Engineering Faculty Document 1-06
May 9, 2006

MEMORANDUM

TO: The Faculty of the Schools of Engineering

FROM: The Faculty of the School of Civil Engineering

RE: New Graduate Level Course

The Faculty of the School of Civil Engineering has approved the following new course. This action is now submitted to the Engineering Faculty for a recommendation for approval.

CE 684 Advanced Engineering Geology

Sem.1, Class 3, Lab 0, Cr 3

Prerequisite: CE 580 or instructor consent

Principles describing the mechanical response of geomaterials subjected to disturbance by man. Relation between geology and engineering. Weathering and hydrothermal alteration of rock masses. Weathered rocks, problem soils, and transitional materials Soluble rock terrain (karst). Applied geomorphology. Civil engineering design factors and case histories that relate to the behavior of rocks and sediments. Characterization of geomaterials behavior, exploration and measurement of their engineering properties. The focus of the course is on theoretical and practical solution of engineering problems.

Reason: To provide students with theoretical knowledge of formation processes of geomaterials and their relation with engineering properties. The emphasis is on the behavior of non-traditional geomaterials that are not covered in other geotechnical courses. The course builds on the geo-technical fundamentals of CE 580 or similar.

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M. Katherine Banks, Interim Head
School of Civil Engineering

Supporting Documentation

1. **Justification:** Traditionally, geomaterials have been classified as "soils" or "rocks". However, most of the materials found near the surface are transitional materials which include soft rocks, weathered rocks, and problem soils. The students need to be acquainted with the classification, behavior and design with such materials for their future professional careers. The course provides additional breadth to the current geotechnical curriculum by including soils, rocks, and transitional materials that are not included in other courses.

2. **Level:** Graduate Level

3. **Prerequisites:** CE 580 or instructor consent

4. **Instructor**: Antonio Bobet

5. **Course Objectives:** Students who complete the course should be able to:

   - Understand the importance of geology in design and to identify geologic features that are critical for the performance of a geotechnical project
   - Understand physico-chemical processes and their relation with engineering properties of geomaterials
   - Recognize geologic features
   - Design and supervise a geotechnical exploration in transitional materials
   - Understand and predict behavior of transitional materials under complex loading
   - Correlate geomorphological features with soil exploration, design and monotoring

6. **Course Outline:**

Lectures	Topic
4	Relation between geology and engineering. Principles of exploration.
2	Geologic and engineering classification of intact rock
9	Overview of structural geology, geologic and engineering description of rock masses (geologic mapping, joint surveys, exploration techniques)
3	Graphical presentation of geological data. Hemispherical projection methods and stability calculations
6	Weathering and Hydrothermal alteration of rock masses mechanisms, and engineering properties.
3	Soluble rock terrain (karst). Characterization, solution processes, drainage. Engineering problems.

Lectures	Topics
3	Soils and rocks as construction materials
3	Permafrost. Foundations on frozen ground
9	Applied geomorphology (description and engineering problems of glacial terrain, shore terrain, alluvial terrain, lakes and swamps, wind deposits)

7. Class notes and other materials distributed in class