



## GOKARAJU RANGARAJU INSTITUTE OF ENGINEERING AND TECHNOLOGY

### ENGINEERING GEOLOGY

Course Code: GR15A2014  
II Year II Semester

L:3 T:1 P:0 C:4

**Prerequisites:** Knowledge of minerals, their formation & chemical composition

#### Course Objectives

- Graduates of this course understand the importance of study of Engineering Geology for the construction of any Civil Engineering structure.
- Graduates of this course acquire knowledge on the structure of earth, the formation of various types of rocks and minerals and their study.
- Graduates of this course understand the various surface and subsurface flows like Rivers, Canals, lakes and Ground water studies etc.

#### Course Outcomes

- Graduates of this program will acquire knowledge of causes of failures of Civil Engineering structures due to Geological reasons and can apply this knowledge when they take up any civil engineering constructions.
- Graduates of this program will have the knowledge about the structure of earth and how various rocks and minerals form in the earth's crust and how to utilize them for various Engineering constructions.
- Graduates of this program will have the knowledge various Geological structures like faults, folds and how they will affect civil engineering structures and what are the precautions to be taken to minimize the effect.

#### Unit-I

**Introduction:** Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological drawbacks. Importance of Physical geology, Petrology and Structural geology.

**Weathering of rocks:** Its effect over the properties of rocks importance of weathering with REFERENCE to dams, reservoirs and tunnels. Weathering of common rock like "Granite".

#### Unit-II

**Mineralogy:** Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming



minerals: Feldspar , Quartz , Flint , Jasper, Olivine , Augite , Hornblende, Muscovite , Biotite , Asbestos, Chlorite , Kyanite , Garnet, Talc , Calcite. Study of other common economics minerals such as Pyrite, Hematite , Magnetite, Chromite , Galena , Pyrolusite, Graphite, Magnesite, and Bauxite.

**Petrology:** Definition of rock: Geological classification of rocks into Igneous, Sedimentary and Metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks and their distinguishing features. Megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

### Unit-III

**Structural geology:** Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types and importance. Common types of soils, their origin and occurrence in India, stabilisation of soils.

### Unit-IV

Ground water, water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land-slides, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and land-slides.

**Geology of dams and reservoirs:** Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factor's Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs.

### Unit-V

**Tunnels:** Purposes of tunneling, effects of tunneling on the ground. Role of geological considerations (Lithological, structural and ground water) in tunneling over break and lining in tunnels.

### Teaching Methodologies

1. Power Point presentations
2. Tutorial Sheets
3. White Board

### Text Books

1. K.V.G.K. Gokhale, Principles of Engineering Geology, B.S publications
2. N. Chennkesavulu, Mc-Millan, Engineering Geology, India Ltd. 2005.

### Reference Books

1. F.G. Bell, Fundamental of Engineering Geology, Butterworths, Publications, New Delhi, 1992.
2. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution.