SAMAL,PTGF |
| Subject: HYDRAULIC AND IRRIGATION ENGG | No. of days/pe rweek class allotted: 05 | Semester From date: 13.02.2023 To Date: 23.05.2023 No. of Weeks: 13 |
| PRE-REQUISIT E | Basic knowledge about Engineering mechanics.SOM, | |
| COURSE OUTCOME S | CO1: Define common fluid properties and interpret results CO2: Realize the science behind fluid flow and compute fluid flow characteristics CO3: Realize the working principle of hydraulic pumps and evaluate their performance CO4: Comprehend the need of irrigation CO5: Determine cause and effect of water logging | |
| Week | Clas s Day | Theory / Practical Topics |
| 1 ST | 1 ST | HYDROSTATICS: Properties of fluid: Density, Specific weight, Specific gravity, Compressibility & Units of these properties |
| | 2 ND | Capillarity(capillary height, effect of capillarity on meniscus of water and mercury) Surface Tension(definition, unit) |
| | 3 RD | Viscosity(definition, mathematical expression, unit) and uses of viscosity. Pressure and its measurements: Definition of intensity of pressure, its variation with height, Atmospheric pressure, gauge pressure Atmospheric pressure, gauge pressure, pressure head and pressure gauges |
| | 4 TH | Pressure exerted on an immersed surface: Total pressure and Resultant pressure, Expression for total pressure & Pressure Exerted on horizontal & vertical surface |
| | 5 TH | QUIZ & ASSIGNMENT-I |
| 2 ND | 1 ST | KINEMATICS OF FLUID FLOW: Basic equation of fluid flow and their application: Rate of discharge, Equation of continuity of liquid flow, Total energy of a liquid |
| | 2 ND | Potential, kinetic & pressure Energy |
| | 3 RD | Bernoulli's theorem and its limitations |
| | 4 TH | Practical applications of Bernoulli's equation |
| | 5 TH | Numericals Practice |
| 3 RD | 1 ST | Flow over Notches and Weirs: Notches, Weirs. Types of notches and weirs |
| | 2 ND | Discharge through different types of notches & weirs and application of notches & weirs |
| | 3 RD | Types of flow through the pipes: Uniform and non uniform flow & examples of uniform & non uniform flow |
| | 4 TH | Laminar and Turbulent flow, rotational & irrigational flow, examples, Steady and unsteady flow; Reynolds's number and its application |
| | 5 TH | Losses of head of a liquid flowing through pipes: Different types of major losses. Simple numerical problems on losses due to friction using Darcy's equation. Different types of minor losses ,Total energy lines & hydraulic gradient lines(Concept Only) |
| 4 TH | 1 ST | QUIZ & ASSIGNMENT-II |

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| | 2 ND | Flow through the Open Channels: Definition of open channel flow, difference between ocf & pipe flow, Types of channel sections-Rectangular sections, Trapezoidal and Circular sections |
| | 3 RD | Reynolds number, velocity distribution for open channel flow, Discharge formulae- Chezy's Formula, Manning's equation |
| | 4 TH | Best economical section & expressions for economical section |
| | 5 TH | Numericals Practice |
| 5 TH | 1 ST | PUMPS: TYPES OF PUMPS: Centrifugal Pump: Basic principles, operation, discharge, Horse power & efficiency of Centrifugal Pump |
| | 2 ND | Reciprocating pumps: types, operation, discharge, Horse power & efficiency of Reciprocating pumps, |
| | 3 RD | Discussion for internal exam |
| | 4 TH | Numericals Practice |
| | 5 TH | Internal Exam |
| 6 TH | 1 ST | QUIZ & ASSIGNMENT-III |
| | 2 ND | HYDROLOGY: Hydrology Cycle, Rainfall: Types and intensity of Rainfall, Hyetograph |
| | 3 RD | Estimation of rainfall data, Rain gauges, Its types (concept only) |
| | 4 TH | Concept of catchment area, Types, run-off, Estimation of flood discharge by Dickens's and Reeve's formula |
| | 5 TH | Discussion on internal exam questions & distribution of evaluated answer sheet |
| 7 TH | 1 ST | WATER REQUIREMENT OF CROPS: Definition of irrigation, necessity of irrigation, benefits of irrigation, Crop seasons, Duty, types of irrigation of irrigation |
| | 2 ND | Delta and base period their relationships, Overlap allowance, Kharif and Rabi crops |
| | 3 RD | Gross command area, culturable command area Intensity of Irrigation, Irrigable area, Time factor, Crop ratio |
| | 4 TH | Numericals Practice |
| | 5 TH | QUIZ & ASSIGNMENT-IV |
| 8 TH | 1 ST | FLOW IRRIGATION: Canal irrigation, Types of canals, Canal irrigation, Types of canals |
| | 2 ND | Different components of irrigation canals and their functions |
| | 3 RD | Sketches of different canal cross-sections, Classification of canals according to their alignment |
| | 4 TH | Various types of canal lining |
| | 5 TH | Advantages and disadvantages of canal lining |
| 9 TH | 1 ST | WATER LOGGING AND DRAINAGE : Causes and effects of water logging, Detection, prevention and remedies of water logging |
| | 2 ND | DIVERSION HEAD WORKS AND REGULATORY STRUCTURES: Necessity and objectives of diversion head works |
| | 3 RD | Weirs and Barrages |
| | 4 TH | QUIZ & ASSIGNMENT-V |
| | 5 TH | Functions of different parts of barrage, Silting and scouring |
| 10 TH | 1 ST | Functions of regulatory structures |
| | 2 ND | CROSS DRAINAGE WORKS : Functions and necessity of Cross drainage works |
| | 3 RD | Aqueduct, Siphon |
| | 4 TH | Superpassage, level crossing, |
| | 5 TH | Concept of each with help of neat sketch |
| 11 TH | 1 ST | Numericals & Problems |
| | 2 ND | QUIZ & ASSIGNMENT-VI |
| | 3 RD | DAMS: |
| | 4 TH | Necessity of storage reservoirs, types of dams |
| | 5 TH | Earthen dams: Types and description |
| 12 TH | 1 ST | Causes of failure and protection measures |
| | 2 ND | Gravity dam- types and description |

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| | 3 RD | Causes of failure and protection measures, Spillways- Types (With Sketch) and necessity |
| | 4 TH | Practical approach of dam |
| | 5 TH | Site knowledge |
| 13 TH | 1 ST | Revision |
| | 2 ND | Revision |
| | 3 RD | Revision |
| | 4 TH | Revision |
| | 5 TH | Revision |

LEARNING RESOURCES:

- 1 D.R. Biswal Hydraulics & Fluid Mechanics Kalyani Pbln
- 2 R.K. Rajput A Text Book of Fluid Mechanics & Hydraulic machines S.Chand
- 3 S.K. Garg Irrigation Engineering & Hydraulics Structures Khanna Publishers
- 4 S.K. Sharma Irrigation Engineering & Hydraulic structures. S. Chand Pbln

Shreekantha Samal,
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 HOD, Civil Department
 Govt. Polytechnic, Koraput



**GOVERNMENT POLYTECHNIC, KORAPUT
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| Discipline: CIVIL ENGG | Semester: 4TH | Name of the Teaching Faculty: RABI NARAYAN HOTA , PTGF |
| Subject: LAND SURVEY I | No. of days/pe rweek class allotted: 05 | Semester From date: 13.02.2023 To Date: 23.05.2023 No. of Weeks: 13 |
| PRE-REQUISIT E | Basic knowledge about Engineering mechanics. | |
| COURSE OUTCOME S | CO1: Define various survey terminology and carryout necessary corrections for errors CO2: Comprehend the principle, purpose, equipment and error corrections CO3: Comprehend the principle, purpose, equipment and error corrections CO4: Comprehend the map nomenclature and apply skills in map interpretation CO5: Gather skill towards leveling and contouring with knowledge of purpose | |
| Wee k | Clas s Day | Theory / Practical Topics |
| 1 ST | 1 ST | INTRODUCTION TO SURVEYING, LINEAR MEASUREMENTS: |
| | 2 ND | Surveying: Definition, Aims and objectives : The importance of surveying in many phases of engineering. |
| | 3 RD | Principles of survey(a) Location of a point by measurement from two points of reference (b) working from whole to part ; Plane surveying- Geodetic Surveying- Instrumental surveying |
| | 4 TH | Difference between Precision and accuracy of measurements, instruments used for measurement of distance: (a) direct method (b) optical method (c) electromagnetic method |
| | 5 TH | Types of tapes : (a) linen or cloth tape (b)glass fibre tape (c)metallic tape (d)steel tape (e)invar tape and Types of chains: (a)metric chain (b)Gunter' chain (c) engineer's chain (d)revenue chain (e)steel band chain |
| 2 ND | 1 ST | QUIZ |
| | 2 ND | Errors and mistakes in linear measurement – classification: mistakes ,systematic error and accidental error, Sources of errors: Instrumental error, Personal error and natural error and remedies |
| | 3 RD | Corrections to measured lengths due to-incorrect length, temperature variation |
| | 4 TH | Corrections to measured lengths due to- pull, sag, numerical problem applying corrections |
| | 5 TH | CHAINING AND CHAIN SURVEYING : |
| 3 RD | 1 ST | Equipment and accessories for chaining : chain or tape, arrows , pegs, ranging rod, offset rod, plasterer's lath and whites , plumb bob |
| | 2 ND | Ranging – Purpose, signaling :signal by the surveyor and action by the assistant ,two methods of ranging: direct and indirect ranging, Line ranger – features and use, error due to incorrect ranging |
| | 3 RD | QUIZ |
| | 4 TH | Methods of chaining –Chaining on flat ground, Chaining on sloping ground – stepping method, Clinometer-features and use, slope correction |
| | 5 TH | Setting perpendicular with chain & tape: (a) To erect a perpendicular to a chain line from a point on it (b) To drop a perpendicular to a chain line |

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| | | from a point outside it . Chaining across different types of obstacles:(a) obstacles to ranging but not chaining (b)obstacle to chaining but not ranging (c)obstacle to both chaining and ranging – Numerical problems on chaining across obstacles |
| 4 TH | 1 ST | Purpose of chain surveying, Its Principles, concept of field book. Selection of survey stations, base line, tie lines, Check lines |
| | 2 ND | Offsets – Necessity, Perpendicular and Oblique offsets, Instruments for setting offset – Cross Staff, Optical Square , Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying |
| | 3 RD | ANGULAR MEASUREMENT AND COMPAS SURVEYING : Measurement of angles with chain, tape & compass |
| | 4 TH | Compass – Types: (a)prismatic compass (b)surveyor compass, features, parts, merits & demerits, testing & adjustment of compass: (a)temporary adjustment (b)permanent adjustment |
| | 5 TH | Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing |
| 5 TH | 1 ST | suitability of application, numerical problems on conversion of bearings |
| | 2 ND | QUIZ |
| | 3 RD | Use of compasses – setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing, |
| | 4 TH | Numerical problems on computation of interior & exterior angles from bearings. |
| | 5 TH | Effects of earth's magnetism – dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination |
| 6 TH | 1 ST | Errors in angle measurement with compass – sources & remedies, Principles of traversing – open & closed traverse, Methods of traversing |
| | 2 ND | Local attraction – causes, detection, errors, corrections, Numerical problems of application of correction due to local attraction |
| | 3 RD | Errors in compass surveying – sources & remedies |
| | 4 TH | Plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table |
| | 5 TH | MAP READING CADASTRAL MAPS & NOMENCLATURE: Study of direction, Scale, Grid Reference and Grid Square |
| 7 TH | 1 ST | QUIZ |
| | 2 ND | PLANE TABLE SURVEYING : Objectives and principles of plane table surveying,use of plane table surveying |
| | 3 RD | Instruments & accessories used in plane table surveying :1. The plane table with leveling head having arrangements for (a) leveling (b) rotation about vertical axis and (c)clamping in any required position 2. Alidade for sighting 3. Plumbing fork and plumb bob 4. Spirit level 5. Compass 6. Drawing paper with a rainproof cover |
| | 4 TH | Methods of plane table surveying – (1) Radiation, (2) Intersection ,Methods of plane table surveying – (3) Traversing, (4) Resection. |
| | 5 TH | THEODOLITE SURVEYING AND TRAVERSING: Purpose and definition of theodolite surveying |
| 8 TH | 1 ST | Transit theodolite- Description of features, component parts, Fundamental axes of a theodolite |
| | 2 ND | Measurement of magnetic bearings, deflection angle, direct angle, setting out angles |
| | 3 RD | QUIZ |
| | 4 TH | Methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method |
| | 5 TH | Traverse computation – consecutive coordinates, latitude and departure, Gale's traverse table |
| 9 TH | 1 ST | Closing error – adjustment of angular errors, adjustment of bearings, |

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| | | numerical problems on closing error |
| | 2 ND | Balancing of traverse – Bowditch's method |
| | 3 RD | transit method, graphical method, axis method, concept of vernier, reading a vernier, Temporary adjustment of theodolite |
| | 4 TH | LEVELLING AND CONTOURING :Definition and Purpose and types of leveling – concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M. |
| | 5 TH | Instruments used for leveling, concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis. |
| 10 TH | 1 ST | Levelling staff – Temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI |
| | 2 ND | Field data entry – level Book – height of collimation method and Rise & Fall method, comparison |
| | 3 RD | Numerical problems on reduction of levels applying both methods, Arithmetic checks |
| | 4 TH | Effects of curvature and refraction, numerical problems on application of correction. |
| | 5 TH | Reciprocal leveling – principles, methods, numerical problems, precise leveling |
| 11 TH | 1 ST | Errors in leveling and precautions, Permanent and temporary adjustments of different types of levels |
| | 2 ND | QUIZ |
| | 3 RD | Definitions, concepts and characteristics of contour |
| | 4 TH | Methods of contouring, plotting contour maps, Interpretation of contour maps, toposheets |
| | 5 TH | Use of contour maps on civil engineering projects – drawing crosssections from contour maps |
| 12 TH | 1 ST | locating proposal routes of roads / railway / canal on a contour map, computation of volume of earthwork from contour map for simple structure |
| | 2 ND | Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.) |
| | 3 RD | Interpret Physical landform (i.e.: Relief, Drainage Pattern etc.), Problem Solving and Decision Making |
| | 4 TH | COMPUTATION OF AREA & VOLUME :Determination of areas computation of areas from plans |
| | 5 TH | Calculation of area by using ordinate rule |
| 13 TH | 1 ST | QUIZ |
| | 2 ND | trapezoidal rule |
| | 3 RD | Simpson's rule. Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes |
| | 4 TH | QUIZ |
| | 5 TH | Rivision |

LEARNING RESOURCES:

- 1 Dr.B.C.Punmia. Surveying, Vol.-I&II Laxmi Publication
- 2 R. Agor A text Book of Surveying & Levelling Khanna Publishers
- 3 N.N Basak. Surveying & Levelling TMH Publishing

Rabinarayan HOD
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13/02/23


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**GOVERNMENT POLYTECHNIC, KORAPUT
DEPARTMENT CIVIL ENGINEERING**

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| Discipline: CIVIL ENGG | Semester: 4TH | Name of the Teaching Faculty: MADHUSMITA DEHURI, HOD CIVIL |
| Subject: HIGHWAY ENGINEERING | No. of days per week class allotted: 05 | Semester From date: 13.02.2023 To Date: 23.05.2023 No. of Weeks: 13 |
| PRE-REQUISITE | Basic knowledge about Physics & Geotechnical Engg., SOM, RCC | |
| COURSE OUTCOMES | CO1: Realize significance of the highway transportation CO2: Acquaint themselves with road geometric terms CO3: Select proper road construction materials CO4: Comprehend the pavements and their types CO5: Acquire knowledge on common construction equipment | |
| Week | Classes Day | Theory / Practical Topics |
| 1 ST | 1 ST | Introduction: Importance of Highway transportation: importance organizations like Indian roads congress |
| | 2 ND | Ministry of Surface Transport |
| | 3 RD | Central Road Research Institute Functions of Indian Roads Congress |
| | 4 TH | IRC classification of roads, Organisation of state highway department |
| | 5 TH | QUIZ |
| 2 ND | 1 ST | Road Geometrics : Glossary of terms used in geometric and their importance |
| | 2 ND | Right of way, formation width, Road margin, road shoulder |
| | 3 RD | Carriage way, side slopes |
| | 4 TH | Kerbs, formation level, Camber, Gradient |
| | 5 TH | Design and average running speed, Stopping sight distance, Passing sight distance |
| 3 RD | 1 ST | QUIZ |
| | 2 ND | Necessity of curves Horizontal and Vertical curves, including transition curves |
| | 3 RD | Concept of Super elevation, mathematical expression for super elevation |
| | 4 TH | Methods of providing super elevation |
| | 5 TH | Road Materials: Difference types of road materials in use: soil, aggregates, and binders |
| 4 TH | 1 ST | Function of soil as highway Subgrade |
| | 2 ND | California Bearing Ratio: methods of finding CBR valued in the laboratory at site and their significance |
| | 3 RD | Testing of aggregates: Abrasion test |
| | 4 TH | Impact test, Crushing strength test |
| | 5 TH | Water absorption test & Soundness test |
| 5 TH | 1 ST | Discussion on units learned |
| | 2 ND | QUIZ |
| | 3 RD | Road Pavements: Road Pavement: Definition of Flexible and Rigid pavement, Merits and demerits of |

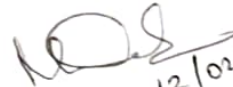
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| | | different pavements and typical cross-sections |
| | 4 TH | Functions of various components of Flexible pavements |
| | 5 TH | Sub-grade preparation: Setting out alignment of road |
| 6 TH | 1 ST | Setting out of bench marks, borrow pits |
| | 2 ND | Control pegs for embankment and cutting |
| | 3 RD | Making profile of embankment |
| | 4 TH | Construction of embankment |
| | 5 TH | Compaction, methods of compaction, necessity of compaction |
| 7 TH | 1 ST | stabilization, methods of stabilization, necessity of stabilization |
| | 2 ND | Preparation of subgrade as per recommendations of IRC Equipment used for subgrade preparation, Methods of checking camber |
| | 3 RD | QUIZ |
| | 4 TH | Gradient and alignment |
| | 5 TH | Sub base Course: Necessity of sub base, stabilized sub base |
| 8 TH | 1 ST | Purpose of stabilization (no designs) |
| | 2 ND | Types of stabilization: Mechanical stabilization , Lime stabilization |
| | 3 RD | Cement stabilization, Fly ash stabilization |
| | 4 TH | Base Course: Preparation of base course, Brick soling, Stone soling and metalling |
| | 5 TH | Water Bound Macadam and Wet-mix Macadam , Bituminous constructions and Different types |
| 9 TH | 1 ST | Surfacing: Surface dressing (i) Premix carpet and (ii) Semi dense carpet |
| | 2 ND | Hill Roads: Introduction: Typical cross-sections showing details of a typical hill road in cut |
| | 3 RD | Typical cross-sections showing details of a typical hill road partly in cutting and partly in filling |
| | 4 TH | QUIZ |
| | 5 TH | Breast Walls & its importance , Retaining walls, different types of bends |
| 10 TH | 1 ST | Road Drainage: Necessity of road drainage work |
| | 2 ND | Types of Cross drainage works |
| | 3 RD | Surface and Sub-surface drains |
| | 4 TH | Storm water drains, Location |
| | 5 TH | Spacing and typical details of side drains , Side ditches for surface drainage, intercepting drains, Pipe drains in hill roads |
| 11 TH | 1 ST | Side ditches for surface drainage, intercepting drains, Pipe drains in hill roads |
| | 2 ND | Details of drains in cutting embankment |
| | 3 RD | Typical cross sections of road drainage |
| | 4 TH | Road Maintenance : Common types of road failures – their causes and remedies |
| | 5 TH | Maintenance of bituminous road such as patch work and resurfacing |
| 12 TH | 1 ST | QUIZ |
| | 2 ND | Maintenance of concrete roads – filling cracks, repairing joints |
| | 3 RD | Maintenance of shoulders (berm), maintenance of traffic control devices |
| | 4 TH | Basic concept of traffic study, Traffic safety and traffic control signal |
| | 5 TH | Construction equipments: Preliminary ideas of plant and equipment : Hot mixing plant Tipper |
| 13 TH | 1 ST | Tractors (wheel and crawler), Scraper |
| | 2 ND | Bulldozer, Dumpers, Shovels, Graders, Roller dragline, Road pavers |
| | 3 RD | Asphalt mixer and Tar boilers , Modern construction equipments for roads |
| | 4 TH | Revision |
| | 5 TH | QUIZ |

LEARNING RESOURCES:

- 1 S.K.Khanna & C.E.G. Justo Highway Engineering Nem Chand & Bros
- 2 S.P.Chandola A Text Book Of Transportation Engineering S. Chand
- 3 S.P.Bindra A course on Highway engineering Dhanpat Rai Publications
- 4 S.K. Sharma Principles, practices & design of Highway Engineering. S. Chand


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

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| Discipline: CIVIL ENGG. | Semester: 4th | Name of the Teaching Faculty: RABINARAYAN HOTA , PTGF |
| Subject: LAND SURVEY PRACTICE I | No. of days/per week class allotted: 07 | Semester From date: 13.02.2023 To Date: 23.05.2023 No. of Weeks: 13 |
| PRE-REQUISITE | Basic knowledge about Topography and measurement. | |
| COURSE OUTCOMES | CO1: Conduct compass surveying and record data in necessary format. CO2: Read, interpret and verify a map. CO3: Setup plane table and conduct survey using different methods. CO4: Use of theodolite and plot the traverse and contour maps. | |
| Week | Class Day | Theory / Practical Topics |
| 1 ST | 1 ST | Linear Measurements, Chaining and Chain Surveying: |
| | 2 ND | Do |
| | 3 RD | Do. |
| | 4 TH | Setting out different types of triangles, given the lengths of sides with chain and tape. |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | DO |
| 2 ND | 1 ST | Setting oblique offsets to objects (at least 3) from a chain using tape |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Angular Measurement and Compass Surveying: |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |
| 3 RD | 1 ST | Testing and adjustment of Prismatic compass and Surveyor's compass. |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | |


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| | | Setting out a closed traverse of 5 sides, using prismatic compass, given bearing of one line and included angles and lengths of sides. |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |
| 4 TH | 1 ST | Map Reading Cadastral Maps & Nomenclature: |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Study of Signs and Symbols |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |
| 5 TH | 1 ST | Positions of existing Control Points and its types |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Plane Table Surveying |
| | 5 TH | Do. |
| | 6 TH | Do |
| | 7 TH | Do |
| 6 TH | 1 ST | Setting up of Plane Table and Plotting five points by radiation method and five inaccessible points by intersection method. |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Plane table surveying by Resection method (two point & three point problem method) |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |
| 7 TH | 1 ST | Theodolite Traversing |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Prolonging a given straight line with the help of a theodolite |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |
| 8 TH | 1 ST | Setting out an open traverse with 5 sides and entering the field data |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Leveling and Contouring: |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |
| 9 TH | 1 ST | Determining Reduced Levels of five given points taking staff readings with Levels. |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Locating contour points in the given area by direct method / indirect |

| | | method |
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| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |
| 10 TH | 1 ST | Basics of Aerial Photography |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Focal Length |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |
| 11 TH | 1 ST | Types of Aerial Photographs (Oblique, Straight) |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Basics of Photogrammetry, DEM and Ortho Image generation |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |
| 12 TH | 1 ST | Photogrammetry: |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Photogrammetry Process |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |
| 13 TH | 1 ST | Application of Imagery and its support data |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | DTM/DEM Generation |
| | 5 TH | Do |
| | 6 TH | Do |
| | 7 TH | Do |

LEARNING RESOURCES:

1. Dr.B.C.Punmia. Surveying, Vol.-I&II Laxmi Publication
2. R. Agor A text Book of Surveying & Levelling Khanna Publishers
3. N.N Basak. Surveying & Levelling TMH Publishing

Rabinarayan Hota
13/02/23
Sign. of Faculty concerned


13/02/23
Sign. of Hota
Madhusmita Hota
HOD, Civil Department
Govt. Polytechnic, Koraput



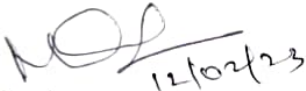
GOVERNMENT POLYTECHNIC, KORAPUT DEPARTMENT CIVIL ENGINEERING

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| Discipline: CIVIL ENGG. | Semester: 4th | Name of the Teaching Faculty: MADHUSMITA DEHURI, HOD CIVIL |
| Subject: TECHNICAL SEMINAR | No. of days/per week class allotted: 03 | Semester From date: 13.02.2022 To Date: 23.05.2023 No. of Weeks: 13 |
| PRE-REQUISITE | Basic knowledge about Technical subject , communication skills and MS power point. | |
| COURSE OUTCOMES | CO1: Presenting seminar on Technical contents. CO2: Presenting seminar on General contents. CO3: Developing communication skills. | |
| Week | Class Day | Theory / Practical Topics |
| 1 ST | 1 ST | Making of PPT (power-point presentation) |
| | 2 ND | Practice |
| | 3 RD | Practice |
| 2 ND | 1 ST | Seminar presentation of 1 st two roll no students |
| | 2 ND | Seminar presentation of 2 nd two roll no students |
| | 3 RD | Seminar presentation of 3 rd two roll no students |
| 3 RD | 1 ST | Seminar presentation of next two roll no students |
| | 2 ND | Seminar presentation of next two roll no students |
| | 3 RD | Seminar presentation of next two roll no students |
| 4 TH | 1 ST | Seminar presentation of next two roll no students |
| | 2 ND | Seminar presentation of next two roll no students |
| | 3 RD | Seminar presentation of next two roll no students |
| 5 TH | 1 ST | Seminar presentation of next two roll no students |
| | 2 ND | Seminar presentation of next two roll no students |
| | 3 RD | Seminar presentation of next two roll no students |
| 6 TH | 1 ST | Seminar presentation of next two roll no students |
| | 2 ND | Seminar presentation of next two roll no students |
| | 3 RD | Seminar presentation of next two roll no students |
| 7 TH | 1 ST | Seminar presentation of next two roll no students |
| | 2 ND | Seminar presentation of next two roll no students |
| | 3 RD | Seminar presentation of next two roll no students |
| 8 TH | 1 ST | Seminar presentation of next two roll no students |
| | 2 ND | Seminar presentation of next two roll no students |
| | 3 RD | Seminar presentation of next two roll no students |
| 9 TH | 1 ST | Seminar presentation of next two roll no students |

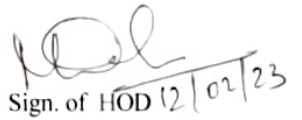
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| | 2 ND | Seminar presentation of next two roll no students |
| | 3 RD | Seminar presentation of next two roll no students |
| 10 TH | 1 ST | Seminar presentation of defaulder students |
| | 2 ND | Seminar presentation of defaulder students |
| | 3 RD | Seminar presentation of defaulder students |
| 11 TH | 1 ST | Seminar presentation of defaulder students |
| | 2 ND | Seminar presentation of defaulder students |
| | 3 RD | Seminar presentation of defaulder students |
| 12 TH | 1 ST | Final seminar presentation of all students |
| | 2 ND | Final seminar presentation of all students |
| | 3 RD | Final seminar presentation of all students |
| 13 TH | 1 ST | Final seminar presentation of all students |
| | 2 ND | Final seminar presentation of all students |
| | 3 RD | Final seminar presentation of all students |

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.


12/02/23

Sign. of Faculty concerned


12/02/23

Sign. of HOD

Madhusmita Dehuri
HOD, Civil Department
Govt. Polytechnic, Koraput



**GOVERNMENT POLYTECHNIC, KORAPUT
DEPARTMENT CIVIL ENGINEERING**

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| Discipline: CIVIL ENGG. | Semester: 4th | Name of the Teaching Faculty: SHREEKANTA SAMAL , PTGF |
| Subject: CIVIL ENGINEERING DRAWING II | No. of days/per week class allotted: 05 | Semester From date: 13.02.2023 To Date: 23.05.2023 No. of Weeks: 13 |
| PRE-REQUISITE | Basic knowledge about soil mechanics and fluid. | |
| COURSE OUTCOMES | CO1: Prepare RCC slab culvert drawings. CO2: Prepare Hume pipe culvert drawings . CO3: Prepare detailed drawings of drainage siphons. CO4: Generate detailed drawing of septic tanks. | |
| Week | Class Day | Theory / Practical Topics |
| 1 ST | 1 ST | Introduction to civil engg. drawing |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Detailed drawing of culvert |
| | 5 TH | Do |
| | 6 TH | Do |
| 2 ND | 1 ST | Do |
| | 2 ND | RCC Slab culvert with right angled wing wall |
| | 3 RD | Do |
| | 4 TH | Do |
| | 5 TH | Do |
| | 6 TH | Hume pipe culvert with splayed wing wall |
| 3 RD | 1 ST | Do |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Irrigation Structures |
| | 5 TH | Do |
| | 6 TH | Do |
| 4 TH | 1 ST | Do |

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| | 2 ND | Detail drawing of a vertical drop type fall (Sarada Type) from given specifications |
| | 3 RD | Do |
| | 4 TH | Do. |
| | 5 TH | Do |
| | 6 TH | Drawing of a Drainage siphon from given specifications |
| 5 TH | 1 ST | Do |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Plumbing and Sanitary connections and fittings of a two roomed building |
| | 5 TH | Do |
| | 6 TH | Do |
| 6 TH | 1 ST | Do |
| | 2 ND | Detailed drawing of septic tank up to 50 users with soak pit and necessary connection from the water closet. |
| | 3 RD | Do |
| | 4 TH | Do |
| | 5 TH | Do |
| | 6 TH | Do |
| 7 TH | 1 ST | Detailed drawing of culvert |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Do r |
| | 5 TH | RCC Slab culvert with right angled wing wall |
| | 6 TH | Do |
| | 1 ST | Do |
| 8 TH | 2 ND | Do |
| | 3 RD | Hume pipe culvert with splayed wing wall |
| | 4 TH | Do |
| | 5 TH | Do |
| | 6 TH | Do |
| | 1 ST | Irrigation Structures |
| 9 TH | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Do |
| | 5 TH | Detail drawing of a vertical drop type fall (Sarada Type) from given specifications |
| | 6 TH | Do |
| 10 TH | 1 ST | Do. |
| | 2 ND | Do |
| | 3 RD | |

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|------------------|-----------------|--|
| | | Drawing of a Drainage siphon from given specifications |
| | 4 TH | Do |
| | 5 TH | Do |
| | 6 TH | Do |
| 11 TH | 1 ST | Plumbing and Sanitary connections and fittings of a two roomed building |
| | 2 ND | Do |
| | 3 RD | Do |
| | 4 TH | Do |
| | 5 TH | Detailed drawing of septic tank up to 50 users with soak pit and necessary connection from the water closet. |
| | 6 TH | Do |
| 12 TH | 1 ST | Do |
| | 2 ND | Do |
| | 3 RD | Revision |
| | 4 TH | Revision |
| | 5 TH | Revision |
| | 6 TH | Revision |
| 13 TH | 1 ST | Revision |
| | 2 ND | Revision |
| | 3 RD | Revision |
| | 4 TH | Revision |
| | 5 TH | Revision |
| | 6 TH | Revision |

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.

Shreekantha Samal
 Sign. of Faculty concerned 12/02/2023

MDD
 Sign. of HOD 13/02/23

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