Department of Electrical Engineering and Computer Science
The University of Kansas

EECS 202- Circuits I_____Spring, 2024

Catalog Data: EECS 202 Circuits I (4). Analysis of linear electrical circuits: Kirchhoff's laws; source, resistor, capacitor and inductor models; nodal and mesh analysis; network theorems; transient analysis; Laplace transform analysis; sinusoidal steady-state analysis; computer-aided analysis. Co-requisites: Math 220 (Differential Equations) Math 290 (Linear Algebra)

Textbook: **Fundamentals of Electric Circuits,** by Alexander and Sadiku, 7th edition, McGraw Hill, 2021

Software: **Cadence Design Capture CIS** (which runs Pspice) is available on EECS network computers

Course Objectives:

This course is designed to give sophomores in electrical and computer engineering the basic tools and techniques for analyzing linear electrical circuits and to develop student proficiency in the use of these tools and techniques.

Prerequisites by Topics:

1. Differential and integral calculus.
2. Concurrent study of simultaneous linear algebraic equations.
3. Concurrent study of differential equations, including solution by Laplace transforms.
4. Sufficient computer familiarity to be able to use the PSpice computer-aided circuit analysis package.

ABET Outcomes: Students should be capable of:

1. Applying the basic definitions and identities for voltage, current, charge, power and energy.
2. Writing proper Kirchhoff's equations for any circuit in both the time- and frequency domains (Laplace transform domain *and* phasor domain).
3. Writing proper Kirchhoff's equations in terms of the basic time-domain and frequency-domain (Laplace transform domain *and* phasor domain) current-voltage relations for linear resistors, capacitors, inductors, and both dependent and independent voltage and current sources.
4. Solving sets of 2 or 3 simultaneous linear circuit equations using matrix or determinants methods.
5. Applying the following circuit theorems and techniques: Thevenin and Norton equivalences, superposition, and ideal op-amp method.

Computer Usage: PSpice dc, ac, and transient simulations of simple electric circuits.

Laboratory Projects: Weekly

Estimated Content:

Engineering Science : 3.5 hours (87%)
Engineering Design : 0.5 hours (13%)

Instructor: Kenneth R. Demarest

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Office Hours: 1:00 - 3:00 MWF
9:30-11:00 and 1:30-3:00 Tu,Th
Zoom Info: Meeting ID: 955 1144 2187 , Passcode: 411316

Grading: The following percentages will be used to arrive at the final grade scores

Exam I 25
Exam II 25
Final Exam 25
Laboratory 10
Quizzes 5
Homework 10

Final letter grades are determined from the final grade scores using a scale similar to the traditional 90-100 A, 80-90 B, etc..., but can vary from semester to semester. **A passing grade must be earned in each of the grade categories (exams, laboratory, quizzes and homework) to earn a passing grade for the course**. **In addition, a composite exam score of C or above must be attained to earn a course grade of C or above**. Changes announced in class supersede these written instructions. EECS 202 will *not* utilize +/- grading system.

Homework: Homework will be collected at the beginning of class on a weekly basis. Late homework is not accepted, except for unusual circumstances. Collaboration with classmates is permitted. Copying is *not* permitted and will dealt with by the Associate Dean of Engineering.

Quizzes: Quizzes will be random and unannounced, and always at beginning of class

Make-ups: Make-up exams are given rarely, and only if: 1) I am informed IN ADVANCE, and 2) I deem the reason to be sufficiently meritorious (job interviews and pleasure trips are not). If the reason is illness, I REQUIRE documentation of the illness from a health-care professional. I do not consider a cold to be an illness.

Class decorum: The School of Engineering is a professional school, and the decorum in this class will reflect that. You are expected to arrive on time, leave on time, and act professionally in class. This includes being intellectually and physically involved in the class. Cell phones are not to be used in class.

Special Needs: Any student who has a disability that demands special accommodations should contact the instructor personally in order to make arrangements. Also, members of KU sanctioned organizations (band, athletic teams, etc.) that have special needs should also contact the instructor as the need arises.

Academic Misconduct: Instances of cheating will be referral to the Dean. Cheating includes, but is not limited to: copying another exam or lab report, copying of hardcopy or online solutions or previously worked homework or exam solutions, having another person do your work, use of "tutoring" websites like chegg.com, etc..

Syllabus

Week	Topic/Chapter
1	Basic Components and Electric Circuits / Chapter 1
2	Voltage and Current Laws / Chapter 2
3	Basic Nodal and Mesh Analysis / Chapter 3
4-5	Circuit Analysis Techniques / Chapter 4
. . . . .	**Exam I** (Wednesday, February 21 - tentative). . . . .
6-7	Operational Amplifiers / Chapter 5
8	Capacitors and Inductors / Chapter 6
9-10	Basic *RL* and *RC* Circuits / Chapter 7
. . . . .	**Exam II** (Wednesday, April 3 - tentative) . . . . .
11-12	Sinusoidal Steady-State Analysis / Chapter 9
13-14	Laplace Transform Circuit Analysis and *RLC* Circuits / Chapter 15/16
. ... ..	**Final Exam** (comprehensive. Monday, May 6, 7:30-10:00 am) . . . .