EE 221 *Circuits II* / EE 221L *Circuits II Laboratory*
Fall 2017

Instructor: Dr. Keith W. Whites
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Office hours: MWF 2-2:50 PM

Please use e-mail rather than the telephone if you need to contact the instructor. All e-mail will be answered. The instructor will have at least three office hours per week in which to answer any questions you may have on the lecture material, homework problems, homework grading, laboratories, etc.

Teaching Assistant/Graders: None.

Catalog Description: (3-1) 4 credits. Pre-requisites: EE220/220L completed with a minimum grade of "C" and MATH 321. Co-requisite: EE 221L. This course is designed to provide the electrical engineering student with an understanding of the basic concepts of the profession. Topics covered include resistive circuits, transient circuits, and sinusoidal analysis. Students also investigate essential principles by conducting laboratory experiments related to the topics studied in the classroom. P-Spice is used to analyze electrical circuits using personal computers.

Meeting Times: The lecture portion of this course will meet Monday, Wednesday, and Friday from 11:00-11:50 AM in room EEP 251B. The laboratory portion meets on pre-announced Thursdays from 2:00-3:50 PM in room EEP 336. These days are listed below in the Class Schedule.

Use of Electronic Devices in Class: The use of electronic devices during lecture can be very disruptive to your learning, to those around you, and to the instructor. To maximize your learning opportunity during lecture, laptops may be used for notetaking, but only as a tablet. The use of laptops with the cover open and in the vertical position are not permitted. The use of smartphones and other electronic devices during the lecture is not allowed. Repeated noncompliance with this course policy may result in the student being excused from the classroom and eventually the course.

Course Reference Materials: The required materials for this course are

- C. K. Alexander and M. N. O. Sadiku, *Fundamentals of Electric Circuits*. New York: McGraw-Hill Education, sixth edition, 2017.
- Additionally, lecture notes from Dr. Dimitris Anagnostou are available from the course web page.

Grading:
45 % – Three semester exams
20 % – Final exam (comprehensive)
15 % – Homework (dropping lowest score on one homework set)
20 % – Laboratories (all must be completed for a passing grade in the course)

Homework policy: One homework set will generally be assigned each week, usually on Friday. The homework assignments will be distributed through the EE 221 web page accessible from the

URL above. One problem from this set will be randomly selected for you to turn in at the beginning of class on the due date and will be graded. Please use engineering paper and write your name and student number on your homework. Please begin each problem on a new sheet of paper and do not write on the back side. Late homework will be penalized with a 10% score reduction per calendar day and will only be accepted when you show the instructor that all of the problems for that set have been completed.

Exam Policy: The exams will be closed book, closed notes, and no formula sheets. Using or referring to equations stored in a calculator is not allowed, even if these equations came pre-programmed in the calculator. If you feel an exam problem was graded incorrectly, it must be resubmitted to the instructor within 24 hours from the time the exam was returned. Failure to write an exam will result in a score of zero. No makeup exams will be given. Upon prior notification of the instructor, allowances will be made under extreme circumstances.

Laboratories: Use a laboratory notebook for all of your laboratory work. Work exclusively in ink and cross out mistakes, keeping them legible. Number the front of every page in the upper right corner. The first page of the lab book is to be used as the table of contents. Pre-laboratory work is to be done in your lab book and completed prior to the scheduled laboratory period. The instructor must sign off on your pre-laboratory work before you begin your lab experiments. Work in teams of no more than two students per bench. Each student must maintain their own lab book. Your completed lab book must be delivered to the instructor no later than 4 PM on the Friday following your lab. Late lab books will be penalized with a 10% score reduction per calendar day. Every lab must be completed to receive a passing grade in the course.

Honor System: All work written in the exams, homework, and the laboratories must be your own. Failure to abide by this rule will result, at a minimum, in a zero score for the assignment and/or further action following SDSMT regulations. Homework solutions and laboratories can be discussed with your colleagues that are currently enrolled in EE 221/221L, but ***all work you submit must be your own***.

Course Outcomes: Upon completion of this course, students should demonstrate the ability to:

1. Understand the concepts of and can calculate apparent, complex, instantaneous, and average power, effective or RMS voltages and currents, power factor, and power factor correction for AC circuits.
2. Understand the basic concepts of 3-phase circuits and analyze simple 3-phase circuits.
3. Analyze circuits with coupled inductances using both mesh and nodal analysis.
4. Determine the stored energy in circuits with mutual inductance.
5. Use the concept of the ideal transformer to approximate the behavior of transformers.
6. Determine the transfer functions of RLC and operational amplifier circuits and construct approximate Bode plots of the magnitude and phase of the transfer function.
7. Understand how to construct the basic first and second-order filters using passive components.
8. Calculate the Laplace transforms of the elementary functions using the definition of the Laplace transform.
9. Know from memory the Laplace transforms and inverse Laplace transforms of the elementary functions.
10. Know how to determine the Laplace transforms of integrals and derivatives of the elementary functions.

11. Apply the initial and final theorems to the Laplace transform of a function.
12. Determine the partial fraction expansion of a Laplace transform.
13. Use the Laplace transform method to set up and solve circuit problems using either mesh or nodal analysis.
14. Determine the Fourier coefficients of simple periodic functions.
15. Determine the response of a linear system to an input which is a periodic function.
16. Determine the Fourier transforms of pulses composed of simple functions. Can determine the time domain response of a linear system to a pulse input.
17. Determine the Z-parameters, Y-parameters, hybrid parameters, and transmission parameters of linear systems and convert between the various representations using tables.

Americans with Disabilities Act (ADA) Statement: Students with special needs or requiring special accommodations should contact the campus ADA coordinator, Megan Reder-Schopp, at 394-6988 and/or the instructor at the earliest opportunity.

Freedom in Learning Statement: Students are responsible for learning the content of any course of study in which they are enrolled. Under board of regents and university policy, student academic performance shall be evaluated solely on an academic basis and students should be free to take reasoned exception to the data or views offered in any course of study. Students who believe that an academic evaluation is unrelated to academic standards but is related instead to judgment of their personal opinion or conduct should contact the dean of the college which offers the class to initiate a review of the evaluation.

EE 221/221L Class Schedule
Fall 2017

Date	Chapter	Topic
8/21	–	Pre-assessment. Introduction to course. Brief review.
8/23	11	AC power analysis
8/24	–	*No laboratory*
8/25	11	AC power analysis
8/28	11	AC power analysis
8/30	11	AC power analysis
8/31	–	*Laboratory 1*
9/1	12	Three-phase circuits
9/4	–	**No class**
9/6	12	Three-phase circuits
9/7	–	*Laboratory 2*
9/8	12	Three-phase circuits
9/11	13	Magnetically coupled circuits
9/13	13	Magnetically coupled circuits
9/14	–	*Laboratory 3*
9/15	13	Magnetically coupled circuits
9/18	13	Magnetically coupled circuits
9/20	14	Frequency response
9/21	–	*Exam review (2-2:50 PM)*
9/22	–	**Exam #1 (Chapters 11 and 12)**
9/25	14	Frequency response
9/27	14	Frequency response
9/28	–	*Laboratory 5*
9/29	14	Frequency response
10/2	14	Frequency response

10/4	15	Introduction to the Laplace transform
10/5	–	*Laboratory 6*
10/6	15	Introduction to the Laplace transform
10/9	–	**No class**
10/11	15	Introduction to the Laplace transform
10/12	–	*Laboratory 7*
10/13	15	Introduction to the Laplace transform
10/16	16	Applications of the Laplace transform
10/18	16	Applications of the Laplace transform
10/19	–	*Laboratory 8*
10/20	16	Applications of the Laplace transform
10/23	16	Applications of the Laplace transform
10/25	16	Applications of the Laplace transform
10/26	–	*Exam review (2-2:50 PM)*
10/27	–	**Exam #2 (Chapters 13-15)**
10/30	17	Fourier series
11/1	17	Fourier series
11/2	–	*Laboratory 9*
11/3	17	Fourier series
11/6	17	Fourier series
11/8	17	Fourier series
11/9	–	*Laboratory 10*
11/10	–	**No class**
11/13	18	Fourier transform
11/15	18	Fourier transform
11/16	–	*No laboratory*
11/17	18	Fourier transform
11/20	18	Fourier transform
11/22	19	Two-port networks
11/23	–	**No class**
11/24	–	**No class**
11/27	19	Two-port networks
11/29	19	Two-port networks
11/30	–	*Laboratory 11*
12/1	–	**Exam #3 (Chapters 16-18)**
12/4	–	Post-assessment. Course assessment.
12/?	–	**Final exam (Chapters 11-19)**, Room EEP 336. (Date and time not posted by Registrar.)