UNIVERSITY OF ZAMBIA

GEOLOGY DEPARTMENT, SCHOOL OF MINES

GGY3051: ENGINEERING GEOLOGY

COURSE INTRODUCTION

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Course Background

The course introduces basic geology and principles of site investigation to civil engineering students.

By the end of the course students are expected to have:

- Developed an appreciation of geologic processes and their influence in civil engineering works
- Acquired knowledge of the most important rocks and minerals and be able to identify them
- Developed ability to interpret geological maps with an emphasis on making construction decisions

Course Objectives & Outcomes

- Main objective is to introduce Civil Engineering students to geology and how the latter is applied to civil engineering and construction/civil engineering works.

- A secondary objective is based on the assumption that most Civil Engineers will deal professionally with geologists in their careers. Thus

- An understanding of terms and methods used by geologists will better enable them to communicate with geoscientists and to properly interpret problems encountered in their fields.

Course Outline

- Introduction & Basics of Engineering Geology
  - ✓ Why Geology for Engineers at all?
  - ✓ Introduction to Earth Science, Earth's Structure and Plate Tectonics (ppts in Topic_1);
  - ✓ Common Rock Forming Minerals – Silicates and Non-Silicates;
  - ✓ Rocks – Igneous, Sedimentary & Metamorphic;
  - ✓ Geological (Discontinuity) Structures – Bedding/Foliation, Folds, Joints and Faults.
- Strength of Geological Materials & Masses
  - ✓ Behaviour of Rocks and Soil materials and masses;
  - ✓ Nature and behavior of Discontinuity surfaces in geological masses
- Geology in Engineering
  - ✓ Geological factors in Civil Engineering (Discontinuities, Fluctuations of Groundwater levels);
  - ✓ Site Investigations (Organisation & Methods of);
  - ✓ Construction materials (winning of),
  - ✓ Stability of Slopes;
  - ✓ Interpretation of Geological Maps and Reports.
- Introduction to Water Resources:
  - ✓ Components of Hydrologic Cycle (Precipitation, Evapotranspiration, Runoff, Infiltration);
  - ✓ Surface water;
  - ✓ General properties of GW flow and its sub-surface distribution);
  - ✓ Surface water – Groundwater relations (Darcy's Law).
  - ✓ **Case Studies:** Water supplies – Threats of anthropogenic activities (Over-exploitation & Pollution) to quantity & quality of GW resources; Influence of Fluctuations of GW levels to stability of Engineering Structures.

Teaching Method

- Lectures – 4 hours per week
- Practical – 3 hours, once a week

Method of Assessment

Continuous assessment – 40 %

- Labs – 20 %
- Tests – 20 %

Final Examination – 60 %

Readers

PRESCRIBED

- Introduction to Physical Geology. Thompson, G.R, & Turk, J.

SUPPLEMENTARY MATERIAL

- A Geology for Engineers, Seventh Edition. Blyth, F.G.H. & de Freitas, M. H.

END OF LECTURE