

Break up of BE Course Structure

Branch: Civil Engineering.

Year: Fourth.

Semester: Seventh

SL. NO.	COURSE NO.	SUBJECT	PERIOD			EVALUATION SCHEME					
			L	T	P	Sessional Examination			ESE	Subject Total	Credit
						TA	CT	Total			
1.	CE 711	Theory of Structures-III.	3	1		50	25	75	100	175	4
2.	CE 712	Design of Structures-III.	3	1		50	25	75	100	175	4
3.	CE 713	Civil Engineering Planning.	3	1		50	25	75	100	175	4
4.	CE 714	Irrigation Engineering.	3	1		50	25	75	100	175	4
5.	CE 715	Elective-I.	3	1		50	25	75	100	175	4
6.	CE 716	Elective-II.	3	1		50	25	75	100	175	4
7.	CE 717	Training.			2					*	2
8.	CE 718	Project-I.			8					**	4
Total			18	6	10						

Total marks: 1200

Total Periods: 34

Total Credits: 30

TA: Teachers assessment.

CT: Class Test.

ESE: End Semester Examination.

Electives: -

Civil Engineering: Elective-I: Open channel Flow/ Advanced Engineering Geosciences/ Environmental Geotechnics.

Elective-II: Elements of Remote Sensing/ Earthquake Engineering.

* Training Report : 20 Marks.

Seminar+Viva : 30 Marks.

** Project-I : TA : 40 Marks.

Report : 30 Marks.

Seminar+Viva : 30 Marks.

**SEVENTH SEMESTER
THEORY OF STRUCTURES – III**

SUB CODE: CE 711

Theory- 100.

**Sessional – 75.
Time- 3 hrs.**

1. Unsymmetrical bending:

Principal moment of inertia, Stress in beams due to unsymmetrical bending, Location of Neutral axis.

2. Moving Loads and Influence lines:

Application to determinate structures-Beam, Truss, 3-hinged arch, Suspension Bridges.

3. Muller-Breslau's Principles:

Influence lines for support reactions, bending moment, shear force in propped cantilever, two span continuous beams and for two hinged arch.

4. Analysis of frames:

Moment Distribution Method, Slope Deflection method, Kani's Method with and without lateral sway.

5. Introduction to Stiffness Method.

6. Analysis of Curved Beam on horizontal plan.

7. Dynamic Analysis:

Introduction, Degrees of freedom, Damping, Free Vibration, Natural frequency, Forced vibration, Simple Structures with single and two degrees of freedom.

8. Plastic Method of Analysis:

Introduction, plastic moment of inertia, plastic section modulus, characteristic of plastic hinge, concept of Moment Redistribution, Static and kinematic method, combined mechanism for plastic collapse loads of beams, single bay two storey and two bay two storey portal frames, simple pitch roof frame, deflection at point of collapse.

SEVENTH SEMESTERS

DESIGN OF STRUCTURES–III

Theory- 100.
Sessional- 75.
Time- 4 hrs.

FIRST HALF

1. **Prestressed concrete:**

Concept of Prestressing materials for Prestressed concrete, I.S. specifications; Analysis of Prestress-resultant stress at section, Thrust line, load balancing concept, stress in tendons. Design of simple section.

2. **Buildings:**

I.S. specifications for loadings, stair cases, Multi-bay multi storey frame, Flat slab.

3. **Water Tank:**

Circular and rectangular tanks, Intze type tank, column-brace type staging.

4. Beams curved in plan, circular raft foundation.

SECOND HALF

5. **Elevated steel water tank:**

Rectangular pressed steel tank, staging and footing.

6. **Plate girder and Gantry girder.**

7. **Industrial Building:**

Elements of an industrial building, structural framing, Bracing.

8. **Tubular structures:**

Behaviour of tubular sections, combined stresses, connections.

**SEVENTH SEMESTER
CIVIL ENGINEERING PLANNING
SUB CODE: CE 713**

**Theory-100.
Sessional-75.
Time-3 hrs.**

Introduction- Planning need, history and dynamics in Development planning.

National Development in context of five year Plan, Planning Commission.

Social, economic and Physical Planning, Regional Planning, Planning for Rural Development.

Urbanization- Historical,

SEVENTH SEMESTER

Need for Services, Bye-laws.

Zoning Regulations.

Building Bye-laws: Bye laws for Residential, Commercial other buildings (as per GMDA)

Regarding area, height, Set back, ventilation, lighting, drainage Water Supply etc.

Procedure for receiving permission for construction.

Basic Principles of Buildings Planning, Aspect, Prospect, Orientation, ventilation, Lighting, Circulation, Horizontal & Vertical transportation.

Planning of Building and Colony. Site Selection, Sizes of parts of building, Practical considerations. Introduction and Application of Vastu principles in Planning.

Planning & Drawing Practical (6 hrs. Practical)-

Conceptual planning and planning details of Residential, Commercial Office, Institutional, Industrial buildings, Colony Planning.

IRRIGATION ENGINEERING

SUB CODE: CE 714

Theory - 100.
Sessional - 75.
Time- 3 hrs.

Introduction:

Definition, aim, necessity, benefits and ill effects of irrigation; irrigation development in India – its status in North East, types of irrigation – advantages and disadvantages, irrigation schemes.

Soil – water plant relationship:

Soil water classifications, field capacity, wilting point, available moisture; soil fertility manure and fertilizer; crop rotation, functions of soil water.

Water requirement of crops:

Crop seasons, consumptive use – evapotranspiration, measurements, command area, delta, duty, base period kor depth, kor period, irrigation requirements, depth and frequency of irrigation, factors effecting water requirements, principal crops of India.

Water application methods:

Surface irrigation – various methods, sub surface irrigation – drip irrigation, sprinkler irrigation, advantages and disadvantages of different methods.

Flow irrigation:

Sources and systems of flow irrigation, irrigation canals – classification, alignment, networks. Inundation canal, canal losses, canal lining – functions, advantages, types, lining materials, maintenance of irrigation canal.

Lift irrigation:

Types, sources, advantages and disadvantages, well irrigation – comparison with canal irrigation, types and construction of wells; lift canal irrigation, Lifting devices – pumps their selection.

Canal Design:

Canal section and bed slope, design of lined and rigid boundary canal – Manning's equation; design of alluvial canals – Kennedy's and Lacey's Silt theories, their limitations and draw backs, design procedures,

Canal Headworks:

Layout and components of storage and diversion head works, descriptive studies of dams, weirs, barrage, spillways and head regulator, sill excluder.

Regulation works :

Canal falls – necessity, location, various types; regulators, silt control devices, canal outlet and escapes.

Cross drainage works:

Necessity, types – aqueducts, superpassages, level crossing, selection of suitable types.

Water Logging and land reclamation:

Water logging – causes, ill effects and preventive measures; reclamation of water logged land – surface and sub surface drains.

SEVENTH SEMESTER

A. OPEN CHANNEL FLOW

SUB CODE: CE 715 (ELECTIVE – I)

Theory – 100.
Sessional- 75.

Time -3 hrs.

Basic Principles:

Open channel, types and section elements. Classification of flow, basic equations, velocity co – efficient, pressure distribution, specific force.

Uniform flow in rigid – boundary channels:

Boundary shear, flow over scattered roughness elements, chezy's equation, Mannig's equation, other resistance formulae, equivalent roughness, channel conveyance, section factor – curves for rectangular and trapezoidal channels, flow in a circular channel, relation between conveyance and depth.

Uniform flow in mobile – boundary channels:

Incipient motion condition, regimes of flow, resistance to flow in alluvial streams.

Design of channels:

Rigid – boundary channels, non scouring erodible boundary channels, alluvial channels, free board in channels.

Energy Depth Relationship:

Specific energy, critical depth, specific energy curve, critical depth computation, control section, application of specific energy and critical depth concepts. Channel transitions.

Gradually Varied flow:

Governing equation and its limitations, water surface profiles – classification and characteristics; flow profiles on mild, steep, critical, horizontal and adverse slopes, computation of G.V.F. in prismatic and non prismatic channels, by Direct step method and by numerical method, delivery of channels.

Rapidly Varied Flow Hydraulic jump:

Types of jump, hydraulic jump in horizontal and sloping rectangular channels, location and length of jump on horizontal floor, forced hydraulic jump, jump in expanding rectangular channels. Energy loss and application of hydraulic jump.

Channel control and transitions :

Free overfall, sharp crested weirs, flow over spillways, broad – crested weirs, side weirs, sluice gate, standing wave flume, subcritical SEVENTH SEMESTER flow transitions, supercritical flow transitions, flow in bends.

Unsteady flow :

Waves and their classification, celerity of a wave, surges, equations of motion, Introduction to Dam Break Flood, method of characteristics and finite difference.

B. ADVANCED ENGINEERING GEOSCIENCES

SUB CODE: CE 715 (ELECTIVE – I)

Theory – 100.

Sessional – 75.

Time - 3 hrs.

**GROUP – A
(GENERAL GEOSCIENCES)**

Definition and role of geosciences in the field of civil engineering.

Rock:

Engineering properties of rocks, Defects in rock masses, Engineering classification of Rocks.

Soil:

Process of soil formation, soil profile, mineralogy of soils, types of bonds, engineering properties of clay minerals, typical soil deposits with special reference to North – East India.

Quarrying and Mining: Definition, methods of quarrying and mining and some related problems.

Basic concept of land from evaluation.

(ENVIRONMENTAL GEOSCIENCES)

Definition and scope of environmental geosciences in of civil engineering.

Seismicity: Definition and causes of earthquakes, seismic waves and their mode of propagation, Intensity and magnitude of earthquake, seismic belt, seismic risk, prediction and mitigation of Earthquake, recent concept and scope of paleoseismicity in earthquake prediction.

GROUP – B

Land – Slide: Types, causes and prevention of land – slides.

Flood: Definition, causes of floods, flood plain development, Role of flood in the development of landform. Simple idea of environmental pollution, Environmental impact of quarrying and mining.

LABORATORY WORKS:

Study of advanced geological maps, bore hole problems, earthquake fault – plane solutions.

Structural models.

SEVENTH SEMESTER C. ENVIRONMENTAL GEOTECHNICS SUB CODE: CE 715 (ELECTIVE – I)

Theory – 100.

Sessional – 75.

Time - 3 hrs.

Introduction to Environmental Geotechnics; Contaminated Land; Source, Production and classification of waster, Environmental Effects on Geotechnical problems, Soil – Pollutant Interactions; Waste Disposal Facilities – site selection and Design, Waste Devices, Geotechnical Application of Fly Ash and other Industrial Wastes.

Geotechnical aspects of Geo – environmental hazards: Earthquake, types of wave generated and their effects, meaning of response spectra and seismic coefficient, liquefaction phenomena and remedial measures.

Books :

Daniel, D.E. (1993) Geotechnical practice for waste Disposal, Chapman and Hall, London.

Dutta, S. (2002) Environmental Treatment Technologies for Hazardous and Medical Wastes. Remedial scope and efficiency, tata McGraw Hill.

Raju, V.S., Datta, M., Seshadri, V., Agarwal, V.K. and Kumar, V. (1996) : Ash Ponds and Ash disposal systems, Norosa publishing House.

Soil Dynamics : Shamsheer prakash, McGraw – Hill Book company

SEVENTH SEMESTER

**ELEMENTS OF REMOTE SENSING
SUB CODE: CE 716 (ELECTIVE – II)**

**Theory –100.
Sessional – 75.
Time- 3 hrs.**

Introduction to remote sensing: Principles, Electromagnetic Radiation. Interaction mechanisms. Ideal and practical remote sensing system. Advantage and Disadvantage of remote sensing over conventional methods. Reference Data Spectral signature.

Platform and sensors for remote sensing. Terrestrial and Aerial platforms, space platforms – Landsat, spot. IRS. Characteristics of various sensor photo theodolite, aerial camera, MSS, RBV, TM, HRV and LISS system Radiometers.

Characteristics and use of various data product – B& W, coloured and Infrared photographs, photomosaic, orthophotograph, B&W satellite imageries, F.C.C., high-density tapes, CCT

Interpretation and analysis of R.S. data: Visual interpretation – interpretation element and key. Interpretation equipments Digital image processing – advantage over visual techniques. Components of image processing system D.I.P. techniques. supervised and unsupervised classification .

Application of Remote sensing to Water Resource Development: Fundamental analysis of Landforms, Geomorphology, drainage characteristics, soil type erosional features, Land use, Vegetal cover, pollution studies, Ground water studies, flood plain Mapping, Application to highway planning and engineering.

Geophysical information system: Basic concept, components usefulness and application area.

**EARTHQUAKE ENGINEERING
SUB CODE: CE 716 (ELECTIVE-II)**

Analysis and Design for Earthquake Effects

**Theory-100.
Sessional-75.
Time-3 hrs.**

Introduction

Earthquake- Magnitude and Intensity; Ground Motions.

Wave Propagation: Parameter- Peak Ground Acceleration, velocity and Displacement, Epicentre & Hypocentre, Focus of Earthquake.

Recording of Ground Motions sensors.

Industry Structural dynamics SDOF systems; Equation of Motions; Free and Forced Vibrations; Damping; Response Spectrum; MDOF systems; Dynamics Properties; Modal Superposition Method; Practical Considerations. Equation of Motions; Free and Forced Vibrations; Numerical Methods, Approximate Methods Rayleigh's Method, Dunkerley's Method, Stodola Method.

Earthquake Analysis: Idealization of Structures: Equivalent Force Concepts; Equivalent seismic lateral loads using seismic coefficient method; Response Spectrum Analysis; Use of IS 1893-2002 for analysis and design of building structures.

Introduction to Design of Bridges, Dams, Industrial Structures and Retaining Walls.

Earthquake Resistant Construction

Earthquake Resistant Design Philosophy; Concept of ductility in structures; ductile detailing requirements; Codal Provisions for ductile detailing (specific reference to IS: 13920-1993).

Specific reference to IS: 4326 for earthquake resistant construction of buildings.

Earthquake-resistant features in non-engineered constructions and masonry structures; specific reference to IS: 13927 and IS: 13928-1993 may be made.

Earthquake geotechnical engineering

Site effects, Soil-structure interaction, Dynamics Properties of Soil, Dynamic Earth Pressure, Soil Liquefaction. Ground Improvement Techniques.

Earthquake Policy & Disaster Mitigation
Review of Damage during Past Earthquake Natural disaster mitigation,
Lessons from past disasters, social and economic aspects, preparedness,
Public policies and role of engineers.
Strategies for Quality Control
Vulnerability assessment of structures
Retrofitting and Strengthening of Buildings and Bridges
Seismic microzonation.

**SEVENTH SEMESTER
PRACTICAL TRAINING**

SUB CODE: CE 717

A Six Weeks Practical Training programs is compulsory. Each student has to undergo a training programme in a relevant field of Civil Engineering in a reputed organization. The student has to prepare a report on the work for which 20 marks are assigned. There shall be one presentation and viva on the work for which 30 marks are assigned.

**SEVENTH SEMESTER
PROJECT-I**

SUB CODE: CE 718

Under this Course, students of the class will be divided into groups of 2/3/4 students. Each group will be assigned a topic related to Civil Engineering field. The topic may be either experimental or theoretical. The group will work under one or more supervisor(s) from the Department and submit a report on the work. Each student will give a presentation on the project work before a panel of examiners.

