

GEOTECHNICAL ENGINEERING II (CE7116)

1. Site Exploration :- Object Program of exploration, various methods of exploration, boring and sampling method, Geophysical exploration, sub surface sounding.
2. Shallow foundations :- types and functions of foundations, Depth of foundation, Ultimate and allowable bearing capacity, shear failure and settlement criteria, Rankine's analysis, Terzaghi's analysis, Local and General shear failure, Effect of water table, Eccentric and inclined loads, Settlement analysis. I.S. recommendation for permissible uniform and differential settlements. Proportioning of footings. Plate load test, standard penetration test. Design of footing based on N-value, combined footings, Raft foundation, its allowable bearing pressure on Soil.
3. Pile foundation :- Situations where pile foundation are adopted, types of piles, pile driving equipment, bearing capacity of piles, static and dynamic formulas , pile load tests, cyclic load tests, penetration tests, negative skin friction, capacity of pile groups, settlement of pile groups , laterally loaded piles.
4. Well Foundation :- Situation where adopted, Elements of wells, Types of wells, methods of construction, tilt and shift, remedial measures. Proportioning – Depth and size of wells on the basis of scour depth , bearing capacity and settlement, Terzaghi's lateral stability analysis.
5. Sheet Piles :- Types and uses of sheet piles, analysis of cantilever and anchored sheet piles in cohesion less and cohesive Soils.
6. Soil Dynamics and machine foundations :- Basic concept of Soil dynamics, Vibration of systems with single degree of freedom , free and forced vibrations with and without damping. Types of machines and their foundations, Design criteria of foundation, field methods of determining design parameters. Cyclic plate load test, Block vibration test, response of block foundations under vertical vibration.
7. Foundation on Expansive Soil :- Identification of expansive Soil, Problems associated with Expansive Soil, Design consideration of foundation on expansive Soil. Under reamed piles.

CONCRETE STRUCTURE – II (CE7117)

1. Multi-storeyed Building frames.
Analysis by approximate methods, design and detailing.
I.S. specification and loading standards.
2. Water Tank and Water Towers – Design of rectangular, circular tanks resting on ground, under ground and elevated (Including Intyz type tank).
3. Design of slab culverts, bridge decks, cross beams and main beams for bridges, T-beam bridge design for I.R.C. loadings.
4. Design of silos and bunkers.

EARTH QUAKE ENGINEERING (CE7118)

- I Elements of Seismology
Definitions of Magnitude, Intensity, Epicenter, etc., General features of tectonic of seismic regions, Seismographs.
- II. Theory of Vibrations
Free vibrations of single degree, two degree and multiple degree freedom systems.
Computation of dynamic response to time dependent forces. Vibration isolation.
Vibration absorbers.
- III. Principles of Earthquake Resistant Design
Response spectrum theory. Brief introduction to accelerographs and S.R.R.'s.
Nature of dynamic loading resulting from earthquakes. Application of Response spectrum Theory to a seismic design to structures. Resistance of structural elements- and structures for dynamic loads, design criteria-strength and deflection. Ductility and absorption of energy
- IV. Dynamic Properties of Soils
- V. Remedial measures and management of earthquake disaster
- VI. Introduction to Indian Standard Codes
IS: 1893 - 1984 and IS: 4326 - 1993

AIR POLLUTION & CONTROL MEASURES (CS 7127)

- I. General
An Environmental problem, Definitions
- II. Type of Air Pollutants & Sources Particulates, CO, SO₂, NO_x, Hydrocarbons etc. Natural & Man made sources, Emission Factors
- III. Air Pollution due to Industries & Automobile Exhausts ,
- IV. Meteorology . . .

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- Wind Profiles, Turbulent diffusion, Wind roses, Topographical effects, Inversions, Plume behaviour,
Plume rise, Stable & unstable conditions.
- V. Plume Dispersion
Gaussian model, Diffusion coefficients, Inversion effects, Limits to the models.
 - VI. Particulates
Terminology, Size distribution, Removal mechanisms, Particulate collection devices, Choice of equipments, Standards
 - VII. Sulphur Oxides
SO_x sources, Ambient concentrations, Test methods, Control techniques, Standards, costs, *Ambient* downwind concentrations
 - VIII. Nitrogen Oxides
Sources, Ambient concentrations, Test methods, Thermodynamics & kinetics of nitrogen oxides, Control techniques, Standards of performance, Costs.
 - IX. Effects of Air Pollution
Plant damage, Corrosion, Art treasures, Human health-respiratory system, Special diseases, Episodes
 - X. Air Quality & Emission Standards
Criteria & standards, U.S. and Indian Standards, Pollution Control Laws.
 - XI. Global Effects of Air-Pollution
Green house effect, Acid rain, Ozone layer disruption etc.

OPEN CHANNEL HYDRAULICS (CS 7129)

1. Description of open channel, Types, State and regime of open channel flow, type of channel, geometry and hydraulic element of open channel, velocity and pressure distribution.
2. Energy and momentum principle and their application, total and specific energy, specific force, energy coefficient critical flow, critical depth computation transition
3. Uniform flow – Resistance equations :- Chezy's & Manning's eqs.
4. Gradually varied flow, Dynamic equation of Gradually varied flow its profile surface computation, practical examples.
5. Rapid varied flow ; characteristics of Rapidly varied flow, hydraulic jumps & computation Energy losses, practical example.
6. Unsteady flow :- Introduction, wave propagation, surges, celerity of gravity wave, Deep & shallow wave.
7. Flow measurement in open channel :- weirs, broad only, weir, ventur flume, parshal flumes.