ECE 487-4 Syllabus\(^1\)
Fall 2014

Instructor/Coordinator: C.J. Hatziadoniu
Email: hatz@siu.edu

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

Office Hours: MWF – 1:00 to 3:00 or by appointment
Lecture: TR, 3:35 – 04:50 p.m., ENGR A-310
Reserved for tutorials, Labs demos: R 9:00-10:50, ENGR A420

TA: Maziar Isapour, m.issapour@gmail.com, ENGR E0201, 453-7051

Grading/Evaluation:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>20%</td>
</tr>
<tr>
<td>Project</td>
<td>25%</td>
</tr>
<tr>
<td>Mid-Term Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam (comprehensive)</td>
<td>30%</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 will be applied.

B. **D2L:** Class material, announcements, assignments as well as grades 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. Make-up exams for legitimate reasons must be arranged ahead of time.

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.

F. **Portfolio:** Students are required to keep a portfolio on D2L to include certain parts of the course work. A penalty of 10 grade points will be applied for not conforming to this requirement.

---

\(^1\) Pages 2 and 3 are for ABET
1. Course number and name: ECE 487 Power Systems Analysis
2. Credits and contact hours: 4 credits, equivalent of three 50 minute meetings per week, use of software (Power World)
4. Text book(s), title, author, and year:
5. Specific course information
   b. prerequisites or co-requisites: ECE 315, ECE 385
   c. indicate whether a required, elective, or selected elective (as per Table 5-1) course in the program: None
   d. Professional Component {Credit Hours}
      Mathematics 0 Sciences 0 General Ed. 0
      Eng. Science  2 Eng. Design  2

6. Instructional Objectives (with SO’s), (a,c,e,i,k).
   The student is expected to:
   1. Produce a single line model of a three phase electrical generation, transmission, and distribution system with per unit values. (e)
   2. Determine the positive sequence impedance diagram of a three-phase system. (e,k)
   3. Find the series impedance and shunt capacitance of all types of transmission line systems given the physical parameters. (e,k)
   4. Design an optimal transmission line system to get a specified amount of power from one location to another. (a,c,k)
   5. Model transmission line systems using the short, medium, and long transmission line models. (a,e)
   6. Use a load-flow program for a simple three phase power. (i,k)
   7. Understand and explain the information that can be obtained from a load-flow study. (i,k)
   8. Use Power World Simulator to model of a given three phase transmission line system. (k)
   9. Use Power World Simulator to model of a given balanced three phase power generation, transmission, and distribution system. (e,k)

7. Brief list of topics (class, lab and project) to be covered (with hours)²
   o Review of three-phase networks, complex power and the per-unit system {10 classes}
   o Modeling of transformers and synchronous machines. System modeling. One-line diagrams. Positive sequence impedance diagrams {9 classes}

² subject to change at the instructor’s discretion
ECE 487 Syllabus, Fall 2014

- Transmission lines. Series impedance. Inductance calculations for all types of transmission lines. Capacitance calculations. Effects of earth, spacing and bundled conductors. Tabular values of line reactance. Design transmission line to specifications {9 classes}

- Transmission lines. Current-voltage relation. Representation of short, medium, and long transmission lines. Reactive power compensation {7 classes}

- Network calculations. Nodal analysis. Bus-admittance matrix. Introduction to load-flow solution using the Newton-Raphson method {8 classes}

- Projects
  1) Design and analysis of a part of power system transmission 12

8. CAD and Computer Tools Used: Power World

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>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</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/. 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.