LESSO	ON PLAN OF 41	TH SEMESTER CIVIL ENGINEERING(202	2-23)
Discipline: CE	Semester: 4 <sup>th</sup>	Name of the Teaching Faculty	
Subject: HIGHWAY ENGINEERING	No. of Days/per week class allotted: 05	No. of Weeks : 20	
Week	Class Day	Theory Topics	Update/commen t
1st	01	Introduction	
	02	functions of Indian Roads Congress	]
	03	IRC classification of roads	]
	04	Organisation of state highway department	
	05	Organisation of state highway department	
2nd	01	Road Geometric	
	02	Glossary of terms used in geometric	1
	03	right of way, formation width, road margin, road shoulder	
	04	carriage way, side slopes, kerbs, formation level, camber and gradient	
	05	Design and average running speed, stopping and passing sight distance	
3rd	01	Necessity of curves, horizontal and vertical curves including transition curves and super elevation,	
	02	Methods o f providing super – elevation	†
	03	Road Materials Difference types of road materials in use sol, aggregates, binders	
	04	California Bearing Ratio: methods of finding CBR valued in the laboratory and at site and their significance	
	05	Availability of road aggregate	
4th	01	Testing aggregates: Abrasion test, impact test, crushing strength test, water absorption test & soundness test Unit	
	02	Binders common binders: cement, bitumen and Tar, propertied as per IS specifications, penetration and viscosity test of bitumen	
	03	Road Pavements Road Pavement : Flexible and rigid pavement	
	04	Sub-grade preparation	]

	05	Sub-grade preparation	
5th	01	Flexible pavements : necessity of sub	
		base, stabilized sub bade: purpose of	
		stabilization	
	02	Types of stabilization	
	03	Mechanical stabilization	
	04	Lime stabilization	
	05	Cement stabilization and fly ash	
		stabilisation	
6th	01	Preparation of base course	
	02	Metalling: Water Bound Macadam and	
		Bituminous Macadam	
	03	Surfacing	
	04	Types of surfacing	
	05	Methods of constructions	
7th	01	Construction of concrete roads as per	
		IRC specifications	
	02	Unit 5:	
		Hill Roads	
	03	introduction	
	04	Typical cross-sections showing all details	
	05	A typical hill road in cut, partly in	
		cutting and partly in filling	
8th	01	Breast Walls,	
	02	Retaining walls,	
	03	different types of bends	
	04	Unit 6:	
		Road Drainage	
	05	Necessity of road drainage work,	
9th	01	cross drainage works	
	02	Surface and sub-surface drains	
	03	Location, spacing and typical details of	
		side drains,	
	04	Intercepting drains, pipe drains in hill	
		roads	
	05	details of drains in cutting embankment	
10th	01	typical cross sections	
	02	Road Maintenance	
		introduction	
	03	Common types of road failures	
	04	causes and remedies	
	05	Maintenance of bituminous road	
11 <sup>th</sup>	01	Maintenance of concrete roads	
	02	maintenance of traffic control devices	

I	02		
	03	Construction equipment's	
		Introduction	
	04	Hot mixing plant	
	05	Tipper, tractors (wheel and crawler)	
12th	01	Name of the Teaching Faculty	
	02		
		No. of Weeks : 20	
	03	Road pavers	-
	04	Modern construction equipments for	
		roads.	
	05	Traffic studies	_
	03	introduction	
	01		
13 <sup>th</sup>		Basic concept of traffic study	
	02	Basic concept of traffic study	_
	03	Traffic safety and traffic control signal	
	04	Road junctions	
	05	Traffic island and refuge island;	
		advantages and disadvantages	
14 <sup>th</sup>	01	Landscaping and Arboriculture	
		introduction	
	02	Meaning of landscaping and	
		arboriculture	
	03	Aesthetics in road side development	
	04	Revision	
	05	Revision	
15 <sup>th</sup>	01	Revision	
	02	Revision	
	03	Revision	
	04	Revision	
	05	Revision	
16 <sup>th</sup>	01	Revision	
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18 <sup>th</sup>	02	Revision	
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	04	Revision	
	05	Revision	
20 <sup>th</sup>	01	Revision	

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Discipline: CE	Semester:-4 <sup>TH</sup>
Subject:-	No of Days/per
Hydraulic and	Week Class
Irrigation	Allotted :-05
Engineering	
Week	Class Day
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	5 <sup>th</sup>

## H SEMESTER CIVIL ENGINEERING(2022-23)

Name of the Teaching Faculty

No. of Weeks: 20

## **Theory/ Practical Topics**

### HYDROSTATICS:

Properties of fluid:density, specific gravity, surface tension,

#### NUMERICAL PROBLEMS SOLVING

capillarity, viscosity and their uses

#### NUMERICAL PROBLEMS SOLVING

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.

#### NUMERICAL PROBLEMS SOLVING

#### NUMERICAL PROBLEMS SOLVING

Pressure exerted on an immersed surface: Total pressure, resultant pressure,

## NUMERICAL PROBLEMS SOLVING

Expression for total pressure exerted on horizontal & vertical surface.

#### NUMERICAL PROBLEMS SOLVING

Kinematics of fluid flow:

Basic equation of fluid flow and their application:Rate of discharge, equation of continuity of liquid flow.

## NUMERICAL PROBLEMS SOLVING

total energy of a liquid in motion-potential, kinetic & pressure

#### NUMERICAL PROBLEMS SOLVING

Bernoulli's theorem and its limitations. Practical applications of Bernoulli's equation.

#### NUMERICAL PROBLEMS SOLVING

Flow over Notches and Weirs: Notches, Weirs, types of notches and weirs,

Discharge through different types of notches and weirs-their application (No Derivation)

# NUMERICAL PROBLEMS SOLVING

Types of flow through the pipes:uniform and non uniform; laminar and turbulent; steady and unsteady

Reynold's number and its application

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).

Flow through the Open Channels: Types of channel sections-rectangular, trapezoidal and circular

Chezy's and Manning's equation.

NUMERICAL PROBLEMS SOLVING

Name of the Teaching Faculty

No. of Weeks: 20

Discharge, horse power & efficiency.

Reciprocating pumps:types, operation

horse power & efficiency

Hydrology Hydrology Cycle

Rainfall: types, intensity, hyetograph

Estimation of rainfall, rain gauges, Its types(concept only),

Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae

Rainfall: types, intensity, hyetograph

Estimation of rainfall, rain gauges, Its types(concept only)

Concept of catchment area, types, run-off, estimation of flood discharge by Dicken's and Ryve's formulae

Water Requirement of Crops

Definition of irrigation, necessity, benefits of irrigation, types of irrigation

Crop season

Duty, Delta and base period their relationship, overlap allowance, kharif and rabi crops

Gross command area, culturable command area, Intensity of Irrigation, irrigable area, time factor, crop ratio

Flow irrigation

Canal irrigation, types of canals, loss of water in canals

Perennial irrigation

Different components of irrigation canals

and their functions

Sketches of different canal cross-sections

classification of canals according to their alignment

Various types of canal lining – Advantages and disadvantages

WATER LOGGING AND DRAINAGE:

Causes and effects of water logging

detection, prevention and remedies
DIVERSION HEAD WORKS AND REGULATORY STRUCTURES
Necessity and objectives of diversion head works
weirs and barrages
General layout of barrage
functions of different parts of barrage
Silting and scouring
Functions of regulatory structures
CROSS DRAINAGE WORKS :
Functions of Cross drainage works aqueduct
necessity of Cross drainage works
aqueduct concept with help of neat sketch
Siphon concept with help of neat sketch
concept with help of neat sketch
DAMS
Necessity of storage reservoirs
types of dams
Earthen dams: types, description
causes of failure and protection measures.
Gravity dam- types, description
Causes of failure and protection measures.
Spillways- Types (With Sketch)
Necessity of spillway
PREVIOUS YEAR QUESTIONS PRACTICE
PREVIOUS YEAR QUESTIONS PRACTICE
PREVIOUS YEAR QUESTIONS PRACTICE
DOUBT CLEARING CLASS
Necessity of spillway
PREVIOUS YEAR QUESTIONS PRACTICE
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PREVIOUS YEAR QUESTIONS PRACTICE
DOUBT CLEARING CLASS

LESSON	PLAN OF 4TH
Discipline: CE	Semester:-4 <sup>TH</sup>
Subject:- LAND SURVEY-I	No of Days/per Week Class Allotted :-05
Week	Class Day
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## I SEMESTER CIVIL ENGINEERING(2022-23)

Name of the Teaching Faculty

No. of Weeks: 20

# **Theory/ Practical Topics**

INTRODUCTION TO SURVEYING, LINEAR MEASUREMENTS:

Surveying: Definition, Aims and objectives

Principles of survey-Plane surveying- Geodetic Surveying- Instrumental surveying.

Precision and accuracy of measurements, instruments used for measurement of distance

Types of tapes and chains

Errors and mistakes in linear measurement – classification

Sources of errors and remedies.

Corrections to measured lengths due to-incorrect length, temperature variation, pull, sag

numerical problem applying corrections

# CHAINING AND CHAIN SURVEYING:

Equipment and accessories for chaining

Ranging – Purpose, signalling, direct and indirect ranging, Line ranger – features and use, error due to incorrect ranging

Methods of chaining –Chaining on flat ground, Chaining on sloping ground – stepping method, Clinometer-features and use, slope correction

Setting perpendicular with chain & tape, Chaining across different types of obstacles –Numerical problems on chaining across obstacles

Purpose of chain surveying, Its Principles, concept of field book.

Selection of survey stations, base line, tie lines, Check lines

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.

ANGULAR MEASUREMENT AND COMPAS SURVEYING:

Measurement of angles with chain, tape & compass

Compass – Types, features, parts, merits & demerits, testing & adjustment of compass

Designation of angles- concept of meridians – Magnetic, True, arbitrary; Concept of bearings – Whole circle bearing, Quadrantal bearing, Reduced bearing, suitability of application

numerical problems on conversion of bearings

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.

Effects of earth's magnetism – dip of needle, magnetic declination, variation in declination

Numerical problems on application of correction for declination.

Local attraction - causes, detection, errors, corrections

Numerical problems of application of correction due to local attraction.

Errors in compass surveying – sources & remedies

Plotting of traverse – check of closing error in closed & open traverse, Bowditch's correction, Gales table

## MAP READING CADASTRAL MAPS & NOMENCLATURE:

Study of direction, Scale, Grid Reference

Grid Square Study of Signs and Symbols

Cadastral Map Preparation Methodology

Unique identification number of parcel

Positions of existing Control Points and its types

4.5 Adjacent Boundaries and Features, Topology Creation and verification.

#### PLANE TABLE SURVEYING:

Objectives, principles and use of plane table surveying.

Instruments & accessories used in plane table surveying.

Methods of plane table surveying -(1) Radiation, (2) Intersection

(3) Traversing, (4) Resection.

Statements of TWO POINT and THREE POINT PROBLEM.

Errors in plane table surveying and their corrections, precautions in plane table surveying.

#### THEODOLITE SURVEYING AND TRAVERSING:

Purpose and definition of theodolite surveying

Transit theodolite- Description of features, component parts,

Fundamental axes of a theodolite, concept of vernier, reading a vernier, Temporary adjustment of theodolite

Concept of transiting -Measurement of horizontal and vertical angles

Measurement of magnetic bearings, deflection angle, direct angle, setting out angles

Prolonging a straight line with theodolite, Errors in Theodolite observations.

Methods of theodolite traversing with – inclined angle method, deflection angle method, bearing method

Plotting the traverse by coordinate method, Checks for open and closed traverse

Traverse computation – consecutive coordinates, latitude and departure, Gale's traverse table

Numerical problems on omitted measurement of lengths & bearings

Closing error – adjustment of angular errors, adjustment of bearings

numerical problems

Balancing of traverse – Bowditch's method, transit method, graphical method, axis method, calculation of area of closed traverse.

# NUMERICAL PROBLEM SOLVING

#### LEVELLING AND CONTOURING:

Definition and Purpose and types of leveling

concepts of level surface, Horizontal surface, vertical surface, datum, R. L., B.M.

Instruments used for leveling

concepts of line of collimation, axis of bubble tube, axis of telescope, Vertical axis

Leveling staff – Temporary adjustments of level, taking reading with level, concept of bench mark, BS, IS, FS, CP, HI.

Field data entry – level Book – height of collimation method and Rise & Fall method, comparison

Numerical problems on reduction of levels applying both methods, Arithmetic checks

Effects of curvature and refraction, numerical problems on application of correction.

Reciprocal leveling – principles, methods, numerical problems, precise leveling.

Errors in leveling and precautions, Permanent and temporary adjustments of different types of levels.

Definitions, concepts and characteristics of contours

Methods of contouring, plotting contour maps, Interpretation of contour maps, top sheets

Use of contour maps on civil engineering projects – drawing cross-sections from contour maps, locating proposal routes of roads / railway / canal on a contour map

Computation of volume of earthwork from contour map for simple structure. 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 COMPUTATION OF AREA & VOLUME: Determination of areas, computation of areas from plans. Calculation of area by using ordinate rule, trapezoidal rule, Simpson's rule Calculation of volumes by prismoidal formula and trapezoidal formula, Prismoidal corrections, curvature correction for volumes. PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE Necessity of spillway PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE DOUBT CLEARING CLASS Necessity of spillway PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE DOUBT CLEARING CLASS Necessity of spillway PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE DOUBT CLEARING CLASS Necessity of spillway PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE DOUBT CLEARING CLASS Necessity of spillway PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE PREVIOUS YEAR QUESTIONS PRACTICE DOUBT CLEARING CLASS

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Discipline: CE	Semester:-4 <sup>TH</sup>
Subject:- STRUCTURAL DESIGN I	No of Days/per Week Class Allotted :-05
Week	Class Day
1 <sup>st</sup>	1 <sup>st</sup>
	2nd
	3rd 4th
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2 <sup>nd</sup>	1 <sup>st</sup>
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20 <sup>TH</sup>	1 <sup>st</sup>
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	5 <sup>th</sup>

# '4TH SEMESTER CIVIL ENGINEERING(2022-23) Name of the Teaching Faculty No. of Weeks: 20 **Theory/ Practical Topics** Working stress method (WSM) Objectives of design and detailing. State the different methods of design of concrete structures. Introduction to reinforced concrete R.C. sections their behaviour Grades of concrete and steel Permissible stresses, assumption in W.S.M. Basic concept of under reinforced ,over reinforced and balanced section PROBLEM SOLVING Flexural design & analysis of singly and doubly reinforced rectangular sections. NUMERICAL PROBLEM SOLVING Limit state method (LSM) Definition, types of limit states, partial safety factors for materials strength Characteristic strength, characteristic load, design load, loading on structure as per I.S. 875 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. Analysis and design of singly reinforced sections (LSM) 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. Concept of under-reinforced, over-reinforced and limiting section, neutral axis co-efficient Numerical problems limiting value of moment of resistance and limiting percentage of steel required for limiting singly R.C. section Numerical problems on determining design constants

Moment of resistance and area of steel for rectangular sections.

Numerical problem solving

Analysis and design of doubly reinforced section (LSM)

General features

Necessity of providing doubly reinforced section, reinforcement limitations.

Analysis of doubly reinforced section, strain diagram, stress diagram

Shear, Bond and Development Length (LSM)

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

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.

#### Numerical problem solving

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

Determination of Development length required for tension reinforcement of cantilevers beam and slab, check for development length.

Analysis and Design of T-Beam (LSM)

General features, advantages, effective width of flange as per IS: 456-2000 code provisions.

Analysis of singly reinforced T-Beam, strain diagram & stress diagram, depth of neutral axis

Numerical problem solving

Design of T-beam for moment and shear for neutral axis within or up to flange bottom.

Numerical problem solving

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)..

## Numerical problem solving

Design of Slab and Stair case (LSM)

Design of simply supported one-way slabs for flexure check for deflection control and shear.

Numerical problem solving

Numerical problem solving

Design of one-way cantilever slabs and cantilevers chajjas for flexure check for deflection control and check for development length and shear

Numerical problem solving

Numerical problem solving

Design of two-way simply supported slabs for flexure with corner free to lift Numerical problem solving Numerical problem solving Design of dog-legged staircase and cantilever staircase. Numerical problem solving Numerical problem solving Simple numerical problems on design of one-way simply supported slabs cantilever slab, twoway simply supported slab, dog-legged staircase and cantilever staircase Numerical problem solving Numerical problem solving Design of Axially loaded columns and Footings (LSM) Assumptions in limit state of collapse- compression. 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. Analysis and design of axially loaded short, square, rectangular columns with lateral ties only; check for short column and check for minimum eccentricity may be applied. Numerical problem solving Numerical problem solving Types of footing Design of isolated square column footing for flexure Design of isolated square column footing for shear Numerical problem solving Numerical problem solving Design of Strip footing for walls Numerical problem solving Numerical problem solving Previous year questions solving Previous year questions solving Numerical problem solving Numerical problem solving Numerical problem solving Previous year questions solving Previous year questions solving Design of Strip footing for walls Numerical problem solving Numerical problem solving Previous year questions solving Previous year questions solving Numerical problem solving DOUBT CLEARING CLASS DOUBT CLEARING CLASS

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