LESSON PLAN: STRUCTURAL DESIGN – I (Th.1)

Discipline: Civil Engineering	Semester: 4th	**Name of the Teaching Faculty: Sandeep Marndy**
Subject: STRUCTURAL DESIGN – I (Th.1)	No. of days/ per week class allotted: 5	Semester From Date : 14/02/2023 To Date: 23/05/2023 No. of Weeks: 15
Week	Class Day	Theory Topics
		1.0 Working stress method (WSM)
1st	1st	1.1 Objectives of design and detailing. State the different methods of design of concrete structures.
	2nd	1.2 Introduction to reinforced concrete, R.C. sections their behavior, grades of concrete and steel. Permissible stresses, assumption in W.S.M.
	3rd	1.3 Flexural design and analysis of single reinforced sections from first principles.
	4th	1.4 Concept of under reinforced, over reinforced and balanced sections.
	5th	1.5 Advantages and disadvantages of WSM, reasons for its obsolescence.
2nd	1st	**Philosophy Of Limit State Method (LSM)** 2.1 Definition, Advantages of LSM over WSM, IS code suggestions regarding design philosophy.
	2nd	2.2 Types of limit states, partial safety factors for materials strength, characteristic strength, characteristic load, design load, loading on structure as per I.S. 875
	3rd	2.3 Study of I.S specification regarding spacing of reinforcement in slab, cover to reinforcement in slab, beam column & footing, minimum reinforcement in slab, beam & column, lapping, anchorage, effective span for beam & slab.
	4th	**Analysis and Design of Single and Double Reinforced Sections (LSM)** 3.1 Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel, neutral axis, stress block diagram and strain diagram for singly reinforced section.
	5th	3.1 Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel, neutral axis, stress block diagram and strain diagram for singly reinforced section.
3rd	1st	3.1 Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel, neutral axis, stress block diagram and strain diagram for singly reinforced section.
	2nd	3.1 Limit state of collapse (flexure), Assumptions, Stress-Strain relationship for concrete and steel, neutral axis, stress block diagram and strain diagram for singly reinforced section.
	3rd	3.2 Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section.
	4th	3.2 Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section.
	5th	3.2 Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section.
4th	1st	3.2 Concept of under- reinforced, over-reinforced and limiting section, neutral axis co-efficient, limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section.
	2nd	3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections
	3rd	3.3 Analysis and design: determination of design constants, moment of resistance and area of steel for rectangular sections

	4th	3.3 Analysis and design: determination of design constants, moment of resistance, area of steel for rectangular sections
	5th	3.3 Analysis and design: determination of design constants, moment of resistance, area of steel for rectangular sections
5th	1st	3.4 Necessity of doubly reinforced section, design of doubly reinforced rectangular section
	2nd	3.4 Necessity of doubly reinforced section, design of doubly reinforced rectangular section
	3rd	3.4 Necessity of doubly reinforced section, design of doubly reinforced rectangular section
	4th	**4. Shear, Bond and Development Length (LSM)** 4.1 Nominal shear stress in R.C. section, design shear strength of concrete, maximum shear stress, design of shear reinforcement, minimum shear reinforcement, forms of shear reinforcement.
	5th	4.2 Bond and types of bond, bond stress, check for bond stress, development length in tension and compression, anchorage value for hooks 900 bend and 450 bend standards lapping of bars, check for development length.
6th	1st	4.3 Numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear. Design of shear reinforcement; Minimum shear reinforcement in beams (Explain through examples only).
	2nd	4.3 Numerical problems on deciding whether shear reinforcement is required or not, check for adequacy of the section in shear. Design of shear reinforcement; Minimum shear reinforcement in beams (Explain through examples only).
	3rd	**5.Analysis and Design of T-Beam (LSM)** 5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	4th	5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	5th	5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
7th	1st	5.1 General features, advantages, effective width of flange as per IS: 456-2000 code provisions.
	2nd	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.
	3rd	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.
	4th	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.
	5th	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.
8th	1st	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.
	2nd	5.2 Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis, moment of resistance of T-beam section with neutral axis lying within the flange.
	3rd	5.3 Simple numerical problems on deciding effective flange width. (Problems only on finding moment of resistance of T-beam section when N.A. lies within or up to the bottom of flange shall be asked in written examination)..
	4th	5.3 Simple numerical problems on deciding effective flange width. (Problems only on finding moment of resistance of T-beam section when N.A. lies within or up to the bottom of flange shall be asked in written examination)..

	5th	5.3 Simple numerical problems on deciding effective flange width. (Problems only on finding moment of resistance of T-beam section when N.A. lies within or up to the bottom of flange shall be asked in written examination)..
9th	1st	5.3 Simple numerical problems on deciding effective flange width. (Problems only on finding moment of resistance of T-beam section when N.A. lies within or up to the bottom of flange shall be asked in written examination)..
	2nd	5.3 Simple numerical problems on deciding effective flange width. (Problems only on finding moment of resistance of T-beam section when N.A. lies within or up to the bottom of flange shall be asked in written examination)..
	3rd	**6. Analysis and Design of Slab and Stair case (LSM)** 6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
	4th	6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
	5th	6.1 Design of simply supported one-way slabs for flexure check for deflection control and shear.
10th	1st	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	2nd	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	3rd	6.2 Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear.
	4th	6.3 Design of two-way simply supported slabs for flexure with corner free to lift.
	5th	6.3 Design of two-way simply supported slabs for flexure with corner free to lift.
11th	1st	6.3 Design of two-way simply supported slabs for flexure with corner free to lift.
	2nd	6.4 Design of dog-legged staircase
	3rd	6.4 Design of dog-legged staircase
	4th	6.4 Design of dog-legged staircase
	5th	6.5 Detailing of reinforcement in stairs spanning longitudinally.
12th	1st	6.5 Detailing of reinforcement in stairs spanning longitudinally.
	2nd	6.5 Detailing of reinforcement in stairs spanning longitudinally.
	3rd	**7.Design of Axially loaded columns and Footings (LSM)** 7.1 Assumptions in limit state of collapse- compression.
	4th	7.1 Assumptions in limit state of collapse- compression.
	5th	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
13th	1st	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
	2nd	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
	3rd	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
	4th	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.

	5th	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
14th	1st	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
	2nd	7.2 Definition and classification of columns, effective length of column. Specification for minimum reinforcement; cover, maximum reinforcement, number of bars in rectangular, square and circular sections, diameter and spacing of lateral ties.
	3rd	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	4th	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	5th	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
15th	1st	7.3 Analysis and design of axially loaded short square, rectangular and circular columns (with lateral ties only).
	2nd	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	3rd	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	4th	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.
	5th	7.4 Types of footing, Design of isolated square column footing of uniform thickness for flexure and shear.

Sandeep Marandy
13.2.23
(Lect-Civil)

LESSON PLAN OF 4TH SEMESTER(2022-23)
CIVIL ENGINEERING

Discipline:- CIVIL	Semester:- 4TH	Name of the Teaching Faculty:-INDU BHARATI MAHAPATRA (PTGF, CIVIL) GOVT POLYTECHNIC,BERHAMPUR
Subject:- Land Surveying-1	No of Days/per Week Class Allotted:-05	Semester From:-14/02/2023 To:-23/05/2023 No of Weeks:- **15**

Week	Class Day	Theory Topics
1st	1st	**INTRODUCTION TO SURVEYING, LINEAR MEASUREMENTS:** Surveying: Definition, Aims and objectives
	2nd	Principles of survey-Plane surveying- Geodetic Surveying- Instrumental surveying.
	3rd	Precision and accuracy of measurements, instruments used for measurement of distance, Types of tapes and chains.
	4th	Errors and mistakes in linear measurement – classification, Sources of errors and remedies.
	5th	Corrections to measured lengths due to-incorrect length, temperature variation, pull, sag, numerical problem applying corrections.
2nd	1st	**CHAINING AND CHAIN SURVEYING :** Equipment and accessories for chaining
	2nd	Ranging – Purpose, signaling, direct and indirect ranging, Line ranger – features and use, error due to incorrect ranging.
	3rd	Methods of chaining –Chaining on flat ground, Chaining on sloping ground – stepping method, Clinometer-features and use, slope correction.
	4th	Setting perpendicular with chain & tape, Chaining across different types of obstacles –Numerical problems on chaining across obstacles.
	5th	Purpose of chain surveying, Its Principles, concept of field book. Selection of survey stations, base line, tie lines, Check lines.
3rd	1st	Offsets – Necessity, Perpendicular and Oblique offsets, Instruments for setting offset – Cross Staff, Optical Square.
	2nd	Errors in chain surveying – compensating and accumulative errors causes & remedies, Precautions to be taken during chain surveying.
	3rd	**ANGULAR MEASUREMENT AND COMPAS SURVEYING :** Measurement of angles with chain, tape &compass Compass – Types, features, parts, merits & demerits, testing & adjustment of compass
	4th	Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing
	5th	suitability of application, numerical problems on conversion of bearings

4th	1st	Use of compasses – setting in field-centering, leveling, taking readings, concepts of Fore bearing, Back Bearing, Numerical problems on computation of interior & exterior angles from bearings.
	2nd	Effects of earth's magnetism – dip of needle, magnetic declination, variation in declination, numerical problems on application of correction for declination.
	3rd	Errors in angle measurement with compass – sources &remedies. Principles of traversing – open & closed traverse, Methods of traversing.
	4th	Local attraction – causes, detection, errors, corrections, Numerical problems of application of correction due to local attraction.
	5th	Errors in compass surveying – sources &remedies
	1st	Plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table
	2nd	**MAP READING CADASTRAL MAPS & NOMENCLATURE:** Study of direction, Scale, Grid Reference and Grid Square Study of Signs and Symbols
	3rd	Cadastral Map Preparation Methodology Unique identification number of parcel
	4th	Positions of existing Control Points and its types
	5th	Adjacent Boundaries and Features, Topology Creation and verification.
6th	1st	**PLANE TABLE SURVEYING :** Objectives, principles and use of plane table surveying.
	2nd	Instruments & accessories used in plane table surveying.
	3rd	Methods of plane table surveying – (1) Radiation, (2) Intersection, (3) Traversing, (4) Resection.
	4th	Statements of TWO POINT and THREE POINTPROBLEM.
	5th	Errors in plane table surveying and their corrections, precautions in plane table surveying.

	1st	**THEODOLITE SURVEYING AND TRAVERSING:** Purpose and definition of theodolite surveying
	2nd	Transit theodolite- Description of features, component parts,
	3rd	Fundamental axes of a theodolite, concept of vernier, reading a vernier,
	4th	Temporary adjustment of theodolite
	5th	Concept of transiting –Measurement of horizontal and vertical angles.
8th	1st	Measurement of magnetic bearings, deflection angle, direct angle,
	2nd	Setting out angles, prolonging a straight line with theodolite, Errors in Theodolite observations.
	3rd	Methods of theodolite traversing with – inclined angle
	4th	method, deflection angle method, bearing method, Plotting the traverse by coordinate method, Checks for open and closed traverse.
	5th	Traverse computation – consecutive coordinates, latitude and departure,
9th	1st	Gale's traverse table, Numerical problems on omitted measurement of lengths & bearings.
	2nd	Closing error – adjustment of angular errors, adjustment of bearings, numerical problems
	3rd	Balancing of traverse – Bowditch's method, transit method
	4th	Graphical method, axis method, calculation of area of closed traverse.
	5th	**LEVELLING AND CONTOURING :** Definition and Purpose and types of leveling– concepts of level surface,
10th	1st	Horizontal surface, vertical surface, datum, R. L.,B.M.
	2nd	Instruments used for leveling, concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis.
	3rd	Leveling staff – Temporary adjustments of level, taking reading
	4th	With level, concept of bench mark, BS, IS, FS, CP,HI.
	5th	Field data entry – level Book – height of collimation method and Rise &
11th	1st	Fall method, comparison, Numerical problems on reduction of levels applying both methods, Arithmetic checks.
	2nd	Effects of curvature and refraction, numerical problems on application of correction.
	3rd	Reciprocal leveling – principles, methods, numerical problems, precise leveling.
	4th	Errors in leveling and precautions, Permanent and temporary adjustments of different types of levels.
	5th	Definitions, concepts and characteristics of contours.
12th	1st	Methods of contouring, plotting contour maps, Interpretation of contour maps, top sheets.
	2nd	Methods of contouring, plotting contour maps, Interpretation of contour maps, top sheets.
	3rd	Use of contour maps on civil engineering projects – drawing cross- sections from contour maps,
	4th	Use of contour maps on civil engineering projects – drawing cross- sections from contour maps,
	5th	locating proposal routes of roads

13th	1st	Railway / canal on a contour map, computation of volume of earthwork from contour map for simple structure.
	2nd	Railway / canal on a contour map, computation of volume of earthwork from contour map for simple structure.
	3rd	Railway / canal on a contour map, computation of volume of earthwork from contour map for simple structure.
	4th	Map Interpretation: Interpret Human and Economic Activities
	5th	Map Interpretation: Interpret Human and Economic Activities
14th	1st	Settlement, Communication, Land use etc.
	2nd	Interpret Physical landform
	3rd	Relief, Drainage Pattern etc.), Problem Solving and Decision Making
	4th	**COMPUTATION OF AREA & VOLUME:** Determination of areas, computation of areas from plans.
	5th	Calculation of area by using ordinate rule, trapezoidal rule, Simpson'srule.
15th	1st	Calculation of area by using ordinate rule, trapezoidal rule, Simpson'srule.
	2nd	Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes
	3rd	Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes
	4th	PYQ Discussion
	5th	PYQ Discussion

Indubharati Mahapatra
(PTGF, civil)

Discipline : Civil Engg.	Semester : 4th	Name of the Teaching Faculty: **TEJASWINI GOUDA**
Subject : - **Hydraulic & Irrigation Engineering**	No. of Days/ per week class allotted: **5**	Semester From Date: **14 February, 2023 To 23 MAY, 2023** No.of Weeks: **15**
Week	**Class Day**	**Theory Topics**
1ST		**PART: A (HYDRAULICS AND MACHINES)** **HYDROSTATICS**
	1ST	**1.1. Properties of fluid:** density, specific gravity, surface tension, capillarity, viscosity and their uses
	2ND	**1.1. Properties of fluid:** density, specific gravity, surface tension, capillarity, viscosity and their uses
2ND	1ST	Numerical Problems
	2ND	**1.2. Pressure and its measurements:** intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure; relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges.
3RD	1ST	**1.2. Pressure and its measurements:** intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure; relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges.
	2ND	Numerical Problems
4TH	1ST	**1.2. Pressure and its measurements:** intensity of pressure, atmospheric pressure, gauge pressure, absolute pressure and vacuum pressure; relationship between atmospheric pressure, absolute pressure and gauge pressure; pressure head; pressure gauges.
	2ND	Numerical Problems
5TH	1ST	**1.3. Pressure exerted on an immersed surface:** Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface.
	2ND	Numerical Problems
6TH	1ST	**1.3. Pressure exerted on an immersed surface:** Total pressure, resultant pressure, expression for total pressure exerted on horizontal & vertical surface.
	2ND	Numerical Problems

	PART: A (HYDRAULICS AND MACHINES)	
	KINEMATICS OF FLUID FLOW:	
7TH	1ST	**2.1. Basic equation of fluid flow and their application:** Rate of discharge, equation of continuity of liquid flow, total energy of a liquid in motion- potential
	2ND	Numerical Problems
8TH	1ST	**2.1. Basic equation of fluid flow and their application:** kinetic & pressure, Bernoulli's theorem and its limitations. Practical applications of Bernoulli's equation.
	2ND	Numerical Problems
9TH	1ST	**2.2. Flow over Notches and Weirs:** Notches, Weirs, types of notches and weirs, Discharge through different types of notches and weirs-their application (No Derivation)
	2ND	**2.2. Flow over Notches and Weirs:** Notches, Weirs, types of notches and weirs, Discharge through different types of notches and weirs-their application (No Derivation)
10TH	1ST	Numerical Problems
	2ND	**2.3. Types of flow through the pipes:** uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application.
11TH	1ST	**2.3. Types of flow through the pipes:** uniform and non uniform; laminar and turbulent; steady and unsteady; Reynold's number and its application.
	2ND	Numerical Problems
12TH	1ST	**2.4. Losses of head of a liquid flowing through pipes:** Different types of major and minor losses. Simple numerical problems on losses due to friction using Darcy's equation, Total energy lines & hydraulic gradient lines (Concept Only).
	2ND	Numerical Problems
13TH	1ST	**2.4. Losses of head of a liquid flowing through pipes:** Different types of major and minor losses. Simple numerical problems on losses due to friction using Darcy's equation, Total energy lines & hydraulic gradient lines (Concept Only).
	2ND	Numerical Problems
14TH	1ST	**2.5 Flow through the Open Channels:** Types of channel sections-rectangular, trapezoidal and circular, discharge formulae-Chezy's and Manning's equation, Best economical section.
	2ND	Numerical Problems
	3RD	**2.5 Flow through the Open Channels:** Types of channel sections-rectangular, trapezoidal and circular, discharge formulae-Chezy's and Manning's equation, Best economical section.
	4TH	Numerical Problems

		PART: A (HYDRAULICS AND MACHINES)
		PUMPS
15TH	1ST	**3.1.** Type of pumps
	2ND	**3.2. Centrifugal pump:** basic principles, operation, discharge, horse power & efficiency
	3RD	**3.2. Centrifugal pump:** basic principles, operation, discharge, horse power & efficiency
	4TH	**3.3. Reciprocating pumps:** types, operation, discharge, horse power & efficiency
	5TH	**3.3. Reciprocating pumps:** types, operation, discharge, horse power & efficiency

Discipline : **Civil Engg.**	Semester : **4th**	Name of the Teaching Faculty: **TEJASWINI GOUDA**
Subject : - **Hydraulic & Irrigation Engineering**	No. of Days/ per week class allotted: **5**	Semester From Date: **14 February, 2023 To 23 MAY, 2023** No.of Weeks: **15**
Week	**Class Day**	**Theory Topics**
		PART: B (IRRIGATION ENGINEERING)
		HYDROLOGY
1ST	3RD	**1.1.** Hydrology Cycle
	4TH	**1.2.** Rainfall: types, intensity, hyetograph
	5TH	**1.3.** Estimation of rainfall, rain gauges, Its types(concept only),
2ND	3RD	**1.4.** Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae
		PART: B (IRRIGATION ENGINEERING)
		WATER REQUIREMENT OF CROPS
	4TH	**2.1.** Definition of irrigation, necessity, benefits of irrigation, types of irrigation
	5TH	**2.2.** Crop season
3RD	3RD	**2.3.** Duty, Delta and base period their relationship, overlap allowance, kharif and rabi crops
	4TH	**2.4.** Gross command area, culturable command area, Intensity of Irrigation, irrigable area, time factor, crop ratio
		PART: B (IRRIGATION ENGINEERING)
		FLOW IRRIGATION
	5TH	**3.1.** Canal irrigation, types of canals, loss of water in canals
4TH	3RD	**3.2.** Perennial irrigation
	4TH	**3.3.** Different components of irrigation canals and their functions

	5TH	**3.3.** Different components of irrigation canals and their functions
5TH	3RD	**3.4.** Sketches of different canal cross-sections
	4TH	**3.5.** Classification of canals according to their alignment, Various types of canal lining – Advantages and disadvantages
	5TH	**3.5.** Classification of canals according to their alignment, Various types of canal lining – Advantages and disadvantages
PART: B (IRRIGATION ENGINEERING) WATER LOGGING AND DRAINAGE		
6TH	3RD	**4.1.** Causes and effects of water logging, detection, prevention and remedies
	4TH	**4.1.** Causes and effects of water logging, detection, prevention and remedies
	PART: B (IRRIGATION ENGINEERING) DIVERSION HEAD WORKS AND REGULATORY STRUCTURES	
	5TH	**5.1.** Necessity and objectives of diversion head works, weirs and barrages
7TH	3RD	**5.1.** Necessity and objectives of diversion head works, weirs and barrages
	4TH	**5.2.** General layout, functions of different parts of barrage
	5TH	**5.2.** General layout, functions of different parts of barrage
8TH	3RD	**5.3.** Silting and scouring
	4TH	**5.3.** Silting and scouring
	5TH	**5.4.** Functions of regulatory structures
9TH	3RD	**5.4.** Functions of regulatory structures
	PART: B (IRRIGATION ENGINEERING) CROSS DRAINAGE WORKS	
	4TH	**6.1.** Functions and necessity of Cross drainage works - aqueduct, siphon, super-passage, level crossing
	5TH	**6.1.** Functions and necessity of Cross drainage works - aqueduct, siphon, super-passage, level crossing
10TH	3RD	**6.1.** Functions and necessity of Cross drainage works - aqueduct, siphon, super-passage, level crossing
	4TH	**6.1.** Functions and necessity of Cross drainage works - aqueduct, siphon, super-passage, level crossing
	5TH	**6.2.** Concept of each with help of neat sketch
11TH	3RD	**6.2.** Concept of each with help of neat sketch
	4TH	**6.2.** Concept of each with help of neat sketch

PART: B (IRRIGATION ENGINEERING) DAMS		
	5TH	**7.1.** Necessity of storage reservoirs, types of dams
12TH	3RD	**7.1.** Necessity of storage reservoirs, types of dams
	4TH	**7.2.** Earthen dams: types, description, causes of failure and protection measures.
	5TH	**7.2.** Earthen dams: types, description, causes of failure and protection measures.
13TH	3RD	**7.3.** Gravity dam- types, description, Causes of failure and protection measures.
	4TH	**7.3.** Gravity dam- types, description, Causes of failure and protection measures.
	5TH	**7.4.** Spillways- Types (With Sketch) and necessity.
14TH	5TH	**7.4.** Spillways- Types (With Sketch) and necessity.

14/02/2023

SIGNATURE OF FACULTY

DISCIPLINE: Civil Engineering	SEMESTER: 4TH	NAME OF THE TEACHING FACULTY: MR A.GUPTESWAR PATRO
SUBJECT: HIGHWAY ENGINEERING	NO. OF DAYS/PER WEEK CLASS ALLOTTED: 5	SEMESTER DURATION: 14/02/2023 TO DATE: 23/05/2023 NO.OF WEEKS : 15
WEEK	CLASSDAY	THEORY/PRACTICALTOPICS
1ST	1ST	CHAPTER-I **Introduction** Importance of Highway transportation: importance organizations like Indian roads congress,
	2ND	Ministry of Surface Transport, Central Road Research Institute.
	3RD	Functions of Indian Roads Congress
	4TH	IRC classification of roads
	5TH	Organization of state highway department
2ND	1ST	CHAPTER-II **Road Geometrics** Glossary of terms used in geometric and their importance
	2ND	formation width, road margin
	3RD	road shoulder
	4TH	carriage way, side slopes
	5TH	kerbs, formation level, camber and gradient
3RD	1ST	kerbs, formation level, camber and gradient
	2ND	Design and average running speed
	3RD	Design and average running speed
	4TH	Design and average running speed
	5TH	stopping and passing sight distance
4TH	1ST	stopping and passing sight distance
	2ND	horizontal and vertical curves including transition curves
	3RD	horizontal and vertical curves including transition curves
	4TH	horizontal and vertical curves including transition curves
	5TH	super elevation
5TH	1ST	super elevation
	2ND	Methods o f providing super - elevation
	3RD	Methods o f providing super - elevation
	4TH	Methods o f providing super - elevation
	5TH	Methods o f providing super - elevation
6TH	1ST	CHAPTER-III **Road Materials** Difference types of road materials in use: soil, aggregates,

	2ND	and binders
	3RD	Function of soil as highway Subgrade
	4TH	California Bearing Ratio: methods of finding CBR valued in the laboratory and at site and their significance
	5TH	Testing aggregates: Abrasion test
7TH	1ST	impact test
	2ND	crushing strength test,
	3RD	absorption test
	4TH	water & soundness test
	5TH	**CHAPTER-IV** **Road Pavements** Road Pavement: Flexible and rigid pavement, their merits and demerits,
8TH	1ST	typical cross-sections, functions of various components Flexible pavements:
	2ND	Sub-grade preparation, Setting out alignment of road
	3RD	setting out bench marks, control pegs for embankment and cutting, borrow pits
	4TH	making profile of embankment, construction of embankment
	5TH	compaction, stabilization, preparation of subgrade, methods of checking camber
9TH	1ST	gradient and alignment as per recommendations of IRC, equipment used for subgrade preparation
	2ND	Sub base Course: Necessity of sub base, stabilized sub base, purpose of stabilization (no designs)
	3RD	Types of stabilization Mechanical stabilization Lime stabilization
	4TH	Cement stabilization Fly ash stabilization
	5TH	Base Course: Preparation of base course, Brick soling, stone soling and metalling, Water Bound Macadam and wet-mix Macadam, Bituminous constructions:
10TH	1ST	Different types Surfacing: Surface dressing (i) Premix carpet and (ii) Semi dense carpet Bituminous concrete Grouting
	2ND	Rigid Pavements: Concept of concrete roads as per IRC specifications
	3RD	**CHAPTER-V** **Hill Roads** Introduction: Typical cross-sections showing all details of a typical hill road in cut,
	4TH	Typical cross-sections showing all details of a typical hill road in cut

	5TH	
11TH	1ST	partly in cutting and
	2ND	partly in filling
	3RD	Breast Walls
	4TH	Retaining walls
	5TH	different types of bends
		CHAPTER-VI
		Road Drainage
12TH	1ST	Necessity of road drainage work,
	2ND	cross drainage works
	3RD	Surface and and storm water drains.
	4TH	Location, spacing and typical details of side drains
	5TH	side ditches for surface drainage, intercepting drains
13TH	1ST	pipe drains in hill roads, details of drains in cutting embankment
	2ND	Typical cross sections.
		CHAPTER-VII
		Road Maintenance
	3RD	Common types of road failures – their causes
	4TH	remedies
	5TH	Maintenance of bituminous road such as patch work
14TH	1ST	resurfacing
	2ND	Maintenance of concrete roads – filling cracks, repairing joints,
	3RD	maintenance of shoulders (berm), maintenance of traffic control devices
	4TH	Basic concept of traffic study, Traffic safety and traffic control signal
		CHAPTER-VIII
		Construction equipments:
		Preliminary ideas of the following plant and equipment
	5TH	Hot mixing plant
15TH	1ST	Tipper, tractors (wheel and crawler) scraper, bulldozer,
	2ND	dumpers, shovels, graders, roller dragline
	3RD	Asphalt mixer and
	4TH	tar boilers
	5TH	Road pavers
		Modern construction equipments for roads.

A. Gupteswar Patra
14/2/2023 (P.T.G.F (Civil))
Signature of Faculty

HoD
Civil Dept.

LESSON PLAN OF 4TH SEMESTER(2022-23) CIVIL ENGINEERING

Discipline :- CIVIL	Semester:- 4TH	Name of the Teaching Faculty:-INDU BHARATI MAHAPATRA (PTGF, CIVIL) GOVT POLYTECHNIC,BERHAMPUR
Subject:- Land Survey Practice-I	No of Days/per Week Class Allotted:-07	Semester From:-14/02/2023 To:-23/05/2023 No of Weeks:- **15**

Week	Class Day	Practical Topics
1st	1st	**Linear Measurements, Chaining and Chain Surveying:** Testing and adjusting of a metric chain.
	2nd	Measurement of distance between two points (more than 2 chain lengths apart) with chain including direct ranging.
	3rd	Setting out different types of triangles, given the lengths of sides with chain and tape.
	4th	Measurement of distance between two points by chaining across a sloped ground using stepping method and aclinometer.
	5th	Measurement of distance by chaining across a obstacles on the chain line i) a pond ii)a building
	6th	iii) a stream/ river (in the event of non-availability of stream / river, a pond or lake may be taken, considering that chaining around the same is not possible.
	7th	Setting perpendicular offsets to various objects (at least 3) from a chain line using-(1) tape, (2) cross-staff, (3) optical square and comparing the accuracy of the 3methods
2nd	1st	Setting perpendicular offsets to various objects (at least 3) from a chain line using-(1) tape, (2) cross-staff, (3) optical square and comparing the accuracy of the 3methods
	2nd	Setting oblique offsets to objects (at least 3) from a chain using tape
	3rd	Setting oblique offsets to objects (at least 3) from a chain using tape
	4th	**Angular Measurement and Compass Surveying**
	5th	Testing and adjustment of Prismatic compass and Surveyor's compass.
	6th	Measurement of bearings of lines (at least 3 lines) and determination of included angles using Prismatic compass and Surveyor's compass.
	7th	Setting out triangles (at least 2) with compass, given the length and bearing of one side and included angles
3rd	1st	Setting out a closed traverse of 5 sides, using prismatic compass, given bearing of one line and included angles and lengths of sides.
	2nd	Setting out a closed traverse of 5 sides, using prismatic compass, given bearing of one line and included angles and lengths of sides.
	3rd	Conducting chain and compass traverse surveying in a given plot of area (2plots)
	4th	recording data in the field book. (5 to 6students/groups)
	5th	**Map Reading Cadastral Maps &Nomenclature:** Study of direction, Scale, Grid Reference and Grid Square
	6th	Study of Signs and Symbols

	7th	Cadastral Map Preparation Methodology
4th	1st	Unique identification number of parcel
	2nd	Positions of existing Control Points and its types
	3rd	Positions of existing Control Points and its types
	4th	Adjacent Boundaries and Features, Topology Creation and verification
	5th	Adjacent Boundaries and Features, Topology Creation and verification
	6th	**Plane Table Surveying:**
	7th	Setting up of Plane Table and Plotting five points by.
5th	1st	Setting up of Plane Table and Plotting five points by.
	2nd	radiation method and five inaccessible points by intersection method
	3rd	radiation method and five inaccessible points by intersection method
	4th	radiation method and five inaccessible points by intersection method
	5th	Conducting Plane Table surveying in a given plot of area by traversing (At least a 5-sided traverse and locating the objects)
	6th	Conducting Plane Table surveying in a given plot of area by traversing (At least a 5-sided traverse and locating the objects)
	7th	Conducting Plane Table surveying in a given plot of area by traversing (At least a 5-sided traverse and locating the objects)
6th	1st	Plane table surveying by Resection method (two point &three point problem method)
	2nd	Plane table surveying by Resection method (two point &three point problem method)
	3rd	**Theodolite Traversing:** Measurement of horizontal angles (3nos.) by repetition and reiteration method and compare two methods
	4th	Measurement of horizontal angles (3nos.) by repetition and reiteration method and compare two methods
	5th	Prolonging a given straight line with the help of theodolite
	6th	Prolonging a given straight line with the help of theodolite
	7th	Prolonging a given straight line with the help of theodolite

	1st	Determination of magnetic bearing of 3 given straight lines
	2nd	Determination of magnetic bearing of 3 given straight lines
	3rd	Determination of magnetic bearing of 3 given straight lines
	4th	Setting out a closed traverse with 6 sides and entering the field data
	5th	Setting out a closed traverse with 6 sides and entering the field data
	6th	Setting out a closed traverse with 6 sides and entering the field data
	7th	Plotting the traverse from exercise 4.1 and checking the error of closure
8th	1st	Plotting the traverse from exercise 4.1 and checking the error of closure
	2nd	Plotting the traverse from exercise 4.1 and checking the error of closure
	3rd	Plotting the traverse from exercise 4.1 and checking the error of closure
	4th	Plotting the traverse from exercise 4.1 and checking the error of closure
	5th	Plotting the traverse from exercise 4.1 and checking the error of closure
	6th	Plotting the traverse from exercise 4.1 and checking the error of closure
	7th	Setting out an open traverse with 5 sides and entering the field data
9th	1st	Setting out an open traverse with 5 sides and entering the field data
	2nd	Setting out an open traverse with 5 sides and entering the field data
	3rd	Setting out an open traverse with 5 sides and entering the field data
	4th	Plotting the traverse from exercise 4.3 and checking the error of closure
	5th	Plotting the traverse from exercise 4.3 and checking the error of closure
	6th	Plotting the traverse from exercise 4.3 and checking the error of closure
	7th	Plotting the traverse from exercise 4.3 and checking the error of closure
10th	1st	Plotting the traverse from exercise 4.3 and checking the error of closure
	2nd	**Leveling and Contouring**
	3rd	**Leveling and Contouring:** Making temporary adjustments of Levels
	4th	Determining Reduced Levels of five given points taking staff readings with Levels.
	5th	Determining Reduced Levels of five given points taking staff readings with Levels.
	6th	Determining Reduced Levels of five given points taking staff readings with Levels.
	7th	Determining Reduced Levels of five given points taking staff readings with Levels.
11th	1st	Determining Reduced Levels of five given points taking staff readings with Levels.
	2nd	Determining Reduced Levels of five given points taking staff readings with Levels.
	3rd	Determining the difference of levels between two points (3 pairs of points / group) by taking staff readings form single set up of level, recording the readings in level book and application of Arithmetic check. (At least 3 change points must be covered)
	4th	Determining the difference of levels between two points (3 pairs of points / group) by taking staff readings form single set up of level, recording the readings in level book and application of Arithmetic check. (At least 3 change points must be covered)
	5th	Determining the difference of levels between two points (3 pairs of points / group) by taking staff readings form single set up of level, recording the readings in level book and application of Arithmetic check. (At least 3 change points must be covered)
	6th	Conduct Fly Leveling (Compound) between two distant points with respect to R.L. of a given B.M. and reduction of levels by both height of collimation and rise & fall method and applying Arithmetic check. (At least 3 change points must be covered)
	7th	Conduct Fly Leveling (Compound) between two distant points with respect to R.L. of a given B.M. and reduction of levels by both height of

		collimation and rise & fall method and applying Arithmetic check. (At least 3 change points must be covered)
12th	1st	Conduct Fly Leveling (Compound) between two distant points with respect to R.L. of a given B.M. and reduction of levels by both height of collimation and rise & fall method and applying Arithmetic check. (At least 3 change points must be covered)
	2nd	Conduct profile leveling along the given alignment for a road / canal for 150m length, taking L. S. at every 15m and C. S. at 1m & 3m apart on both sides at every 30m interval and recording the data in level book and applying arithmetical check.
	3rd	Conduct profile leveling along the given alignment for a road / canal for 150m length, taking L. S. at every 15m and C. S. at 1m & 3m apart on both sides at every 30m interval and recording the data in level book and applying arithmetical check.
	4th	Conduct profile leveling along the given alignment for a road / canal for 150m length, taking L. S. at every 15m and C. S. at 1m & 3m apart on both sides at every 30m interval and recording the data in level book and applying arithmetical check.
	5th	Locating contour points in the given area by direct method / indirect method
	6th	Locating contour points in the given area by direct method / indirect method
	7th	Conducting block level survey in the given area
13th	1st	Plotting and drawing contour map of a given area by radial method
	2nd	Plotting and drawing contour map of a given area by radial method
	3rd	Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.), Interpret Physical landform (i.e.: Relief, Drainage Pattern etc.), Problem Solving and Decision-making
	4th	Map Interpretation: Interpret Human and Economic Activities (i.e.: Settlement, Communication, Land use etc.), Interpret Physical landform (i.e.: Relief, Drainage Pattern etc.), Problem Solving and Decision-making
	5th	**Basics of Aerial Photography: Film**
	6th	Focal Length ,Scale
	7th	Types of Aerial Photographs (Oblique, Straight)
14th	1st	**Basics of Photogrammetry, DEM and Ortho Image generation:**
	2nd	Photogrammetry: Classification of Photogrammetry
	3rd	Aerial Photogrammetry
	4th	Aerial Photogrammetry
	5th	Terrestrial Photogrammetry
	6th	Photogrammetry Process:
	7th	Acquisition of Imagery using aerial and satellite platform Control Survey
15th	1st	Geometric Distortion in Imagery
	2nd	Application of Imagery and its support data
	3rd	Orientation and Triangulation
	4th	Stereoscopic Measurement: X-parallax andY-parallax
	5th	DTM/Degeneration Ortho Image Generation
	6th	Doubt clear class
	7th	Doubt clear class

Indubharati Mahapatra
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