EE 457/559 Electric Energy Distribution
Winter 2017

Course Information

Time: Tu-Th 12:30-2:30
Location: MEB 237
Credits: 4
Professor: Richard D. Christie
Office: EE 222
Phone: 206-543-9689
email: christie -at- ee.washington.edu
Hours: Tu 9:30-11:30, W 1:00-3:00
Whenever my office door is open or ajar
Teaching Assistant: TBD
Office: TBD
Email: TBD
Hours: TBD
Grader: TBD

Syllabus

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Overview, Analysis Tools, History</td>
<td>Ch. 1</td>
</tr>
<tr>
<td>2</td>
<td>Overhead Lines</td>
<td>Ch. 4,5,6</td>
</tr>
<tr>
<td>3</td>
<td>Underground Cables</td>
<td>Ch. 4,5,6</td>
</tr>
<tr>
<td>4</td>
<td>Primary Transformers</td>
<td>Ch. 8</td>
</tr>
<tr>
<td>5</td>
<td>Power Flow</td>
<td>Ch. 10</td>
</tr>
<tr>
<td>6</td>
<td>End-Use Load Models</td>
<td>Ch. 9</td>
</tr>
<tr>
<td>7</td>
<td>Secondary Transformers</td>
<td>Ch. 8</td>
</tr>
<tr>
<td>8</td>
<td>Voltage Regulation</td>
<td>Ch. 7</td>
</tr>
<tr>
<td>9</td>
<td>Faults and Substations</td>
<td>Notes</td>
</tr>
<tr>
<td>10</td>
<td>VAR Optimization, Microgrids</td>
<td>Notes</td>
</tr>
</tbody>
</table>
10:30 AM Thursday March 16 FINAL


Prerequisites (by course): EE 351

Prerequisites (by topic): Three phase AC power system calculations (215 text)
Simple synchronous machine models (351 text)
Per unit system (GSO 3.3, 3.5)
Integral and differential calculus
Matlab programming

Field Trip: A field trip may be arranged.
EE 455 Course Policy

Grading

The grading in this course is based on written homework, computer assignments, quizzes and the final examination. The homework and programming will be performed by assigned groups. The written examinations will be individual. There will be a 10-15 minute quiz every Thursday at the start of the second hour of class (3:30) and a two hour final. The course grade will be computed as follows:

- Homework: 26%
- Quizzes: 26%
- Project(s): 26%
- Final Examination: 27%

(Yes, this adds to 105%). The final average will be divided by 25, and rounded to one decimal place. No curve will be used.

Grade Inflation Adjustment: In the event of a class average grade under 3.0, I will shift everybody's grade up the same amount to achieve a 3.0. In the event of a class average over 3.5, I reserve the right to shift everybody's grade down the same amount to achieve a 3.5. (Shift applied to unrounded grades.)

Homework

Homework will be assigned weekly, usually due Thursdays. It will typically be due one week after it is assigned. It will typically consist of five problems, often with multiple parts. Each problem is weighted equally unless otherwise indicated on the assignment. One problem may be a simple computer programming assignment. Homework will be done by assigned groups. See the section on group assignments.

Homework is due at the beginning of class to the class drop box on the due date. Late homework will be accepted up to the start of the next class, or when solutions have been published, whichever comes first, with a 25% penalty. A group member may volunteer in writing (e.g. email) to accept the entire penalty.

Homework will be graded and returned as soon as possible, usually a week after submission. Because homework is a group product, a high standard of achievement is expected.

Computer Assignments

Computer assignments include the use of WindMil, a professional distribution analysis package, and/or GridLAB-D, an open source distribution analysis package. They will be used in small homework assignments and the course project. There will also be a simple three phase power flow written in Matlab. These assignments are group assignments. The project will require a presentation as well as a report.

Examinations

The final examination is open book and open note. Quizzes are closed book, closed note, no calculator. Expect about five problems on the final. The final is comprehensive.

See the Group Assignments section regarding group bonuses for exams. See also the grading section on class average grades and grade inflation.

I expect you to make a good faith effort to attend every examination as scheduled. Makeup examinations are extremely inconvenient for both of us. The commonly accepted reasons for missing an examination are your personal illness, or a death in your immediate family (parents, spouse or child). Other reasons will be judged on a case by case basis. Please make every effort to let me know as soon as possible when you cannot attend an examination, before the examination if at all possible, so we can arrange a make up.

Group Assignments
You will be formed into groups of two or three to do the homework and computer assignments. Groups will be assigned by me in the first week of class and will stay together for the duration of the class. Each group will hand in ONE set of answers or report, and each participating group member will receive the same grade.

The following approach is strongly suggested for doing the homework (and lab reports) in groups:

1. Each individual member independently sketches out the method of solving the problem, e.g. "First find possible device states…" Focus on the sequence of calculations, the equations to use, and the source of values for the variables in the equations.
2. At the group meeting, compare solution approaches and agree on one approach.
3. One individual does the complete solution.
4. Another individual (or, both other individuals) reviews the solution for correctness.

Choose group supervisor for each assignment. The supervisor lists which group members get credit for the HW assignment. If a group member has not contributed, the supervisor can omit their name from the HW cover page. If it should subsequently be established that a named group member was given credit for an assignment, but did not participate in the assignment, the group supervisor as well as the group member will receive a zero on the assignment. The group supervisor (only) should sign the cover page near the list of names of contributing group members, e.g.

John Smith
Pham Nguyen
Supervised by: Ellen Johnson <signature>

If you have not formally chosen a supervisor for any given assignment, any one group member should sign the cover page. The signature indicates that the group supervisor certifies that the other group members have done sufficient work to receive credit for the assignment.

The group may also wish to choose a recorder to be responsible for assembling the finished assignment and getting it handed in.

In general, students are expected to work with their assigned groups for the duration of the course. Assignments will only be accepted from designated groups. In extraordinary circumstances, and with my consent, a student may quit a group. In extraordinary circumstances, with a unanimous request from the rest of the group, and with my consent, a student may be fired from a group. Students who have quit or been fired may join another group with the unanimous consent of that group and with my consent. Homework and computer assignments will be accepted from individuals (i.e. not groups) only with my consent.

Special deal on exams: If the group exam or quiz average is over 80% of the point total, each member of the group gets an extra 5% of the point total on that exam or quiz. The point is to encourage group members to tutor each other to achieve the bonus.

Free riders: The most common group problem is a member who does not contribute. Excusing this behavior usually just leads to more of it. Putting off a discussion of the problem just makes the confrontation worse. Groups with free riders are strongly encouraged to use the zero-on-assignment process.

Disabled Students

If you have a documented disability and wish to discuss academic accommodations, please contact me as soon as possible. I am happy to make every reasonable accommodation.

Academic Integrity
I expect every member of the class to conform to the highest standards of academic integrity. The following statements set forth these standards as I understand them to apply to the EE 455 class:

Because your homework, labs and design project have a bearing on your grade, they must be your group's original work. You may compare homework answers and discuss problem solving methods with other groups in the class, but the final result - the work you hand in - must consist of work that your group, and your group only, has performed. For homework, when writing out the answers to be handed in, if they are being copied from anything the group itself has not generated, then that is cheating. For project reports, material copied from other sources must be clearly marked to indicate its origin, usually with a citation to the reference material. Copied material that is not so attributed is considered plagiarism.

**Examinations must be your individual original work.** No discussion of any kind is allowed among students while taking an examination.

Copying homework done by someone outside the group, or copying old homework or the answer key, copying the work of anyone else on examinations, the use of unauthorized notes or other unauthorized aids during examinations, and knowingly permitting your work to be copied for the purpose of cheating are all examples of cheating. During an examination, you may ask the instructor questions if you do not understand some aspect of a problem statement, or if you are unclear about what is required. Please try not to ask questions about your answer, such as “Am I doing this the right way?”

If you cheat, you cheat yourself of the opportunity to learn the material, and you cheat your classmates - all of your classmates - out of grades they have earned. If you let someone else copy your work, you are allowing them to devalue your grade and that of your fellow students. Cheating is a bad way to embark on a career in engineering. Cheaters make bad engineers, and I want you to be good ones. You can help by not tolerating cheating by your fellow students. The TAs and I will monitor for cheating and will write up all suspected cases. About the worst thing I can imagine is writing up someone who is not actually cheating. Please help us avoid this by avoiding even the appearance of possible cheating. Cheating can result in failure of the course and even eventual expulsion from the University.

(rdcd Dec 2016)