ELECTIVE-III (BCE408)

1. Open Channel Hydraulics (3-1-0): Credit-04

Module I

Basic Fluid flow concepts: Classification of open channels, classification of flow, basic equations, velocity distribution, pressure distribution, energy and momentum coefficients.

Uniform flow in rigid boundary channels: Shear stress on the boundary, flow over scattered roughness elements, Chezy's equation, Manning's equation, effect of channel shape on resistance equation, section factor curves for rectangular and trapezoidal channels, flow in a circular channel, relation between conveyance and depth.

Module II

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.

Specific energy: Specific energy, specific force, critical depth computations, control section, application of specific energy and critical depth concepts.

Module III

Gradually varied flow: Types of non uniform flow, governing equations, characteristics of surface curves, classification of water surface profiles, sketching of water surface profiles, discharge from reservoir, profiles in compound channels, computation of gradually varied flow in prismatic channels, gradually varied flow in non prismatic channels.

Module IV

Rapidly varied flow: Application of conservation laws, channel transitions, supercritical flow past weirs, spillways, hydraulic jumps

Unsteady flow: Waves and their classification, celerity of a wave, surges, equation of motion, method of characteristics, dam break problem.

Text Books

1. Flow through open channels - K. G. Ranga Raju
2. Open channel flow - M. Hanif Chaudhry
3. Open Channel Hydraulics - V. T. Chow
4. Flow in open channels - K. Subramanya

2. ENVIRONMENTAL GEOTECHNIQUE (3-1-0): CREDIT-04

Module- I

Introduction: Scope, importance, waste generation, subsurface contamination,
Geosynthetics: Types, manufacturing functions, applications and economics.

Module- II

Forms of waste and their properties: Municipal waste, mineral waste, industrial waste, hazardous waste, index properties, strength, compressibility and permeability of municipal and mineral waste.

Module- III

Selection of waste disposal sites, factors affecting site selection, siting criteria and siting rating method, Landfills for municipal and hazardous waste: components of land fills, layouts, daily cells, base lining systems, stability of slopes, constructing aspects.

Module- IV

Ash ponds and mine tailing impoundments: slurry deposition of mine tailing and coal ash in impoundments, layouts, components, design of tailing dam/ash dykes, slope stability.
Remediation: Principle of remediation: Planning, source control, soil gas extraction, soil washing, and bioremediation.

Reference books:

1. Geotechnology of waste management, I. S. Oweis and R. P. Khera, Butterwarths, London.
2. Engineering with geosynthetics, Ed. G. V. Rao and G.V.S.S. Raju, Tata McGraw Hill
3. Geotechnical practice for waste disposal, D. E. Daniel, Chapman and Hall, London.

3. Theory of Elasticity and Plasticity (3-1-0) Credits:04

Module- I

Plane stress and plane strain problems. General stress and strain equations (Equilibrium and compatibility equations).Two dimensional problems in rectangular coordinates.

Module- II

Stress and strain components, differential equation, equilibrium equations and compatibility equations in polar coordinate. Stress distribution for axisymmetric problems. Pure bending of curved bars, thick walled cylinder. Concentrated force at a point of straight boundary. Force acting on the end of a wedge. Concentrated force acting on a beam. Effect of circular holes on stress distributions in plates.

Module- III

Stress and strain in three dimensions: Principles stresses, maximum shearing stress, principal axes of strain. Stretching of prismatical bar by its own axis. Elementary problems of elasticity in three dimension.

Module- IV

Torsion of non-circular prismatic bars. Saint Venant's theory. Various analogies. Torsion of hollow and thin section. Application of energy methods.

Module- V

Introduction to the theory of plasticity., the yield criteria of metals, stress space representation of yield criteria. stress-strain relations plastic potential, flow rules and maximum work hypothesis. Two dimensional plastic flow problems. Incompressible two dimensional flow, stresses in plastic materials in condition of plane strain, equation of equilibrium the simplest slip-line fields.

Essential Reading

1. S P Timoshenko and J N Goodier, Theory of Elasticity, Mc Graw Hill
2. Hoffman and Sachs, Theory of plasticity

Supplementary Reading

1. N.Filonenko-Borodich, Theory of Elasticity, Mir Publishers,Moscow,1965
2. W. Johnson and P B Meller, Plasticity of Mechanical Engineers
3. C.R. Calladine, 'Plasticity for Engineers', Ellis Herwood, Chichester, U.K., 1985

4. REMOTE SENSING AND GIS APPLICATIONS (3-1-0): CREDIT-04

Module – I

Remote Sensing – I: Basic concepts and foundation of remote sensing – elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

Remote Sensing – II: Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

Module – II

Geographic Information System: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

Types of data representation: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS – File management, Spatial data – Layer based GIS, Feature based GIS mapping.

Module – III

GIS Spatial Analysis: Computational Analysis Methods (CAM), Visual Analysis Methods (VAM), Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

Module – IV

Water Resources Applications-I: Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development, Watershed characteristics.

Water Resources Applications – II: Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for Artificial Recharge Structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

1. Remote Sensing and its applications - LRA Narayana [University Press 1999.]
2. Principals of Geophysical Information Systems – P. A. Burragh and R. A. Mc Donnell [Oxford Publishers 2004.]

REFERENCES:

1. Concepts & Techniques of GIS - C.P.Lo Albert, K.W. Yonng,[Prentice Hall (India) Publications.]
2. Remote Sensing and Geographical Information systems - M.Anji Reddy [B.S.Publications.]
3. GIS by Kang – tsung chang, [TMH Publications & Co.]
4. Basics of Remote sensing & GIS - S.Kumar [Laxmi Publications.]

5.Town Planning & Architecture(3-1-0) Credit: 04

Town Planning

Module – I

Elements of City plan, Surveys, Zoning, Housing, Slums, Parks & Play grounds, Public buildings & Town centres and Industries

Module – II

Communication & Trffic Control, Urban renewal & replanning the existing towns, Master plan, Planning law & Legislation.

Books for reference :
Fundamentals of town planning- G.K.Hiraskar- Dhanpat Rai Publication.

Architecture

Module – I

i) Architecture as a fine art , its aim,importance and methods of study. Fundamental principles of architecture- Truth, beauty and Goodness.
ii) Qualities and factors of beauty.
iii) Qualities : Strength, Vitability, Restraint, Refinement, Repose, Grace, Breadth, Scale, Expression or setting out of purpose, Unity in concept, Factors : Mass, Form, Proportion, Balance, Symmetry, Solids, and voids, Light and shade.

Module – II

i) Influence on architectural development : Effects of topography, Climate, Religion, Customs, Traditions, Technological development and aspirations of time.
ii) Class in Orders : Definition, Doric, Ionic, Corinthian, Composite and Tuscan orders, Knowledge of the details of their parts and proportions.
iii)Indian Architecture : Stupas, Chaityas and Viharas with examples. Jain style - Architectural character and example .
Hindu style – Dravidian temples and gopuram, Orissan group of temples with examples, Indo- Islamic architecture with examples.
iv)Architectural character of modern architecture.

Reference Books :
1.Fundamentals of town planning -G.K. Hiraskar - Dhanpat Rai & Publication
2. architects & Builders hand book – Kiddar & Parker
3. The great ages of world architecture - G.K.Hiraska

6. River Engineering (3-1-0): Credit-04