GEO 313 Understanding Water Resources for the 21st Century

CREDITS

Prerequisite: One DEC E course

COURSE GOAL: The primary goal of this course is for students to gain an understanding of the interrelationships between the fundamental processes that govern the distribution and resupply of the world’s water resources and societal water resource supply and demand. In order to gain a comprehensive understanding of the societal needs for water and what affects its availability, students explore topics from climate change and droughts to past and ongoing water-rights conflicts, water resource management, conservation practices, pollution sources, water quality standards, drinking water treatment, water security and government regulation.

COURSE CONTEXT:
This is a DEC H course that allows more in depth exploration of a natural science topic for students in any major who have had a DEC E (natural science course). This course is also an elective course for Earth & Space Science majors.

INSTRUCTIONAL COMPONENTS:

A. Concept Presentation
   1. Presentation of material by Powerpoint lecture slides; lectures are posted on Blackboard

B. Concept Reinforcement
   1. Term paper that requires integration of concepts presented and application to specific regions
   2. Unscheduled quizzes that reinforce understanding of lecture material
   3. Three in-class tests requiring students to integrate geologic understanding and societal implications

C. Concept Development
   1. Water and its Role in Society
   2. Processes as the Basis for the Hydrologic Cycle
      • Global Hydrologic Cycle
      • Distribution of World’s Water
      • Climate and Rainfall Patterns
      • Evaporation, Transpiration, Infiltration, Runoff
      • Watersheds, Streamflow, and Rivers Systems
      • Lakes, Ponds, and Wetlands
      • Groundwater and Subsurface Flow
   3. Water Resource Supply, Demand, and Management
      • Water Usage: Agricultural, Industrial, Municipal, Recreational
      • Water Resource Management; Examples: Los Angeles, New York, Long Island
      • Factors Controlling Supply-Demand: Global, Regional, and Local
      • Impacts of Climate Change and Population Growth
      • Water Law in the US and World
      • Water-based Conflicts and Global Politics
   4. Water Quality
      • Chemistry of Water
      • Drinking Water Standards, Government Agencies
      • Pollutants, Emerging Contaminants
      • Drinking Water Treatment
      • Wastewater Treatment; Desalination
   5. Water and Society
      Water Security for LDC
Energy and Water
River Flooding; Dams and Reservoirs

D. Scientific Communication
1. Faculty-led verbal questions of concepts and course content during lecture classes
2. Written term project

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:
1. Comprehend the fundamental role of water in society
2. Integrate the basics of the Hydrologic Cycle
3. Describe Water Resource Supply, Demand, and Management
4. Explain the factors controlling Supply-Demand at a global, regional, and local level
5. Understand the impacts of climate change and population growth
6. Describe Water Law in the US and World
7. Discuss water-based conflicts and the role of global politics
8. Understand assessment of water quality, and the mechanisms used to enhance it
9. Comprehend other societal needs to use and control water-based natural phenomena

GOALS FOR BROADER SKILLS:
A. To develop skills in synthesizing data from a variety of approaches in order to understand the controls on a natural phenomenon.
B. Development of science literacy and the ability to express this in written format
C. Looking at natural phenomena and developing strategies to maximize its use for the betterment of society, while preserving it for generations to come

ASSESSMENT OF ATTAINMENT OF COURSE GOALS:
Student attainment of course goals is assessed throughout the semester using student in-class participation, quizzes, and exams. Attainment of skills in concept integration, science literacy and written expression is assessed by a written term paper.
GEO 313 Course details  Spring 2014
Tue. & Thu. 10:00-11:20 AM ESS 079
Instructor: Mirza Beg (mirza.beg@stonybrook.edu)
Office hours: ESS 138 Mon. 1:00-2:00 P.M.

REQUIRED MATERIALS:
Textbooks (required):

COURSE EVALUATION:
1. 3 Exams (scheduled) 60% (20% each)
2. Quizzes (unscheduled) 20% (lowest quiz score dropped)
3. Term project (written) 15% (check out the requirements and deadlines under term project description document)
4. Participation (classroom) 5%

Note: A make-up exam is permitted only if the absence is justified and accompanied by written documentation.

COURSE SCHEDULE (Schedule is subject to change. Check for updated syllabi and class announcements.)

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<thead>
<tr>
<th>Date</th>
<th>Lecture/Discussion Topics</th>
<th>Reading Chapter (Cech / Anisfield)</th>
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<tbody>
<tr>
<td>Tue., 1/28</td>
<td>Overview and Introduction</td>
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<td>Thu., 1/30</td>
<td>Water and its Role in Society</td>
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<td><strong>Processes as the Basis for the Hydrologic Cycle</strong></td>
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<td>Tue., 2/4</td>
<td>Global Hydrologic Cycle</td>
<td>2 / 2.1</td>
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<td>Thu., 2/6</td>
<td>Distribution of World’s Water</td>
<td>2 / 3.1</td>
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<td>Tue., 2/11</td>
<td>Climate and Rainfall Patterns</td>
<td>2 / 2.1</td>
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<td>Thu., 2/13</td>
<td>Evaporation, Transpiration, Infiltration, Runoff</td>
<td>2 / 2.1</td>
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<tr>
<td>Tue., 2/18</td>
<td>Watersheds, Streamflow, and Rivers Systems</td>
<td>3 / 2.2</td>
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<td>Thu., 2/20</td>
<td>Watersheds, Streamflow, and Rivers Systems, contd.</td>
<td>3 / 2.2</td>
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<td>Tue., 2/25</td>
<td>Lakes, Ponds, and Wetlands</td>
<td>3 / None</td>
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<td>Thu., 2/27</td>
<td>Groundwater and Subsurface Flow and Review for Exam #1</td>
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<td>Tue., 3/4</td>
<td><strong>Exam #1</strong></td>
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<td><strong>Water Resource Supply, Demand, and Management</strong></td>
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<td>Thu., 3/6</td>
<td>Water Usage: Agricultural, Industrial, Municipal, Recreational</td>
<td>6 / 3.2, 10</td>
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<td>Thu., 3/13</td>
<td>Factors Controlling Supply-Demand: Global, Regional, and Local</td>
<td>None / 5, 3.1</td>
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<td>Tue., 3/18</td>
<td><em>Spring Break – No Class</em></td>
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<td>Thu., 3/20</td>
<td><em>Spring Break – No Class</em></td>
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<td>Tue., 3/25</td>
<td>Impacts of Climate Change and Population Growth</td>
<td>None / 6.1</td>
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<td>Thu., 3/27</td>
<td>Water Law in the US and World</td>
<td>8 / 5.3, 12.2</td>
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<td><strong>Water-based Conflicts and Global Politics</strong></td>
<td>14 / 13</td>
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<td>Tue., 4/1</td>
<td>Film Screening and Review for Exam #2</td>
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<td>Tue., 4/8</td>
<td><strong>Exam #2</strong></td>
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Water Quality
Thu., 4/10 Chemistry of Water 5 / None
Tue., 4/15 Drinking Water Standards, Government Agencies 11, 9 (312-316) / 2.3
Thu., 4/17 Pollutants, Emerging Contaminants 5 / 2.3, 9.5
Thu., 4/22 Pollutants, Emerging Contaminants, contd. 5 / 2.3, 9.5
Tue., 4/24 Drinking Water Treatment 11 / 9
Thu., 4/29 Wastewater Treatment; Desalination 11 / 7.5-6

Water and Society
Tue., 5/1 Water Security for LDC TBA
Thu., 5/6 Energy and Water None / 11.1
Tue., 5/8 River Flooding; Dams and Reservoirs and Review for Exam #3 3 (91-97), 7 / 4, 7.1-2

Fri., 5/16 Exam #3 (11:15-1:45 PM)

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 are required to report any suspected instances of academic dishonesty to the Academic Judiciary. 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 Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn.

Classroom conduct
Class participation, including questions and discussion, is mandatory for positive evaluation. Cell phone use (including texting) during class is prohibited. Cell phones must be turned off or changed to silent mode during class to minimize distractions and interruptions.