CB361 Engineering Geology

COURSE INFORMATION

Prerequisites	Academic Year & Level		Teaching Methods			Credit Hrs.
	Year	Semester	Lecture	Tutorial	Laboratory	
None	3	5	2	2	0	3

COURSE AIM

The course aims at introducing the student to the basics and principles of engineering geology, and the physical characteristics of soil through using; communication technologies and skills, engineering technologies, data collection and interpretation from laboratory and field, and writing technical reports referring to the relevant literature.

COURSE WEEKLY CONTENTS

1 Soil in engineering: General perspective of geotechnical engineering and engineering geology, general approach to solving geotechnical problems

2 Earth surface: Changes in the earth, types and origins of rocks, dimensions and surface relief of the earth and ocean floors, temperature gradient and density inside the earth

3 Earth structure and age: Composition of the earth, earthquakes, changes in earth before occurrence, belts, scales of magnitude, waves and their propagation mechanism, continental drift, oceanic ridges, plate tectonics, earth age

4 Rocks and soil deposits: The geological cycle; igneous, sedimentary and metamorphic rocks, sedimentary deposits

5 Surface processes: Rock weathering, clay minerals, flocculation and dispersion, absorbed water; compressibility, shrinkage and expansion

6 Geological structures: dip and strike, unconformity, folds, faults, brittle fracture, normal and reverse faults, fault groups, joints, geological maps

7 Subsurface exploration: Scope of exploration program, depth of exploration, spacing of borings, site reconnaissance, subsurface exploration, behavior of adjoining structures+ Midterm Exam

8 Subsurface exploration: Geophysical testing, borings, disturbed samples, undisturbed samples, core boring, test pits, field tests, observation wells, boring logs

9 Soil transport: Water-transported soils, wind-transported soils, glaciers, residual soils

10 Physical properties of soils: Void ratio, porosity, water content, degree of saturation, specific gravity, volumetric-gravimetric relationships, relative density of granular soils.

11 Index properties of soils: Consistency of clays, Atterberg limits: liquid limit, plastic limit, shrinkage limit; activity and sensitivity

12 Grain size distribution of cohesion-less soils: Different codes of classification, detailed laboratory procedure of the grain size determination and analysis, reading the percentages of soil sample constituents from the produced GSD Curve.

13 Soil classification: Classification based on grain size, coefficients of uniformity and curvature, AASHTO classification system, Unified Soil Classification system

14 Compaction:(Laboratory proctor tests) Standard and modified Proctor tests, performance control, detailed laboratory procedure for production of dry density-water content relationship, the effect of soil type on the proctor tests.

15 Compaction (field tests& relation with lab. Proctor tests)Field equipment, detailed procedure of in-situ obtained dry density and water content, percentage of compaction, and factors affecting the obtained dry density

STUDENT GRADING & ASSESSMENT

Weeks	Exams	Assign.	Quizzes	Reports	Present.	Lab.	Total
1 to 7	20 Midterm	← 10 MARKS To be freely distributed among possible assessments →					30
8 to 12	← 20 MARKS →						20
13 to 15	← 10 MARKS →						10
16 or 17	40 Final						40
Total	Exams	Assign.	Quizzes	Reports	Present.	Lab.	100

REFERENCES

Textbook	Engineering: Principles And Practices, Donald Coduto, Pearson Education, 2nd Edition, 2011.
Other	Fundamentals of Geotechnical Engineering, DAS, Braja M., Brooks-Cole, 1999.