EK307 Electric Circuits Syllabus

Fall 2019 Section A2-Carruthers

Boston University College of Engineering

Contents

1 Summary 1

2 Administration 2
  2.1 Times/Places . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 2
  2.2 Contact Information . . . . . . . . . . . . . . . . . . . . . . . . 2
  2.3 Course website . . . . . . . . . . . . . . . . . . . . . . . . . . . 2

3 Academic Content 2
  3.1 Textbook . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 2
  3.2 Homework . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 2
  3.3 Laboratory . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 3
  3.4 Topic Outline . . . . . . . . . . . . . . . . . . . . . . . . . . . . 3

4 Grading and Assessment 4
  4.1 Collaboration policy . . . . . . . . . . . . . . . . . . . . . . . . . 4
  4.2 Test schedule . . . . . . . . . . . . . . . . . . . . . . . . . . . . . 4
  4.3 Numerical Grade . . . . . . . . . . . . . . . . . . . . . . . . . . . 4
  4.4 Expectations of Achievement Levels . . . . . . . . . . . . . . . . 5
    4.4.1 A-level student . . . . . . . . . . . . . . . . . . . . . . . . . 5
    4.4.2 B-level student . . . . . . . . . . . . . . . . . . . . . . . . . 5
    4.4.3 C-level student . . . . . . . . . . . . . . . . . . . . . . . . . 5
    4.4.4 D or F level student . . . . . . . . . . . . . . . . . . . . . . 6

5 Discussions and Lab Schedule 6
  5.1 Discussion Sections: (2 hours 45 min each) . . . . . . . . . . . . 6
  5.2 Lab Sections: (1 hour 45 min each) . . . . . . . . . . . . . . . . . 6

1 Summary

EK307 involves the use of a coordinated set of lectures, labs, homework, and exams to provide students with an introduction to electric circuit analysis and design. Laboratory sessions meet weekly in PHO105 where students will perform
a variety of introductory circuit experiments using components and a breadboard. Students are required to register for a laboratory section as well as a discussion section. The course will contain two mid-terms and a final exam.

2 Administration

2.1 Times/Places
The lecture is Monday and Wednesday 10:10-11:55 in PHO 211
See tables at end of this syllabus for lab and discussion schedule.

2.2 Contact Information
Outside of class, the best way to contact Dr. Carruthers is via the piazza discussion board.
Here are some alternatives to be used in emergency situations:

- email jbc@bu.edu
- phone/text message: 617-264-7939
- at his office (PHO 432)

2.3 Course website
The course website for our section is here: curl.bu.edu/ek307_fall19

3 Academic Content

3.1 Textbook
Any recent text on the electrical circuit design and analysis can be used as a reference for this class. Examples of other acceptable textbooks are:

- Irwin and Nelms, Basic Engineering Circuit Analysis, 11th edition

3.2 Homework
There will be regular graded homeworks to be completed using edx.
These can be attempted as often as desired: the best grade recorded prior to the due date of each homework will be the grade achieved.
In addition to the graded homeworks, students should be completing and attempting more problems to properly learn the material and prepare for the exams. The two primary sources for these problems are:

- The Problem Workbook (about one hundred of these). These are problems Prof. Carruthers has written either as exam problems or review problems. The solutions will be made available after you have some time to try the problems without looking at the solution.

- problems from “the” book. Completing the homeworks and the problem workbook is generally not a sufficient amount of problem solving experience to perform well in the class. Unassigned problems from the textbook should also be attempted.

3.3 Laboratory

There will be a lab most weeks, with the following exceptions:

- the first week
- the final week
- Columbus Day week
- Thanksgiving Day week

See lab website for more information.

3.4 Topic Outline

The course is about the design and analysis of electric circuits, and related general methods and tools of problem solving and thinking about how the world works. More specifically, we cover:


4 Grading and Assessment

4.1 Collaboration policy

Homeworks: In this class, you are permitted to collaborate as much as you wish with your classmates on homeworks.

Exams: All exams (the two midterms and the final) can be completed with a partner. You must partner with a different person on each of the three exams.

Labs: please refer to the lab instructional staff and the lab documentation for collaboration policy.

The University has very clear policies regarding academic honesty. It considers plagiarism and other forms of cheating serious offenses and will enforce serious penalties when they occur. All students are required to abide by all applicable policies and regulations on academic honesty.

Here is the academic conduct code for Boston University

4.2 Test schedule

We will hold two midterm exams during our class time, on the following dates:

- Wednesday October 2nd
- Wednesday November 6th

The final exam will be scheduled during the final exam period.

4.3 Numerical Grade

60% of your grade will be assigned to test scores, 20% to lab performance and 20% to homework and participation. The breakdown is below:

<table>
<thead>
<tr>
<th>Component</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Exam</td>
<td>25%</td>
</tr>
<tr>
<td>Midterm 1</td>
<td>15%</td>
</tr>
<tr>
<td>Midterm 2</td>
<td>20%</td>
</tr>
<tr>
<td>Labs</td>
<td>20%</td>
</tr>
<tr>
<td>Homework</td>
<td>15%</td>
</tr>
<tr>
<td>Participation</td>
<td>5%</td>
</tr>
</tbody>
</table>

To receive an A or A- in this class, you must complete one or more exams individually and receive a grade of 90% or more on that exam.
4.4 Expectations of Achievement Levels

4.4.1 A-level student

This student

- has mastered the concepts of V/I/R/L/C/opamps and related design and analysis techniques
- can accurately and promptly solve circuit analysis problems using effective techniques
- can combine multiple aspects of electric circuit principles to solve new problems
- can design effective and correct circuits to meet design specifications
- fully understands DC, step, and AC circuit operational modes, analysis of these, and their relationship to each other.
- understands the role of the various components of electrical circuit design
- has mastered all aspects of circuit lab work, including design, testing, measurement, quality circuit construction, and documentation of process and results.
- takes an active and positive role in the class community, often also involving helping other students and asking good questions in class and online.

4.4.2 B-level student

This student

- has a solid understanding of the concepts of V/I/R/L/C/opamps and related design and analysis techniques
- can solve most circuit analysis problems, but sometimes gets stuck on technique or process
- can design circuits to meet most design specifications
- has a basic understanding of DC, step, and AC circuit operational modes, analysis of these, and their relationship to each other.
- has a basic understanding the role of the various components of electrical circuit design
- is proficient in all or most aspects of circuit lab work, including design, testing, measurement, quality circuit construction, and documentation of process and results.
- takes an active and positive role in the class community, often asking good questions in class and online.
- demonstrates effort and commitment to understanding electric circuits

4.4.3 C-level student

This student

- is proficient in the basic concepts of V/I/R/L/C/opamps and related design and analysis techniques
- struggles to solve circuit analysis problems,
• can design circuits that go part of the way toward meeting specifications
• is familiar with (but not fully proficient in) DC, step, and AC circuit operational modes, analysis of these, and their relationship to each other.
• is familiar with the role of the various components of electrical circuit design
• has participated in all aspects of circuit lab work, including design, testing, measurement, quality circuit construction, and documentation of process and results.
• takes a reasonably active role in the class community (i.e. comes to class most of the time, ask questions in person or on discussion board)
• demonstrates effort and commitment to improving

4.4.4 D or F level student

This student
  • never demonstrates basic knowledge of circuit operation, analysis, or design.
  • does not demonstrate commitment to learning
  • does not participate to a satisfactory level in class activities
  • did not participate in the laboratory exercises

5 Discussions and Lab Schedule

5.1 Discussion Sections: (2 hours 45 min each)

You may attend any of the discussion sections as needed.

The format is “drop in for help”.

<table>
<thead>
<tr>
<th>Section</th>
<th>B1</th>
<th>B2</th>
<th>B3</th>
<th>B4</th>
<th>B5</th>
<th>B6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>25</td>
<td>56</td>
<td>31</td>
<td>28</td>
<td>64</td>
<td>12</td>
</tr>
<tr>
<td>Time</td>
<td>Mon 6:30</td>
<td>Tue 6:30</td>
<td>Wed 6:30</td>
<td>Thu 6:30</td>
<td>Fri 2:30</td>
<td>Thu 3:30</td>
</tr>
<tr>
<td>Room</td>
<td>CAS B20</td>
<td>CAS B20</td>
<td>SCI 117</td>
<td>CAS B20</td>
<td>EPC 209</td>
<td>KCB 106</td>
</tr>
</tbody>
</table>

5.2 Lab Sections: (1 hour 45 min each)

All labs are in PHO 105.

<table>
<thead>
<tr>
<th>Section</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>C4</th>
<th>C5</th>
<th>C6</th>
<th>C7</th>
<th>C8</th>
<th>C9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>27</td>
<td>26</td>
<td>22</td>
<td>26</td>
<td>28</td>
<td>10</td>
<td>26</td>
<td>23</td>
<td>28</td>
</tr>
<tr>
<td>Time</td>
<td>M 8:00</td>
<td>W 6:30</td>
<td>T 9:00</td>
<td>Th 6:30</td>
<td>M 12:20</td>
<td>Th 3:30</td>
<td>W 12:20</td>
<td>M 4:30</td>
<td>F 10:10</td>
</tr>
</tbody>
</table>