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Prerequisite: consult the advisor.

Description: 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.

Objective: The course introduces the Planet Earth: its origin, its history, its materials, its processes and the dynamics of how it changes.

Format: Lectures, discussion and exercises will be given, topographic and geologic maps as well as aerial and satellite imageries will be analyzed. Internet resources in geology shareware/software for visualization of topography and structure will be introduced. Related films will be shown throughout the semester.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Text Ref.</th>
<th>Lab Exercises</th>
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<tbody>
<tr>
<td>1</td>
<td>Planet Earth (topo maps, air photos &amp; satellite imageries)</td>
<td>4-51</td>
<td>81-100 (R), 98-99 (A)</td>
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<tr>
<td>2</td>
<td>Minerals</td>
<td>54-82</td>
<td>6-25 (R), 25 (A)</td>
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<td>3</td>
<td>Igneous Rocks</td>
<td>84-117</td>
<td>26-40 (R), 41 (A)</td>
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<td>4</td>
<td>Sedimentary Rocks &amp; Weathering</td>
<td>120-149, 264-290</td>
<td>44-57 (R), 58-60 (A)</td>
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<tr>
<td>5</td>
<td>Metamorphic Rocks &amp; Exam Review</td>
<td>152-173</td>
<td>61-70 (R), 71-73 (A)</td>
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<tr>
<td>6</td>
<td>Exam I &amp; Geologic Time</td>
<td>200-227</td>
<td>Handouts</td>
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<tr>
<td>7</td>
<td>Structural Geology – Deformed Rocks</td>
<td>176-198</td>
<td>186-202 (R), 198 (A)</td>
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<tr>
<td>8</td>
<td>Plate Tectonics</td>
<td>506-530</td>
<td>223-237 (R), 224, 225 (A)</td>
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<tr>
<td>9</td>
<td>Plate Boundaries</td>
<td>564-664</td>
<td>238-275 (R), 246,</td>
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(R) Reading   (A) Assignment

**Grading:**

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<table>
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<tbody>
<tr>
<td>Exam 1:</td>
<td>25%</td>
<td>Exam 2:</td>
</tr>
<tr>
<td>Homework:</td>
<td>20%</td>
<td>Final Exam</td>
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</tbody>
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Exams will be primarily short answer, multiple choice and short essay. A paper can be substituted for either Exam 1 or Exam 2. All papers are due one week before the final exam. Your papers will be retained by the CEE Department. All lab exercises are due the week following the date assigned.

* 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.

*Course Objectives Matrix – CE 342 Geology*

<table>
<thead>
<tr>
<th>Strategies and Actions</th>
<th>Student Learning Outcomes</th>
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<tbody>
<tr>
<td>Introduce the theory of measurements and related errors.</td>
<td>Learn the geometric aspects of surveying and basic statistical tools to understand errors and how to account for them.</td>
</tr>
<tr>
<td>Examine aspects of Geographic Information System (GIS) and Global Positioning System (GPS).</td>
<td>Understand the general theory behind positioning with GPS and mapping with GIS.</td>
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</tbody>
</table>
Discuss surveying theory as applied to engineering projects.

Introduce the theory of mapping and CAD.

Demonstrate surveying equipment and its proper use.

Use Geographic Information System (GIS) as a mapping tool.

Introduce the control network as a basis for mapping.

Practice computations associated with route and construction surveys.

Combine mapping with CAD.

Learn about the applications of surveying in site planning and construction.

Learn the elements of mapping and how to perform them with CAD.

Knowledge of the mechanical and electronic make-up of surveying equipment.

Recognize the difference between CAD and GIS.

Understand the requirements and design of control surveys.

Become familiar with stationing, cross-section, area and volume computations.

Learn how to convert field notes into a CAD map.

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
(f) understanding of ethical and professional responsibility
(g) ability to communicate effectively
(h) broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) recognition of need for, and an ability to engage in life-long learning
(j) knowledge of contemporary issues
(k) ability to use techniques, skills and modern engineering tools necessary for engineering practice