Southern Illinois University Carbondale

ECE 481-3 Syllabus
Fall 2014

Instructor: Prof. C.J. Hatziadoniu  
Email: hatz@siu.edu

Office: ENGR E-0221  
Office Phone: 453-7036

Office Hours: MWF – 01:00 to 03:00 or by appointment
Lecture: MWF, 04:00 –4:50 p.m., ENGR A-207
Lab: N/A

Grading/Evaluation:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Two Projects</td>
<td>40%</td>
</tr>
<tr>
<td>Mid-term exam</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>20%</td>
</tr>
</tbody>
</table>

A: 100-90; B: 89-80; C: 79-70; D: 69-60; F: 60+.

Classroom Policies:

A. **Attendance Policy:** Attendance is required. Attendance will be taken at random times (at least 7). A penalty of 5 grade point deduction for many absences.

B. **D2L:** Class material, announcements and assignments are posted on D2L. Students are responsible for all announcements made in class and/or posted to D2L.

C. **Late Homework/Missed Exams:** Late homework is not accepted without an excuse. If an exam is missed for a legitimate reason, a grade will be assigned based on the remaining homework/exams.

D. **Academic Honesty:** Plagiarized work will be punishable up-to a failing grade in the course and referral to the university. Copying on homework, projects or exams or cheating will also be punishable with a failing grade in the course and referral to the university.

E. **Academic Standards:** Project reports and homework submissions are official university documents that must be prepared with care so that they are legible, well organized and include adequate information so they can be evaluated. Projects must be typed including the equations and most of the figures. Substandard work will receive a failing grade up to zero.

---

1 Pages 2 and 3 are for ABET
1. **Course number and name**: ECE 481 Wind and solar energy power systems
2. **Credits and contact hours**: 3 credits, three 50-minute sessions per week; two projects.
3. **Course Committee**: C.J. Hatziadoniu, R. Ahmedi
4. **Text book(s), title, author, and year**:

**References or other supplemental materials:**

5. **Specific course information**
   a. **(catalog description)**: This course introduces graduate students to Wind and solar energy power systems. Planning of wind generation; design and operation of wind generators, mechanical and electrical design, power conditioning, control and protection. Planning, operation and design of electric solar plants; power conditioning, control and protection.
   b. **prerequisites or co-requisites**: ECE385
   c. **Is this Course Required by other courses**: No
   d. **Professional Component {Credit Hours}**
      - Mathematics 0
      - Sciences 0
      - General Ed. 0
      - Eng. Science 1
      - Eng. Design 2

6. **Instructional Objectives (with SO’s).**
   After taking the course:
   1. The student should be able to understand the main components of a wind, solar and energy storage system, their function and size requirements. (c)
   2. The student should be able to understand the overall functioning of a wind, solar, or storage system. (c, h)
   3. The student should be able to understand the operating requirements and constraints of the above systems. (c, e)
   4. The student should be able to plan and select the types and size of components of a wind or solar plant at a given site and predict the expected energy outcome. (c, h)
   5. The student should be able to perform a basic cost benefit analysis of the above systems and predict the cost of the unit of energy. (e)
   6. The student should be able to understand issues related to the control and protection of renewable energy systems. (c)
   7. The student should be able to use advanced software tools like SIMULINK and MATLAB to represent and analyze the dynamic behavior of the above systems. (k)

7. **Brief list of topics (class, lab and project) to be covered (with hours)**
   a. **Classroom Topic (Hours)**
      1. Power from wind, wind turbines, designing and planning of wind farms: 12 hours;
      2. Design elements of the mechanical and the electrical system, network interface, control and protection: 5 hours;

---

2 subject to change at the instructor’s discretion. Students are responsible for announcements made in class and on D2L.
ECE 481 Syllabus Fall 2014

3. Solar array technology, solar power plant design, network interface, control and protection: 10 hours;
4. Energy storage, fuel cells, combining storage elements with wind and solar power: 10 hours;
   General control and protection issues: 6 hours.
b. Laboratory Topics None
c. Projects (Hours)
   1. Planning and design of wind turbine  3
   2. Planning and design of a solar facility with storage  6

8. CAD and Computer Tools Used: MATLAB
9. Assessment of the Contribution to Student Outcomes

<table>
<thead>
<tr>
<th>Outcome</th>
<th>a</th>
<th>b</th>
<th>c</th>
<th>d</th>
<th>e</th>
<th>f</th>
<th>g</th>
<th>h</th>
<th>i</th>
<th>j</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessed</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Student Outcomes (ABET criteria a-k) are quoted here:

(a) an ability to apply knowledge of mathematics, science, and engineering
(b) an ability to design and conduct experiments, as well as to analyze and interpret data
(c) an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
(d) an ability to function on multidisciplinary teams
(e) an ability to identify, formulate, and solve engineering problems
(f) an understanding of professional and ethical responsibility
(g) an ability to communicate effectively
(h) the broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
(i) a recognition of the need for, and an ability to engage in life-long learning
(j) a knowledge of contemporary issues
(k) an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

University Policies

A. Incomplete Grades: An INC is assigned when, for reasons beyond their control, students engaged in passing work are unable to complete all class assignments. An INC must be changed to a completed grade within a time period designated by the instructor but not to exceed one year from the close of the term in which the course was taken, or graduation, whichever occurs first. Should the student fail to complete the course within the time period designated, not to exceed one year, or graduation, whichever comes first, the incomplete will be converted to a grade of F and the grade will be computed in the student’s grade point average. Students should not reregister for courses in which an INC has been assigned with the intent of changing the INC grade. Re-registration will not prevent the INC from being changed to an F.
B. **Academic Integrity:** You are expected to submit your original work and adhere to the academic policies as stated in the SIU Student Conduct Code: [http://srr.siu.edu](http://srr.siu.edu) (listed under Additional Links). Any act of academic dishonesty, cheating, or plagiarism in any form, including anonymous internet sources used in student papers, will be reported. These acts are taken seriously and the consequences may range from failing as assignment to expulsion from the university.

C. **SIU Email:** Your SIU email account is an official form of University communication. Your instructor will use SIU email as a primary means of electronic communication with students. Please make sure that you maintain a valid password and acquire the habit of regularly checking your SIU email account for important instructor and University announcements. You may view the official SIU Student Email Policy at: [http://policies.siu.edu/policies/email.html](http://policies.siu.edu/policies/email.html).

D. **Emergency Procedures:** SIU is committed to providing a safe and healthy environment for study and work. Because some health and safety circumstances are beyond our control, we ask that you become familiar with SIU Emergency response Plan and building Emergency Response Team (BERT) program. Emergency response information is available on posters in buildings on campus, available on BERT’s website at [http://www.bert.siu.edu/](http://www.bert.siu.edu/), the SIU Department of Public Safety’s website [www.dps.siu.edu](http://www.dps.siu.edu) (disaster dropdown and video, “Shots Fired”), and in the Emergency Response Guideline pamphlet. Know how to respond to each type of emergency. Instructors will provide guidance and direction to students in the classroom in the event of an emergency affecting your location. **It is important that you follow these instructions and stay with your instructor during an evacuation or sheltering emergency.** The Building Emergency Response Team will provide assistance to your instructor in evacuating the building or sheltering within the facility.

E. **Supplementary Assistance:** SIU is committed to assisting students with disabilities. With the cooperation of SIU’s Disability Support Services (DSS), each student who qualifies for reasonable supplementary assistance has the right to receive it. Students requesting supplementary assistance must first register with DSS in Woody Hall, B-150, 618-453-5738 or 618-453-2293 (TTY), by email DSS@siu.edu, or [http://disabilityservices.siu.edu/](http://disabilityservices.siu.edu/). Notice: If you have any type of special need(s) or disability for which you require accommodations to promote your learning in class, please contact me as soon as possible. The Office of Disability Support Services (DSS) offers various support services and can help you with special accommodations. You may wish to contact DSS to verify your eligibility and options for accommodations related to your special need(s) or disability.
Student Services

A. Learning Support Services: The Center for Learning Support Services (CLSS) assists students of all cultures, abilities, backgrounds and identities with enhancing their self-management and interdependent learning skills. Programs offered by CLSS include: group study sessions; math tutoring; academic coaching; early intervention program; and study skills seminars. For additional information please contact CLSS in Woody Hall, Room A-313, 618-453-2925, or www.tutoring.siu.edu.

B. Writing Center: The Writing Center offers free tutoring services and assistance with improving writing skills to all SIU undergraduate students and faculty. For center locations and hours, to schedule an appointment online, and to view information regarding the Online Writing Lab (OWL) contact the Writing Center at 618-453-1231 (Morris Library location); 618-453-2927 (Trueblood location), or www.write.siu.edu.

C. Saluki Cares: The purpose of Saluki Cares is to develop, facilitate and coordinate a university-wide program of care and support for students in any type of distress-physical, emotional, financial or personal. By working closely with faculty, staff, students and their families, SIU will continue to display a culture of care and demonstrate to our students and their families that they are an important part of the community. To make a referral to Saluki Cares click, call or send: http://salukicares.siu.edu/index.html; 618-453-5714, or siucares@siu.edu.