JOHN A. REIF, JR. DEPARTMENT OF
CIVIL AND ENVIRONMENTAL ENGINEERING

NJIT New Jersey Institute of Technology

CE 342 – Geology - Summer 2018

Texts:
Text A: Eric H. Christiansen and W. Kenneth Hamblin, Dynamic Earth, Jones and Bartlett Learning (2015)
Text B: Hamblin and Howard, Exercises in Physical Geology, 12th Edition, Prentice Hall, ISBN: 0-13-144770-X.

Instructor: Mr. Rafal Wojcik, M.S., P.E.,, Room 262 Colton Hall (by appointment),
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Prerequisite: *Consult the advisor.*

Course Description & Objectives*: 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.

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

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.

CE 342 – Geology in Engineering
[Lecture Topic Schedule]

Date	Topics	Text Book Reading Assign.	Assignment
May 22	Role of Geology in Engineering; Historical Notes; Environmental Dimension; Earth Structure & Processes, Topographic Map Interpretation	**Text A:** Ch. 1 &2 **Text B:** Pg. 81-100	Lab 1: Topographic Maps
May 29	Minerals: Buildings Blocks of Soil & Rock; Mineral properties and identification, formation, and industrial/engineering properties.	**Text A:** Ch. 3 **Text B:** Pg. 6-25	Lab 2: Minerals
June 5	Igneous Rocks: Intrusive/Extrusive, Processes & Structure; Volcanoes and Flows;	**Text A:** Ch. 4 **Text B:** Pg. 26-43	Lab 3: Igneous Rocks
June 12	Sedimentary Rocks: Formation and processes; Clastic vs. Non Clastic	**Text A:** Ch. 5 **Text B:** Pg. 44-60	Lab 4: Sedimentary Rocks

June 19	Metamorphic Rocks: Formation, processes, veins, and the Rock cycle; Ores and Mining; Rock Identification & Rock ID Chart; Rock as a Construction Material; Rock Quarrying;	**Text A:** Ch. 6 **Text B:** Pg. 61-80	Lab 5: Metamorphic Rocks
June 26	**MIDTERM EXAM**		
July 3	Geologic Time Scale; Relative/Absolute Dating; Stratigraphy; Weathering & Geomorphology; Physiographic Provinces; Geologic Maps;	**Text A:** Ch. 8 & 10 **Text B:** Pg. 74-80, 101-105	Lab 6: Stratigraphy & Relative Dating Lab 7: Physiographic Provinces
July 10	River Systems & Formations; Flood Zoning & Protection; Alluvial deposits and fans	**Text A:** Ch. 12 **Text B:** Pg. 107-122	
July 17	Continental & Alpine Glaciation; Glacial Deposits incl. Ground Moraines, Glacial Till, Glaciofluvial, and Glaciolacuastrine Deposits;	**Text A:** Ch. 14 **Text B:** Pg. 140-159	Lab 8: Glaciation
July 24	Groundwater and Wells; Engineering Geomorphology of Carbonate Formations and Karst Areas; Sinkhole Hazards; Depth to Groundwater; Seismicity and Earthquakes; Seismic Hazards; Seismic Building Codes; Slope Stability (if time allows)	**Text A:** Ch. 13 **Text B:** Pg. 129-139	
July 31	**FINAL EXAM**		

Grading:

Midterm Exam :	25%
Homework:	20%
Rock Collection:	20%
Final Exam	25%
Class Participation & Attendance	10%

Exams will be primarily short answer, multiple choice and short essay. No Make up exams will be given. All lab exercises are due the week following the date assigned. Laboratory and homework assignments must be handed in at the beginning of the class. Assignments must be typed, however, hand sketches (as necessary) and calculations on engineering computation paper are required. **Late assignments are not accepted.**

* The NJIT Honor Code will be upheld and any violations will be brought to the immediate attention of the Dean of Students.
* Students will be consulted by the instructor and must agree to any modifications or deviations from the syllabus throughout the course of the semester.

Additional Policies:

- All work must be submitted in a professional manner. This means it should be in a neat, organized and orderly.
- 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.

Outcomes Course Matrix – CE 342 – Geology

Strategies, Actions and Assignments	ABET Student Outcomes (1-7)	Program Educational Objectives	Assessment Measures
Student Learning Outcome 1: Develop an understanding of physical geological processes of the planet earth and the dynamics of how it changes.			
Introduce the rock types and importance in CE	1	1	Homework, lab identification exams
Introduce dynamic processes and geologic hazards	**1, 3**	**1**	Homework, exams, essay
Introduce mineral resources of the Earth	**1, 3**	**1**	Homework, exams, essay

Revised: 5/7/2018

CEE Mission, Program Educational Objectives and Student 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 educational objectives are reflected in the achievements of our recent alumni:

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

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

3 – Service: Alumni will perform service to society and the engineering profession through membership and participation in professional societies, government, educational institutions, civic organizations, charitable giving and other humanitarian endeavors.

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

1. an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety and welfare, as well as global, cultural, social, environmental and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental and societal contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Revised: 2/13/18