

## SYLLABUS

### BCN 6558– Building Integrated Renewable Energy Systems



**Prerequisites:** Graduate standing or instructor approval

**Description:** A hands-on solar photovoltaic (PV) systems, suitable for grad students in architecture, building construction, and engineering.

**Key Words:** renewable energy, photovoltaic

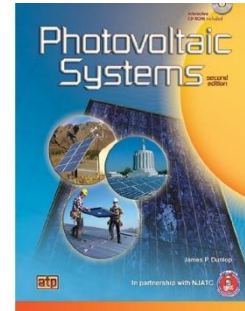
**Method:** Lectures; research papers; oral presentations; solar PV projects; field trips; guest lectures; exams; homework

#### **Objectives:**

1. Learn about the latest PV system technologies, tools, economics, and installation systems.
2. Learn how to design and lay out a photovoltaic system using online simulation tools
3. Learn how to perform a site survey for locating solar PV systems on buildings and building sites.
4. Be able to test PV panels and build a PV array including wiring and electronics.
5. Learn about the state of the art of net zero energy building design and practice.
6. Learn how to perform Life Cycle and economic analyses of PV installations.
7. Become aware of state, national, and international policies that affect the future of renewable energy uptake.

**Course Outline:** This course is organized on a 15 week schedule with assigned readings and projects.

**Required Text:** Dunlop, James, "Photovoltaic Systems," 3<sup>rd</sup> Edition, American Technical Publishers Inc., 2012



**References:** *Environmental Building News*, monthly green building newsletter published by BuildingGreen, Inc., available online through Gatorlink accounts at <http://www.buildinggreen.com>

*Eco-Structure*, AIA, <http://www.ecco-structure.com>

*GreenBuilder*, <http://www.greenbuildermag.com>

*Green Source*, McGraw Hill Construction and BuildingGreen, <http://greensource.construction.com>

*High Performance Buildings*, ASHRAE publication, <http://www.HPBmagazine.com>

Kibert, C.J. "Sustainable Construction: Green Building Design and Delivery," 3<sup>rd</sup> Edition, New York: John Wiley & Sons, 2012.

**Instructor:** Charles J. Kibert

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## **ME Rinker Sr. School of Building Construction University of Florida**

**Class Attendance.** Attendance at all class meetings is mandatory. Unexcused absences will result in a half letter grade reduction.

**Late Assignments.** Assignments are due to the instructor by the start of class on the due date. A 40% deduction will be imposed for assignments up to 24 hours late. Assignments more than 24 hours late will receive no credit.

**Disruptive Behavior Policy.** Students engaging in disruptive behavior will be asked to leave the classroom. Use of cell phones and computers without permission of the instructor is considered disruptive behavior.

**Honor Policy.** It is Rinker School policy that any incidence of cheating, copying, signing rosters for others, or other attempts to deceive will be penalized by course failure.

**Grading.** The final student grade will be a letter grade based on the percentage of the Total Points Achievable. The grades based on the percentage are as follows: The grades based on the percentage are as follows:

A: 93 and up, A-: 90-92.9  
B+: 87-89.9, B: 83-86.9, B-: 80-82.9,  
C+: 77-79.9, C: 73-76.9, C-: 70-72.9,  
D+: 67-69.9, D: 63-66.9, D-: 60-62.9,  
E: 59 or below.

**Course Requirements:** The required papers and projects for this course are described below.

**A. Renewable Energy Laboratories (3) : 100 points each**

**B. Renewable Energy Project: 100 points (Team Project)**

**C. Course Paper: 100 points**

**D. Project Oral Presentation: 50 points**

**E. Paper Oral Presentation: 50 points**

**F. Quizzes 10 points each**

**G. Homework 10 points each: as assigned**

**H. Attendance:** One-half letter grade reduction for each class period missed

**Total Points = 600 points + Quizzes + Homework + Bonus**

**Bonus:** Up to 20 points for an outstanding project or paper.

**Paper:** 1500 words in length on a topic assigned by the instructor. Paper will be in APA format

**Renewable Energy Laboratories:** There will be three assigned labs regarding site surveys, PV performance, and PV simulations.

### **Renewable Energy Project**

Students will be divided into teams and each group, in consultation with the instructor, will be assigned or select a building project for application of high-performance green building approaches. The project and its requirements will be announced in class.

**Quizzes:** A quiz may be given at the start of each class on the assigned tasks for that class. Students are required to complete all assignments prior to class and be prepared for in-depth discussion in class. Each quiz has a value of 10 points.

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**WEEKLY SCHEDULE AND ASSIGNMENTS**

Each week consists of 2.5 hours of lecture and in-class activities for which you are expected to be prepared prior to attending class. You are required to complete all assignments prior to class and you may be quizzed on your knowledge of the assigned readings and tasks. In addition to the readings listed below, the instructor may assign additional readings.

**Outline of Semester Schedule**

<b>Week</b>	<b>Description</b>	<b>Reading</b>
1	Module 1 Introduction Energy and Power	-----
2	Module 2 Solar Radiation	Chapters 1 & 2
3	Module 3 Site Survey and Planning; Class Paper Due	Chapter 3
4	Laboratory 1 Site Surveys	Lab 1 Handout
5	Module 4 System Components and Configurations	Chapter 4
6	Module 5 Cells, Modules and Arrays	Chapter 5
7	Module 6 Batteries, Charge Controllers, and Inverters	Chapters 6, 7, 8
8	Laboratory 2 PV System Assembly and Module Testing	Lab 2 Handout
9	Module 7 System Sizing	Chapter 9
10	Module 8 Permitting and Inspection	Chapter 13
11	Module 9 PV simulation tools	-----
12	Laboratory 3 PV Laboratory 3	Lab 3 Handout
13	Module 10 Life Cycle Costing/Economics of PV Systems	Chapter 15
14	Module 11 Net zero energy buildings	-----
15	Project Presentations	-----