

ENGINEERING GEOLOGY

Course Code: 13CE1116

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Course Educational Objectives:

- ❖ To impart basic concepts of engineering geology those are required for a Civil Engineer.
- ❖ To familiarize a student with rock types and their properties

Course Outcomes:

Student will develop an understanding of petrology, mineralogy, and structural geology, geology of dams, tunnels and reservoirs.

UNIT-I

(10 Lectures)

PHYSICAL GEOLOGY:

Branches of Natural Science, Earth Science, Weathering – Types of weathering, Formation of Rivers, River piracy – Various stages of a river. Delta formation, Meandering of river, Formation of Oxbow lakes, Action of Wind, Formation of Sand dunes, Formation of Soils, Different types of soils and their classification.

UNIT-II

(15 Lectures)

MINERALOGY & PETROLOGY :

Definition of mineral as colour, streak, luster, cleavage, fracture, hardness, specific gravity, structure, diaphinity, isomorphism, polymorphism, pseudomorphism, special properties, diagnostic properties, chemical composition, uses. Rock

Forming minerals: Rock forming minerals, economic minerals – properties of: Calcite, Feldspar, Quartz, Olivine, Augite, Hornblende, Muscovite, Biotite, Barites, Bauxite, Garnet, Talc, Hamatite, Magnetite, Chlorite, Galena, & Graphite. Difference between Rock and Mineral. Geological classification of rocks. Igneous Rocks : their structures, textures,

concordant bodies, discordant bodies, sills, lopoliths, phacoliths, Bismalith, Dyke, Batholith, Plutonic, Hypabyssal and Volcanic Igneous rocks properties of Granite, Pegmatite, Gabbaro, Dolerite, Basalt. Sedimentary rocks: Mode of deformation, texture and structures of sedimentary rocks; clastic, Rudaceous, Chemcial and Biological rocks. Structures of sedimentary rocks as Bedding, Ripple marks, Tracks and trails, Rain prints, Fossils, Calcareous, Argillaceous, Siliceous and Ferruginous rocks. Properties of Breccia, Conglomerate, Sand stone, Lime stone & Shale. Metamorphic rocks: Metamorphism, Dynamic Metamorphism, Thermal Metamorphism, Dynamo thermal metamorphism. Metasomatism. Structures and Textures of Metamorphic rocks as lineation, foliation, Cataclastic texture, Grannulose texture, Schistose texture, Gneissose textures. Properties of Slate, Marble, Schist, Gneiss, Quartzite.

UNIT-III

(15 Lectures)

STRUCTURAL GEOLOGY:

Strike, Dip, folds – various types – Faults – Various types – Unconformities – Joints. GROUND WATER: Wells – Deep well, shallow well, Springs – Different types.

UNIT-IV

(10 Lectures)

EARTHQUAKES:

Classification of seismic waves, Mercalli & Richter scales, causes and effects, Seismic belts, Seismic zones of India, precautions while constructing engineering structures. Land Slides: Causes, effects, methods of mitigating impact of landslides.

UNIT-V

(12 Lectures)

DAMS AND TUNNELS:

Selection of site of dam construction, Gravity dams, Arch dams and Earthen dams – Geological considerations for dam construction. Reservoir formed – Geological consideration for no leakage, Long life and more usefulness. Tunnels: Necessity – Effects – Litho logical – Structural and Ground Water considerations.

TEXT BOOKS:

1. N.Chennkesavulu, “*Engineering Geology*”, Mc-Millan, India Ltd. 2005.
2. Parbin Singh, “*Engineering and General Geology*”, SK Kataria & Sons, 2009.

REFERENCES:

1. F.G. Bell, “*Fundamentals of Engineering Geology*”, Butterworths, Publications, New Delhi, 1992.
2. Krynine & Judd, “*Principles of Engineering Geology & Geotechnics*”, CBS Publishers & Distribution.
3. K.V.G.K. Gokhale, “*Principles of Engineering Geology*”, B.S Publications, 2009.

