

EE 220 - CIRCUITS I

CATALOG DATA

Introduction to linear circuit analysis. Kirchhoff's laws; operational amplifiers; node and loop analysis; Thevenin, Norton, and other network theorems; first order RL and RC circuits.

Credits 3

PREREQUISITE

Prerequisite: Math 182. All prerequisite courses must be completed with a grade of C or better.

Co-requisite: EE 220D

TEXTBOOK(s)

Fundamentals of Electric Circuits, 5th Edition by Charles K Alexander, Matthew Sadiku

Publisher: McGraw-Hill Higher Education Publication Date: January 12, 2012

ISBN-10: 0073380571 | ISBN-13: 978-0073380575 | Edition: 5

PREREQUISITE BY TOPIC

1. Differential and integral calculus
2. Physics of electricity and magnetism

TOPICS

Introduction, basic definitions, basic electric elements (3 classes)

Ohm's Law and Kirchhoff's Laws (3 classes)

Network Equivalence, Series Resistors and Voltage Division, Parallel Resistors and Current Division, Analysis of Series-Parallel Circuits (3 classes)

Analysis techniques (Nodal, Mesh and Loop Analysis) (4 classes)

Linear Property, superposition, source transformation theorems (1.5 classes)

Thevenin and Norton Equivalent circuits (3 classes)

Op-amps and Op-amp-based circuits (3 classes)

The energy storage elements (3 classes)

First order RL and RC circuits (3 classes)

SPICE (3 classes)

LEARNING OUTCOMES (Student outcomes) [UULO course outcomes]

Upon completion of the course, students should be able to:

1. Analyze simple resistive circuits including those containing independent sources with mesh and nodal analysis (1.2, 1.3, 1.6, 1.8, 1.9) [1,2]
2. Derive simplified resistor networks (1.3, 1.6, 1.9) [1,2]
3. Derive Thevenin and Norton equivalent circuits (1.2, 1.3, 1.6, 1.9) [1,2]
4. Apply circuit theorems (Ohms Law, Superposition, Source transformation) to simplify the analysis of electrical circuits (1.2, 1.3, 1.6, 1.9) [1,2]
5. Analyze of operational amplifiers circuits (1.3, 1.6, 1.9) [1,2]
6. Analyze first order RL, RC circuits containing switches, independent sources, dependent sources,

resistors, capacitors, inductors for transient response (1.1,1.2, 1.3, 1.6, 1.9) [1,2]

COMPUTER USAGE

Students to use SPICE for analysis and to verify their calculations. Instruction in 220D.

GRADING

Homework Assignments (25%), SPICE Assignments (20%), Midterm (25%), Final (30%).

STUDENT OUTCOMES

1. The appropriate technical knowledge and skills:
 1. an ability to apply mathematics through differential and integral calculus,
 2. an ability to apply advanced mathematics such as differential equations, linear algebra, complex variables, and discrete mathematics,
 3. an ability to apply knowledge of basic sciences,
 6. an ability to apply knowledge of engineering,
 8. an ability to identify, formulate, and solve engineering problems,
 9. an ability to analyze and design complex electrical and electronic devices,
 10. an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice,

UUULO COURSE OUTCOMES

1. Intellectual Breadth and Lifelong Learning
2. Inquiry and Critical Thinking
3. Communication
4. Global/Multicultural Knowledge and Awareness
5. Citizenship and Ethics

COURSE PREPARER AND DATE OF PREPARATION

R. Jacob Baker, Monday, January 15, 2015

Academic Misconduct—Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution.

An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: <https://www.unlv.edu/studentconduct/student-conduct>.

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Disability Resource Center (DRC)—The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Religious Holidays Policy—Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor **within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses**, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

Transparency in Learning and Teaching

The University encourages application of the transparency method of constructing assignments for student success. Please see these two links for further information:

<https://www.unlv.edu/provost/teachingandlearning> or <https://www.unlv.edu/provost/transparency>

Library Resources

Students may consult with a librarian on research needs. For this class, the subject librarian is Sue Wainscott. (https://www.library.unlv.edu/contact/librarians_by_subject). UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu>.

Incomplete Grades—The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student's control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving "I" grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Tutoring and Coaching

The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call 702-895-3177. The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

UNLV Writing Center

One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student's Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>.

Rebelmail—By policy, faculty and staff should e-mail students' Rebelmail accounts only. Rebelmail is UNLV's official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students' e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

Final Examinations—The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.