Spring 2021

CE 342-006: Geology

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Department of Civil and Environmental Engineering
Course Description and Outline

CE 342 – Geology **Spring 2021**
Section 006 **Alan Slaughter, P.E.**

Course Objective: The 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.

Course Texts:
A: Christiansen, E.H. and Hamblin, W.K., Dynamic Earth, An Introduction to Physical Geology, Jones and Bartlett Learning, Prentice Hall, 2015, ISBN: 978-1-4496-5984-4
B: Hamblin and Howard, Exercises in Physical Geology,12th Edition, Prentice Hall,ISBN:0-13-144770-X.

Course Format: Each week the schedule will be sent out via email not later than Monday 9 am. Students will be required to view the background materials (pdfs and/or videos) posted on Canvas either before or during the "combined" Wednesday class/lab period. Students will then participate in a live Webex session on Wednesday.
It is essential that students preview the Canvas materials prior to their Webex session to enhance understanding of the course material.

Term Assignment: All students are required to assemble an identified collection of rocks and minerals. Information and knowledge for this assignment will be provided throughout the course.

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.

Course Grading Basis: Labs = 35%; Final Exam = 35%; Rock Collection = 20%; Attendance and Class Participation = 10%.

Instructor Contact: Prof. Slaughter: Colton Hall**,** slaughte@njit.edu.

Course Syllabus: *Please see next page.* Students will be consulted on any substantial changes to the course syllabus.

Course Policies:
- Homework and projects shall be submitted as pdf files through the Canvas Assignments portal.
- Homework must be submitted on or before the posted due date and time (typically Tuesday, 11:59 pm). Late assignments will automatically incur a reduction in points and will not be detail graded by the instructor.
- Make-up examinations will not be administered.
- Homework and projects will be subject to the NJIT Honor Code. That is, **they must be the student's own work and written in their own words**. There is no objection to students studying in groups, but when it comes time to do the write-up, the assignment must be unique to the student. Homework that is copied from another student or other sources will be rejected and reported.

Course Outline: CE 342 - Geology **Spring 2021**

Week Beginning	*LECTURE TOPIC*	*Assigned Reading Text (A)*	*Assigned Reading Lab Manual (B)*	*Lab Assignment**
Jan. 19	Role of Geology in Engineering; Historical Notes; Environmental Dimension; Geo Quiz	Ch. 1,2	None	None
Jan. 25	Earth Structure and Processes; Topographic Map Interpretation	Ch. 1,2	Pg. 81-100	Lab 1: Topographic Maps
Feb. 1	Geologic Time Scale; Absolute Dating; Fossils and Mass Extinctions; Geologic History of New York Metro Area	Ch. 8	Pg. 74-80	Lab 2: Geologic Time & Absolute Dating
Feb. 8	Relative Dating; Ground Water and the Water Table; Carbonate Formations and Karst Areas; Sinkhole Hazards	Ch. 8, 13	Pg. 74-80; Pg. 129-137	Lab 3: Groundwater, Karst, & Relative Dating
Feb. 15	Minerals Prelab; Rock and Mineral Specimen Pickup	Ch. 3	Pg. 6-25	Lab 4A: Minerals Prelab and Specimen Pickup
Feb. 22	Minerals: The Building Blocks of Rock and Soil; Mineral Properties and Identification; Minerals with Engineering and Industrial Importance.	Ch. 3	Pg. 6-25	Lab 4B: Mineral Identification
Mar. 1	Igneous Rocks and Processes; Intrusive and Extrusive Structures	Ch. 4	Pg. 26-40	Lab 5: Igneous Rocks
Mar. 8	Sedimentary Rocks and Processes; Stokes Law; Diagenesis; Sedimentary Structures	Ch. 5	Pg. 44-57	Lab 6: Sedimentary Rocks
Mar. 22	Metamorphic Rocks and Processes; Veins; Rock Cycle	Ch. 6	Pg. 61-70	Lab 7: Metamorphic Rocks
Mar. 29	Rock Identification Chart; Rock as Construction Material; Rock Engineering	Handouts	---	Lab 8: Rock Engineering

DATE	*LECTURE TOPIC*	*Assigned Reading Text (A)*	*Assigned Reading Lab Manual (B)*	*Lab Assignment**
Apr. 5	Global Climate Change; Glacial Systems and Deposits: Till, Glaciofluvial, and Glaciolacustrine	Ch. 14	Pg. 140-143; 151-153	
Apr. 12	Plate Tectonics; Seismicity and Earthquakes; Earthquake Engineering; Tsunamis	Ch. 7, 17, 18	Pg. 216-219; 223-225.	Lab 10: Earthquakes and Seismicity
Apr. 19	Weathering; Talus Slopes; Physiographic Provinces; Geologic Maps;	Ch. 10, 11	Pg. 101-105; Pg. 123-128.	Lab 9: Geologic Maps & Physiographic Provinces Discussion of Final Exam Format
Apr. 26	Term Assignment Due. **No Class**			
May 7-13	Final Exam Week (**Check schedule!!**)			

* Laboratory Assignments include problems from Text B, as well as supplemental problems.

Note: Week 1 and week 2 will be webex presentations and not in class. From there we will see how things go.

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

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.