Engineering Geology
The University of Toledo
Department of Environmental Sciences
EEES-3250, (43488)

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Term: Fall 2015
Class Location: BO-1006
Class Day/Time: TR 3:45-5:25pm
Credit Hours: 3

COURSE/CATALOG DESCRIPTION
Application of geologic principles to engineering practices (dams, tunnels, drainage, foundations and water supply). Labs stress rock and mineral identification, quality control tests in engineering design and construction using rock.

COURSE OVERVIEW
This class introduces the application of geologic principles to engineering practices through a series of readings, laboratory exercises and practical problems. The first portion of the class covers the fundamentals of geology including: plate tectonics and the resulting distributions of geologic materials and phenomena; mineral, rock and soil characterization; geologic structures; and construction and use of geologic maps. The remainder of the course investigates specific geologic processes and applications to engineering practices.

STUDENT LEARNING OUTCOMES
Upon completing this course, the student will be able to:
1. Assess plate tectonic settings for geologic hazards and rock types expected,
2. Identify common rock-forming minerals as hand specimens and in rock samples,
3. Classify three types of rocks based on texture and composition,
4. Decipher geologic setting of sediment and rock formation,
5. Perform rock mechanic analyses including stress-strain relationships and rock mass classification,
6. Use strike/dip data to analyze and map dipping, folded, and faulted strata,
7. Deciphering geologic maps to determine geometry and orientation of beds, folds and faults.

Engineering Geology students must demonstrate the capacity to apply geological reasoning and scientific inquiry to geological problems (i.e., demonstrate scientific and quantitative reasoning.)

TEACHING STRATEGIES
Engineering Geology is presented face-to-face with time allotted for students to work on problems and ask questions. As an applied science geology is best learned with hands-on exercises. As such, laboratory exercises for the first portion of the class focus on identifying geologic materials and deciphering the processes that formed them. The labs in the last portion of the class focus on rock-mass classification, geologic map reading and hydrogeologic analysis.
PREREQUISITES AND COREQUISITES
Math 1750 or 1850

REQUIRED TEXTS AND ANCILLARY MATERIALS
ISBN 0131457306

GRADING
Two in-class exams are each worth 20% of the final grade and the final exam is worth 30%. Labs/Homeworks will constitute 30% of your final grade.

Exams: The course will be presented in two units: 1) Earth materials and processes; 2) rock mechanics and earth structures and mapping. Each of these units will be followed by and exam. Because application of principles is cumulative, the final exam will be comprehensive.

Homework: Generally readings and laboratory/homeworks are assigned weekly and due the following week.

Midterm Grading: Lab/Homeworks completed by midterm and Exam 1 constitute the midterm grade.

Final Grading: Conventional letter+/- scale, i.e., A >95%, A- 90-94%, B+ 87-89%, B 84-86%, ..., F<60%

COURSE SCHEDULE

<table>
<thead>
<tr>
<th>Week</th>
<th>Unit 1: Earth Materials and Processes, Reading (Kehew), Laboratory Exercise</th>
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<tbody>
<tr>
<td>8/24</td>
<td>1. Introduction to Geology, Ch. 1</td>
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<tr>
<td>8/31</td>
<td>2. Plate Tectonics, Ch. 2, Plate Tectonics</td>
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<td>9/7</td>
<td>3. Minerals, Ch. 3, Mineral ID</td>
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<tr>
<td>9/14</td>
<td>4. Igneous Processes and Rocks, Ch. 4</td>
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<td>9/21</td>
<td>5. Igneous Rocks, Igneous Rock ID</td>
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<td>10/5</td>
<td>7. Fall break (Mon. and Tues.), Sedimentary Rocks</td>
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<td>10/12</td>
<td>8. Exam 1 on Unit 1, Thurs., Oct. 15th,  Earth Materials and Processes</td>
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<tr>
<td>10/19</td>
<td>9. Metamorphic Processes, Ch. 6, Metamorphic Rock ID</td>
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<td>11/2</td>
<td>11. Rock Mechanics, Rock Mass Classification</td>
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<tr>
<td>11/9</td>
<td>12. Rock Mass Classification</td>
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<tr>
<td>11/23</td>
<td>14. Geologic Structures, Ch. 8, Geologic Map Reading</td>
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<tr>
<td>11/30</td>
<td>15. Geologic Maps</td>
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<td>12/7</td>
<td>16. Tie up and review</td>
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<td>12/14</td>
<td>Finals Week, Final Exam: Mon., December 14th, 2:45-4:45pm</td>
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TECHNOLOGY REQUIREMENTS
Engineering Geology requires access to a personal computer to complete assignments. The software used includes Microsoft Excel or any suitable spreadsheet program that allows the analysis and graphing of tabulated data. Access to Blackboard is required to obtain homework assignments, lecture outlines, data set and maps.
UNIVERSITY POLICIES

Policy Statement on Non-Discrimination on the basis of Disability (ADA.) The University is an equal opportunity educational institution. Please read The University’s Policy Statement on Nondiscrimination on the Basis of Disability Americans with Disability Act Compliance.

Academic Accommodations

The University of Toledo is committed to providing equal access to education for all students. If you have a documented disability or you believe you have a disability and would like information regarding academic accommodations/adjustments in this course please contact the Student Disability Services Office.