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 : 16/01/2024 To Date: 26/04/2024 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 and area of steel for rectangular sections
	5th	3.3 Analysis and design: determination of design constants, moment of resistance and 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.

Sambar Marandy
12/01/2024
(Lect. Civil)

13.01.24

13/1/2024
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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: **16th January, 2024** to **26th April, 2024** 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**
1ST	**PART: B (IRRIGATION ENGINEERING) HYDROLOGY**	
	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.

13/01/2024

SIGNATURE OF FACULTY

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13/1/2024

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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: 16/01/2024 TO DATE: 26/04/2024 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	partly in cutting and
11TH	1ST	partly in filling
	2ND	Breast Walls
	3RD	Retaining walls
	4TH	different types of bends
	5TH	CHAPTER-VI **Road Drainage** Necessity of road drainage work,
12TH	1ST	cross drainage works
	2ND	Surface and and storm water drains.
	3RD	Location, spacing and typical details of side drains
	4TH	side ditches for surface drainage, intercepting drains
	5TH	pipe drains in hill roads, details of drains in cutting embankment
13TH	1ST	Typical cross sections.
	2ND	CHAPTER-VII **Road Maintenance** Common types of road failures – their causes
	3RD	remedies
	4TH	Maintenance of bituminous road such as patch work
	5TH	resurfacing
14TH	1ST	Maintenance of concrete roads – filling cracks, repairing joints,
	2ND	maintenance of shoulders (berm), maintenance of traffic control devices
	3RD	Basic concept of traffic study, Traffic safety and traffic control signal
	4TH	CHAPTER-VIII **Construction equipments:** Preliminary ideas of the following plant and equipment Hot mixing plant
	5TH	Tipper, tractors (wheel and crawler) scraper, bulldozer,
15TH	1ST	dumpers, shovels, graders, roller dragline
	2ND	Asphalt mixer and
	3RD	tar boilers
	4TH	Road pavers
	5TH	Modern construction equipments for roads.

A. Gupteswar Patra (P.T.G.P.) (Civil)
Signature of Faculty

HoD
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LESSON PLAN OF 4TH SEMESTER(2023-24) 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:- 16/01/2024 To:-26/04/2024 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 GridSquare 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.
7th	1st	**THEODOLITE SURVEYING AND TRAVERSING:** Purpose and definition of theodolitesurveying
	2nd	Transit theodolite- Description of features, component parts,
	3rd	Fundamental axes of a theodolite, concept of vernier, reading a vernier,
	4th	Temporary adjustment oftheodolite
	5th	Concept of transiting –Measurement of horizontal and verticalangles.
8th	1st	Measurement of magnetic bearings, deflection angle, direct angle,
	2nd	settingout 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 closedtraverse.
	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 ofbearings, numericalproblems
	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 levelsurface,
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, Verticalaxis.
	3rd	Levelling staff – Temporary adjustments of level, taking reading
	4th	withlevel, 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, Arithmeticchecks.
	2nd	Effects of curvature and refraction, numerical problems on applicationof correction.
	3rd	Reciprocal leveling – principles, methods, numerical problems, precise leveling.

	4th	Errors in leveling and precautions, Permanent and temporary adjustmentsof different types oflevels.
	5th	Definitions, concepts and characteristics of contours.
12th	1st	Methods of contouring, plotting contour maps, Interpretation of contourmaps, toposheets.
	2nd	Methods of contouring, plotting contour maps, Interpretation of contourmaps, toposheets.
	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 simplestructure.
	2nd	railway / canal on a contour map, computation of volume of earthwork from contour map for simplestructure.
	3rd	railway / canal on a contour map, computation of volume of earthwork from contour map for simplestructure.
	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 fromplans.
	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 Disscussion
	5th	PYQ Disscussion

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