Fourth Semester						
COURSE CONTENTS						
CE-4001	**Survey – I**	**L**	**T**	**P**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	2	70	22

UNIT–I

Plane table Surveying: - Introduction, Principle, and accessories used in plane tabling, advantages and disadvantages. Setting of Plane Table, Orienting the Table. Methods of Plane Tabling, Radiation, Intersection, Measurement of Area and Volume, Minor Instruments.

UNIT - II

Topographic Surveying: - Introduction, Procedure of Topography Survey, Route Survey (L-Section & Cross-Section), Contouring (Characteristics & Methods).

UNIT - III

Theodolite: - Introduction & important definitions, Construction detail of Transit Theodolite, temporary and permanent adjustments, measurement of horizontal and vertical angles, Traversing, Closing error, traverse computations, and omitted measurements etc.

UNIT - IV

Tachometery: - Principle of tacheometric systems, construction details, stadia system, uses of anallatic lens, tangential system, subtense system, instrument constant (laboratory & field), field work, use of tacheometry for traversing and contouring.

UNIT - V

Trigonometric Leveling:-Trigonometrical leveling, determination of height and distance when the base of the object is accessible and inaccessible, curvature and refraction correction, reciprocal leveling. Introduction to Total Stations.

Laboratory Work:-

1. Plane Table Survey by Radiation Method.
2. Plane Table Survey by Intersection Method.
3. Contouring of small areas.
4. Profile Leveling (L-Section & Cross-Section).
5. Study of Theodolite and measurements of horizontal and vertical angles.
6. Measurement of horizontal angles by Reiteration method.
7. Determining the height and distance of lighting conductor when the base of the object is inaccessible.
8. Determination of Tachometric constants
9. Determination of height and distance of a point by tachometric method.

Reference Books: -

1. T.P. Kanetkar – Surveying and Leveling Vol. I & II, Pune Vidhyarthi Griha Prakashan, Pune
2. B.C. Punmia – Surveying Vol. I & II,Laxmi Publications New Delhi
3. S.K. Duggal - Surveying and Leveling, Tata McGraw Hill .
4. H.K. Basak - Surveying and Leveling, Tata McGraw Hill .
5. K. R. Arora – Surveying Vol. I & II, Standard Book House

	COURSE CONTENTS					
CE-4002	**Theory of Structure – I**	**L**	**T**	**P**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	0	70	22

UNIT - I

Virtual work and Energy Principles : Principles of Virtual work applied to deformable bodies, strain energy and complementary energy, Energy theorems, Maxwell's Reciprocal theorem, Analysis of Pin-Jointed, determinate indeterminate for static loads using costing lianas theorem.

UNIT - II

Indeterminate Structures–I: Static and Kinematics indeterminacy, Analysis of Fixed and continuous beams by theorem of three moments, Effect of sinking and rotation of supports, Moment distribution method (without sway). Analysis of beam and frames (rigid and non rigid) by consistence deformation method.

UNIT - III

Indeterminate Structures–II: Analysis of beams and frames by slope Deflection method, Column Analogy method.

UNIT - IV

Arches and Suspension Cables: Three hinged arches of different shapes, Eddy's Theorem, Suspension cable, stiffening girders, Two Hinged and Fixed Arches - Rib shortening and temperature effects.

UNIT - V

Rolling loads and Influence Lines: Maximum SF and BM curves for various types of Rolling loads, focal length, EUDL, Influence Lines for Determinate Structures- Beams.

Reference Books :

(i)   Ghali A & Neville M., Structural Analysis - A Unified classical and matrix Approach, Chapman and Hall, New York.
(ii)   Wang C.K. Intermediate structural analysis, McGraw Hill, New York.
(iii)   Kinney Streling J. Indeterminate structural Analysis, Addison Wesley.
(iv)   Reddy C.S., Basic Structural Analysis, Tata McGraw Hill Publishing Company, New Delhi.
(v)   Norris C.H., Wilbur J.B. and Utkys. Elementry Structural Analysis, McGraw Hill International, Tokyo.
(vi)   Theory of Structure – I by B.C. Punmia.
(vii)   Theory of Structure – I by Ramamurtam.

COURSE CONTENTS							
CE-4003	**Construction Technology**	**L**	**T**	**P**	**Max. Marks**	**Min. Marks**	
Duration	3 Hours	3	1	2	70	22	

UNIT-I
Material: Brick, Cement, Mortar, Advance construction material of fly ash in mortar and concrete and other materials.

UNIT-II
Concrete Technology: Introduction Classification, properties, grades, advantage and disadvantages of concrete, ingredients of concrete, types of cement, Sand, aggregates, water and admixtures.

UNIT–III
Testing of Concrete: Inspection, testing and quality control of constituent materials of concrete as per Indian Standard Specification. **Admixtures:** various types, their role in concrete. **Type of concrete:** Light weight concrete, Ferro cement, fiber reinforced concrete, polymer concrete composites. Properties & uses.

UNIT– IV
Properties of Fresh and Hardened Concrete: Introduction, Workability, Testing of concrete, factors affecting concrete, Rheology of concrete, Compressive and Tensile strength, Stress and strain characteristics, shrinkage and temperature effects. Creep of concrete permeability, durability, thermal properties and micro cracking of concrete.

UNIT–V
Design of Concrete Mix: Various classical methods of concrete mix design, I.S. code method, basic considerations and factors influencing the choice of mix design, acceptance criteria for concrete, concrete mixes with Pozzolanic materials.

Reference Books-

1. Varshney R.S. Concrete Technology, Oxford & IBH Publishing Co.
2. Gambhir ML; Concrete Technology- TMH.
3. Shetty, M.S. – Concrete Technology.
4. Sinha SN, Reinforced Concrete Technology, TMH.
5. New Building Materials Published by BMTPC New Delhi.
6. Hand Books on Materials & Technology, Published by BMTPC & HUDCO.
7. Mohan Rai & M.P. Jaisingh, Advances in Building Materials and Constructions.
8. Jackson N, Civil Engineering Materials.
9. Properties of Concrete – AM Neville- Person Education.
10. Advance in Building Materials & construction, Mohan Rai & M.P. Jai Singh.
11. Engineering Materials, S.C. Rangwala.
12. Building Construction, Sushil Kumar.
13. Building Construction, B.C. Punmia.
14. Building Construction, Metchell.

List of Experiments:

1. Tests of Bricks.
2. Tests of Aggregates.
3. Tests of Cement.
4. Determination of compressive strength of concrete with different cement grades.
5. Determination of workability of concrete by slump test.
6. Determination of workability of concrete by compacting factor apparatus.
7. Design of different concrete mix.
8. Nondestructive testing of concrete by rebound hammer test.
9. Nondestructive testing of concrete by ultrasonic method.
10. Test for the effect of admixtures on the concrete compressive strength.

COURSE CONTENTS					
CE-4004	**Transportation-I**	**L**	**T**	**P**	**Max. Marks**	**Min. Marks**
Duration	3 Hours	3	1	0	70	22

UNIT - I

Introduction, Tractive Resistances & Permanent Way: Principles of Transportation, transportation by roads, railways, airways, waterways, their importance and limitations. Route surveys and alignment, railway track, development and gauges. Hauling capacity and tractive effort.

(i)   Rails: types, welding of rails, wear and tear of rails, rail creep.

(ii) Sleepers: types and comparison, requirement of a good sleeper, sleeper density.

(iii) Rail fastenings: types, fish plates, fish bolts, spikes, bearing plates, chain keys, check and guard rails.

(iv) Ballast: requirement of good ballast, various materials used as ballast, quantity of ballast.

Different methods of plate laying, material trains, calculation of materials required, relaying of tract.

UNIT - II

Geometric Design, Station & Yards, Points and Crossings, Signaling & Interlocking: Formation, cross sections, super elevation, equilibrium, cant and cant deficiency, various curves, speed on curves. Types, locations, general equipments, layouts, marshalling yards. Definition, layout details, design of simple turnouts. Types of signals in stations and yards, principles of signaling and inter locking.

UNIT - III

Airport Planning, runway & Taxiway: Airport site selection, air craft characteristics and their effects of runway alignments, windrose diagrams, basic runway length and corrections, classification of airports.
Geometrical Elements : Taxi ways and runways, pattern of runway capacity.

UNIT - IV

Airport Obstructions, Lightning & Traffic Control: Zoning regulations, approach area, approach surface imaginary conical, horizontal. Rotating beacon, boundary lights, approach lights, runway and taxiway lighting etc. instrumental lending system, precision approach radar, VOR enroute traffic control.

UNIT - V

Introduction to tunnels and Docks & Harbors engineering surveys, alignments, Classification, principles of design – construction and Maintenance

Reference Books:

(i)   Highway Engineering by Gurucharan Singh.
(ii)   Principles of Pavement Design by E.J. Yoder & M.W. Witzech.
(iii)   Highway Engineering by S.K. Khana & C.E.G. Justo.
(iv)   Airport Planning & Design by S.K. Khanna & M.G. Arora.
(v)   Horonjeff Robert "The Planning & Design of Airports".
(vi)   Sharma & Sharma, Principles and Practice of Highway Engineering.
(vii)   Relevant IRC & IS Codes.
(viii) Laboratory Mannual by Dr. S.K. Khanna.
(ix)   Railway Engineering by S.C. Rangwala – Charotar Publication House, Anand.
(x)   Railway Engineering by Arora & Saxena – Dhanpat Rai & Sons.
(xi)   Railway Tract by K.F. Anita.
(xii)   Harbour, Docks & Tunnel Engineering – R. Srinivasan.

CE-4005	Fluid Mechanics – II	L	T	P	Max. Marks	Min. Marks
Duration	3 Hours	3	1	2	70	22

UNIT - I

Turbulent flow : Hydro-dynamically smooth and rough boundaries, shear stress in turbulent flow, velocity distribution in turbulent flow, resistance of smooth and artificially roughened pipes.

Pipe flow problems : Loss of head due to friction and minor energy losses, concepts of equivalent length, hydraulic and energy gradient lines, siphon, pipes in series, pipes in parallel, equivalent branching of pipes.

Pipe Network : Water Hammer (only quick closure case). Transmission of power. Hardy Cross Method

Unit - II

Boundary Layer : Laminar & turbulent boundary layer and laminar sub layer, thickness of boundary layer, total drag force due to boundary layer, boundary layer separation & control.

Forces on immersed bodies : Forces exerted by flowing fluid on a body, types of drag & expression for drag, drag on a sphere, a flat plate, a cylinder; circulation and lift on circular cylinder, lift on an aerofoil.

Unit - III

Uniform flow in open channels : Channel geometry and elements of channel section, velocity distribution, energy in open channel flow, specific energy, types of flow, critical flow and its computations, uniform flow and its computations, Chezy's and Manning's formulae, determination of normal depth and velocity, Normal and critical slopes, Economical sections, Saint Vegnet equation.

Unit-IV

Non uniform flow in open channels : Basic assumptions and dynamic equations of gradually varied flow, characteristics analysis and computations of flow profiles, rapidly varied flow- hydraulic jump in rectangular channels and its basic characteristics, surges in open channels & channel flow routing, venturi flume.

Unit-V

Turbines: Classifications, definitions, similarity laws, specific speed and unit quantities, Pelton turbine-their construction and settings, speed regulation, dimensions of various elements, Action of jet, torque, power and efficiency for ideal case, characteristic curves. Reaction turbines: construction & settings, draft tube theory, runaway speed, simple theory of design and characteristic curves, cavitation.

Centrifugal pumps: Various types and their important components, manometric head, total head, net positive suction head, specific speed, shut off head, energy losses, cavitation, principle of working and characteristic curves.

Reciprocating pumps: Principle of working, Coefficient of discharge, slip, single acting and double acting pump, Manometric head, Acceleration head.

List of Experiment

1   Study the performances characteristics of Pelton Wheel.
2   Study the performances characteristics of Francis Turbine
3   Study the performances characteristics of Kaplan Turbine
4   Caliration of multistage (Two) Pump & Study of characteristic of variable speed pump
5   To study the performance & details of operation of Hyd. Ram
6   Determination of coefficient of discharge for a broad crested weir & to plot water surface profile over weir
7   Study of the characteristic of the Reciprocating pump
8   Study of the characteristics of the Centrifugal Pump.

Suggested Books & Study Material:

1   Fluid Mechanics - Modi & Seth - Standard Book house, Delhi
2   Open Channel Flow by Rangaraju - Tata Mc Graw - Hill Publishing Comp. Ltd., New Delhi
3   Fluid Mechanics - A.K. Jain - Khanna Publishers, Delhi
4   Fluid Mechanics, Hydraulics & Hydraulic Mechanics - K.R. Arora - Standard Pub. Distributors, Delhi-6
5   Hyd. of open channels By Bakhmetiff B.A. (McGraw Hill, New York)
6   Open Channel Hyd. By Chow V.T. (McGraw Hill, New York)
7   Engineering Hydraulics By H. Rouse
8   Centrifugal & Axial Flow Pump by Stempanoff A.J. New York
9   Relevant IS codes.

COURSE CONTENTS						
CE-4006	**Computer – II**	**L**	**T**	**P**	**Max. Marks**	**Min. Marks**
Duration	6 Hours	0	0	6	60	20

3D: Properties, Region, Solids, Solid Editing.

3D: Views, Visual Styles, Lights, Camera, Array.

3D Studio Max :

       Generation of Model, File Transfer, File Linking,
       Lights, Cameras, Views,
       Materials, Modify,
       Environment, Rendering, Output, Output Devices.