

## Course Policy, Procedures, and Syllabus

*Building Construction Program, Georgia Institute of Technology*

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| <b>Course Title:</b>                             | Sustainable Energy in AEC  |
| <b>Course No:</b>                                | BC 8813-DC   |
| <b>Prerequisites:</b>                            | None   |
| <b>Semester/Year:</b>                            | Fall 2009  |
| <b>Schedule</b>                                  | 6:05 pm - 8:55 pm, Monday  |
| <b>Room</b>                                      | ES&T L1105   |
| <b>Instructor(s):</b>                            | Dr. Daniel Castro, P.E.  |
| <b>Assistant (if any):</b>                       |  |
| <b>Office:</b>                                   | BC 106 (College of Architecture Annex)   |
| <b>Office Phone:</b>                             | (404) 385-6964   |
| <b>E-mail Address:</b>                           | dcastro@gatech.edu   |
| <b>Office Hours:</b>                             | M 4-6pm, W 4-6 pm  |
| <b>Required Textbooks:</b>                       |  |
| <b>Recommended Readings:</b>                     | <p><u>Energy for Sustainability</u>, Randolph, J., and Masters, G. M., Island Press, 2008, ISBN 1-59726-103-3</p> <p><u>Sustainable Energy: Choosing among Options</u>, Tester, J. W., Drake, E. M., Driscoll, M. J., Golay, M. W., Peters, W. A, MIT Press, 2005, ISBN 978-0-262-20153-7</p> <p><u>Sustainable Energy Systems Engineering</u>, Gevorkian, P., McGraw-Hill, 2007, ISBN 0-07-147359-9</p> <p><u>Alternative Energy Resources</u>, Kruger, P., John Wiley &amp; Sons, 2006, ISBN 0-471-77209-9</p> <p><u>Energy Systems Engineering: Evaluation and Implementation</u>, Vanek, F. M., Albright, L. D., McGraw-Hill, 2008, ISBN 0-07-149593-2</p>   |
| <b>Course Description, Goal, and Objectives:</b> | <p>An introductory course on sustainable energy in architecture, engineering and construction. The Goals &amp; Objectives are as follows:</p> <ol style="list-style-type: none"> <li>1. To introduce students to fundamental concepts of sustainable sources of energy to power buildings. Sources of energy include but are not limited to fuel cells, solar, wind, biomass, geothermal, hydroelectric, and nuclear.</li> <li>2. To discuss technical-economical and environmental aspects of these sources, as well as their sustainability, performance, constructability, combinability, safety, and the requirements to be included in construction documents.</li> <li>3. To address the impact of these sources to applicable green building rating systems.</li> </ol> |

### Assignment and Evaluation:

Final grades will be based on an aggregate point total for exams, homework, papers, quizzes, classroom participation, and/or projects. **Grades may be curved to provide a balance of intellectual challenge and academic reward.** Course grading is as follows:

| A             | B       | C       | D       | F    |
|---------------|---------|---------|---------|------|
| 90% and above | 80%-89% | 70%-79% | 60%-69% | <60% |

**Points:** The following table summarizes the points for this course. Group presentations will be graded for the entire group, and evaluation of individual team members will become part of the final grade. Make-up exams/presentations are not allowed for any reason. All homework, projects, tests and exam grades will become final one week after they are returned in class. Class participation (discussion and quizzes) will contribute to the final grade. The final exam and project presentation/report are comprehensive.

|                                    | Points       | Percent     |
|------------------------------------|--------------|-------------|
| Homework                           | 200          | 20          |
| Class Attendance and Participation | 100          | 10          |
| Quizzes                            | 100          | 10          |
| Midterm Exam                       | 150          | 15          |
| Group Project Presentation/Report  | 250          | 25          |
| Final Exam                         | 200          | 20          |
| <b>TOTAL</b>                       | <b>1,000</b> | <b>100%</b> |

## COURSE POLICIES

In the following policies, 'you' indicates the 'student' and 'instructor' means 'faculty' or 'professor.'

**Policies and Expectations:** This course will be an intense and sometimes frustrating educational experience; it is necessary that we all contribute to its success by following the course policies. You should not only be in class, but also strive to participate in class discussions when appropriate.

**Assignment Deadlines:** All assignments given are due on the date indicated. All students are expected to complete any and all assignments given. The instructor reserves the right to modify assignments as necessary. You will not receive credit for late assignments (homework, projects, readings, and others). However, the instructor will accept and correct these assignments, in order to provide you with feedback that will be beneficial in the learning process. **NO EXCEPTIONS.**

**Class Attendance Policies:** Attendance is mandatory for all class lectures, labs, site visits, and exams, unless you are ill or officially excused by the instructor as the result of participation in a university function. There are no "free cuts" permitted and there will be a penalty (as decided by the instructor) for not attending the class. If you attend fewer than 75% of the scheduled class meetings, you will not receive credit for the course. Any student arriving late for class or leaving early from class will be counted as absent from that class period. This policy is in your best interest, since attendance is essential for understanding some of the complex reasoning processes covered in this course which is critical for doing well in this class. In the case of unavoidable absences, you are responsible for making up the work done in class. It is not the instructor's responsibility to provide the student with that information outside of class. It is your responsibility to obtain any missed information or handouts given in class from a classmate and you should exchange phone numbers or e-mail addresses with other students in the class to better facilitate note sharing, etc. No companions, friends, family, or pets are permitted in class.

**Methods of Communicating:** You can submit all written work to the instructor in class, in hard copy or by e-mail, if allowed by the instructor (the assignment must be received by the deadline given). You can also ask questions and ask for clarification by e-mail, in class, or by visiting the instructor by appointment at his/her office. Students are not permitted to discuss grades with the instructor via e-mail, only in-person.

**Method of Instruction:** The course may consist of a combination of lectures, discussion, guest speakers, site visits, videos, presentations by industry professionals, labs, and teamwork.

**Readings, Preparation and Participation:** The reading assignments, problems cases and discussion forums are an integral element of the course. Students are expected to complete readings and other assigned work prior to each class, in order to fully participate in the discussion. Learning is approached as a participatory process, which benefits from student/teacher and student/student interaction. The lectures may not explicitly follow the assigned book reading, but are designed to bring together diverse information from various sources.

**Field Trips:** Field trips visits are mandatory and are meant as an enrichment experience. Field trip locations will be announced prior to the scheduled visit. It is the student's responsibility to wear hard-toed shoes, hard hats, protective eye cover (on certain sites) and long trousers/slacks during the field trip. Students are required to fill out and sign the Georgia Tech's "Release and Waiver of Liability" form, as well as any other forms required by the company whose site is being visited.

**Laptop/Handheld Computer Use:** Laptop/handheld computers may be used in class to take notes ONLY, but not for other purposes, such as e-mail, Web site searches, chat, or other personal uses. Students using computers during class for work not related to that class must leave the classroom for the remainder of the class period. Abuse of this policy will result in the prohibition of laptop use by this student.

**Cell Phones:** All communication devices must be turned off in the classroom. The use of cell phones, beepers, or other communication devices is disruptive, and is therefore prohibited during class. No personal listening devices or personal transportation devices are permitted.

**Make-up Exams:** There will be no make-up exams under any circumstances, except medical reasons. Provide your instructor with a letter from your medical doctor to schedule a make-up exam.

**Food and Drink in the Classroom:** Students are not allowed to bring food or drinks into classroom unless approved by the instructor.

**Class Discussions:** Your active and productive participation in class discussions is encouraged. Various viewpoints and opinions are encouraged and welcome. Questioning the ideas of others, including the instructor, is similarly welcome. However, the instructor will exercise his/her responsibility to manage the discussions so that ideas and argument can proceed in an orderly fashion. If your conduct during class discussions seriously disrupts the atmosphere of mutual respect, you will not be permitted to participate further.

**Instructor's Absence or Tardiness:** If the instructor is late in arriving to class, you must wait a full 20 minutes after the start of class before you may leave without being counted absent, or you must follow any written instructions the instructor may give you about an anticipated absence or tardiness.

**Plagiarism:** Students are expected to do their own work in this course. To use another writer's or speaker's ideas without giving proper credit by means of standard documentation is plagiarism. All course papers, notes, homework, and projects submitted to the instructor are subject to textual similarity review for the detection of plagiarism. All submitted papers will be included as source documents in the reference database for the purpose of detecting plagiarism of such papers. The instructor will follow the Institute's policy for plagiarism.

**Academic Misconduct/Honor Code:** Students in this course are responsible for behaving in accordance with the Georgia Tech Academic Honor Code. The Institute Student Honor Code is printed in the Georgia Tech General Catalog, as well as available on the Web at: [www.honor.gatech.edu](http://www.honor.gatech.edu).

**Disabilities:** Any student that may need an accommodation for any sort of disability should contact the ADAPTS Office: Assistant Dean/Coordinator for Students with Disabilities, Smithgall Students Services Building, Suite 221. The phone number is (404) 894-2564.

**Computer Specifications:** For information on computer specifications to meet Georgia Tech standards, visit [www.coa.gatech.edu/computing/comp\\_specs.htm](http://www.coa.gatech.edu/computing/comp_specs.htm). Internet access is required for this course, as is an e-mail account for communication with the instructor.

**Policy Changes:** Information contained in the course syllabus, other than the grade and absence policies, may be subject to change with reasonable advance notice, as deemed appropriate by the instructor.

### **Supplemental Policies:**

The following supplemental policies will supersede the previous policies listed above, at the discretion of the instructor.

**Class Attendance:** 10% of the final grade will be impacted by attendance and participation.

**Regrading:** All grade disputes for homework, lab assignments, and exams are to be made on paper. The instructor does not discuss or argue regrades in person. A student has until one week after receiving his/her grade on a homework, lab assignment or exam to dispute the grade. Handling regrades in this manner eliminates the "end of semester" digging for points. When

disputing a grade, you should state the question, the dispute, and the number of points you feel you should have received for the question. Note that when you ask for a question to be regraded, the entire assignment may be regraded, and there is a possibility of losing points. The above policy applies to the final exam as well.

**Assignment Standards:** All work is due on the date assigned and to be completed on engineering paper or computer-printed. All sketches will be made using a straight edge or computer-printed. Specific criteria for grading each assignment will be discussed in class, but the following general criteria will be used for grading:

- How effectively does the document accomplish its intended task? (This may include meeting reader's needs, meeting its organizational goals, providing a sound rationale and thorough treatment of the topic, and providing useful and accurate information.)
- How well constructed is the document? (This refers to orderly and coherent presentation of material, effective design and formatting, appropriate use of visuals, and professional style and tone.)
- How effectively was the document produced? (This relates to the quality of planning, collaboration, research, drafting, editing, and proofreading.)

The A paper contains excellent technical writing, producing a highly efficient document. The content and organization are appropriate for the intended purpose and audience. The design makes the writing attractive and easily accessible. The writing is clear and concise, using appropriate diction and standard American English. If the writing contains minor errors (an occasional spelling error or an error in grammar), the errors do not detract from the purpose of the assignment.

The B paper contains better than average technical writing, producing a usually efficient document. The content and organization are usually appropriate for the intended purpose and audience. The design is good, creating a readable document. The writing is clear and uses standard American English. The paper may contain some errors in grammar and usage, but the errors do not interfere with the purpose of the assignment.

The C paper contains average technical writing, producing a document that somewhat achieves its purpose. The content and organization are somewhat appropriate for the audience and purpose.

The design does not greatly interfere with reading, but the document could be made more attractive and readable. The writing is fairly clear, but it contains problems with word choice and errors in the use of grammar that may require re-reading to get meaning.

The D paper contains unsatisfactory technical writing, producing a document that frequently fails to achieve its purpose. The content and organization are not appropriate to the purpose and audience. Poor design makes the document confusing and difficult to read. The writing is vague, and errors in word choice and grammatical usage prevent. The reader from understanding and using the document.

The F paper completely fails to achieve its purpose. The content and organization are not suitable for purpose and audience. The design produces an inaccessible document. The writing is incoherent and contains many serious errors in word choice and grammatical usage.

The NC (No Credit) paper does not address the basic criteria of the assignment.

## Course Syllabus BC8813-DC

| Class | Date   | Topic or Subject  | Text/Topic/Reading Assignments | Professor/<br>Guest Speaker | Homework/Project Due Date  | Other                        |
|-------|--------|---|--------------------------------|-----------------------------|----------------------------|------------------------------|
| 1     | Aug 17 | ➤ Class Overview<br>➤ Introduction                              |                                | Castro                      |                            |                              |
| 2     | Aug 24 | ➤ Patterns of Energy Use<br>➤ Energy Sources and Sustainability | ➤ Chapter 1<br>➤ Chapter 2     | Castro                      | ➤ Chapter Review Questions | Term Project Discussion      |
| 3     | Aug 31 | ➤ Virtual Design and Construction<br>➤ Energy Fundamentals      | ➤ Chapter 4                    | Dr. Fischer<br>Castro       | ➤ Chapter Review Questions | Reinsch Auditorium<br>Pierce |
| 4     | Sep 7  | Holiday   |                                |                             |                            |                              |
| 5     | Sep 14 | ➤ Energy Analysis and LCA<br>➤ Tax Benefits                     | ➤ Chapter 5                    | Castro / Mr. Alan Smith     | ➤ Chapter Review Questions | Term Project Deliverable 1   |
| 6     | Sep 21 | ➤ Energy Efficiency for Buildings<br>➤ Midterm Exam Review      | ➤ Chapter 6                    | Castro / Mr. Carl Seville   | ➤ Chapter Review Questions |                              |
| 7     | Sep 28 | ➤ Midterm Exam  |                                | Castro                      |                            |                              |
| 8     | Oct 5  | Fall Recess   |                                |                             |                            |                              |
| 9     | Oct 12 | ➤ Solar Energy for Buildings<br>➤ Term Project Briefing         | ➤ Chapter 7                    | Castro                      |                            | Term Project Deliverable 2   |
| 10    | Oct 19 | ➤ Centralized Electric Power Systems                            | ➤ Chapter 9                    | Castro                      | ➤ Chapter Review Questions |                              |
| 11    | Oct 26 | ➤ Distributed Energy Systems                                    | ➤ Chapter 10                   |                             | Chapter Review Questions   |                              |
| 12    | Nov 2  | ➤ Photovoltaic Systems  | ➤ Chapter 11                   | Castro / Dr. Jay Sampat     | ➤ Chapter Review Questions |                              |
| 13    | Nov 9  | ➤ Wind Turbines   | ➤ Chapter 12                   | Castro                      | ➤ Chapter Review Questions |                              |
| 14    | Nov 16 | ➤ Biomass and Geothermal  | ➤ Chapter 14                   | Castro                      | ➤ Chapter Review Questions |                              |
| 15    | Nov 23 | ➤ Sustainability Index  |                                | Ms. Ospina                  |                            |                              |
| 16    | Nov 30 | ➤ Group Project Presentations                                   |                                | Castro                      |                            |                              |
| 17    | Dec 10 | ➤ Final Exam  |                                | Castro                      |                            |                              |