Electrical Engineering 2120: Circuits II  
Prior Number - Electrical Engineering 153

Credit and Contact Hours
3 credit hours lecture (Three 50-minute sessions per week are typical).

Instructor
Varies: T. Swift, Ph.D.; B. Shrestha, Ph.D.; R. Moss, Ph.D.; R. Egbert, Ph.D.; and T. Odu-Ayo, Ph.D.

Text(s)

Course Information

Course Description
Analysis of steady-state AC circuits, phasor notation, polyphase circuits, complex frequency and frequency response, magnetically-coupled circuits.

Prerequisites
Electrical Engineering 2100 (151) and Math 2222 (22) with a grade of “C” of better; Passing the Electrical Engineering Advancement Exam I.

Required or Elective
Required for electrical or computer engineering majors

Course Goals

General Outcomes
1. Learn to represent electrical circuits and signals in the frequency domain.
2. Learn to apply fundamental network laws for circuit analysis using complex numbers and phasors
3. Understand complex power for single-phase
4. Introduce concepts in frequency response
5. Learn to relate circuit behavior to transfer functions
6. Introduce the analysis of mutual inductance and ideal transformers
7. Introduce the analysis of three-phase systems
### Relationship of Course to Program Outcomes

<table>
<thead>
<tr>
<th>ECE Outcome</th>
<th>Course Outcomes</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>a</td>
<td>S S S S S</td>
<td>Small Class Size, Frequent Help Sessions (multiple times per week) moderated by both students and faculty</td>
</tr>
<tr>
<td>b</td>
<td>M M</td>
<td>Provides fundamental knowledge as well as familiarity with computational methods and commercial software.</td>
</tr>
<tr>
<td>c</td>
<td>M M</td>
<td>Topics fundamental to Electrical &amp; Computer Engineering</td>
</tr>
<tr>
<td>d</td>
<td>W</td>
<td></td>
</tr>
<tr>
<td>e</td>
<td>S M S M M</td>
<td></td>
</tr>
<tr>
<td>f</td>
<td>M W</td>
<td></td>
</tr>
<tr>
<td>g</td>
<td>M</td>
<td></td>
</tr>
<tr>
<td>h</td>
<td>W W</td>
<td></td>
</tr>
<tr>
<td>i</td>
<td>W W</td>
<td></td>
</tr>
<tr>
<td>j</td>
<td>S</td>
<td></td>
</tr>
<tr>
<td>k</td>
<td>S M S S M</td>
<td></td>
</tr>
<tr>
<td>l</td>
<td>M S M W</td>
<td></td>
</tr>
</tbody>
</table>

S – strong connection; M – medium connection; W – weak connection

### Topics Covered
1. Classical solution of circuit equations with differential equations (1 week)
2. Complex numbers and phasor representation (1 week)
3. AC Circuit Analysis (2 weeks)
4. Single Phase Power (2 weeks)
5. Frequency response (2 weeks)
6. Mutual Inductance and Transformers (2 weeks)
7. Three Phase Power (2 week)
8. Quizzes (1 week)
9. Reviews, Examinations, and Final Examination (2 weeks)