

Devi Ahilya University, Indore, India Institute of Engineering & Technology				II Year B.E. (CIVIL)			
Subject Code & Name	Instructions Hours per Week			Credits			
AVR4C1 Engineering Geology	L	T	P	L	T	P	Total
	3	1	2	3	1	1	5
Duration of Theory Paper: 3 Hours							

### Learning Objectives:

To provide the knowledge of Engineering Geology.

## COURSE CONTENTS

### UNIT-1

**Introduction:** Objects and scope of engineering geology. The origin, age and internal structure of the earth. Volcanoes, earthquakes, continental drift and isostasy, weathering, denudation and deposition, wind, river, glacial and marine erosion.

Soil formation, soil profile, geological classification of soil and concept of plate tectonics.

### UNIT-2

#### SECTION A:- mineralogy and crystallography:

Fundamentals of mineralogy, study of common rock forming minerals, their origin, occurrence and physical properties for identification. Elements of crystallography and introduction to crystal systems.

#### SECTION B:-Petrology:

Composition of earth crust. Igneous sedimentary and metamorphic rocks and their mode of occurrence, structure and texture, characteristics, classification of rocks and their importance in civil engineering.

#### SECTION C :- Stratigraphy and Indian geology:

General principles of stratigraphy, geological time scale, division of India in three units. Study of important Geological formation of the peninsular India. Archeans, Dharwars, Cuddapah, Vindhyan, Gondwana systems, Deccan traps.

### UNIT-3

### **SECTION A:- Rock mechanics**

Rock classification, engineering classification of intact rocks, rock quality designation, mechanical properties of rocks, tensile, compressive, shear strength, hardness, brittle failure of rock, stress deformation characteristics of rock masses, deformation modulus and elastic constants laboratory tests on rock spacing, point load index test, high pressure permeability test, triaxial test, brazilian test, uniaxial test on rocks.

### **SECTION B:-Structural geology:**

Structures related to rocks. Dip, strike and out crops. Classification and detailed studies of geological structures i.e., Folds, fault, joints unconformity and their importance in civil engineering.

### **UNIT-4**

#### **Applied geology:-**

Engineering properties of rocks and their relation to rock mass deformation. Physical characters of building stones and road metals.

Influence of geological conditions of foundation and designs of buildings, stability of hill slopes and transportation routes. Geology of reservoir and dam sites, its location, strength, stability and water tightness of foundation rocks, their depth, physical characters and effects of structural features.

Tunnels-Effect of the structure of rocks competency of rocks, suitable location of a tunnels, problem of ground water seepage.

### **UNIT-5**

**Hydrology:-** hydrology cycle, ground water in hydrological cycle. Origin of ground water and springs. Geological structures favouring ground water occurrence. Classification of aquifers, ground water provinces of India- their aquifers characteristics. Ground water occurrence and flow in Igneous, sedimentary and metamorphic rocks. Geophysical prospecting and water logging.

#### **Books Recommended:**

1. Subinoy Gangopadhyay, Engineering geology: Oxford university press.
2. Mukerjee P.K.A, Textbook of Geology, World Press Pvt. Ltd., Calcutta.
3. Legget R.F., Geology and Engineering, Mcgraw Hill.
4. Krgnine D.P. and Judd W.R., Principles of Engineering Geology, Mchgraw Hill

#### **List of Experiments(Expandable)**

1. Identification of simple rock forming minerals.

2. Identification of rock.

3. Simple map Exercises.

4. Field Visit/ Geological Excursion.