

N.C.College of Engineering

Israna-132107 (Panipat)



Scheme and Syllabus 2016-20

Civil Engineering

Second Year (3rd and 4th Semester)

N.C. COLLEGE OF ENGINEERING, ISRANA

SCHEME OF STUDIES AND EXAMINATION DEPARTMENT OF CIVIL ENGINEERING 2nd Year (Semester-III) 2016-20

Sr.No.	Subject Code	Subject	BOS	Teaching Schedule			Contact Hours	Credit
				L	T	P/D		
1	MGT-231	Industrial Economics	MGMT.	3	-	-	3	3
2	MATH-231	Mathematics-III	A.S	4	1	-	5	5
3	CE-231	Structural Analysis – I	CIVIL	3	1	-	4	4
4	CE-232	Fluid Mechanics -I	CIVIL	3	1	-	4	4
5	CE-233	Building Materials & Construction	CIVIL	3	1	-	4	4
6	CE-234	Surveying	CIVIL	3	-	-	3	3
7	CE-23P1	Structural Mechanics - I Lab	CIVIL	-	-	2	2	1
8	CE-23P2	Fluid Mechanics – I Lab	CIVIL	-	-	2	2	1
9	CE-23P3	Surveying Lab	CIVIL	-	-	2	2	1
10	CE-23P4	Computer aided Building Drawing	CIVIL	-	-	2	2	1
11	CE-23A	Society to School Connect Programme	CIVIL			2	2	audit
Total				19	4	10	33	27

N.C. COLLEGE OF ENGINEERING, ISRANA

SCHEME OF STUDIES AND EXAMINATION DEPARTMENT OF CIVIL ENGINEERING 2nd Year (Semester-IV) 2016-20

Sr.No.	Subject Code	Subject Name	BOS	Teaching Schedule			Contact Hours	Credit
				L	T	P/D		
1	CE-241	Structural Analysis-II	CIVIL	4	1	-	5	5
2	CE-242	Design of Steel Structures- I	CIVIL	3	1	-	4	4
3	CE-243	Fluid Mechanics-II	CIVIL	3	1	-	4	4
4	CE-244	Geo-Informatics	CIVIL	3	1	-	4	4
5	CE-245	Soil Mechanics	CIVIL	3	1	-	4	4
6	CE-246	General Proficiency & Fitness	CIVIL	-	-	-	-	1
6	CE-24P1	Geo-Informatics Lab	CIVIL	-	-	3	3	2
7	CE-24P2	Fluid Mechanics-II Lab	CIVIL	-	-	2	2	1
8	CE-24P3	Soil Mechanics Lab	CIVIL	-	-	2	2	1
9	CE-24P4	Technical Seminar	CIVIL			2	2	1
		Total		16	5	9	30	27

MARKS DISTRIBUTION

(ACCORDING TO AUTONOMY)

FOR ALL THEORY COURSES: -

1. On semester evaluation of all theory courses total: 100 marks

Distribution

I. Mid semester exam:	20 marks
II. Mid semester exam:	20 marks
Continues Evaluation Test (CET):	20 marks
Attendance:	20 marks
Teacher's assessment:	20 marks

2) End semester (final examination) of all theory courses

Total: 100 marks

3) Total of on semester + end semester evaluation

is of : 200 marks

4) To pass a theory course student should obtain

Minimum: - 40 marks in on semester evaluation.

: - 35 marks in end semester evaluation.

Total: - 80 marks out of 200.

Criterion for passing and failing the theory course: -

- a) If students fails in on semester evaluation despite passing in aggregate one will have to repeat that course.
- b) If student pass in on semester evaluation but fails in end semester exam he/ she will be permitted to appear in supplementary examination.
- c) If student is pass both in on semester evaluation and end semester evaluation but fails in total then He/ she would have to appear in supplementary exam.
- d) If attendance in a course is below 75%, the student shall not be permitted to appear in the End- Semester Examination.

FOR ALL PRACTICAL (LABORATORY) COURSES:

B. Tech. (ME) 3rd & 4th Semester, Syllabus 2016-17

I) On semester evaluation of all practical (laboratory) courses would be of total: 120 marks.

Distribution

Performance of class practical:	60 marks
Reports of practical:	60 marks

II) End semester evaluation (final lab exam + oral or viva test)

Total: 80 marks

III) Total of on semester evaluation final lab examination + end semester evaluation is of : 200 marks

IV) To pass a lab course student should obtain

Minimum: - 48 marks in on semester evaluation.

28 marks in end semester evaluation.

Total- 80 marks out of -200

Criterion for passing and failing the lab course is just like theory course.

CALCULATION OF SEMESTER GRADE POINT AVERAGE: -

Semester grade point average (SGPA) is the weighted average of the grade for the subjects registered in a Semester and is computed as follows:

$$SGPA = \frac{\sum_i C_i \times G_i}{\sum_i C_i}$$

C_i denotes the Credits (or Units) assigned to the i th subject and G_i denotes the Grade Point Equivalent to the Letter Grade obtained for the i th subject.

Cumulative Grade Point Average (CGPA) is the weighted average of the grades of the subjects for the registered in the semester.

3rd Semester (Civil Engineering)
INDUSTRIAL ECONOMICS
MGT-231

L T
3 0

On Semester Evaluation 100
End Semester Evaluation 100

Note: - 1. There are NINE questions in a set of question-paper. All questions carry equal marks.
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

Characteristics and Principles of Management- Meaning Management as an Art, Science and Profession, Functions of Management, Corporate Social Responsibility
Communication -Process and Barriers.

UNIT-II

Marketing Management-Meaning, Nature, Scope and Functions of marketing Management, Marketing Research, Marketing Mix, Marketing Information system
International Marketing Management- Meaning, Nature and Scope.

UNIT-III

Financial Management-Objectives, Scope and Functions of financial management, Capital Structure, Sources of Finance, Project Management- meaning, Feasibility study of Project, Social Cost Benefit Analysis.

UNIT-IV

Human Resource Management- Meaning, Nature, Scope and Functions of Human Resource Management, Difference between Personal management and Human Resource Management, Job Analysis-meaning and process, Performance Appraisal

Suggested Readings

- a) Philip Kotler.(2003). Marketing Management: Analysis, Planning, Implementation and Control. Prentice Hall of India
- b) Michael, J.E., Bruce, J.W. and William, J.S. (13th Edition, 2004). Marketing Management. Tata McGrawHill, New Delhi.
- c) Aswatthapa, K.; Human Resource and Personnel Management, TMH, 1997
- d) C.B.Gupta Management Theory and Practice, Sultan Chand and Sons
- e) D. Cenzo, D.A. & Robbins S.P. : Human Resource Management, 5th ed, NY, 1994
- f) Pandey I.M Financial Mgt, Vikas Publication
- g) Parsana Chandra, Financial Mgt, Tata McGraw New Delhi
- h) Khan M.Y and Jain P.K Financial Mgt, Problem and Cases, Tata McGraw Hill, New Delhi

3rd Semester (Civil Engineering)
MATHEMATICS-III
MATH-231

L **T**
4 **1**

On Semester Evaluation 100
End Semester Evaluation 100

Note: - 1. There are NINE questions in a set of question-paper. All questions carry equal marks.
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

Partial Differential Equations: Formation of partial differential equations, Lagrange's linear partial differential equation, First order non-linear partial differential equation, Charpit's method.

UNIT-II

Functions of a Complex Variables: Exponential function, Trigonometric, Hyperbolic and Logarithmic functions, limit and continuity of a function, Differentiability and analyticity. Cauchy-Riemann equations, Necessary and sufficient conditions for a function to be analytic, Polar form of the Cauchy-Riemann equations, Harmonic functions, Application to flow problems.

UNIT-III

Integration of Complex Functions: Cauchy-Integral theorem and formula, Power series, radius and circle of convergence. Taylor's, Maclaurin's and Laurent's series. Zeros and singularities of complex function, Residues. Integration of real integrals using residues (around unit and semi circle only)

UNIT-IV

Power Series: Methods for solutions of ordinary differential equations. Bessel Equation, Recurrence formula for $J_n(x)$, generating function for $J_n(x)$, Equation reducible to Bessel function, Orthogonality of Bessel function, Legendre equation and Legendre polynomials, Rodrigue's Formula, Generating function for $P_n(x)$, Recurrence formula for $P_n(x)$.

Text Books:

1. Kresyzig, E., "Advanced Engineering Mathematics", John Wiley and Sons. (Latest edition).
2. Ramana, B.V., "Higher Engineering Mathematics" Tata McGraw-Hill.
3. Jain, R. K. and Iyengar, S. R. K. "Advanced Engineering Mathematics", Narcois, 2003 (2nd Ed.)
4. Mathur A. B., Jaggi V. P., "Advanced Engineering Mathematics", Khanna Publishers.
5. Grewal, B.S., "Higher Engineering Mathematics", Khanna Publishers.

3rd Semester (Civil Engineering)
STRUCTURAL ANALYSIS - I
CE-231

L **T**
3 **1**

On Semester Evaluation 100
End Semester Evaluation 100

Note: - **1. There are NINE questions in a set of question-paper. All questions carry equal marks.**
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

Analysis of Stresses and Strains: Analysis of simple states of stresses and strains, elastic constraints, bending stresses, theory of simple bending, flexure formula, combined stresses in beams, shear stresses, Mohr's circle, Principle stresses and strains, torsion in shafts and closed thin walled sections, stresses and strains in cylindrical shells and spheres under internal pressure.

Theory of Columns: Slenderness ratio, end connections, short columns, Euler's critical buckling loads, eccentrically loaded short columns, cylinder columns subjected to axial and eccentric loading.

UNIT-II

Bending Moment and shear Force in Determinate Beams and Frames: Definitions and sign conventions, axial force, shear force and bending moment diagrams.

Three hinged Arches: Horizontal thrust, shear force and bending moment diagrams.

UNIT-III

Deflections in Beams: Introduction, slope and deflections in beams by differential equations, moment area method and conjugate beam method, unit load method, principle of virtual work, Maxwell's Law of Reciprocal Deflections, Williot's Mohr diagram.

UNIT-IV

Analysis of Statically Determinate Trusses: Introduction, various types, stability, analysis of plane trusses by method of joints and method of sections, analysis of space trusses using tension coefficient method.

Text Books:

Mechanics of Solids	-	Dr. V.S. Prasad, Galgotia Pub., New Delhi
Strength of Materials	-	Dr. R.K. Bansal, Luxmi Publications
Strength of Materials	-	Sandhu Singh, Khanna Publishers
Elementary Structural Analysis	-	Jain, A.K., Nem Chand & Bros., Roorkee

Reference Books:

Strength of Materials -	G.H.Ryder, Third Ed. In SI UNITS 1969 Macmillan India
Strength of Materials-	Andrew Pytel and Fredinand L.Sinder, Fourth Ed., Int. Student Ed. Addison-Wesley Longman
Strength of Materials -	Popov, PHI, N.Delhi.
Strength of Materials -	A Rudimentary Approach – M.A. Jayaram.

Note: The Examiner will set nine questions, taking First question from entire syllabus, two questions from each Unit. The students are required to attempt five questions in all selecting at least one from each unit and First question is compulsory. All questions will carry equal marks

3rd Semester (Civil Engineering)
FLUID MECHANICS -I
CE-232

L T
3 1

On Semester Evaluation 100
End Semester Evaluation 100

Note: - 1. There are NINE questions in a set of question-paper. All questions carry equal marks.
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

Introduction & Fluid Statics: Fluid properties, Mass density, specific weight, specific volume and specific gravity, surface tension, capillarity, pressure inside a droplet and bubble, compressibility, viscosity-Newtonian & Non-Newtonian fluids, real and ideal fluids, continuum concept. Pascal's law, hydrostatic equation-pressure-density-height relationship, gauge and absolute pressure, simple, differential and sensitive manometers, two liquid manometers. Hydrostatic forces on plane and curved surfaces, center of pressure, buoyancy and stability of immersed and floating bodies, relative equilibrium, determination of metacentric height, fluid masses subjected to uniform acceleration, free & forced vortex.

UNIT-II

Kinematics of fluids:- Eulerian and Lagrangian descriptions of fluid flow. Stream, streak and pathlines, types of flows-Steady and unsteady, uniform and non-uniform, laminar and turbulent flows, one two and three-dimensional flows. Flow rate and continuity equation in differential form, rotation & circulation, stream function and velocity potential, flow nets-graphical and experimental methods of drawing flow nets.

Fluid Dynamics:- Concept of system and control volume, Euler's equation, Bernoulli's equation, Pitot tube, venturimeter, orificemeter, flow through orifices & mouthpieces, Kinetic and momentum correction factors, potential flow: uniform and vortex flow, flow past a Rankine half body, flow past a cylinder with and without circulation.

UNIT-III

Viscous Flow:- Flow regimes & Reynolds number, Relationship between shear stress and pressure gradient, uni-directional flow between stationary and moving parallel plates, movement of piston in a dashpot, power absorbed in bearings. Flow through pipes-Hagen-Poiseuille Law, hydraulic gradient and total energy lines, major and minor losses in pipes. Power transmission through pipes, branched pipes-parallel and series.

UNIT-IV

Boundary Layer Analysis:- Boundary layer concept, displacement, momentum and energy thickness of boundary layer. Laminar and turbulent boundary layer flows, drag on a flat plate, boundary layer separation and control, streamline and bluff bodies, lift and drag on a cylinder and an airfoil.

Turbulent flow:- Shear stress in turbulent flow, turbulent boundary layer, laminar sub-layer, smooth and rough boundaries, Prandtl mixing length hypothesis, hydraulically smooth and rough pipes, velocity distribution in pipes, friction coefficient of smooth and rough pipes.

Text Books:

Fluid Mechanics	–	Streeter V L and Wylie E B, Mc Graw Hill
Mechanics of Fluids	–	I H Shames, Mc Graw Hill
Fluid Mechanics	–	B White
Fluid Mechanics	–	Senjel

References Books:

- Introduction to Fluid Mechanics and Fluid Machines – S.K. Som and G. Biswas, TMH
Fluid Mechanics and Fluid Power Engineering – D.S. Kumar, S.K. Kataria and Sons
Fluid Mechanics and Machinery – S.K. Agarwal, TMH, New Delhi

Note: The Examiner will set nine questions, taking First question from entire syllabus, two questions from each Unit. The students are required to attempt five questions in all selecting at least one from each unit and First question is compulsory. All questions will carry equal marks

3rd Semester (Civil Engineering)
BUILDING MATERIALS & CONSTRUCTION
CE-233

L T
3 1

On Semester Evaluation: 100
End Semester Evaluation: 100

Note: - 1. There are NINE questions in a set of question-paper. All questions carry equal marks.
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

MATERIALS:

Stone: Classification, requirements of good structural stone, quarrying, blasting and sorting out of stones, dressing, sawing and polishing, prevention and seasoning of stone.

Brick: Classification of bricks, constituents of good brick earth, harmful ingredients, manufacturing of bricks, testing of bricks.

Lime: Classification of lime, manufacturing, artificial hydraulic lime pozzolona, testing of lime, storage of lime.

Cement: composition, types of cement, manufacturing of ordinary Portland cement, testing of cement, special types of cement, storage of cement.

Mortar: Definition, proportions of lime and cement mortars, mortars for masonry and plastering.

Concrete: Definition, proportions and ingredients of concrete, manufacturing of concrete, uses, water cement ratio, workability of concrete.

UNIT-II

Timber: Classification of timber, structure of timber, seasoning of timber, defects in timber, fire proofing of timber, plywood, fiberboard, masonite and its manufacturing, important Indian timbers.

Ferrous and Non-Ferrous Metals: Definitions, manufacturing of cast iron, manufacturing of steel from pig iron, types of steel, marketable form of steel.

UNIT-III

CONSTRUCTION

Masonry Construction: Introduction, various terms used, stone masonry-Dressing of stones, Classifications of stone masonry, safe permissible loads, Brick masonry-bonds in brick work, Defects in brick masonry, composite stone and brick masonry.

Cavity and Partition Walls: Advantages, position of cavity, types of non-bearing partitions, constructional details and precautions, construction of masonry cavity wall.

Foundation: Functions, types of foundations, `Site Investigation and sub soil exploration, general feature of shallow & Pile foundations, Details of shallow and deep foundations, foundations for Black cotton soil, loads on foundations, essential requirements of good foundation.

UNIT-IV

Damp-Proofing and Water-Proofing: Defects and causes of dampness, prevention of dampness materials used, damp-proofing treatment in buildings, water proofing treatment of roofs including pitched roofs.

Roofs and Floors: Types of roofs, various terms used, roof trusses, king post truss-queen post truss. Floor structures, ground, basement and upper floors, various types of floorings.

Doors and Windows: Locations, sizes, types of doors and windows, fixtures and fasteners for doors and windows.

Stairs: Introduction, technical terms, requirements of a good stair, classification of stairs, stairs of different materials.

Text Books:

- | | | | |
|----|--------------------------|---|--|
| 1. | Building Construction | - | Sushil Kumar, Standard Pub.,New Delhi |
| 2. | Building Materials | - | Rangawala |
| 3. | Construction Engineering | - | Y.S.Sane |
| 4. | Building Construction | - | Gurcharan Singh; Standard Pub.,New Delhi |

Reference Books:

- National Building Code of India - Bureau of Indian Standards.
Civil Engineering Handbook - Khanna Publishers

Note: The Examiner will set nine questions, taking First question from entire syllabus, two questions from each Unit. The students are required to attempt five questions in all selecting at least one from each unit and First question is compulsory. All questions will carry equal marks

L T
3 -

On Semester Evaluation: 100
End Semester Evaluation: 100

**Note: - 1. There are NINE questions in a set of question-paper. All questions carry equal marks.
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.**

UNIT-I

Fundamental Principles of Surveying: Definition, objects, classification, fundamental principles, Scales.

Measurement of Distances: Direct measurement, instruments for Chaining, instruments for making stations, chaining of line, errors in chaining, tape corrections examples.

Chain Surveying: Introduction, survey stations, lines, locating ground features field book work, instruments for setting out right angles, Basic problems in chaining, obstacles in chaining, plotting a chain survey.

Compass: Bearing of angles, theory of magnetic and prismatic compass, Instruments for measurement of angles-prismatic and surveyor's compass, bearing of lines, local attraction, examples, errors in Compass.

UNIT-II

Levelling: Definition of terms used in levelling, types of level and staff, temporary adjustment of levels, principles of levelling, reduction of levels, booking of staff readings, examples, Curvature and refraction, Reciprocal and profile levelling, cross sectioning, levelling problems, errors in levelling.

Contour: Contouring, characteristics of contours lines, locating contours, interpolation of contours, uses of contour map.

UNIT-III

Plane Table Surveying: Plane table, methods of plane table surveying, radiation, intersection, traversing and resection, two-point and three-point problems.

Theodolite: Theodolites, temporary adjustment of Theodolite, measurement of angles, repetition and reiteration method, traverse surveying with Theodolite, checks in traversing, adjustment of closed traverse, examples.

UNIT-IV

Tacheometry: Uses of tachymetry, principle of tacheometric surveying, instruments used in tacheometry, systems of tacheometric surveying-stadia system fixed hair method, determination of tacheometric constants tangential systems, examples.

Curves: Classification of curves, elements of simple circular curve, location of tangent point-chain and tape methods, instrumental methods, examples of simple curves. Transition Curves-Length and types of transition curves, length of combined curve, examples.

Vertical Curves: Necessity and types of vertical curves.

Text Books:

1. Surveying Vol.I & II - B.C.Punmia
2. Surveying Vol.I & II - T.P.Kanitkar
3. Surveying Vol.I & II - S.K.Duggal.
4. Plane Surveying - A.M.Chandra

Reference Books:

1. Surveying - Rangawala
2. Surveying - D.N.Ghosh
3. Plane and Geodetic Surveying Vol.I - Clark

3rd Semester (Civil Engineering)
STRUCTURAL MECHANICS – I LAB
CE-23P1

P/D
2

On Semester Evaluation :120
End Semester Evaluation :80

1. Verification of reciprocal theorem of deflection using a simple supported beam.
2. Verification of moment area theorem for slopes and deflections of the beam.
3. Deflections of a truss-horizontal deflection & vertical deflection of various joints of a pin-jointed truss.
4. Elastic displacements (vertical & horizontal) of curved members.
5. Experimental and analytical study of 3-hinged arch and influence line for horizontal thrust.
6. Experimental and analytical study of behavior of struts with various end conditions.
7. Uniaxial tension test for steel.
8. Uniaxial compression test on concrete & brick specimens.

3rd Semester (Civil Engineering)
FLUID MECHANICS – I LAB
CE-23P2

P/D
2

On Semester Evaluation: 120
End Semester Evaluation: 80

1. To determine metacentric height of the ship model.
2. To verify the Bernoulli's theorem.
3. To determine coefficient of discharge for an Orificemeter.
4. To determine coefficient of discharge of a venturimeter.
5. To determine coefficient of discharge for an Orifice under variable head.
6. To determine coefficient of discharge for a mouth piece.
7. To study development of boundary layer over a flat plate.
8. To study velocity distribution in a rectangular open channel.
9. Velocity measurements by current meter, float, double float (demonstration only).

3rd Semester (Civil Engineering)
SURVEYING LAB
CE-23P3

P/D
2

On Semester Evaluation: 120
End Semester Evaluation: 80

1. **Chain surveying:**
 - i). Chaining and chain traversing.
 - ii). Compass traversing.

2. **Plane tabling:**

Methods of plane table surveying, two – point & three – point problems.

3. **Levelling:**
 - i). Profile levelling and plotting of longitudinal section and cross – sections.
 - ii). Y levelling.
 - iii). Permanent adjustment of level.
 - iv). Reciprocal levelling.
 - v). Contouring and preparation contour map.

3rd Semester (Civil Engineering)
COMPUTER AIDED BUILDING DRAWING
CE-23P4

P/D
2

On Semester Evaluation: 120
End Semester Evaluation: 80

1. Typical Drawing of:

- a) English Bond in brick work
- b) Flemish Bond in brick work
- c) Cavity Wall
- d) Grillage Foundation

2. Preparation of Building Drawing:

- a) Ground floor plan with Auto Cad
- b) Two Sectional Elevations with Auto Cad
- c) Front and Side Elevations with Auto Cad

3rd Semester (Civil Engineering)
Society to School Connect Programme
CE-23A

P/D
2

On Semester Evaluation: 120
End Semester Evaluation: 80

4th Semester (Civil Engineering)
STRUCTURAL ANALYSIS-II
CE-241

L	T	On Semester Evaluation 100
4	1	End Semester Evaluation 100

Note: - 1. There are NINE questions in a set of question-paper. All questions carry equal marks.
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

Statically Indeterminate Structures:

Introduction, Static and Kinematic Indeterminacies, Castigliano's theorems, Strain energy method, Analysis of frames with one or two redundant members using Castigliano's 2nd theorem.

UNIT-II

Slope Deflection and Moment Distribution Methods:

Analysis of continuous beams & portal frames, Portal frames with inclined members.

UNIT-III

Column Analogy Method:

Elastic centre, Properties of analogous column, Applications to beam & frames.

Analysis of Two-hinged Arches:

Parabolic and circular Arches, Bending Moment Diagram for various loadings, Temperature effects, Rib shortening, Axial thrust and Radial Shear force diagrams.

UNIT-IV

Unsymmetrical Bending:

Introduction centroidal principal axes of sections, Bending stresses in beam subjected to unsymmetrical bending, shear centre, shear centre for channel, Angles and Z sections.

Cable and Suspension Bridges:

Introduction, uniformly loaded cables, Temperature stresses, three-hinged stiffening Girder and two-hinged stiffening girder.

Books:

1. Statically Indeterminate Structures, C.K. Wang, McGraw Hill Books Co., New York.
2. Advanced Structural Analysis, A.K. Jain, Nem Chand & Bros., Roorkee.
3. Indeterminate Structures, R.L. Jindal, S.Chand & Co., N.Delhi.
4. Theory of Structures, Vol. I, S.P.Gupta & G.S. Pandit, Tata McGraw Hill, New Delhi.

4th Semester (Civil Engineering)
DESIGN OF STEEL STRUCTURES-I
CE-242

L	T	On Semester Evaluation	100
3	1	End Semester Evaluation	100

Note: - 1. There are NINE questions in a set of question-paper. All questions carry equal marks.
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

Introduction: Properties of structural steel. I.S.Rolled sections and I.S. specification.

Connections: Importance, various types of connections, simple and moment resistant, riveted, bolted and welded connections.

UNIT-II

Design of Tension Members: Introduction, types of tension members, net sectional areas, design of tension members, lug angles and splices.

Design of Compression Members: Introduction, effective length and slenderness ratio, various types of sections used for columns, built up columns, necessity, design of built up columns, laced and batted columns including the design of lacing and battens, design of eccentrically loaded compression members.

UNIT-III

Column Bases and Footings: Introduction, types of column bases, design of slab base and gusseted base, design of gusseted base subjected to eccentrically loading, design of grillage foundations.

Design of Beams: Introduction, types of sections, general design criteria for beams, design of laterally supported and unsupported beams, design of built up beams, web buckling, web crippling and diagonal buckling.

UNIT-IV

Gantry Girders: Introduction, various loads, specification, design of gantry girder.

Plate Girder: Introduction, elements of plate girder, design steps of a plate girder, necessity of stiffeners in plate girder, various types of stiffeners, web and flange splices (brief introduction), Curtailment of flange plates, design beam to column connections: Introduction, design of framed and seat connection.

Drawing:

1. Structural drawings of various types of welded connections (simple and eccentric)
2. Beam to column connections (framed & seat connections)
3. Column bases-slab base, gusseted base and grillage foundation.
4. Plate girder.
5. Roof truss.

Books:

1. Design of Steel Structures, A.S.Arya & J.L.Ajmani, Nem Chand & Bros., Roorkee.
2. Design of Steel Structures, M.Raghupati, TMH Pub., N.Delhi.
3. Design of Steel Structures, S.M. A. Kazmi & S.K. Jindal Prentice Hall, New Delhi.
4. Design of Steel Structures, S.K. Duggal, TMH Pub., N.Delhi.

4th Semester (Civil Engineering)
FLUID MECHANICS-II
CE-243

L **T**
3 **1**

On Semester Evaluation 100
End Semester Evaluation 100

Note: - 1. There are NINE questions in a set of question-paper. All questions carry equal marks.
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

Laminar Flow: Navier Stoke's equation, Laminar flow between parallel plates, Couette flow, laminar flow through pipes-Hagen Poiseuille law flow around a sphere-Stokes' law.

Flow through Pipes: Types of flows – Reynold's experiment, shear stress on turbulent flow, boundary layer in pipes-Establishment of flow, velocity distribution for turbulent flow in smooth and rough pipes, resistance to flow of fluid in smooth and rough pipes, Stanton and Moody's diagram. Darcy's weisbach equation, other energy losses in pipes, loss due to sudden expansion, hydraulic gradient and total energy lines, pipes in series and in parallel, equivalent pipe, branched pipe, pipe networks, Hardy Cross method, water hammer.

UNIT-II

Drag and Lift: Types of drag, drag on a sphere, flat plate, cylinder and airfoil, development of lift on immersed bodies like circular cylinder and airfoil.

Open Channel Flow: Types of flow in open channels, geometric parameters of channel section uniform flow, most economical section (rectangular and trapezoidal), specific energy and critical depth, momentum in open channel, specific force, critical flow in rectangular channel applications of specific energy and discharge diagrams to channel surges in open channels, positive and negative surges, gradually varied flow equation and its integration, surface profiles.

UNIT-III

Boundary Layer Analysis: Boundary layer thickness, boundary layer over a flat plate, laminar boundary layer, turbulent boundary layer, laminar sub-layer, smooth and rough boundaries, local and average friction coefficient, separation and its, control.

Dimensional Analysis and Hydraulic Similude: Dimensional analysis, Buckingham theorem, important dimensionless numbers and their significance, geometric, kinematic and dynamic similarity, model studies, physical modeling similar and distorted models.

UNIT-IV

Pumps and Turbines: Reciprocating pumps, their types, work done by single and double acting pumps. Centrifugal pumps, components and parts and working types, heads of a pump-statics and manometric heads,. Force executed by fluid jet on stationary and moving flat vanes, Turbine classifications of turbines based on head and specific speed, component and working of Pelton wheel and Francis tubines, cavitation and setting of turbines.

Books:

1. Hydraulic and Fluid Mechanics by P.N.Modi & S.M. Seth.
2. Introduction to Fluid Mechanics by Robert W. Fox & Alan T.McDonald
3. Fluid Mechanics Through Problems by R.J. Grade
4. Engineering Fluid Mechanics by R.J. Grade & A.G. Mirajgaoker.

4th Semester (Civil Engineering)
GEO-INFORMATICS
CE-244

L T
3 1

On Semester Evaluation 100
End Semester Evaluation 100

Note: - 1. There are NINE questions in a set of question-paper. All questions carry equal marks.
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

Trigonometrical Levelling:

Introduction, height and distances-base of the object accessible, base of object inaccessible, geodetical observation, refraction and curvature, axis signal correction, difference in elevation between two points.

Triangulation:

Triangulation systems, classification, strength of figure, selection of triangulation stations, grade of triangulation, field work of triangulation, triangulation computations, introduction to E.D.M. instruments.

UNIT-II

Survey Adjustment and Treatment of Observations:

Types of errors, definition of weight of an observation, most probable values, law of accidental errors, law of weights, determination of probable error (different cases with examples) principle of least squares, adjustment of triangulation figures by method of least squares.

UNIT-III

Astronomy:

Definitions of astronomical terms, star at elongation, star at prime vertical star at horizon, star at culmination, celestial coordinate systems, Napier's rule of circular parts, various time systems: sidereal, apparent, solar and mean solar time, equation of time-its cause.

UNIT-IV

Elements of Photogrammetry:

Introduction: types of photographs, types of aerial photographs, aerial camera and height displacements in vertical photographs, stereoscopic vision and stereoscopies, height determination from parallax measurement, flight planning.

Introduction of Remote Sensing and its Systems:

Concept of G.I.S. and G.P.S. –Basic Components, data input, storage output.

Books:

1. Surveying Vol. 2, by B.C. Punmia
2. Surveying Vol. 3, by B.C. Punmia
3. Surveying Vol. 2, by T.P. Kanitkar

- Note: - 1. There are NINE questions in a set of question-paper. All questions carry equal marks.**
2. Attempt five questions in all. FIRST question is compulsory which covers the whole syllabus. Attempt ONE question from each of the other four Units.

UNIT-I

Soil Formation and Composition: Introduction, soil, Soil Mechanics and Geo Tech. Engineering, origin of soils, scope of soil engg., weathering, soil formation, characteristics of different types of Soils, inter particle force a soil structure.

Classification of Soils: Indian Standard Classification System Introduction, three phase system, weight-volume relationships, soil grain properties, soil aggregate properties, grain size analysis, sieve analysis, sedimentation analysis, grain size distribution curves, consistency of soils, consistency limits and their determination, activity of clays & relative density of sands.

UNIT-II

Permeability of Soils: Introduction, Darcy's law and its validity, discharge velocity and seepage velocity, factors affecting permeability, laboratory determination of coefficient of permeability.

Effective Stress Concept: Principle of effective stress, effective stress under hydrostatic conditions, capillary rise in soils, effective stress in the zone of capillary rise, effective stress under steady state hydro-dynamic conditions, seepage force, quick condition, critical hydraulic gradient two dimensional flow, Laplace's equation, properties and utilities of flownet.

Compaction: Introduction, role of moisture and compactive effect in compaction laboratory determination of optimum moisture content, moisture density relationship, compaction in field.

UNIT-III

Vertical Stress below Applied Loads: Introduction, Boussinesq's equation, vertical stress distribution diagrams, vertical stress beneath loaded areas, Newmark's influence chart, approximate stress distribution methods for loaded areas Westergaard's analysis.

Compressibility and Consolidation: Introduction, components of total settlement, consolidation process, compressibility. consolidation settlement, secondary consolidation.

UNIT-IV

Shear Strength: Introduction, Mohr stress circle, Mohr-Coulomb failure-criterion, relationship between principal stresses at failure, shear tests, direct shear test unconfined compression test, triaxial compression tests, drainage conditions and strength parameters, Vane shear test, shear strength characteristics of sands.

Earth Pressure: Introduction, earth pressure at rest, Rankine's active & passive states of plastic equilibrium, Rankine's earth pressure theory, Coulomb's earth pressure theory.

Books Recommended:

1. Basic and Applied Soil Mechanics by Gopal Ranjan, ASR Rao, New Age International (P) Ltd. Pub. N.Delhi.
2. Soil Engg. In Theory and Practice, Vol. I, Fundamentals and General Principles by Alam Singh, CBS Pub., N.Delhi.
3. Engg. Properties of Soils by S.K. Gulati, Tata-Mcgraw Hill, N.Delhi.
4. Geotechnical Engg. By P.Purshotam Raj, Tata Mcgraw Hill.
5. Principals of Geotechnical Engg. By B.M.Das, PWS KENT, Boston.

4th Semester (Civil Engineering)
GENERAL PROFICIENCY & FITNESS
CE-246

P/D

On Semester Evaluation :120
End Semester Evaluation :80

4th Semester (Civil Engineering)
GEO-INFORMATICS LAB
CE-24P1

P/D
3

On Semester Evaluation :120
End Semester Evaluation :80

1. Theodolite:

Study of Theodolite, measurement of horizontal angle measurement of vertical angle, Permanent adjustment.

2. Tacheometry:

Tacheometric constants, calculating horizontal distance and elevations with the help of tacheometer.

3. Curves:

Setting of simple circular curves by off set method, off set from chord produced, off set from long chord and by deflection angle method.

4. Triangulation:

An exercise of triangulation including base line measurement.

4th Semester (Civil Engineering)
FLUID MECHANICS-II LAB
CE-24P2

P/D
2

On Semester Evaluation :120
End Semester Evaluation :80

1. To determine the coefficient of drag by Stoke's law for spherical bodies.
2. To study the phenomenon of cavitation in pipe flow.
3. To determine the critical Reynold's number for flow through commercial pipes.
4. To determine the coefficient of discharge for flow over a broad crested weir.
5. To study the characteristics of a hydraulic jump on a horizontal floor and sloping glacis including friction blocks.
6. To study the scouring phenomenon around a bridge pier model.
7. To study the scouring phenomenon for flow past a spur.
8. To determine the characteristics of a centrifugal pump.
9. To study the momentum characteristics of a given jet.
10. To determine head loss due to various pipe fittings.

4th Semester (Civil Engineering)
SOIL MECHANICS LAB
CE-24P3

P/D
2

On Semester Evaluation : 120
End Semester Evaluation : 80

1. Visual Soil Classification and water content determination.
2. Determination of specific gravity of soil solids.
3. Grain size analysis-sieve analysis.
4. Liquid limit and plastic limit determination.
5. Field density by:
 - a). Sand replacement method
 - b). Core cutter method
6. Proctor's compaction test.
7. Coefficient of permeability of soils.
8. Unconfined compressive strength test.

4th Semester (Civil Engineering)
Technical Seminar
CE-24P4

P/D
2

On Semester Evaluation : 120
End Semester Evaluation : 80