Linear Circuit Analysis I
EGR 215 and EGR 215L

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Office: STEM 207E
Office Hours: MW 9:30 – 10:30 AM / M 1:00 - 2:00 PM / MTR 2:00 – 3:00 PM /
Department: Department of Physics and Astronomy
Class meeting time and place: Lecture – TR 9:30 – 10:45 AM STEM 108; Lab W 2:00 PM – 4:50 PM
STEM 111

Course Description:
Principles of electrical circuits and systems. Basic circuit elements (resistance, inductance, mutual
inductance, capacitance, independent and dependent controlled voltage, and current sources). Topology of
electrical networks; Kirchhoff’s laws; node and mesh analysis; DC circuit analysis; operational
amplifiers; transient and sinusoidal steady-state analysis; AC circuit analysis; first- and second-order
circuits; and use of computer simulation software to solve circuit problems. Lecture and laboratory grades
are computed independently.

Text and Materials:
Matthew N. O. Sadiku, McGraw-Hill. ISBN 9781260527940

Course Calendar:

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics</th>
<th>Chapter</th>
<th>Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Aug 26</td>
<td>Basic Concepts, Basic Laws</td>
<td>1, 2</td>
<td>No Lab</td>
</tr>
<tr>
<td>2</td>
<td>Sep 2</td>
<td>Methods of Analysis</td>
<td>3</td>
<td>Lab 1</td>
</tr>
<tr>
<td>3</td>
<td>Sep 9</td>
<td>Methods of Analysis</td>
<td>3</td>
<td>Lab 2</td>
</tr>
<tr>
<td>4</td>
<td>Sep 16</td>
<td>Methods of Analysis</td>
<td>3</td>
<td>Lab 3</td>
</tr>
<tr>
<td>5</td>
<td>Sep 23</td>
<td>Circuit Theorems</td>
<td>4</td>
<td>Lab 4</td>
</tr>
<tr>
<td>6</td>
<td>Sep 30</td>
<td>Circuit Theorems Exam 1 (Chapters 1,2,3)</td>
<td>4</td>
<td>Lab 5</td>
</tr>
<tr>
<td>7</td>
<td>Oct 7</td>
<td>Operational Amplifiers</td>
<td>5</td>
<td>Practicum</td>
</tr>
<tr>
<td>8</td>
<td>Oct 14</td>
<td>Capacitors and Inductors</td>
<td>6</td>
<td>Lab 6</td>
</tr>
<tr>
<td>9</td>
<td>Oct 21</td>
<td>First Order Circuits</td>
<td>7</td>
<td>Lab 7</td>
</tr>
<tr>
<td>10</td>
<td>Oct 28</td>
<td>Second Order Circuits Exam 2 (Chapters 4,5,6)</td>
<td>8</td>
<td>Lab 8</td>
</tr>
<tr>
<td>11</td>
<td>Nov 4</td>
<td>Sinusoids and Phasors</td>
<td>9</td>
<td>Lab 9</td>
</tr>
<tr>
<td>12</td>
<td>Nov 11</td>
<td>Sinusoids and Phasors</td>
<td>9</td>
<td>Lab 10</td>
</tr>
<tr>
<td>13</td>
<td>Nov 18</td>
<td>Sinusoidal Steady State Analysis</td>
<td>10</td>
<td>Lab 11</td>
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<tr>
<td>14</td>
<td>Nov 25</td>
<td>Thanksgiving Holiday</td>
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<tr>
<td>15</td>
<td>Dec 2</td>
<td>Sinusoidal Steady State Analysis</td>
<td>10</td>
<td>Practicum</td>
</tr>
<tr>
<td>16</td>
<td>Dec 9</td>
<td>Final Exam (All Chapters)</td>
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</tbody>
</table>

Assignments:
There will be assignments almost every week, they are due one week after they have been posted. The
assignments will be posted in McGraw-Hill Connect.

Quizzes:
Quizzes will be posted on D2L. The idea is to reinforce knowledge from lecture and reading assignments.
Exams:
There will be a total of two regular exams during the semester, and one comprehensive final exam. The exams will be based on the homework, and the materials covered during the lecture.

Laboratory Procedures:
The laboratory procedures will be returned by the end of the laboratory period to the Teaching Assistant.

Laboratory Reports:
Two laboratory reports will be required during the semester. The first will be at the beginning of the semester, and the last at the end of the semester. The report will be written based on the results from the laboratory procedures. The laboratory report template is located in D2L.

Practicum Exams:
Two practicums exams will be given during the semester. These are going to be individual, and you will be assessed based on your laboratory skills. The instructor will provide a grading rubric in advance. Be aware that all practicums will have a duration of 80 minutes.

Grading Policy:

<table>
<thead>
<tr>
<th></th>
<th>Lecture</th>
<th>Laboratory</th>
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</thead>
<tbody>
<tr>
<td>Homework</td>
<td>15%</td>
<td>Lab Procedures</td>
</tr>
<tr>
<td>Attendance</td>
<td>5%</td>
<td>Lab Reports</td>
</tr>
<tr>
<td>Quizzes</td>
<td>15%</td>
<td>Attendance</td>
</tr>
<tr>
<td>Exams</td>
<td>40%</td>
<td>Practicum</td>
</tr>
<tr>
<td>Final Exam</td>
<td>25%</td>
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</tbody>
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Late Policy
Any assignment should be returned in time. In the case that the assignment is returned late it will be affected by the following policy:

<table>
<thead>
<tr>
<th>Time Late</th>
<th>Deduction</th>
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<tbody>
<tr>
<td>Less than 2 hours</td>
<td>5</td>
</tr>
<tr>
<td>More than 2 hours less than 12</td>
<td>10</td>
</tr>
<tr>
<td>More than 12 hours less than 24</td>
<td>20</td>
</tr>
<tr>
<td>More than 24 hours less than 48</td>
<td>50</td>
</tr>
<tr>
<td>More than 48 hours</td>
<td>100</td>
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</tbody>
</table>

Assignments will be affected by a different policy. A deduction of 2% will be applied to the assignment for every hour that is late. This will be done automatically by Connect.

Attendance Policy:
Attendance will be taken at the beginning of each class. Five points was allocated for attendance. I understand that things happen, and you are not able to attend class a couple of times. Therefore, you can miss only 3 lectures without deduction. However, it is your responsibility to investigate the topics covered in class, and any assignments or quizzes that were made that day. As a professor, I don’t have the responsibility to hunt you down to tell you what was assigned. Only in very special situations I will grant you with an extension. Coming to my office the day the assignment is due asking for an extension, because you didn’t know about assignment is not a valid reason. Do not assume that you will get an extension.

Student Learning Outcomes
By the end of the course, a successful student will be able to:
1. Explain the concept of electric potential, current, and power.
2. Identify concepts of electric network topology: nodes, branches, and loops.
3. Describe the relationship of ideal voltage and current in resistors, capacitors and inductors.
4. Describe the relationship of ideal voltage and current in mutual inductance.
5. Apply Kirchhoff's Laws (KVL and KCL) to analyze electric circuits.
6. Explain the concept of Thevenin and Norton equivalent.
7. Apply Thevenin and Norton equivalent to circuits.
8. Analyze simple operational-amplifier circuits using an ideal op amp model.
10. Apply the phasor transform to sinusoidal steady state analysis of electric circuits.
11. Perform basic laboratory experiments using bench equipment.
12. Use simulation software to analyze electrical circuits.
13. Design circuits based on specific user requirements.
14. Write effective laboratory reports.
15. Understand importance of electric circuits in the real world.

Program Learning Outcomes
Graduates of the program will have:
1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors
3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and social contexts
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies

General Education Core Curriculum Objectives/Outcomes (EEO)
There are no specific general education core curriculum objectives in this course. This course is not a general education core curriculum course.

Credit Hour Justification
Meets 3 hrs/wk for 15 weeks, and also meets for a 2-hour final examination. This is a problem-oriented class and lab with homework problems. The lecture and lab combine for 5 hours and 20 minutes of contact time each week and the work outside of classes each week for the combined courses averages much more than 10 hours and 40 minutes in working homework problems, preparing and answering online quizzes, reading the book to understand the theories used in lecture and in homework problems and exams, reading the lab manual to prepare for the lab experiments done each week, writing up the lab
experiments, writing formal laboratory reports, and studying for exams which include major exams and possibly short lecture quizzes.

**Academic Integrity (A-9.1)**
Academic integrity is a responsibility of all university faculty and students. Faculty members promote academic integrity in multiple ways including instruction on the components of academic honesty, as well as abiding by university policy on penalties for cheating and plagiarism.

**Definition of Academic Dishonesty**
Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit.

Please read the complete policy at [http://www.sfasu.edu/policies/academic_integrity.asp](http://www.sfasu.edu/policies/academic_integrity.asp)

**Withheld Grades Semester Grades Policy (A-54)**
Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Students with Disabilities**
To obtain disability related accommodations, alternate formats and/or auxiliary aids, students with disabilities must contact the Office of Disability Services (ODS), Human Services Building, and Room 325, 468-3004 / 468-1004 (TDD) as early as possible in the semester. Once verified, ODS will notify the course instructor and outline the accommodation and/or auxiliary aids to be provided. Failure to request services in a timely manner may delay your accommodations. For additional information, go to [http://www.sfasu.edu/disabilityservices/](http://www.sfasu.edu/disabilityservices/).