ECE 20100 Linear Circuit Analysis I
Fall 2019, Section 015
MWF 3:30-4:20pm, BRNG 2280

Syllabus

Instructor: Irith Pomeranz
Office: MSEE 234
E-mail: pomeranz@ecn.purdue.edu
Office Hours: MWF 11:00-11:50am,
or send an e-mail for a time
on MWF 8:00am-6:00pm.
Please specify several preferred times.

Help Rooms: EE 209, 234.

TA: Hari Narayana Addepalli
Office: EE 209, Table 1
E-mail: haddepal@purdue.edu
Office Hours: T 1:00-3:00pm, Th 1:00-2:00pm

TA: Peyton Holm
E-mail: pholm@purdue.edu

TA: Nikola Prljевич
E-mail: nprljevi@purdue.edu
Prerequisites:
(ENGR 13100 or ENGR 14100 or ENGR 13300) and 
(PHYS 17200 or PHYS 15200) and (MA 16600 Min-
imum Grade of C- or MA 16200 Minimum Grade of 
C-) and (MA 26100 [may be taken concurrently] or 
MA 17400 [may be taken concurrently] or MA 18200 
[may be taken concurrently] or MA 27101 [may be 
taken concurrently])

Requisites by Topic:
Prerequisites: Two semesters of calculus; complex 
numbers; computer literacy and experience with Mat-
Lab or equivalent; some familiarity with vectors and 
matrices.
Concurrent Prerequisites: Third semester of calculus.

Catalog Description:
Volt-ampere characteristics for circuit elements; inde-
dependent and dependent sources; Kirchhoff’s laws and 
circuit equations. Source transformation; Thevenin’s 
and Norton’s theorems; superposition. Step response 
of 1st order (RC, RL) and 2nd order (RLC) circuits. 
Phasor analysis, impedance calculations, and compu-
tation of sinusoidal steady state responses. Instanta-
neous and average power, complex power, power fac-
tor correction, and maximum power transfer. Instanta-
taneous and average power.
**Required Text(s):**

**Recommended Text(s):**
**Learning Outcomes:**
A student who successfully fulfills the course requirements will have demonstrated:
An ability to analyze linear resistive circuits. [1]
An ability to analyze 1st order linear circuits with sources and/or passive elements. [1]
An ability to analyze 2nd order linear circuits with sources and/or passive elements. [1]

**Assessment Method for Learning Outcomes:**
Learning outcomes will be assessed based on three midterm exams and a final exam. There is a correspondence between problem-sets (exams, or specific problems on exams) and learning outcomes based on their topics. To pass the course a student must pass at least one of the problem-sets corresponding to each learning outcome. The final exam will be used only as an additional opportunity to pass the outcomes. It will not be considered in calculating the final grades.
Final Grade Determination:

<table>
<thead>
<tr>
<th>Item</th>
<th>%</th>
<th>Date</th>
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<tbody>
<tr>
<td>Homeworks</td>
<td>16</td>
<td>See Homework File</td>
</tr>
<tr>
<td>Midterm 1</td>
<td>28</td>
<td>Tue 09/24, 6:30-7:30pm, FRNY G140</td>
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<tr>
<td>Midterm 2</td>
<td>28</td>
<td>Thu 10/31, 6:30-7:30pm, FRNY G140</td>
</tr>
<tr>
<td>Midterm 3</td>
<td>28</td>
<td>Thu 11/21, 6:30-7:30pm, RHPH 172</td>
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</tbody>
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All the items are mandatory, and necessary for passing the course.

The plus/minus grading system will be used when assigning final grades.

The final exam will be used only as an additional opportunity to pass the learning outcomes. It will not be considered in calculating the final grades.

Course Website:
https://engineering.purdue.edu/~pomeranz
Syllabus, course schedule, homework assignments, and other information are posted here.

Students are asked to access the course website at the beginning of the semester to ensure that they can retrieve information posted on it. Problems should be reported immediately to the instructor.

In addition students are asked to check the website regularly for announcements.
**Approximate Lecture Outline:**
(A more detailed outline is available in the ECE course description website)

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Chapter</th>
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<tbody>
<tr>
<td>1</td>
<td>Charge, Current, Voltage and Ohm’s Law</td>
<td>1</td>
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<tr>
<td>2</td>
<td>Kirchhoff’s Current and Voltage Laws and Series-Parallel Resistive Circuits</td>
<td>2</td>
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<td>3</td>
<td>Nodal and Loop Analyses</td>
<td>3</td>
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<td>4</td>
<td>Linearity, Superposition, and Source Transformation</td>
<td>5</td>
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<td>5</td>
<td>Thevenin, Norton, and Maximum Power Transfer Theorems</td>
<td>6</td>
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<td>6</td>
<td>Inductors and Capacitors</td>
<td>7</td>
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<tr>
<td>7</td>
<td>First Order RL and RC Circuits</td>
<td>8.1-8.4</td>
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<tr>
<td>8</td>
<td>First Order RL and RC Circuits</td>
<td>8.5-8.7</td>
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<tr>
<td>9</td>
<td>Second Order Linear Circuits</td>
<td>9.1-9.3</td>
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<tr>
<td>10</td>
<td>Second Order Linear Circuits</td>
<td>9.4-9.5</td>
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<tr>
<td>11</td>
<td>The Operational Amplifier</td>
<td>4, 6.5, 8.8</td>
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<tr>
<td>12</td>
<td>Sinusoidal Steady State Analysis by Phasor Methods</td>
<td>10.1-10.7</td>
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<tr>
<td>13</td>
<td>Sinusoidal Steady State Analysis by Phasor Methods</td>
<td>10.8-10.10</td>
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<tr>
<td>14</td>
<td>Sinusoidal Steady State Power Calculations</td>
<td>11</td>
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<tr>
<td>15</td>
<td>Review, Exam 1, Exam 2, Exam 3</td>
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</table>
The Purdue Honors Pledge:
As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue.

Academic Integrity:
Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing integrity@purdue.edu or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

Emergency-Related Issues:
In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. Information about changes in this course will be available on the course website. Students are asked to familiarize themselves with Campus Emergency procedures posted on the Purdue website.
Accessibility and Accommodations:
Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let the instructor know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

CAPS Information:
If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack, https://purdue.welltrack.com/. Sign in and find information and tools at your fingertips, available to you at any time. If you need support and information about options and resources, please see the Office of the Dean of Students, http://www.purdue.edu/odos, for drop-in hours (M-F, 8am-5pm). If you are struggling and need mental health services: Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at (765)494-6995 and http://www.purdue.edu/caps/ during and after hours, on weekends and holidays, or by going to the CAPS office of the second floor of the Purdue University Student Health Center (PUSH) during business hours.