Sichuan University - Pittsburgh Institute

MEMS 0031 **Electric Circuits** **Spring 2025**

Note: This syllabus is subject to changes during the semester. Any changes to the syllabus will be announced in class or posted on the Blackboard course area.

Introduction/Learning Objectives: This course introduces the fundamental laws, principles, and analysis techniques for DC and AC linear circuits whose elements consist of passive and active components used in modern engineering practice, including determining steady-state and transient responses.

Prerequisites: Differential and integral calculus, physics of electricity and magnetism (desirable)

Course Outcomes:

- Understand the terminology used in conjunction with electric circuits and the terminal characteristics of ideal circuit elements;
- Mathematically model electric systems using ideal resistive, inductive, and capacitive elements;
- Apply phasors and impedance transformations to the analysis of electric circuits fed by a sinusoidal input in steady state;
- Apply various systematic methods (node, mesh, terminal equivalency, and circuit theorems) to electric circuit analysis in steady state and study power;
- Apply various circuit analysis techniques to study circuits, including source transfomation;
- Use Pspice to assist in analyzing electric circuits in a steady state.

Applicable ABET Outcomes:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Instructor: Dr. Lawrence Lam
Office Hours: Mon: 5:30-6:00pm; Tues: 1-6:00pm; Wed: 4:30-6:00pm
Location: SCUPI Rm513
Email: lawrence.lam@scupi.cn **(Please include "MEMS-0031" and some topic keywords in the subject line.)**

Teaching Assistants:
Yiran Qu, (for Lectures & Simulations)
2022141520248@stu.scu.edu.cn
TBC - Office Hour and Location

Lectures: Wed.: 13:50 – 16:25, Place: TBD
Simulation: Recitation by TA, time TBD

Textbook: *Introduction to Electric Circuits, SI Version Global Edition or 9th edition.* (ISBN: 978-1-119-23538-5 or 9798-1-118-47750-2)

Grading:

Homework	10%
Quizzes	10%
Labs	10%
Midterm	35%
Final Exam	35%

Letter grades will be determined from accumulated point totals and assigned according to the scale below.

A: 90 - 100	A-: 85 - 90	B+: 80 - 85	B: 76 - 80	B-: 73 - 76
C+: 70 - 73	C: 66 - 70	C-: 63 - 66	D: 60 - 63	F: < 60

Note: Up to 2% points could be granted to the final grade based on the overall course performance (lecture attendance, homework submission punctuality, course engagement such as in-class question answering and discussion, etc.).

Homework: Homework problems will be assigned throughout the semester. All finished homework needs to be submitted in pdf file format online by the specified due date. Homework will be graded and solutions for all homework problems will be posted 24 hours after the submission due date. While discussion between students is allowed for solving homework problems, each student must write and submit the homework individually.

Quizzes: In-class quizzes will be given each week at the beginning of the class. Each quiz will have up to a few questions or problems related to the learned content from last week lecture. Each student must complete the quizzes individually. No makeup for quizzes.

Labs: There are a few simulation labs to help students design and get a feel of the design outputs of a circuit. Lab simulation will use Pspice software, and the lab report will be due on the due date and submitted to the Blackboard website in PDF file format. There will be a 20% reduction in grade per day late.

Exams: There will be one midterm exam and one final exam. Exact exam dates will be announced at least one week ahead of time.

Late Work and Make-up Policy: Late homework submission will be accepted up to 24 hours after the due date with a 20% penalty per day, unless an extension request is approved **prior to the homework due date**. Extensions are granted at the instructor's discretion. In general, **no** make-ups for quizzes and exams (including midterm and final exams) will be allowed. Exceptions will only be made for special circumstances such as a medical emergency. All exceptions will need to have documents to validate. If you cannot attend a quiz or an exam, you must contact the instructor prior to the quiz and exam. Failure to do so will result in a zero grade on that quiz or exam.

Grade Rebuttal: For any quiz or exam, you have one week to request correction if you feel your answer might be mis-graded. No correction will be made a week after the quiz or exam grade is posted.

Disability Services: If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact the instructor as early as possible in the semester. Reasonable accommodations will be arranged for this course.

Communication with Instructor for Absence: In any situation regarding class absence, a student who becomes ill or has other emergency issues is responsible for communicating with the instructor. Please contact the instructor or Teaching Assistant via email prior to the lecture or lab to be involved.

Academic Integrity: Students in this course must comply with the SCUPI and/or the University of Pittsburgh's Policy on Academic Integrity. Any student suspected of violating this obligation for any reason during the semester will be required to participate in the procedural process initiated at the instructor level, as outlined in the University Guidelines on Academic Integrity. This may include, but is not limited to, confiscating the examination of any individual suspected of violating University Policy.

Audio/Video Recording: To ensure free and open discussion, students may not record lectures, discussions and/or any other class activities without the advance written permission from the instructor, and any such recording properly approved in advance can solely be limited to the student's own private use.

Tentative Course Topics (subject to changes):

- Electric variables and circuit elements
- Kirchhoff's and Ohm's laws
- Mesh and node equations
- Thevenin and Norton equivalent circuits
- First- and second-order circuits
- AC circuit analysis and power