

Geology for Engineers

Course Code	Credit Hours
CE-112	2-0

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%
Lab Project/ Open Ended Lab Report/ Assignment/ Quiz	10%
Final Assesment/ Viva	20%

Teaching Plan

Week No	Topics/Learning Outcomes
1-2	<p>General geology</p> <ul style="list-style-type: none">• The earth as planet and process of external origin• Weathering and erosion• transportation, and deposition, of rock material by geological agents• Processes of internal origin volcanism, earthquakes, intrusion and metamorphism• Rock cycle, diastrophism, and isostasy.
3-4	<p>Elements of structural geology</p> <ul style="list-style-type: none">• Folds and faults, joints, fractures, and cleavages• Unconformities, primary and secondary structural features of rock• Expression of geological features on geological field maps• Construction of cross sections and geological mapping
5-6	<p>Minerals and rocks</p> <ul style="list-style-type: none">• Important minerals and rocks, and their identification• Igneous, sedimentary and metamorphic rocks• Fossils• Basic principles of stratigraphy and Geologic time scale• Brief introduction of local geology from boring logs.
7-8	<p>Applied geology</p> <ul style="list-style-type: none">• Application of geology to planning and design of various civil engineering infrastructure like dams, reservoirs, bridges, application of geology to building materials and soils.
9	<p>Mid Semester Exam</p>
10-11	<p>Earthquakes</p> <ul style="list-style-type: none">• Theory of plate-tectonics, seismic waves, seismology• Prediction of earthquakes and preventive measures against earthquakes• Ground subsidence• Earthquake zoning of Pakistan
12-13	<p>Stability of rock slopes</p> <ul style="list-style-type: none">• Various types of rock failures and factors affecting the stability of rock slopes• Analysis, and calculation of factor of safety

	<ul style="list-style-type: none"> • Types of Land Sliding: Slump, Rockslides and Rock Falls • Causes of landslides and remedial measures
13-14	<p>Hydrogeology</p> <ul style="list-style-type: none"> • Introduction to Wells, Springs, Streams, Ground Water, and Glaciers • Types of Wells, Springs, Streams, Ground Water, and Glaciers.
15-16	<p>Tunnelling</p> <ul style="list-style-type: none"> • Introduction to Tunnels • Types of Tunnels • Tunnel Construction Methods in Rocks • Geological Survey Prior to Tunnelling • Lining of Tunnels and Its Sections.
17&18	End Semester Exam

Practical: Nil.