San José State University
Electrical Engineering Department
EE134-01, Power Systems, Fall, 2021

Course and Contact Information

Instructor(s): Fei Gu
Office Location: Engineering Building Room 341
Telephone: (949) 478-2562
Email: fei.gu@sjsu.edu
Office Hours: Friday 18:45 -19:45
Class Days/Time: Friday 16:00 - 18:45
Classroom: Engineering Building Room 341
Prerequisites: EE 110 and EE 112 (with grade of "C-" or better).
GE/SJSU Studies Category: Undergraduate

Course Description

Introduction to power systems including: complex power, power factor correction, power quality, power flow analysis, grid steady state and transient stability, fault analysis, integration of renewable energy, theory and modeling of transformers, transmission lines, and synchronous generators.

Course Format

Course is offered as an in-person lecture series.

Course Learning Outcomes (CLO)

This course introduces the theory of operation of power systems. Upon successful completion of this GE course, students will be able to:

1. Determine voltage, current, power, reactive power of a three-phase circuit
2. Use per-unit system to model a power system.
3. Calculate transmission line parameter based on simplified model.
4. Determine necessary condition for maintaining voltage level.
5. Formulate power flow problem for solution by numerical methods.
Required Texts/Readings

Textbook


Other Readings


Course Requirements and Assignments

Homework is crucial for understanding the course material. Homework will be assigned regularly and will be collected and graded. Students are encouraged to discuss homework problems with other students in the class but you have to submit your own independent solutions. Copied homework earns zero grade for all parties involved and could have more serious consequences.

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally three hours per unit per week) for instruction, preparation/studying, or course related activities, including but not limited to internships, labs, and clinical practica. Other course structures will have equivalent workload expectations as described in the syllabus.

Final Examination or Evaluation

There will be one midterm and one final exam. The midterm dates will be announced at least 1 week before the exam. The final exam will be given at the official university final exam time for this course. The exam format will be announced at least 1 week prior to each exam.

Grading Information

Homework 25%
Midterm Exam: 35%
Final Exam 40%

A from 100 to 94 A- from 93 to 90
B+ from 89 to 87 B from 86 to 84 B- from 83 to 80
C+ from 79 to 77 C from 76 to 74 C- from 73 to 70
D+ from 69 to 67 D from 66 to 64 D- from 63 to 60 F below 60

This course must be passed with a C- or better as a CSU graduation requirement.

University Policies

Per University Policy S16-9 (http://www.sjsu.edu/senate/docs/S16-9.pdf), relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on Syllabus Information web page (http://www.sjsu.edu/gup/syllabusinfo), which is hosted by the Office of Undergraduate Education. Make sure to visit this page to review and be aware of these university policies and resources.
Dropping and Adding

Students are responsible for understanding the policies and procedures about add/drop, grade forgiveness, etc. Refer to the current semester’s Catalog Policies section at http://info.sjsu.edu/static/catalog/policies.html. Add/drop deadlines can be found on the current academic year calendars document on the Academic Calendars webpage at http://www.sjsu.edu/provost/services/academic_calendars/. The Late Drop Policy is available at http://www.sjsu.edu/aars/policies/relatedrops/policy/. Students should be aware of the current deadlines and penalties for dropping classes.

Information about the latest changes and news is available at the Advising Hub at http://www.sjsu.edu/advising/.

Consent for Recording of Class and Public Sharing of Instructor Material

University Policy S12-7, http://www.sjsu.edu/senate/docs/S12-7.pdf, requires students to obtain instructor’s permission to record the course and the following items to be included in the syllabus:

- Common courtesy and professional behavior dictate that you notify someone when you are recording him/her. You must obtain the instructor’s permission to make audio or video recordings in this class. Such permission allows the recordings to be used for your private, study purposes only. The recordings are the intellectual property of the instructor; you have not been given any rights to reproduce or distribute the material.
- Course material developed by the instructor is the intellectual property of the instructor and cannot be shared publicly without his/her approval. You may not publicly share or upload instructor generated material for this course such as exam questions, lecture notes, or homework solutions without instructor consent.
- Zoom lectures may be recorded and placed on Canvas. Recorded lectures are for student’s review only and may not be shared with anyone or placed on public domain or social media.

Academic Integrity

Your commitment, as a student, to learning is evidenced by your enrollment at San Jose State University. The University Academic Integrity Policy S07-2 at http://www.sjsu.edu/senate/docs/S07-2.pdf requires you to be honest in all your academic course work. Faculty members are required to report all infractions to the office of Student Conduct and Ethical Development. The Student Conduct and Ethical Development website is available at http://www.sjsu.edu/studentconduct/.

Campus Policy in Compliance with the American Disabilities Act

If you need course adaptations or accommodations because of a disability, or if you need to make special arrangements in case the building must be evacuated, please make an appointment with me as soon as possible, or see me during office hours. Presidential Directive 97-03 at http://www.sjsu.edu/president/docs/directives/PD_1997-03.pdf requires that students with disabilities requesting accommodations must register with the Accessible Education Center (AEC) at http://www.sjsu.edu/aec to establish a record of their disability.

Accommodation to Students’ Religious Holidays

San José State University shall provide accommodation on any graded class work or activities for students wishing to observe religious holidays when such observances require students to be absent from class. It is the
responsibility of the student to inform the instructor, in writing, about such holidays before the add deadline at the start of each semester. If such holidays occur before the add deadline, the student must notify the instructor, in writing, at least three days before the date that he/she will be absent. It is the responsibility of the instructor to make every reasonable effort to honor the student request without penalty, and of the student to make up the work missed. See University Policy S14-7 at http://www.sjsu.edu/senate/docs/S14-7.pdf.

EE Department Honor Code
The Electrical Engineering Department will enforce the following Honor Code that must be read and accepted by all students.
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I have read the Honor Code and agree with its provisions. My continued enrollment in this course constitutes full acceptance of this code. I will NOT:

• Take an exam in place of someone else, or have someone take an exam in my place
• Give information or receive information from another person during an exam
• Use more reference material during an exam than is allowed by the instructor
• Obtain a copy of an exam prior to the time it is given
• Alter an exam after it has been graded and then return it to the instructor for re-grading
• Leave the exam room without returning the exam to the instructor.”

Measures Dealing with Occurrences of Cheating

• Department policy mandates that the student or students involved in cheating will receive an “F” on that evaluation instrument (paper, exam, project, homework, etc.) and will be reported to the Department and the University.
• A student’s second offense in any course will result in a department’s recommendation of suspension from the University.
 EE134 / Power Systems, Fall 2021, Tentative Course Schedule

This schedule is subject to change with sufficient advance notice such as class announcements.

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics, Readings, Assignments, Deadlines</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>08/20/2021</td>
<td>Course introduction, phasor analysis, active and reactive powers, reactive power compensation, balanced three-phase systems.</td>
</tr>
<tr>
<td>2</td>
<td>08/27/2021</td>
<td>Transformers, magnetic circuits, transformer circuit model, transformer tests, voltage regulation and efficiency, transformer magnetization and inrush.</td>
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<tr>
<td>3</td>
<td>09/03/2021</td>
<td>Three-phase transformers, one-line diagrams, per-unit calculations.</td>
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<tr>
<td>4</td>
<td>09/10/2021</td>
<td>Magnetic flux and inductance, inductance of transmission lines, transmission line conductors, bundled conductors.</td>
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<tr>
<td>5</td>
<td>09/17/2021</td>
<td>Electric fields, Capacitance of transmission lines, Capacitance of three-phase lines, effect of earth.</td>
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<tr>
<td>6</td>
<td>09/24/2021</td>
<td>Transmission line modeling, short and medium transmission lines, Introduction to long transmission lines and traveling waves.</td>
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<tr>
<td>7</td>
<td>10/01/2021</td>
<td>Midterm Exam</td>
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<tr>
<td>8</td>
<td>10/08/2021</td>
<td>Power flow and reactive power in transmission lines, introduction to transmission line transients and reflection, introduction to lattice diagrams.</td>
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<tr>
<td>9</td>
<td>10/15/2021</td>
<td>System study and load flow, Gauss-Seidel and Newton-Raphson methods.</td>
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<tr>
<td>10</td>
<td>10/22/2021</td>
<td>Symmetrical faults, fault current calculations, system protection.</td>
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<tr>
<td>12</td>
<td>11/05/2021</td>
<td>Electric machinery fundamentals, synchronous generators.</td>
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<tr>
<td>13</td>
<td>11/12/2021</td>
<td>Generator stability, swing equation, equal area criterion.</td>
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<tr>
<td>14</td>
<td>11/19/2021</td>
<td>System control, economic dispatch, Distribution systems, grounding, harmonics.</td>
</tr>
<tr>
<td>16</td>
<td>11/24/2021</td>
<td>Scheduled Holiday - Thanksgiving</td>
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<tr>
<td>17</td>
<td>12/03/2021</td>
<td>Review/Makeup Session / Q&amp;A</td>
</tr>
<tr>
<td>Final Exam</td>
<td>12/08/2021</td>
<td>14:45 – 17:00</td>
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