Syllabus for MAE40
Linear Circuits – Winter 2022

January 6, 2022

This is the Syllabus for MAE40 Linear Circuits – Winter 2021. Steady-state and dynamic behavior of linear, lumped-parameter electrical circuits. Kirchoff's laws. RLC circuits. Node and mesh analysis. Operational amplifiers. Signal acquisition and conditioning. Electric motors. Design applications in engineering.

Instructor

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Teaching assistants

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Prerequisites

Grades of C- or better in Math 20D, 20F and Phys 2B.

Text

The Analysis and Design of Linear Circuits, 8th Edition, R. E. Thomas, A. J. Rosa and G. J. Toussaint, Wiley 2016. ISBN: 978-1-119-23538-5.

Other editions of the book are also fine to use (however, homework will be assigned from the 8th edition). Various editions are available at the Science and Engineering Library Reserves.

Calendar

Part I

- Introduction (T & R, Chapters 1 & 2)
- Equivalent circuits (T & R, Chapters 2 & 3)
- Systematic circuit analysis (T & R, Chapter 3)
- Active circuits (T & R, Chapter 4)

Part II

- (*Laplace transform*) (T & R, Chapter 6 & 9)
- Circuits in the s-domain (T & R, Chapter 6 & 10)
- *s*-domain circuit analysis and design (T & R, Chapter 10)
- Frequency response and filter design (T & R, Chapter 12 & 14)

The website contains a list of downloadable PDFs with the slides used during the lectures so that in class you can focus on the discussion and actively understanding the material – including asking plenty of questions!

Exams

The first midterm will be on Monday, January 31, 2022, during class.

The second midterm will be on Friday, February 25, 2022, during class.

The final will be on Monday, March 14, 2022, 11:30am-2:30pm.

Homework

There will be a set of homework problems per week taken from the main text. Homework assignments are due weekly, on Fridays at midnight (specific dates for your reference are included in the webpage). 20% deduction for lateness by one day without reason, else 100%.

We use an all electronic homework submission and grading process through Gradescope (within Canvas). Homework, instructions, and solutions will be posted there. You can handwrite legibly or type, then scan your homework as a PDF file for submission. Please check the quality of your PDF file before submission. If we cannot read it, we cannot grade it! Please turn in a readable and organized homework. This is a big class! Here is a suggestion: include your name and your ID # on top of each and every page, answer questions in logical order, and start answering a question always on the top of the page.

You are encouraged to ask questions about homework problems in the discussion session. You are encouraged to work in groups on homework problems but each student must turn in homework separately.

To efficiently address questions related to homework, we use Piazza at http://piazza.com/ucsd/winter2022/mae40. Answers to questions will be posted regularly, but do not expect immediate turnarounds!

Grading policy

The overall grade will be calculated as the maximum between the following two scales

Scale1: Homework: 20%, Midterm1: 25%, Midterm2: 25%, Final exam: 30%
Scale2: Homework: 20%, Midterm1: 20%, Midterm2: 20%, Final exam: 40%

Having two midterms lowers the stakes/importance of any given exam in the final grade, hopefully allowing you to make up for an isolated bad performance.

Even though the hwk is only 1/5 of the total grade, past experience reveals that it is nearly impossible to get a good grade without having worked on and spent time with the homework consistently throughout the course.

Official solutions to the midterms and final exams will be posted online.

Canvas

Your scores will be available via Canvas. Check out https://canvas.ucsd.edu/courses/34191 for instructions on how to register and log in. Please **check it regularly** to make sure your homework scores are being transcribed correctly.

Academic honesty

No form of academic dishonesty will be tolerated. We take this very seriously. For the definition of academic dishonesty and its consequences, refer to the UCSD General Catalog 2021-2022 at http://www.ucsd.edu/catalog/

Prior to starting the course, you should visit https://academicintegrity.ucsd.edu/forms/form-pledge.html and take the UCSD Academic Integrity Pledge.

Lectures and hours

Lectures and discussion sessions will be in-person, pandemic permitting. For the first four weeks, all UCSD classes will be remote, and hence lectures and discussion sessions will be virtual. We will hold them on Zoom (specific access information is provided on Canvas in the announcements "Zoom Link for Virtual Lectures" and "Zoom Link for Virtual Discussion Sessions").

When in person, *lectures* take place on Mondays, Wednesdays, and Fridays, from 11:00am to 11:50am, at the Cognitive Science Building, room 002. When virtual, lectures will take place live at the allotted time. All lectures, either in-person or virtual, will be recorded.

When in person, *discussion sessions* take place on Wednesdays, from 4:00pm to 4:50pm, at the Cognitive Science Building, room 002. When virtual, discussion session will take place live at the allotted time. All sessions, either in-person or virtual, will be recorded.

All recordings will be available on Canvas.

Office hours

Office hours will be virtual throughout the quarter. Specific access information is provided on Canvas in the announcement "Virtual Office Hours".

Instructor: Mondays, from 2:30pm to 3:30pm, on Zoom

Teaching assistant: Thursdays, from 3:30pm to 4:30pm, on Zoom

Course webpage

http://carmenere.ucsd.edu/jorge/teaching/mae40/w22

The webpage contains this syllabus and the list of homework due. Please check it periodically for updates and other announcements related to the course.

IDEA Engineering Student Center

The IDEA Engineering Student Center is a hub for student engagement, academic enrichment, personal/professional development, leadership, community involvement, and a respectful learning environment for all. The IDEA Center is currently working remotely and invites undergraduate and graduate students to connect through its Facebook page (https://www.facebook.com/ucsdidea) or Instagram page (https://www.instagram.com/ucsdidea)

Campus Safety Requirements and Expectations

Keeping our campus healthy takes all of us. You are expected to follow the campus safety requirements and pursue personal protection practices to protect yourself and the others around you. These include:

- Participate in the university's daily screening process.
  Everyone must complete a Daily Symptom Survey to access a university-controlled facility.
- Participate in the university's testing program.
  All students are required to participate in the COVID-19 Testing program as required by their vaccination status:
  - Unvaccinated students with approved exceptions must complete a COVID-19 test twice a week.
  - Students who are fully vaccinated must complete a COVID-19 test once a week, for the first four weeks of the quarter.
- Wear a well-fitted face covering that covers your nose and mouth at all times.
  Everyone is required to wear face coverings indoors regardless of vaccination status. If you see someone not wearing a face covering or wearing it incorrectly, then kindly ask them to mask up.
- Monitor the daily potential exposure report.
  Every day the university will update the potential exposure report with building and some classroom information and the dates of exposure. Download the CA COVID Notify app to your phone to receive an alert if you have been potentially exposed to COVID-19.
- Assist in the contact tracing process.
  If you are contacted by a case investigator, it means you have been identified as close contact, please respond promptly. You must assist with identifying other individuals who might have some degree of risk due to close contact with individuals who have been diagnosed with COVID-19.
- Contact the instructional team if you are impacted by COVID-19

Please note that due to the ongoing COVID-19 Pandemic, changes may be made in response to new developments and information.