MANIPAL UNIVERSITY JAIPUR

School of Civil and Chemical Engineering

Department of Civil Engineering
Course Hand-out

Engineering Geology | CV 1304 | 4 Credits

Session: Jul- Dec 2017 | Faculty: Dr Harshavardhana B G

Course Outcomes: At the end of the course, students will be able to

1304.1: Understand the significance/basics of various rocks, minerals, and geological structures.

1304.2: Discern different geological processes, causing a variety of rock structures that may be disastrous to civil constructions.

1304.3: Apprehend the importance and application of engineering geology to design as well as construct safe, durable, strong and economical civil engineering structures.

1304.4: Comprehend the application of modern techniques/tools to identify/predict the geological conditions to develop skills.

A. SYLLABUS

Introduction: Overview and scope of the subject, Geology and its role in Civil Engineering, Earth as a planet, its internal structure and composition.

Mineralogy: Description and identification of rock-forming minerals and Ores, their physical and special properties; Olivine, Augite, Hornblende, Mica group, Feldspar group, Quartz and its varieties. Carbonate group, Asbestos, Kaolin, Talc, Gypsum, Garnet, Corundum, Magnetite, Hematite, Limonite, Pyrite, Chalcopyrite, Galena and Bauxite.

Petrology: Definition, sources of rocks, classification of rocks based on mode of formation, rock-cycle. Identification and description. Igneous rocks: Granite, Syenite, Diorite, Gabbro, Dunite; Pegmatite, Porphiries, Dolerite; Rhyolite, Basalt and Pumice. Sedimentary rocks: Primary structures and description of Sandstones, Conglomerate, Breccia, Shale, Limestones and Laterite. Metamorphic rocks: Gneiss, Quartzite, Marble, Slate, Phyllite and Schists, Rock as building material.

Structural Geology: Definition, outcrop, dip and strike of a rock-bed, clinometer and compass. Folds, joints, faults, and unconformity, their recognition and importance in Civil Engineering field investigation.

Physical Geology: Weathering of rocks, types of weathering, agencies, causes and products of weathering. Origin and development of river systems, erosion, transportation and deposition by rivers, geological action of wind and its geomorphic features.

Hydrogeology: Hydrological cycle, distribution of ground water in the earth crust, types and properties of water bearing geological formation, selection of sites for well locations, techniques of ground water exploration, artificial recharge of groundwater methods, rain water harvesting. Sea water intrusion and remedial measures.

Geodynamics: Plate tectonics, earthquake, seismic waves, magnitude and intensity scales, earthquake-recording instruments, characteristics of strong ground motions and attenuation, earthquake occurrence in the world, seismic zoning map of India and its use. Tsunami and landslides, causes, effects and remedial measures.

Engineering Geology: Geological considerations in selection of sites for Dams, Reservoirs, Tunnels, Bridges and Highways.

B. TEXT BOOKS

I. Mukherjee, P. K. (2005). A Text Book of Geology, World Press, Kolkata.

II. Reddy, D. V. (2012). Engineering Geology for Civil Engineering, Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

III. Singh, P. (2013). Engineering and General Geology, Published by S. K. Kataria and Sons, New Delhi.