

UNIT I

Chapter 1 : General Geology, Mineralogy and Petrology

1-1 to 1-73

Syllabus :

- (a) Introduction to the subject, scope and sub divisions. General Geology: The earth as a planet, Interior and General Composition of the Earth and Rock Cycle
- (b) **Introduction to Mineralogy** : Physical properties of Minerals, Classification of Minerals, Silicate and Non Silicate Minerals, Rock Forming Minerals.
- (c) **Introduction to Petrology, Broad classification of rocks**
- Igneous petrology** : Plutonic, Hypabyssal and Volcanic rocks, Structures, Textures and Classification of Igneous rocks. Study of common rock types prescribed in practical work and their engineering applications.
- Secondary Petrology** : Rock weathering, Sedimentary Structures, lithification and diagenesis Process, Genetic classification of secondary rocks and grain size classification and Textures, Study of common rock types prescribed in practical work and their civil engineering applications.
- Metamorphic Petrology** : Agents, Types of metamorphism, Texture and structures. Study of common rock types prescribed in practical work and their civil engineering applications.

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UNIT II

Chapter 2 : Geomorphology and Historical Geology

2-1 to 2-42

Syllabus:

(a) Geomorphology : Endogenic and Exogenic processes, Geological action by fluvial process i.e. river and Landforms formed it, Aeolian and glacial process, Coastal geomorphology.

(b) Historical geology : General principles of Stratigraphy, Geological time scale with respect to Indian geological time scale, Physiographic divisions of India, Archean's & Dharwar formation, Cudappah formations, Vindhyan formations, Gondwana formations, Deccan Trap formations, significance of their structural characters in major civil engineering activities.

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UNIT III

Chapter 3 : Structural Geology and Plate Tectonics**3-1 to 3-37****Syllabus :**

- (a) Introduction to plate tectonics and Mountain building activity.
- (b) Structural Geology : Out crop, dip and strike, conformable series, unconformity, its types and overlap, faults and their types, folds and their types, inliers and outlier. Civil engineering importance of faults and folds with examples.
- (c) Structures of rocks : Igneous intrusions and their types, joints and their types, stratification and lamination.

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UNIT IV

Chapter 4 : Remote Sensing and G.I.S., Preliminary Geological Studies**4-1 to 4-34****Syllabus :**

- a) Remote sensing (RS) :** Definition, Stages of Remote Sensing, Remote sensing platforms, Active and Passive Remote Sensing, Electromagnetic Spectrum, Visible band, Scattering and Absorption of EMR in atmosphere and its effect on Satellite Imagery; resolution of satellite images, Elements of remote sensing for Visual interpretation viz, Tone, Shape, Size, Pattern, Texture, Shadow and Association.
- b) Geographical Information System (GIS) :** Introduction, Definition, Tools, Applications of Remote Sensing and Geographical Information system in Civil Engineering.
- c) Preliminary Geological Exploration :** reconnaissance survey, Desk study, surface and subsurface Geological Investigations: Direct methods like Test and trial pits, pilot trenches, Drilling, Core inspection significance and limitations of it. Indirect methods like Resistivity, Seismic Survey and its Significance and limitations.

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UNIT V

Chapter 5 : Role of Engineering Geology in Dams, Reservoir and Tunneling

5-1 to 5-24

Syllabus :

- (a) **Geology of Dams and Reservoir** : Strength, stability and water tightness of foundation rocks, influence of geological conditions on the choice and type of dam, preliminary geological work on dam and reservoir sites, precautions to be taken to counteract unsuitable conditions and their relevant treatments with case studies.
- (b) **Tunneling** : Preliminary geological investigations, important geological considerations while choosing alignment, difficulties during tunneling as encountered due to various geological conditions, Role of groundwater and suitability of common rock types for excavation and tunneling and important case studies in Kasara and Bor Ghat sections of central railway in Maharashtra and in India, particularly in Himalayas etc.

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UNIT VI

Chapter 6 : Geological Hazards, Ground Water and Building Stone

6-1 to 6-44

Syllabus :

- (a) **Geological hazards** : Volcanism, Earthquakes and Seismic zones of India, Landslides and stability of hill slopes and Preventive measures.
- (b) **Groundwater** : Types of groundwater, water table and depth zones, influence of hydro geological properties of rocks, types of aquifers, artesian wells and its geological conditions, artificial recharge of groundwater. geological work of groundwater, levels, effects of dams and canals, effect of pumping, cone of depression, circle of influence, fluctuations in water table, Methods of conservation of groundwater and its management, introduction of watershed management,.
- (c) **Building stones** : Requirements of good building stone: strength, durability, ease of dressing, appearance, mineral composition, textures and field structures, suitability of common rocks as building stone.

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