

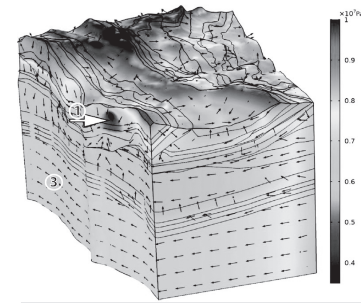
19CE214 ENGINEERING GEOLOGY

Hours Per Week :

L	T	P	C
2	-	2	3

Total Hours :

L	T	P	WA/RA	SSH/HS	CS	SA	S	BS
30	-	30	20	48	6	12	3	2



Source :<https://tu-freiberg.de>

COURSE DESCRIPTION AND OBJECTIVES:

The course offers knowledge of Geology for Civil Engineering applications and explaining the geological agents and their role in constantly moulding the surface of the earth. The objective of this course is to introduce the basic geology to Civil engineering students and to inspire them to think clearly and critically the solution to Civil engineering problems using the knowledge of geology.

COURSE OUTCOMES:

Upon completion of the course, the student will be able to achieve the following outcomes:

COs	Course Outcomes	POs
1	Describe the properties of minerals along with the concepts of engineering geology	1
2	Describe the properties of rocks	1
3	Explain the concepts structural geology and significance of landslides & earthquakes	1
4	Classify the rocks with various laboratory and field test	1
5	Examine the geological conditions of dams and reservoirs	1

SKILLS:

- ✓ Distinguish geological formations.
- ✓ Identify topographical features and geological formations.
- ✓ Identify minerals by using physical properties.
- ✓ Identify rocks by using physical properties.
- ✓ understand various secondary structures.

UNIT -I**L-9**

INTRODUCTION AND PHYSICAL GEOLOGY: Branches of geology, Importance of geology from civil engineering point of view, Importance of physical geology, Petrology and structural geology. Weathering process with reference to dams, Reservoirs and tunnels, weathering of common rock like "Granite".

MINERALOGY: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Physical properties of minerals. 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 economic minerals such as Pyrite, Hematite, Magnetite, Chromite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.

UNIT-II**L-9**

PETROLOGY: Definition of rock, Geological classification of rocks into igneous, Sedimentary and metamorphic rocks, Dykes and sills, Common structures, textures and their distinguishing features of igneous, Sedimentary and metamorphic rocks.

MEGASCOPIC STUDY OF ROCKS: Megascopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sandstone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble.

UNIT-III**L-9**

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,

EARTHQUAKES AND LANDSLIDES: Earthquakes -their causes and effects, Shield areas and seismic belts, Seismic waves, Richter scale, Precautions to be taken for building construction in seismic areas, Landslides, their causes and effects, Measures to be taken to prevent their occurrence.

UNIT-IV**L-9**

ROCK MASSES AS CONSTRUCTION MATERIAL: Definition of Rock masses, Classification of Rock mass: Terzaghi's Rock classification, US Bureau of Mines classification, Classification of rock material based on unconfined compressive strength, Goodman's classification of Rock mass continuity.

ROCK MECHANICS: Brief description of Sub surface investigations in rocks, Brief description of field & laboratory tests on rocks: Uniaxial compressive strength, Tensile Strength, Shear Strength, Modulus of elasticity, Triaxial test, Jack test, Shear test.

UNIT - V**L-9**

GEOLOGY OF DAMS: 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.

GEOLOGY OF RESERVOIRS: Factors contributing to the success of a reservoir, Geological factors influencing water tightness and life of reservoirs.

LABORATORY EXPERIMENTS

LIST OF EXPERIMENTS

TOTAL HOURS :30

1. Study of Survey of India Topographical Maps
2. Preparation of Drainage maps using Topographical Maps
3. Preparation of Slope maps using Topographical Maps
4. Preparation of Base maps using Topographical Maps
5. Watershed delineation and Morphometric analysis
6. Study of Satellite Imageries
7. Preparation of Land use and Land cover maps using Satellite Imageries
8. Identification of Minerals in Hand Specimens by studying physical properties
 - a) Rock- forming minerals b) Ore- forming minerals
9. Identification of Rocks in Hand Specimens by studying physical properties
 - a) Igneous Rocks b) Sedimentary Rocks c) Metamorphic Rocks
10. Identification of Geological features through wooden Models: Petrological Diagrams
11. Interpretation of Geological Maps
12. Determination of Strike and Dip of formations
13. Determination of True and vertical thickness of formations
14. Electrical Resistivity Method
15. Study of Geological Structural Models

TEXT BOOKS:

1. Parbin Singh, "Engineering and General Geology", 13th edition, S. K. Kataria and Sons, New Delhi, 2012.
2. N. Chennakesavulu, "Engineering Geology", 2nd edition, MacMillan, India Ltd., New Delhi, 2009.

REFERENCES:

1. D. Venkata Reddy, "Engineering Geology for Civil Engineers", 1st edition, Oxford and IBM Publishing Company Pvt. Ltd., New Delhi, 1997.
2. K. V. G. K. Gokhale, "Principals of Engineering Geology", 2nd edition, B. S. Publications, New Delhi, 2011..