INSTRUCTOR  
Joseph Sottile, Office: 234A MMRB, Phone: 257 – 4616, e-mail: jsottile@ieee.org

MEETING TIMES  
9:30 – 10:45 a.m., TR – 202 RGAN  
Office hours: MTWRF 11:00 – 12:00 or contact me for an appointment

TEXTBOOK  

SOFTWARE  

GOALS  
Develop an understanding of the operation, analysis, and design of modern industry and utility electric power systems

PREREQUISITES  
Engineering Standing or consent of the instructor. Students should have a basic knowledge of three-phase circuits, matrix algebra, and the use of personal computers. (EE 537 is not a prerequisite.)

TOPICS  
1. Review of three-phase power systems  
2. Per-unit representation  
3. Power flow solutions, control, power system design and planning  
4. Symmetrical three-phase fault calculations  
5. Symmetrical components  
6. Unsymmetrical fault calculations and system protection  
7. Power system stability (if time permits)

OUTCOMES  
Students completing the course should achieve the following competencies:

1. Knowledge of basic power system concepts,  
2. Ability to apply analysis techniques relating to power flow,  
3. Ability to apply analysis techniques relating to fault calculations and system stability, and  
4. Ability to use commercially available software for the analysis, evaluation, and design of electric power systems.

MEASURES  
Three semester exams and a comprehensive final exam are given. Assigned homework is collected and checked. A project requiring the use of computer techniques in the analysis and design of an electric power system is given and evaluated.

CONTENT  
The course begins with a review of three-phase networks, power system concepts, transformers, synchronous machines, and (as new material) the
per-unit system. Next, power flow analysis is introduced and examples are given on how this technique may be used in power system control, design, and planning. Fundamentals of power system protection are discussed, the theory of symmetrical components is introduced, and the techniques needed to calculate currents under balanced and unbalanced fault conditions are developed. The course concludes with a discussion of transient stability. Problem solving is emphasized, including computer solutions.

**Grading**

Grading is based on three midterm exams, a final comprehensive exam, homework, and a computer project. All exams are closed book with no notes. The *tentative* exam schedule and weights are,

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Exam 1</td>
<td>Thursday, February 5</td>
</tr>
<tr>
<td>Exam 2</td>
<td>Thursday, March 5</td>
</tr>
<tr>
<td>Exam 3</td>
<td>Tuesday, April 7</td>
</tr>
<tr>
<td>Final Exam</td>
<td>Friday, May 8 at 10:30 a.m.</td>
</tr>
<tr>
<td>Homework</td>
<td></td>
</tr>
<tr>
<td>Project</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Average</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>90-100</td>
<td>A</td>
</tr>
<tr>
<td>80-89.9</td>
<td>B</td>
</tr>
<tr>
<td>70-79.9</td>
<td>C</td>
</tr>
<tr>
<td>60-69.9</td>
<td>D</td>
</tr>
<tr>
<td>&lt;60</td>
<td>E</td>
</tr>
</tbody>
</table>

**Graduate Students**

Our accreditation association and policy of the Graduate School require that there be different assignments and grading criteria for undergraduate students and graduate students in 400G and 500-level courses. For that reason, you will find differences in course requirements and/or grading criteria in this class, posted on the syllabus.

Graduate students will be required to conduct an additional assignment on the fast decoupled power method for performing load flow analysis. The grade for this assignment will be included in the homework portion of the student’s grade and will have a weight equal to a standard homework assignment.

**Course website** ([http://www.engr.uky.edu/~jsottile/](http://www.engr.uky.edu/~jsottile/))

There is a website for the course that will have homework assignments posted, test dates identified, and so forth. The website is not elaborate, but may be helpful. Note that all assignments will be handed out in class.