Syllabus for
ENV 310 Sustainability and Renewable Energy - Costa Rica
January 9 to 20, 2013

Instructor: Dr. Michael Sperazza
Office: Earth and Space Sciences Building (ESS) Rm340
Phone: 631-632-1687
Email: michael.sperazza@stonybrook.edu
Office Hours: Wednesday 10am to 12 pm, or by appointment
Blackboard: blackboard.stonybrook.edu

Prerequisites: Permission of the Instructor

Category H courses are designed to help students understand the social and global implications of science and technology and to examine examples of the impact of science, culture, and society on one another.

Course Description: Hands on experience in Costa Rica to learn and see the country’s efforts for environmental sustainability and renewable energy. Students will spend 12 days in Costa Rica to participate in site visits to five renewable energy facilities and 4 environmental sustainability efforts. This in-depth experience is supported with topic-specific lectures, online readings and assignments, and work on an interdisciplinary capstone project. Students will also collaborate with local engineers on a community service project to provide the local communities with accessible water or other sustainability initiatives.

Students will examine how renewable energy technology changes cultural and societal behavior while meeting energy needs. Sustainable efforts in Costa Rica provide students with a global perspective of what is achievable to meet growing demands for energy and reducing human impacts on the environment. The program is offered with partner Green LLC.

How it works: Students will enroll in the course for the winter semester they plan to attend the program in Costa Rica. Prior to your trip you will be assigned online readings and assignments to prepare you for your sustainability and renewable energy experiences. While in Costa Rica you will participate in lectures, site visits, a community service project, and a team capstone project. During the trip you will have additional readings, exams, and assignments. Toward the end of your Costa Rican experience you will present your capstone project along with other participating students in an open forum to share your work and experiences.

Required Texts:
Pre-trip online reading and assignment
Additional readings will be assigned partly online in advance of your trip and some during your stay in Costa Rica

Additional Recommended Reading
Energy Transitions: History, Requirements, Prospects, Vaclav Smil, Praeger, 2010

Course Overview
This is a 12-day comprehensive overview of the commercial renewable energy industry using Costa Rica and its infrastructure as our classroom. For many of our students, the course work, site visits, and cultural exposure to the people and practices of the Costa Ricans will spark a lifelong passion for renewable energy and sustainable living practices. The educational approach is a blend of interactive lectures from distinguished faculty, hands-on exclusive energy plant visits, community service initiatives, and a culminating team capstone project. These activities are combined with a traditional focus of individual study on provided materials, corresponding class time, and interactive discussion.

Learning Objectives
● Gain a comprehensive understanding and personal familiarity of the science and technology behind renewable energy systems: hydroelectric, wind, geothermal, solar, biomass, and bio fuels
● Be able to put renewable energy in the global perspective, societal adaptation to changing technology and the resulting impacts on global cultures.
● Analyze financial costs and environmental impact of renewable energy production facilities in a historical, present, and possibly futuristic context
● Develop evaluation skills of energy sources and projects in terms of feasibility within the matrix of technical, economic, environmental, and political perspective approaches
● Gain the necessary vocabulary to allow one to further discuss concepts related to commercial energy production, transmission management, and legislative policies within the industry to allow one to discuss the subject matter more extensively
● Enhance one's leadership, teamwork, and networking skills through exciting adventure excursions and exposure to professional relationships
● Network with industry professionals and like-minded students who aspire to excel in the field of renewable energy
● Expand one's perspective of cultural awareness for Costa Rica and its people
● Advance knowledge on sustainable techniques and how these efforts may be adapted as part of a global environmental effort.

Hands-On Site Visits
Over the course of the program, students visit a renewable energy plant in each of the following categories: Biomass, Hydroelectricity (both High and Low Head), Wind, and Geothermal. In addition, Solar power applications are observed and mastered in a residential setting. Please note that the physical proximity of these commercial plants to one another in Costa Rica, combined with the exclusive touring access with a plant manager, make the educational experience possible here like nowhere else in the world. In addition, our group visits a biogas methane production farm, a series of natural potable water springs collected and gravity fed to its end use, an endemic tree reforestation walking tour, and a sustainable homes development project.

**Capstone Project**
As part of the Educational Program, each student is required to choose and develop an independent project dealing with topics related to Renewable Energy, Public Policy, Business, Ecology, Environmental Science and others. Each student will be partnered with another to collaborate on this Capstone Project.

The project must address a current issue which can be solved or improved through the application of renewable energy policy, technology, business, sustainable ecology, and environmental policy.

The Capstone Project inspires and motivates students to think outside the box and implement the learned materials, while creating the innovations of tomorrow. A number of student projects have been presented as proposals and are currently in their beginning stages of implementation. Historically, on each Capstone Presentation night, there have been several industry professionals present and so the Project should be taken seriously by the students.

**Tentative Meeting Schedule:**
**Pre-Trip**
Online Readings and Assignments

**Day 1:**
Language Immersion Program
Cultural Background of Costa Rica
Energy in Transition Class

**Day 2:**
Wind Power and Industry Overview
Wind Power Site Visit
Climate Talk & Historical Backdrop of the Arenal Guanacaste Region
Environmental hike and discussion
Launch Capstone project
Sustainable Housing Design

**Day 3:**
Geothermal Introduction
Experiential Site Visit
Geothermal Article discussion and in depth plant visit review
Capstone collaborative work session

Day 4:
Rio Celeste: Arenal National Park

Day 5:
Biological Reforestation Visit
Community Service projects
Biomass Energy Overview
Sustainable Farms Tour
B-green homes development
Capstone collaborative work session

Day 6:
Exclusive Site Visit of Ingenio Taboga, Costa Rica’s largest producer of sugar, hydrous and anhydrous alcohol and sustainable energy
Biomass Site Visit Review Session
Capstone collaborative work session

Day 7:
Hydroelectric Power Overview & Industry Article Discussion
High Pressure Hydroelectric Plant Visit
Vigo sustainable property tour
Capstone collaborative work session

Day 8:
Solar Power and Industry Overview
Low Pressure Hydroelectric Plant Visit
Hydroelectric Site Review
Capstone collaborative work session

Day 9:
Capstone Presentations

Day 10:
Current Industry Issues Discussion – Student driven debate
Nuclear Power Debate
Cultural day at Tamarindo Beach

Day 11:
Coastal Environmental Overview
Cultural day at Brasilito Beach
Culmination of GREEN program and commencement ceremony

Day 12:
Travel Home
Grading:
Attendance and participation 20%
Journal/Blog 20%
Assignments 20%
Community Service Project 10%
Capstone Project 20%
Capstone Presentation 10%

Basis for grading: 100-95 (A); 94-91 (A-); 90 – 88 (B+); 87 – 84 (B); 83-81 (B-); 80-78 (C+);
77-74 (C); 73-71(C-); 70-68 (D+); 67-60 (D), <60 (F).

Student’s Responsibility: Ensure you have entered a working email account in your Black Board account. Access your BB account and make sure that you have access to this class, send yourself a test email using the email option within BB. Adhere to deadlines for term paper and other assignments. Adhere to the formatting instructions for the term paper. Seek help from instructor when problems arise. Should you have a disability follow the regulations spelled out below so that it can be evaluated as soon as possible.

Academic Dishonesty Policy: Academic dishonesty is a serious offense and a breach of academic integrity that may result in failure of the course or failure for the individual paper or assignment. The “Code of Student Conduct” states that all forms of academic dishonesty, including the following are prohibited (see student handbook):
- Plagiarism – the intentional use of ideas or words of another as one’s own paper or other academic assignments. If you are unsure of what constitutes Plagiarism visit this document [http://www.wpacouncil.org/positions/WPApagiarism.pdf](http://www.wpacouncil.org/positions/WPApagiarism.pdf) or ask the instructor.
- Cheating during examinations, whether by copying from a fellow student or by using information in the form of unauthorized aids brought to the examination.
- The submission of work for any assignment that has been prepared by another student.

Academic Integrity Statement: 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. Any suspected instance of academic dishonesty will be reported 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://naples.cc.sunysb.edu/CAS/ajc.nsf](http://naples.cc.sunysb.edu/CAS/ajc.nsf).

Classroom Policy: Students are expected to follow the Stony Brook Code of Conduct while in the classroom. If you are not familiar with the Code you can find it at: [http://studentaffairs.stonybrook.edu/sites/handbook/Code_1-22-03.pdf](http://studentaffairs.stonybrook.edu/sites/handbook/Code_1-22-03.pdf)
Behavior that is disruptive to the function of the class, other students, or the instructor will not be tolerated. Poor class behavior or violations to the Code of Conduct will lead to removal from the
class, possible withdrawal, or suspension. Food is not permitted in class. Beverages are OK, but please bring a container the can be closed to reduce spills. If a spill occurs please clean it up immediately.

**Instructional Responsibilities:** The University's statement of *Minimal Instructional Responsibilities* and *Minimal Undergraduate Student Responsibilities* are protocols with which you may already be familiar. They were established by the University Senate in 1996. If you have not already done so, please review them carefully. Both statements may be found beginning on page 81 of the *Academic Policies and Regulations* section of the on-line *Undergraduate Bulletin*: [http://www.stonybrook.edu/ugrbulletin/current/index.shtml](http://www.stonybrook.edu/ugrbulletin/current/index.shtml)

**ADA Statement:** If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact Disability Support Services at (631) 632-6748 or [http://studentaffairs.stonybrook.edu/dss/](http://studentaffairs.stonybrook.edu/dss/). They will determine with you what accommodations are necessary and appropriate. All information and documentation is confidential.

Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website: [http://www.sunysb.edu/ehs/fire/disabilities.shtml](http://www.sunysb.edu/ehs/fire/disabilities.shtml)

**Course Content:**
Course material accessed from Blackboard, SB Connect, SB Capture or a Stony Brook Course website is for the exclusive use of students who are currently enrolled in the course. Content from these systems cannot be reused or distributed without written permission of the instructor and/or the copyright holder.

Duplication of materials protected by copyright, without permission of the copyright holder is a violation of the Federal copyright law, as well as a violation of Stony Brook's Academic Integrity and Student Conduct Codes [http://www.stonybrook.edu/uaa/academicjudiciary/policies.shtml](http://www.stonybrook.edu/uaa/academicjudiciary/policies.shtml)