



# INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal - 500 043, Hyderabad, Telangana

## COURSE CONTENT

ENGINEERING GEOLOGY									
IV Semester: CE									
Course Code	Category	Hours/Week			Credits	Maximum Marks			
		L	T	P		C	CIA	SEE	Total
ACED09	Core	3	0	0	3	40	60	100	
Contact Classes: 48		Tutorial Classes: Nil		Practical Classes: Nil			Total Classes: 48		
Prerequisite: Nil									

### I. COURSE OVERVIEW:

This course covers the study of physical geology, structural geology and petrology also the importance of geology from civil engineering point of view. It deals weathering of common rocks like granite and with reference to dams and reservoirs. This course also covers study of minerals, properties, role of properties in their identification. Finally, this course addresses study and selection of site for dams and reservoirs, improvement of competence of the site by grouting, water tightness, and design considerations of constructing tunnels and lining of tunnels.

### II. COURSE OBJECTIVES:

The students will try to learn:

- I. The process of formation of rocks, their classifications and properties of minerals.
- II. Different geological structures encountered in nature.
- III. Importance of geophysical and geological studies of sites for tunnels, dams and reservoirs.

### III. COURSE OUTCOMES:

At the end of the course students should be able to:

- CO 1 Relate the concepts of how minerals form and their uses for identifying the rock forming.
- CO 2 Classify rocks using basic geological systems for selective construction material.
- CO 3 Interpret graphs and models used in structural geology for demonstrating stress, strain and tectonics
- CO 4 Relate the geologic concepts and approaches of rock for engineering projects.
- CO 5 Compare past tectonic settings of an area for evaluation of current structures.
- CO 6 List out the design and construction procedures required for controlling safety of rock behaviour in dam construction

### IV. COURSE CONTENT:

#### MODULE –I: INTRODUCTION TO WEATHERING OF ROCKS (10)

Introduction: Importance of geology from civil engineering point of view. Brief study of case histories of failures of some civil engineering constructions due to geological draw backs. 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.

#### MODULE -II: MINERALOGY (10)

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, Chlorite, Galena,

Pyrolusite, Graphite, Magnesite, and Bauxite..

### **MODULE -III: PETROLOGY (10)**

Definition of rock, geological classification of rocks into igneous, sedimentary and metamorphic. Dykes and Sills, common structures and textures of igneous, sedimentary and metamorphic rocks.

Megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate. Rock excavation, stone aggregates.

### **MODULE -IV: STRUCTURAL GEOLOGY (9)**

Indian stratigraphy, paleontology and geological time scale, out crop, strike and dip study of common geological structures associating with the rocks such as fold, faults unconformities, and joint types. Ground water: Water table, common types of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield hazards, water in landslides their causes and effects, measures to be taken to prevent their occurrence. Importance of study of ground water, earthquake and landslides.

### **MODULE -V GEOLOGY OF DAMS AND RESERVOIRS (9)**

Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Factors contributing to the success of a reservoir, Geological factors influencing water tightness and life of reservoirs, Geo hazards, ground subsidence.

### **V. TEXT BOOKS:**

1. Kesavulu, N. Chenna, *Textbook of Engineering Geology*, Macmillan India, 2009.
2. Venkat Reddy, "Engineering Geology", Vikas Publications, New Delhi, India, 2<sup>nd</sup> Edition, 2011.
3. Vasudev Kanithi, "Engineering Geology", University Press, 1<sup>st</sup> Edition, 2013.

### **VI. REFERENCE BOOKS:**

1. F.G. Bell, *Fundamentals of Engineering Geology*, Butterworth's Publications, 3<sup>rd</sup> Edition, New Delhi, 1992.
2. Gokhale, *Principles of Engineering Geology*, BS Publications, 2009.

### **VII. ELECTRONICS RESOURCES:**

1. <https://nptel.ac.in/courses/105105106>
2. [https://onlinecourses.nptel.ac.in/noc23\\_ce107/preview](https://onlinecourses.nptel.ac.in/noc23_ce107/preview)

### **VIII. MATERIAL ONLINE:**

1. Course template
2. Tech-talk topics
3. Assignments
4. Definition and terminology
5. Tutorial question bank
6. Model question paper – I
7. Model question paper – II
8. Lecture notes
9. Early lecture readiness videos (ELRV)
10. Power point presentations