EGEE 203 Electric Circuits

Instructor: Dr. Raman Menon Unnikrishnan
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Class Time:
Section 4 (13190) MW 4:00-5:15 PM E321;
Section 5 (13248) MW 10:00-11:15 AM CS406

You should attend the section in which you are enrolled; NO EXCEPTIONS

Office Hours: Wednesdays 2:00 PM – 4:00 PM

Prerequisites: PHYS 226 and MATH 250A are prerequisites, and CPSC 120 (prerequisite or co-requisite for electrical and computer engineering students) or EGME 205 are corequisites.


Chapters Covered:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1, 2</td>
<td>Why learn Electric Circuits? Preliminaries, system of units, current, voltage, power, circuit elements; Ohm’s law, Kirchhoff’s voltage and current laws, analysis of single-loop and single-node-pair circuits, resistance and source combination, voltage and current division</td>
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<td>2, 3</td>
<td>Nodal and mesh analysis; Source transformation,</td>
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<td>4</td>
<td>Linearity and superposition, Thevenin and Norton theorems; Y-Δ transformation</td>
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<td>5</td>
<td>Test No. 1 (Please note that the timing for Test 1 is approximate.)</td>
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<td>6</td>
<td>Other circuit elements: inductors and capacitors</td>
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<td>7</td>
<td>Duality, source-free RL and RC circuits</td>
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<td>8</td>
<td>The unit-step function, natural and forced responses, examples of RL and RC circuits</td>
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<td>9</td>
<td>Sinusoidal forcing function, the phasor concept, complex forcing function, phasor relationships; Average power and RMS values, effective values of current and voltage</td>
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<td>10</td>
<td>Impedance and admittance, the sinusoidal steady state response, nodal and mesh analysis</td>
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<td>11</td>
<td>Test No. 2 (Please note that the timing for Test 2 is approximate.)</td>
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<td>12</td>
<td>Superposition, source transformation, Thevenin’s theorem, phasor diagram</td>
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<td>13</td>
<td>Apparent power, power factor, power factor correction;</td>
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<td>14</td>
<td>Complex power, polyphase circuits; 3-phase source, Y-connected and Δ-connected loads</td>
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<td>15</td>
<td>Catch up and review</td>
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<tr>
<td>16</td>
<td>Use of wattmeter, Two-wattmeter method of measuring power</td>
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<tr>
<td>17</td>
<td>Final Exam</td>
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Note: The order of material given above is approximate and will follow the flow in the textbook. The dates of tests are tentative and will be finalized a week prior to the exact date.
ABET Student Outcomes

Upon satisfactory completion of this course, we will demonstrate that the students achieve the following outcomes in partial compliance with the expectations of Criterion of ABET General Criteria 3:

**Outcome ‘1’**
an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics

**Outcome ‘7’**
an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

**Post connections:** EGEE 203 Engineering Circuit Analysis prepares the student to take follow up courses.

1. **Electrical Engineering Majors:** EGEE 203 lectures introduce some of the most fundamental concepts in electrical engineering. The companion course EGEE 203L infuses hands-on laboratory skills to the students. EGEE 203L may be taken concurrently with EGEE 203 or after the completion of the course. EGEE 203 is a prerequisite to EGEE 203 Electronics 1, EGEE 309 Network Analysis and EGEE 311 Field Theory. You may see how critical is the concepts introduced in EGEE 203 by examining the Curriculum Flow Chart for the BS program in Electrical Engineering. Please visit:


2. **Computer Engineering Majors:** EGEE 203 is just as fundamental a course for computer engineers as it is for electrical engineers. EGEE 203 forms a direct or indirect prerequisite for required courses such as EGEE 303 Electronics 1, EGEE 303L Electronics Lab, EGCP 381 Computer Design and EGCP 441 Advanced Electronics. Almost all the electives and senior design courses require a thorough knowledge of basic electrical circuits.

3. **Mechanical Engineering Majors:** Electives such as EGME 456 Introduction to Mechatronics for Engineers and EGME 4486 Introduction to Electronics Packaging specify skills in electrical circuits and electronics as prerequisites. Notwithstanding the fact that the capstone design duo EGME 414 and EGME 419 involve some electrical engineers as team mates, fundamental ideas introduced in electrical circuits are necessary when dealing with calculations or design of the ubiquitous electrical components that are central to many mechanical parts, devices and systems.

4. **Other Engineering or Computer Science majors:** Electric Circuits will open up new world of skills sets that make sense out of anything that involves electricity. It not only introduces interesting and important skill sets but it will see how simple mathematics (determinants, linear algebra and complex arithmetic) teach you to tame complex concepts. If you have room in your study plan, this course will be an excellent preparation for other electrical engineering courses.
Examinations: The midterm tests will cover specific lecture topics. The final exam will be comprehensive. If you have any compelling reasons for not being able to attend the midterm test, prior notification to the instructor will be required. A make-up test may be provided. The final exam date is mandatory and required for successful completion of this course.

Grading Policy:

2 Midterm tests 25% each  
Final exam (comprehensive) 35%  
Class Participation & quiz 10% (No make-up opportunities)  
Homework 5%

Class participation will depend heavily on attendance and is a mandatory component of evaluation. Acceptance of late work is totally discretionary. One should not expect extra credit problems but if they are available, appropriate announcement will be made. Grades will be awarded without “+/−” gradations. A grade of “A” will be guaranteed for earning points ≥90, “B” will be guaranteed for points greater than 80 and less than 90, etc. with adjustment at the lower end made if necessary at the discretion of the instructor.

Final Exam Dates for Spring 2018: Refer to the CSUF Website

Academic Dishonesty
Academic dishonesty is not tolerated and will result in at least a course grade penalty to be determined by the severity of the dishonesty. Incidents of dishonesty will also be reported to the Office of Judicial Affairs, http://www.fullerton.edu/deanofstudents/Judicial/. It is each student’s responsibility to avoid academic dishonesty and to know the university’s policy regarding such. Cell phones and other electronic storage and communication devices will not be permitted during tests and examinations.

Special Accommodations
Please refer to students’ rights to accommodations for documented special needs by visiting http://www.fullerton.edu/DSS/

Campus Emergency
Please familiarize with the actions students should take in an emergency by visiting http://prepare.fullerton.edu/

Course Redesign through Technology (CRT) Project
Surveys: In order to facilitate course redesign, there may be periodic surveys posted to the class by both the Office of the Chancellor and Dr. Unnikrishnan. Extra credit points will be awarded for participation in class surveys.

Important message: EGEE 203 is a mainstream engineering course that requires considerable effort in analysis, synthesis and use of mathematics. While the concepts are straightforward and easy to grasp, class performance is directly proportional to effort and participation. Missing even one lecture may prove to be very costly.