Spring 2020

CE 342-002: Geology

John Schuring

Department of Civil and Environmental Engineering
Course Description and Outline

CE 342 – Geology **Spring 2020**
Sections 002 and 004 **Dr. John Schuring**

Restriction: Sophomore status. Studies science of geology with emphasis on physical geological processes. Stresses the principle of uniformity of process in the context of rock and soil formation, transformation, deformation, and mass movement. Includes aspects of historical geology and geomorphology.

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. Each student is required to assemble a personal rock collection.

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 lecture will be on Wednesday followed by laboratory exercises on the same day. Weekly lecture materials will be posted on Canvas each week on the Saturday preceding Wednesday's lecture. Students should preview the material and either download it to their tablet on print out a paper copy for the purposes of note taking during the lecture. Laboratory Exercises will require analysis both during lab class time and for homework. Laboratory assignments must be handed in at the beginning of the laboratory class when they are due, otherwise they will be considered as late (see Course Policies below). Assignments must be typed, however, hand sketches (as necessary) and calculations on engineering computation paper may also be required. All work must be submitted in a professional manner, meaning it should be neat, organized and orderly.

Term Assignment: All students are required to assemble their own 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.

"Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at: http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf.

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. **Any student found in violation of the code by cheating, plagiarizing or**

using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu"

Course Grading Basis: Midterm Exam = 25%; Final Exam = 30%; Labs = 20%; Term Assignment = 15%; Class Participation and Attendance = 10%.

Instructor Contact:
Prof. Schuring: Colton Hall**,** Room 416; schuring@njit.edu. Office hour: Wed. 2:45-3:45.

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

Course Policies:

- Homework and projects shall be submitted as hard copies. Electronic versions will not be accepted.
- Assignments must be submitted on time at the beginning of class on the due date. Late assignments will automatically incur a 50% reduction in points and will not be detail graded by the instructor.
- You should save a copy of your homework BEFORE you submit to the instructor, since it may not always be possible to return all homework back in time to study for quizzes/examinations.
- Make-up examination will not be administered.
- Switch off laptops/cellphones and stow out of view during quizzes/exams. If you want to keep time during an exam, bring a watch.
- No recording devices shall be used during class or examinations.

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DATE	*LECTURE TOPIC*	*Assigned Reading Text (A)*	*Assigned Reading Lab Manual (B)*	*Lab Assignment**
Jan. 22	Role of Geology in Engineering; Historical Notes; Environmental Dimension; Geo Quiz	Ch. 1,2	None	None
Jan. 29	Earth Structure and Processes; Topographic Map Interpretation	Ch. 1,2	Pg. 81-100	Lab 1: Topographic Maps
Feb. 5	Minerals: The Building Blocks of Rock and Soil; Mineral Properties and Identification; Minerals with Engineering and Industrial Importance.	Ch. 3	Pg. 6-25	Lab 2: Minerals
Feb. 12	Igneous Rocks and Processes; Intrusive and Extrusive Structures	Ch. 4	Pg. 26-40	Lab 3: Igneous Rocks
Feb. 19	Sedimentary Rocks and Processes; Stokes Law; Diagenesis; Sedimentary Structures	Ch. 5	Pg. 44-57	Lab 4: Sedimentary Rocks
Feb. 26	Metamorphic Rocks and Processes; Veins; Rock Cycle	Ch. 6	Pg. 61-70	Lab 5: Metamorphic Rocks
Mar. 4	Rock Identification Chart; Rock as Construction Material	Ch. 8	Pg. 74-80	Rock and Mineral Review
Mar. 11	**Midterm Exam**	--	--	--
Mar. 18	Spring Break (no class)			
Mar. 25	Geologic Time Scale; Relative and Absolute Dating; Fossils and Mass Extinctions; Geologic History of New York Metro Area	Ch. 8	Pg. 74-80	Exam Review Lab 6: Stratigraphy and Relative Dating
Apr. 1	Weathering; Talus Slopes; Physiographic Provinces; Geologic Maps; Rock Engineering; Rock Coring	Ch. 10, 11	Pg. 101-105; Pg. 123-128.	Lab 7: Rock Engineering and Geologic Maps

DATE	*LECTURE TOPIC*	*Assigned Reading Text (A)*	*Assigned Reading Lab Manual (B)*	*Lab Assignment**
Apr. 8	Global Climate Change; Glacial Systems and Deposits: Till, Glaciofluvial, and Glaciolacustrine	Ch. 14	Pg. 140-143; 151-153	Lab 8: Continental Glaciation
Apr. 15	Carbonate Formations and Karst Areas; Sinkhole Hazards; Water Gaps and Wind Gaps	Ch. 13	Pg. 129-130	Lab 9: Karst Geomorphology
Apr. 22	Plate Tectonics, Seismicity and Earthquakes; Seismic Hazards	Ch. 7, 17, 18	Pg. 216-219; 223-224	Lab 10: Seismicity
Apr. 29	**Rock Collection Due** (no class)			
May 8-14	Final Exam (**Check schedule!!**)			

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

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.