Department of Civil and Environmental Engineering
Course Description and Outline

CE 342 – Geology **Spring 2025**
Sections 002 and 004 **Dr. John Schuring**

Course Objective: The course introduces 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: Class Notes and Supplemental Laboratory Materials are posted on Canvas weekly to assist students in completing the laboratory assignments.
C: OPTIONAL REFERENCE: Hamblin and Howard, Exercises in Physical Geology,12th Edition, Prentice Hall, ISBN:0-13-144770-X (currently out of print but preowned copies are readily available).

Course Format:
1) Each week the lecture will be on Wednesday from 10:00-11:20 am followed by laboratory exercises on the same day. Weekly lecture materials will also be posted on Canvas. Students should preview the material and either download it to their tablet or print out a paper copy for the purposes of note taking during the lecture.
2) Laboratory Exercises are assigned weekly that require analysis both during lab class time and for homework. Laboratory assignments are submitted via Canvas portal not later than 11:59 pm on the Tuesday following the lecture. Otherwise, they will be considered as late (see Course Policies below). Assignments must be typed, although CAD drawings, hand sketches 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 the answers presented in sequential order.
3) Each week an email will be sent out on Monday morning confirming the week's activities.

Term Assignment: All students are required to assemble their own 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. The Honor Code can be found at https://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf .

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

Instructor Contact: Prof. Schuring: Colton Hall**,** schuring@njit.edu. Office Hours: Wed. 8:30-9:30 am and 2:45-3:30 pm in Colton 416.

Course Syllabus: *Please see page 3.* 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 50% 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 (including tables, figures, etc.) that is copied from another student or other sources will be rejected and reported.
- **AI Statement**: The use of artificial intelligence (AI) is **not permitted** on this course. Students are expected to complete work without AI assistance to develop their skills in this subject area.

Withdrawals: In order to ensure consistency and fairness in application of the NJIT policy on withdrawals, student requests for withdrawals after the deadline will not be permitted unless extenuating circumstances (e.g., major family emergency or substantial medical difficulty) are documented. The course Professors and the Dean of Students are the principal points of contact for students considering withdrawals.

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Date	*LECTURE TOPIC*	*Assigned Reading Text (A)*	*Assigned Reading For Lab*	*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	Supplemental	Lab 1: Topographic Maps
Feb. 5	Geologic Time Scale; Relative Dating; Fossils and Mass Extinctions; Geologic History of New York Metro Area	Ch. 8	Supplemental	Lab 2: Geologic Time & Absolute Dating
Feb. 12	Minerals: The Building Blocks of Rock and Soil; Mineral Properties and Identification	Ch. 3	Supplemental	Lab 3A: Mineral Properties
Feb. 19	Mineral Properties and Identification (cont.); Minerals with Engineering and Industrial Importance	Ch. 3	Supplemental	Lab 3B: Mineral Identification
Feb. 26	Igneous Rocks and Processes; Intrusive and Extrusive Structures	Ch. 4	Supplemental	Lab 4: Igneous Rocks
March 5	Sedimentary Rocks and Processes; Stokes Law; Diagenesis; Sedimentary Structures	Ch. 5	Supplemental	Lab 5: Sedimentary Rocks
March 12	Metamorphic Rocks and Processes; Veins; Rock Cycle	Ch. 6	Supplemental	Lab 6: Metamorphic Rocks
March 26	Rock Identification Chart; Rock as Construction Material; Rock Engineering; Water Gaps and Wind Gaps.	Handouts	Supplemental	Lab 7: Rock Engineering
April 2	Weathering; Talus Slopes; Physiographic Provinces; Geologic Maps.	Ch. 10, 11	Supplemental	Lab 8: Geologic Maps & Physiographic Provinces

Date	***LECTURE TOPIC***	***Assigned Reading Text (A)***	***Assigned Reading For Lab***	***Lab Assignment***
April 9	Plate Tectonics, Seismicity and Earthquakes; Seismic Hazards	Ch. 7, 17, 18	Supplemental	Lab 9: Earthquakes and Seismicity
April 16	Ground Water and the Water Table; Carbonate Formations and Karst Areas; Sinkhole Hazards	Ch. 8, 13	Supplemental	Lab 10: Groundwater, Karst, & Relative Dating
April 23	Global Climate Change; Glacial Systems and Deposits: Till, Glaciofluvial, and Glaciolacustrine; Discussion of Final Exam Format	Ch. 14	Supplemental	
April 30	**Rock Collection Due** (no formal class)			
May 10-16	**Final Exam** (**Check schedule!!**)			

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

Program Educational Objectives

Our **Program Educational Objectives** are reflected in the achievements of our recent alumni:

- **Engineering Practice:** Alumni will successfully engage in the ethical practice of civil engineering within industry, government, and private practice, working towards safe, practical, resilient and sustainable solutions in a wide array of technical specialties including construction, environmental, geotechnical, structural, transportation, and water resources.
- **Professional Growth:** Alumni will advance their technical and interpersonal 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 academia, business, and law through further education.
- **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.

Student Outcomes

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

- an ability to identify, formulate and solve complex engineering problems by applying principles of engineering, science and mathematics

- 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
- an ability to communicate effectively with a range of audiences
- 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
- 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
- an ability to develop and conduct appropriate experimentation, analyze and interpret data and use engineering judgment to draw conclusion
- an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

Updated 1/6/2025