

## **CE-3005 GEOLOGY**

### **COURSE OBJECTIVE**

To study geological science and apply the same in the field of civil engineering. The course begins with history of earth's formation. It moves on to the different types of soil found on earth and finally describes the various applications of geological science in civil engineering. Also to make the students familiar with remote sensing and geographical information system.

### **COURSE CONTENT**

Introduction and Physical Geology- Objects and scope of geology. The crust and the interior of the earth, origin and age of the earth, sub-aerial land, sub-terrain weathering, denudation and deposition, wind, river, glacial and marine erosion, volcanoes, soil, formation of soil profile , geological classification of soil and concept of earthquake, Plate- tectonics.

Mineralogy and Crystallography- Fundamentals of mineralogy, study of common rock forming minerals, ores and minerals of economic importance to civil engineering. elements of crystallography and introduction to crystal systems.

Petrology: Composition of earth's crust, study of igneous, sedimentary and Metamorphic rocks and their formation, characteristics classification, Rocks of civil engineering importance.

Geology of India: Physical features of India, Brief geological history of India, occurrence of important ores and minerals in India.

Structural Geology: Structures related to rocks, Dip, Strike and outcrops, Classification and detailed studies of geological structures i.e. folds, Faults, Joints, Unconformity and their importance in Civil Engineering.

Applied Geology: Introduction to applied geology and its use in civil engineering, properties of rocks, selection of sites for roads, bridges, dams, reservoirs and tunnels. Prevention of Engineering structures from seismic shocks, stability of hill sides, water bearing strata, artesian wells, Use of remote-sensing techniques in selection of above sites.

Remote Sensing: Basic principles, roll of remote sensing in civil engineering, components, classification, remote sensing data acquisition process, various interpretation techniques in remote sensing, different types of remote sensing satellite imagery with special relevance to Indian Remote Sensing Satellites (IRS) and applications.

Geographic Information Systems (GIS): Definition, components and advantages, application of geological knowledge in civil engineering projects like dams, bridges, roads, tunnels and multistory buildings, geological factors in the design of buildings.

### **COURSE OUTCOME**

1. Understanding of the role of geology in design and construction processes.
2. Ability to apply geological concepts and approaches to rock engineering projects.
3. Ability to identify and classify rocks using basic geological classifications and understand the formation and properties of each category.
4. Ability to use the geological literature to establish the Geo-technical framework needed to properly design and construct heavy civil engineering projects.
5. Understanding the application of remote sensing and geographical information system in civil engineering projects.

## REFERENCE

1. Parbin Singh – “Engineering and General Geology”
2. S.K. Garg – “ A text Book of Physical and Engineering Geology”
3. Varghese P.C., *Engineering Geology for civil engineering*, PHI
4. A. Parthasarthy- *Engineering Geology*, Wiley
5. Duggal, Pandey and Rawal- *Engineering Geology*, Macgra Hill
6. Duggal SK, pandey, Rawal, *Engineering Geology*, Mc Graw Hills
7. Kamith Vasudev, *Engineering Geology*, University Press
8. Alam MM. *Engineering Geology and Geo- Engineering*, Axiom Books
9. Gangopadhay S., *Engineering Geology*, Oxford
10. Gulati ; *Geotechnical Engineering*; TMH
11. P.K. Mukerjee – “ A text Book of Geology”
12. Das and Sobhan, *Principles of Geo-technical Engineering*, Cengage Learning
13. Kueffer and Lillesand, *Remote sensing and Image interpretation*
14. Valdiya K. S., *Environmental Geology in Indian Context –Tata Mc Graw Hill*

## LIST OF EXPERIMENT

1. Identification of simple rock-forming minerals and important ores.
2. Identification of rocks.
3. Simple map Exercises.
4. Field Visit / Geological Excursion.