GEO105 Energy Resources for the 21st Century  3 CREDITS

COURSE GOALS:
The primary goals of this course are to provide a vision of the current global energy setting and to develop the skillset that enables critical thinking on issues that interface energy, society, and science.

COURSE CONTEXT:
This is a lower division course that may be taken to meet Category E - Natural Science DEC requirements and is appropriate for all students.

INSTRUCTIONAL COMPONENTS:

A. Concept Presentation
   - Presentation of material by Powerpoint lecture slides
   - Slides made available on Blackboard

B. Concept Reinforcement
   - NYC Case Study report based on an assigned topic from PlaNYC
   - In-class activities and extra credit homework focus on developing tools that enable critical thinking on issues that interface society and science Homework assignments will use the Internet for accessing relevant information and spread sheets, Google Earth, and Python to evaluate this information
   - Three in-class tests and 7 formal quizzes requiring students to convey important information and demonstrate geologic reasoning skills

C. Concept Development
   - What is energy? Thermodynamics. Energy Mechanics
   - Home Energy Conservation and Heat-Transfer Control
   - Solar Energy and the Earth System
   - Energy from Fossil Fuels
   - Fossil Fuels and Climate Change
   - Air Pollution and Energy Use
   - Global Warming and Thermal Pollution
   - Electricity, Circuits, and Electric Generation
   - Smart Grid Technology PlaNYC

D. Scientific Communication
   - Through quizzes and short answer questions

COURSE LOGISTICS:
The course content is distributed weekly through two 80-minute lectures by the professor
EXPECTED COURSE OUTCOMES:
By the end of the course, students will be able to:

• Define and explain the basics of thermodynamics and energy mechanics
• Understand Energy Conservation and Heat-Transfer Control
• Relate Solar Energy, nuclear, geothermal, solar, wind, hydro, tidal, and other energy sources to the Earth System
• Explain the origin of fossil fuels and how their use influences climate change
• Link Air Pollution and Energy Use
• Relate Global Warming and Thermal Pollution
• Explain the basics of Electricity, Circuits, and Electric Generation
• Understand Smart Grid Technology PlaNYC
• Assess the long term sustainability of current energy
• Anticipate energy needs and evaluate future resources for time scales of 10, 20, 50, and 100 years.
• Identify the technical advances that are required to meet the future energy needs.
• Think critically about issues that interface society and science. Use the internet for accessing relevant information and spread sheets (such as Excel) and Google Earth to evaluate this information.

GOALS FOR BROADER SKILLS
A. To develop skills in synthesizing data from a variety of approaches in order to critically evaluate issues that interface science and society
B. Develop scientific literacy

ASSESSMENT OF ATTAINMENT OF COURSE GOALS:
Student attainment of course goals is assessed throughout the semester, using tests, in class assignments, homeworks and term project.
GEO 105 Course details

Mon, Wed 2:30 – 3:50 Javits Lecture Center 102
Instructor: Glenn Richard (glenn.richard@stonybrook.edu)
Office hours: Room ESS 063B Wed., 1:00 - 2:00, or by appointment

REQUIRED MATERIALS:


COURSE EVALUATION

- Scheduled Quizzes: 20 or 30 points each; 150 points total, 7 quizzes in total
- 2 Exams and 1 final 100 points each
- NYC Case Study Report: 100 points
Case study report based on an assigned topic from PlaNYC; must be in a format specified in advance by the course instructor.
- Extra Credit Activities: 1 to 3 points each

Grading Scale:

<table>
<thead>
<tr>
<th>Periodically, extra credit activities will be offered during class time, usually without prior notice. To receive credit for these activities, you must be present in class to hand them in personally, unless they are offered as homework. Therefore, it is in your best interest to attend each class session, even through we will be posting the class lectures on Blackboard, and will not be taking formal attendance. Total Number of Points</th>
<th>Course Grade</th>
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<tr>
<td>450 or greater</td>
<td>A</td>
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<tr>
<td>425 to 449</td>
<td>A-</td>
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<tr>
<td>400 to 424</td>
<td>B+</td>
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<td>375 to 399</td>
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<tr>
<td>350 to 374</td>
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<td>325 to 349</td>
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<td>300 to 324</td>
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<td>275 to 299</td>
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<td>250 to 274</td>
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<td>225 to 249</td>
<td>D</td>
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<td>0 to 224</td>
<td>F</td>
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COURSE SCHEDULE:

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Reading</th>
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</thead>
<tbody>
<tr>
<td>January 27, 29</td>
<td>Course Overview; Energy Overview</td>
<td>Ch 1,2</td>
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<tr>
<td>February 3, 5</td>
<td><strong>SNOw</strong></td>
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<tr>
<td>Feb 10,12</td>
<td>Energy, Thermodynamics, Energy Mechanics</td>
<td>Ch 5.6</td>
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<td>Feb 17,19</td>
<td>Solar Energy and the Earth System, Passive Solar Design</td>
<td>Ch 7</td>
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<td>February 24, 26</td>
<td>Oil, Gas and Coal; Fossil Fuels and Climate Change</td>
<td>Ch 8,9</td>
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<td>March 3, 5</td>
<td>Electricity, Circuits, and Electric Generation; Storage and Distribution of Electricity</td>
<td>Ch 10,11</td>
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<tr>
<td>March 10, 12</td>
<td>PLaNYC; Exam 1</td>
<td>PlaNYC:</td>
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University Policies and Student Expectations

Information about university policies and expectations that you should be aware of, and are responsible for, can be found at:

http://sb.cc.stonybrook.edu/bulletin/current/policiesandregulations/policies_expectations/index.php

TEACH Act Copyright Notice from the Provost’s Office

"The materials in this course available online or via a website link are for the exclusive use of registered students currently enrolled in this course and may not be further distributed. In addition to legal sanctions, violation of these copyright prohibitions may result in University disciplinary action."

Americans with Disabilities Act

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, Room 128,(631)632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential.

Academic Integrity

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person’s work as your own is always wrong. Faculty is required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty please refer to the academic judiciary website at:

http://www.stonybrook.edu/uaa/academicjudiciary/

Critical Incident Management

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of University Community Standards any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.
Course Grade: Based on Total Number of Points
Scheduled Quizzes: 20 or 30 points each; 150 points total
open book, open discussion
7 quizzes in total; see class schedule for dates and point values
Exam 1: 100 points, multiple choice
closed book, no notes, no discussion, see class schedule for date
Exam 2: 100 points, multiple choice
closed book, no notes, no discussion, see class schedule for date
Final Exam: 100 points, multiple choice
closed book, no notes, no discussion, see class schedule for date
NYC Case Study Report: 100 points
Case study report based on an assigned topic from PlaNYC; must be in a format specified in advance by the course instructor.
Extra Credit Activities: 1 to 3 points each