

Branch: Civil Engineering.

Year: Third.

Semester: Sixth

SL. NO.	COURSE NO.	SUBJECT	PERIOD			EVALUATION SCHEME					
			L	T	P	Sessional Examination			ESE	Subject Total	Credit
						TA	CT	Total			
1.	CE 611	Design of Structures-II.	3	1		30	20	50	100	150	4
2.	CE 612	Foundation Engineering.	3	1		30	20	50	100	150	4
3.	CE 613	Transportation Engineering-II.	3	1		30	20	50	100	150	4
4.	CE 614	Environmental Engineering-II.	3	1		30	20	50	100	150	4
5.	CE 615	Estimation and Valuation.	3	1		30	20	50	100	150	4
6.	CE 616	Hydrology.	3	1		30	20	50	100	150	4
7.	CE 617	General Proficiency.							50	50	2
Practical/Drawing/Design											
8.	CE 617	Survey Camp.			4				50	50	2
9.	CE 611 L	Design of Structures-II.			3	30	20	50		50	2
10.	CE 613 L	Transportation Engineering-II.			3	30	20	50		50	2
11.	CE 614	Environmental Engineering-II.			3	30	20	50		50	2
Total			18	6	13						

Total marks: 1150

Total Periods: 37

Total Credits: 34

TA: Teachers assessment.

CT: Class Test.

ESE: End Semester Examination.

SIXTH SEMESTER

DESIGN OF STRUCTURES- II

SUB CODE: CE 611

Theory – 100.
Sessional – 50.
Time - 4 hrs.

1. **General principles of design:**
Types of loads, structural arrangement, structural metals and their properties, I.S. specification.
2. **Riveted joints:**
Dimension, pitch, edge distance, types of failure, strength and efficiency of lap and butt joints, splices for angles, flanges and web plates.
3. **Riveted connections in frames:**
Centrally and eccentrically loaded connection, riveted connection, rivet in combined shear and tension.
4. **Welded joints:**
Types of welded joints, various types of butt and fillet joints, strength and efficiency of welded joints.
5. **Welded connection in frames:**
Welded brackets, moment resistant welded connections. Design of tension members, splicing of tension members.
6. **Design of compression members:**
Simple struts, concentrically and eccentrically loaded simple and built up columns, column splice, secondary design consideration, column splicing.
7. **Design of beams:**
Simple and built up beams, laterally restrained and un-restrained beams.
8. **Column bases:**

Centrally and eccentrically loaded, base plate design and grillage foundation.

9. Design of roof truss:

Types of truss for different spans, dead, live and wind loads, rise, camber and spacing, end supports and bearings, joints and connections, design of purlin. Industrial buildings-truss, columns, bracings.

Practical Class on Design of Structures

SIXTH SEMESTER

DESIGN OF STRUCTURES- II (PRACTICAL)

SUB CODE: CE 611L

Marks- 50.

Concrete:

Preparation of detailed structural drawings various reinforced concrete members viz. beam, slab, column, foundation (shallow and deep), pile cap etc.

Steel:

Preparation of detailed drawing for riveted and welded connections, splicing, lacing, column base, grillage foundation, beam-column connections.

Working Drawing to be prepared in tracing paper and blue print copies to be submitted.

SIXTH SEMESTER

FOUNDATION ENGINEERING

SUB COD: CE 612

**Theory – 100 marks.
Sessional – 50 marks.
Time – 3 hrs.**

Introduction:

Classification of foundation types and principles of selection.

Lateral earth pressure:

Earth pressure at rest, Rankine and Coulomb's theories for active and passive states, influence of surcharge, water table, wall friction and deformation on earth pressure, Culman's graphical method, point of application.

Bearing capacity of shallow footings:

Requirements for satisfactory action of footings, Terzaghi's theory, factors affecting bearing capacity, influence of eccentric and inclined loads. Determination of allowable bearing pressure and proportioning of footing on clay and sand.

Stress distribution computation for immediate and consolidation settlements, limits of settlement, correction for rigidity and three dimensional consolidation effects, settlement of foundation in sand and clay, Boussinesque and Westgaard formula and Newmark's chart.

Deep foundation:

Uses and types of piles, bearing capacity of single pile in clay and sand, Engineering News and Hiley's formula, Indian standard pile load test, group action, negative skin friction, settlement of pile groups.

Piers and caisson foundations, elements of well foundation, depth of well foundation, list of forces acting on well, remedial measures for shifts and tilts of well, permissible values.

Introduction to ground improvement techniques including use of geosynthetics.

Soil exploration:

Purpose, methods of soil exploration, methods of boring, soil samples and samplers, penetration and sounding tests, plate load test, geophysical methods, planning of exploration programme.

SUB CODE: CE 613

Types of machine foundations, modes of vibration of a block foundation, degrees of freedom of a block foundation, design criteria of a reciprocating machine foundation.

**SEVENTH SEMESTER
TRANSPORTATION ENGINEERING–II**

**Theory - 100.
Sessional - 50.
Time- 3 hrs.**

Railway Engineering:

Permanent way:

Rail, sleeper, ballast – their ideal requirements, dimensions, classification and behaviours, wearing of rails, coning of wheels, creep – causes, effects & remedies, Railway surveys – traffic, reconnaissance, preliminary and final location surveys.

Geometric Design:

Gauges, alignment, horizontal curves, super elevation, Gradients and grade compensation, Length of transition curve, cross – sections of permanent way, Geometric requirements for high speeds.

Construction of railway track:

Stages in construction, methods of plate laying, various fittings and fixtures, points and crossings, Turn – outs and track junctions.

Signalling and interlocking:

Control of train movements types of signals in stations and yards, principles of interlocking.

Resistances to traction:

Various resistances, Hauling capacity and Tractive effort, various stresses in Railway Track.

Airport Engineering :**Aircraft characteristics :**

Aeroplane component parts.

Airport Planning :

Regional planning, Airport selection, Zoning laws, Imaginary surfaces.

Airport Layout:

Geometric components of an airport and their functions, Typical Airport layouts.

Runway Design :

Runway orientation, Basic Runway Length, corrections for Elevation, Temperature and Gradient, Runway Geometrics.

Taxiway Design :

Geometric Design Standards, Turning radius, Exit Taxiways.

Structural Design of Airport Pavements:

Design factors, Design methods for Flexible and Rigid Pavement, Design of an overlay, special characteristics and Requirements of Airport Drainage.

Tunnel Engineering :

Advantages and Disadvantages of Tunnels, Classification, Shapes of Tunnels, Sizes of Tunnels.

Shafts:

Classification, Shape, Size and location. Introduction to various methods of tunneling, Methods of ventilation and Dust Control.

SIXTH SEMESTER**TRANSPORTATION ENGINEERING – II
SUB CODE: CE 613 L**

**Marks-50.
Time – 4 Hrs.**

LABORATORY WORK: -

1. Ductility determination.
2. Viscosity determination.
3. Softening Point determination.
4. Flash and fire point determination.
5. Striping Value determination.
6. Marshal Stability test.
7. Penetration test,
8. Skid Resistance test.

SIXTH SEMESTER

ENVIRONMENTAL ENGINEERING–II

SUB CODE: CE 614

Theory – 100 marks.

Sessional – 50 marks.

Time - 3 hrs.

Introduction:

Sanitation, sewage, sewer, sewerage, method of water collection conservancy and water carriage system, sewerage system types, selection of a system.

Waste water flow :

Quantity of sanitary sewage, infiltration of water, variation in flow and its impact on waste water system, quantity of storm water, rational method, time of concentration, rainfall intensity duration relationship, Empirical formula.

Sewage characteristics:

Important parameters and their significance SOD COD solids, DO nitrogen, test physical, chemical, biological: Standards of disposal in natural water course and on land.

Waste water collection:

Sewerage system, principle of lay out and planning shapes of sewers design of sewers, self clansing velocity and slopes, construction and testing of sewers line, sewers materials, joints and appurtenances, maintenance of sewerage system. Sewage pumping and its necessity, sewage pumps.

Waste water treatment:

Objectives, methods and their sequance and afficiencies, preliminary treatment screening, grit removal, scum removal, primary treatment, sedimentation, secondary biological treatment, trickling filter, circlulation, activated sludge process: sludge digestion and disposal.

Waste water disposal: Disposal by dilution, disposal by irrigation, sewage farming, sewage sickness, sewage disposal for independent houses and small communities septic tank and its general features, working principle and design consideration : imhoff tank, oxidation pond, aerated lagoon etc.

Plumbing for drainage of building:

various system of plumbing, traps, layout of house, drainage, ventilation.

Environmental Pollution:

Introduction to air, sound, ground pollution. Causes, effects, and preventive measures.

Refuse disposal and rural sanitation:

Collection storage, recovery and disposal of refuse.

Elements of ecology:

Ecosystem components, energy flow effects of human interference.

SIXTH SEMESTER

ENVIRONMENTAL ENGINEERING–II

SUB CODE: CE 614 L

Marks-50.

Laboratory tests for Water:

DO (Dissolve Oxygen), BOD (Bio-Chemical Oxygen Demand), COD (Chemical Oxygen Demand).

SIXTH SEMESTER

ESTIMATION AND VALUATION

SUB CODE: CE 615

**Theory – 100 marks.
Sessional – 50 marks.
Time – 3 hrs.**

1st half: Estimation (60 marks)

Introduction: -

Principles of Estimating, Purpose and types of Estimates, Standard methods of measurement.

Specifications of work: -

Aims of specification, Types, Method of preparation, Detail specification of some important items.

Rate Analysis: -

Purpose importance, Factors affecting Rate Analysis, Labour & Material requirement for important items of work.

Schedule of Rates: -

Local schedule of Rates, CPWD schedule, Importance of schedule. Schedule of Rates for important item-such as-Earth work, Carriage, Concrete, Brick work, Wood work, Steel work etc.

Building Estimate: -

Estimate of Single Storied Building (sloped roof & R.C.C.), Trusses.

HYDROLOGY

Road Estimate: -

Earthwork Calculation, Estimate for a New Road, Culvert.

SIXTH SEMESTER

2nd half: Valuation (40 marks)

Basic knowledge of value: -

Market value, rent, ground rent secured, unsecured, interest, present value, reversionary value.

Rental method of valuation: -

Cross rent, net rent, rack rent, security, year's purchase, annual sinking fund, salary or premium.

Land and Building methods of valuations: -

Factors affecting value of lands.

Buster land, land locked land: -

Various methods of valuation of buildings, Depreciation, Comparison of land value by belting, value of leasehold interest.

SUB CODE: CE 616

Theory – 100.

Sessional – 50.

Time – 3 hrs.

Introduction: Hydrology- definition & scope, hydrologic cycle and its components.

Precipitation: Forms, type & formation of precipitation, measurement of rainfall, interpretation of rainfall data, estimating missing data, double mass curve, average rainfall over area, DAD analysis, abstraction from precipitation.

Runoff and Hydrograph: Runoff components, factor effecting runoff, hydrograph and its components, base flow separation, unit hydrograph– concept, derivation, limitations and use, S- hydrograph and its uses.

SUB CODE: CE 618

Ground Water hydrology: Occurrence of ground water, soil-water relationship, Aquifers, movement of ground water, Darcy's law, yield from wells for confined and unconfined aquifers, yield of an open well.

SIXTH SEMESTER **Urban hydrology:** Introduction, use of rational method, hydrograph method.

Flood routing: Definition, storage equation, reservoir routing and channel routing, Hydrologic methods.

Water resources planning: Role of water in national development, single and multipurpose projects, reservoirs– types, Physical characteristics, determination of reservoir capacity, mass curve, yield from a reservoir.

SURVEY CAMP

Marks: 50.

To set out a composite circular –transition- circular.

Approximate mapping of a small area using stepping for linear distance.

Traversing with theodolite using tacheometric principle for distance measures and its plotting. Using Plane-tables, locate the important details. Also draw the contour lines using any method.

Setting out a route alignment.

Demonstration of all available instruments such as, Automatic level, Microoptic theodolites, Total station and GPS.

Theoretical introduction to GIS.

