

Engineering Geology

Course Code CE-121	Credit Hours 3-0
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Course Description

The aim of the course is to make engineers familiar with geological processes, plate tectonics and some situations where they never realized a geo-hazards issue even existed. This course will enable the student to operate effectively with geologists by explaining terminology and concepts in the field of engineering geology.

Text Book:

1. Geology for Engineers by F.G.H. BLYTH.
2. Principles of Physical Geology by Charles C. Plummer.

Reference Book:

References Material (Books):

1. Structural Geology by Marland P. Billings.
2. Essentials of Geology by Reed Wicander and James S. Monroe

Prerequisites

Nil

ASSESSMENT SYSTEM FOR THEORY

	Without Project (%)	With Project/Complex Engineering Problems (%)
Quizzes	15	10-15
Assignments	10	5-10
Mid Terms	25	25
Project	-	5-10
End Semester Exam	50	45-50

ASSESSMENT SYSTEM FOR LAB

Lab Work/ Psychomotor Assessment/ Lab Reports	70%
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Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1	Introduction to Geology and various branches of Geology: Origin and internal constitution of the earth, importance of Geology for Civil Engineering projects.
2-3	Rocks & Minerals: Main rock groups. Igneous, sedimentary, and metamorphic rocks, important minerals and ores, rock Cycle, important building stones and other construction materials.
4	Weathering and Erosion: Agents of weathering and erosion, weathering classification, cycle of erosion, normal, glacial, and marine erosion. landforms, mass wasting, formation of meanders & oxbow lakes, types of soil
5	Structural Features: Dip, strike, folds, faults, joints, unconformities conformable and unconformable series of strata. effects of folding, faulting and jointing on civil engineering projects and their recognition in the field, engineering rock mass classification
6	Earthquakes: Definition, Technical terms, causes of earthquake, classification of earthquakes, earthquake or seismic waves, mechanism of earthquake, measuring of earthquake intensity (Modified Mercalli Intensity Scale), effects of earthquake & protective measures against earthquake, preliminary earthquake resistant construction.
7	Volcanoes: Formation of volcanoes causes of volcanoes, nature and types of volcanic eruptions, products of eruptions, types of volcanoes, geysers. effects of volcanoes on environment.
	Mid Semester Exam
8	Landslides: Definition, causes of landslides, classification of landslides, preventive measures against landslides.
9	Tunneling: Engineering geology of tunnels, geological survey prior to tunneling, lining of tunnels and their section, selection of tunnel site and its requirements. introduction to nuclear repositories.

10	Geological Survey: Physical method of subsurface mapping, exploratory geological surveys and engineering geological investigation at engineering sites.
11-12	Glaciers and Glaciations: Origin of glacial ice, types of glaciers, movement of glaciers, glacial erosion, deposition by glacier, introduction to climate change Ground water: hydrologic cycle, geology of aquifer, well, springs, stream, and ground water conditions, construction of water wells, contamination of ground water, groundwater conservation and rain harvesting
13-16	Engineering Applications: Dams, types of dams, geological and geotechnical criteria for selection of dam sites, reservoirs, and pertinent geological investigations, civil engineering projects in context of foundations, cutting, tunnels, highways, airfields, and bridges, role of geology in sustainable environment
17-18	End Semester Exam

Practical: Nil.