Department of Civil and Environmental Engineering

Course Description and Tentative Outline

Summer 2017
CE: 342 - Geology
Instructor: **Rafal Wojcik, PE**
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Office Hours: By appointment

Course Texts: 1) Hamblin, W.K. and Christiansen, E.H., Dynamic Earth, 1st Edition, Jones and Bartlett, 2014, ISBN-13: 9781449659844
2) Hamblin and Howard, Exercises in Physical Geology, 12th Edition, Prentice Hall, ISBN: 0-13-144770-X
In addition, hand outs will be distributed.

Course Description: This course introduces the Planet Earth, including its origin, its history, its materials, and its processes. The first part of the course focuses on rocks and minerals with an emphasis on formative environments. The role of various geologic agents in shaping the surface of Earth is examined next. The student will learn how to analyze topographic maps and satellite images to identify classic geomorphic landforms and deposits. The course introduces selected applications of geology to environmental and engineering projects. Each student is required to assemble a personal rock collection as a capstone project.

Course Format: Weekly lectures will be followed by laboratory exercises. The exercises will require analysis both during class time and for homework. Laboratory and homework assignments must be handed in at the beginning of the subsequent laboratory class. Assignments must be typed, however, hand sketches (as necessary) are accepted. **Late assignments are *not* accepted**.

Term Assignment: All students are required to assemble their own collection of 10 rocks and minerals. Necessary background information and knowledge for this assignment will be provided throughout the semester.

Honor Code: Students are advised that the NJIT Honor Code will be upheld in this course, and any violations will be brought to the immediate attention of the Dean of Students.

Additional Policies:

- All work must be submitted in a professional manner.
- Homework/Lab assignments must be typed and, if required, completed on an 8 1/2" x 11" engineering calculation paper, in a manner consistent with professional practice.
- Electronic versions of homework or projects will not be accepted.
- Please keep a copy of all your work until you have a received a final grade (make a copy of your entire assignment, and file accordingly). Please save a copy of your homework BEFORE you submit to the instructor, since it may not be possible for the instructor to return the corrected homework back in time for you to study for quizzes/examinations.

- ABSOLUTELY NO LATE SUBMISSIONS. All late assignments will incur a 50% reduction if handed same day, and 100% deduction thereafter.
- No make-up examination will be administered.
- Switch off laptops/cellphones during quizzes/exams. Please bring a watch to keep time during examinations.
- No recording devices shall be used during class or examinations.

Course Syllabus: *Please see following page.* Students will be consulted on any substantial changes to the course syllabus. Changes will be discussed and announced in advance.

Week	Lecture Topic	Assigned Reading Text #1	Assigned Reading Text #2	Lab Assignment
1	Role of Geology in Engineering; Historical Notes; Environmental Dimension; Earth Structure & Processes, Topographic Map Interpretation	Ch. 1 &2	Pg. 81-100	Lab 1: Topographic Maps
2	Minerals: Buildings Blocks of Soil & Rock; Mineral identification, formation, and engineering properties. Igneous Rocks: Intrusive/Extrusive, Processes & Structure	Ch. 3, Ch. 4	Pg. 6-25	Lab 2: Minerals Lab 3: Igneous Rocks
3	Sedimentary Rocks: Formation, processes, Stokes Law, Rock Coring* Metamorphic Rocks: Formation, processes, Rock Cycle, Veins Rock as Construction Material; Rock Coring	Ch. 5, Ch. 6, Ch.24	Pg. 26-40, 44-57, 61-70	Lab 4: Sedimentary Rocks Lab 5: Metamorphic Rocks
4	**Midterm Exam** Geologic Time Scale; Relative/Absolute Dating; Rock ID Chart	Ch. 8	Pg. 74-80	Lab 6: Stratigraphy and Relative Dating
5	Weathering & Geomorphology; Physiographic Provinces; Geo History of NY Metro Area; Geologic Maps; River Systems & Forms; Flood Zoning & Protection; Rock Engineering	Ch. 10, Ch. 12	Pg. 101-103, Pg. 106-108	Lab 7: Physiographic Provinces Lab 8: Rock Engineering
6	Global Climate Change; Sea Level Rise; Glacial Process; Valley Glaciation Continental Glaciation; Engineering Geomorphology of Glacial Till, Glaciofluvial, and Glaciolacuastrine Deposits	Ch. 14	Pg. 140-143, Pg. 151-153	Lab 9: Alluvial Deposits and Valley Glaciation Lab 10: Engineering Geomorphology Continental Glaciation
7	Groundwater and Wells; Engineering Geomorphology of Carbonate Formations and Karst Areas; Sinkhole Hazards; Plate Tectonics; Seismicity and Earthquakes; Seismic Hazards	Ch. 13, Ch. 17 & 18	129-130, 216-219; 223-224	Lab 11: Engineering Geomorphology of Karst Areas Lab 12: Earthquakes & Seismicity
8	**Final Exam (check schedule) & Rock Collection Due**			

Course Objectives Matrix – CE 342 Geology

Strategies and Actions	Student Learning Objectives	Student Outcomes (a-k)	Prog. Educational Object	Assessment Methods/Metrics
Course Objective 1: Develop an understanding of physical geological processes of the planet earth and the dynamics of how it changes				
Introduce the rock types	**Students can identify various rock types and formations**	**a**	**1**	**Homework, lab identification exams**

Introduce dynamic processes	**Students can explain plate tectonics, seismicity, Hydraulic Systems, Glacier Systems**	**a,g,h,j**	**1**	**Homework, exams, essay**
Introduce resources in the Earth	**Student can explain/identify minerals found in the earth**	**A,g,h,j**	**1**	**Homework, exams, essay**

CEE Mission, Program Objectives and Program Outcomes

The mission of the Department of Civil and Environmental Engineering is:

- to educate a diverse student body to be employed in the engineering profession
- to encourage research and scholarship among our faculty and students

- to promote service to the engineering profession and society

Our program objectives are reflected in the achievements of our recent alumni.

1 – Engineering Practice: Recent alumni will successfully engage in the practice of civil engineering within industry, government, and private practice, working in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.

2 – Professional Growth: Recent alumni will advance their skills through professional growth and development activities such as graduate study in engineering, professional registration, and continuing education; some graduates will transition into other professional fields such as business and law through further education.

3 – Service: Recent alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, civic organizations, and humanitarian endeavors.

Our program outcomes are what students are expected to know and be able to do by the time of their graduation:

(a) ability to apply knowledge of math, science, and engineering

(b) ability to design and conduct experiments, as well as interpret data

(c) ability to design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability

(d) ability to function multi-disciplinary teams

(e) ability to identify, formulate, and solve engineering problems