Subject Code: CSE290

INTRODUCTION TO GEOTECHNOLOGY

Subject Aim:

This subject is intended to:

1. Provide students with instruction on the fundamentals of geotechnology.
2. Provide an essential background for studies in soil mechanics, rock mechanics, foundation engineering and geotechnical designs.

Learning Outcomes:

Students will demonstrate their ability to:

1. Understand and classify the different nature and properties of different types of rocks.
2. Understand basic soil and rock mechanics.
3. Apply the knowledge to foundation designs and construction.
4. Interpret the test results of the soil samplings.

Syllabus Content:

Mineralogy and Petrology

Surface processes and weathering
Weathering of rock, erosion and deposition; hydrological cycle (River, Marine, Wind, Glacial).

Structural geology
Fold, Fault and joints, stereographic projection of joint; map reading and mapping, section of geological structures.

Site investigation
Plan for site investigation; direct and indirect methods for site investigation and sampling, logging of boreholes in situ test (e.g. SPT, CPT, PMT, DMT, DMT, VST); interpretation of test results. Methods of geophysical exploration.

Geology for engineering
Geological application to tunnels. Transportation links, dams, reservoirs and catchments, coastline protection, slope and foundation.

Soil mechanics
Soil classification, 3 phase model, mass–volume relationship, void ratio, porosity, moisture content, specific gravity, unit weight, degree of saturation, soil consistency and Atterberg limits; soil hydraulics; basic concept of shear strength.

Rock Mechanics
Index properties of rock for engineering, classification of rock masses; rock strength and failure criteria; rock slope stability.

Laboratory and Fieldwork
Identification of common minerals and rocks. Field and site visits to illustrate course topics. Mapping.
Learning and Teaching Approach:

Teaching is based on lectures to be supported by laboratory and fieldwork to identify common rocks. Field and site visits to illustrate course topics.

Assessment:

70% examination + 30% coursework.

Reading List:

Recommended:


GEO, *Guide to Rock and Soil Descriptions*, GeoGuide 3, GCO, Civil Engineering Services Department, Hong Kong, 1988


