

## **Engineering Geology**

**CE-504**

**Contracts: 3L**

**Credits- 3**

### **Module 1.**

Geology and its importance in Civil Engineering. [2]

### **Module 2.**

Mineralogy: Definition, internal and external structure of minerals, study of crystals, Classification and physical properties of minerals. [3]

### **Module 3.**

Classification of rocks: Igneous rocks: Origin, mode of occurrence, forms & texture, classification and engineering importance.

Sedimentary rocks: Process of sedimentation, classification and engineering importance.

Metamorphic rocks: Agents and types of metamorphism, classification and engineering importance. [4]

### **Module 4.**

Weathering of rocks: Agents and kinds of weathering, soil formation & classification based on origin. [2]

### **Module 5.**

Geological work of rivers: Origin and stages in the system, erosion, transportation and deposition. [1]

### **Module 6.**

Structural geology: Introduction to structural elements of rocks, dip & strike, definition, description, classification of folds, faults and joints, importance of geological structures in Civil Engineering. [4]

### **Module 7.**

Earthquakes and seismic hazards: Causes and effects, seismic waves and seismographs, Mercalli's intensity scale and Richter's scale of magnitude. [3]

### **Module 8.**

Engineering properties of rocks: Porosity, permeability, compressive strength, tensile strength and abrasive resistance. [3]

### **Module 9.**

Rocks as construction materials: Qualities required for building and ornamental stones, foundations, concrete aggregate, railway ballast, road metal, pavement, flooring and roofing. [3]

### **Module 10.**

Geophysical exploration: Methods of Geophysical Exploration, electrical resistivity method field procedure – sounding and profiling, electrode configuration, and interpretation of resistivity data.

Geophysical surveys in ground water and other Civil Engg. Projects. [4]

### **Module 11.**

Applied Geology: Surface and subsurface geological and geophysical investigations in major Civil Engg. Projects. Geological studies of Dams and reservoir sites, Geological studies for selection of tunnels and underground excavations. [4]

### **Module 12.**

Landslides: Types of landslides, causes, effects and prevention of landslides. [3]

### **Reference Books:**

1. Engineering and General Geology by Parbin Singh, Fourth edition. Katson publishing house Delhi 1987.
2. Engineering Geology for Civil Engineers –D. Venkat Reddy, Oxford, IBH, 1995.
3. Tyrell: Principles of petrology, 1972, Asia, Bombay.
4. Marland P. Billings: Structural Geology, fourth edition, 1975, Wiley eastern Prentice-Hall, U.S.A. 1972.
5. Todd D.K. Ground Water hydrology. Jonh Wiley & Sons, Second edition, 1980.