EENG 398-01: Topics in Advanced Engineering Applications
Introduction to Radio Frequency (RF)
Spring 2024
Course Syllabus

General Information
Instructor: David Molinero (molinero@chapman.edu)
Lecture: KC N216, M: 7:00PM – 7:50PM
Office Hours: Monday, 5h30PM – 7PM (by appointment)

Course Description
Students will be exposed to topics in advanced topics in electrical engineering through directed reading and practicums.

See overview section below for specific details of this offering.

Course Learning Outcomes
The course is intended to provide students with an introductory class to radio frequency (RF) theory and hands-on on small signal measurements.

Program Learning Outcomes
The Chapman experience creates outcomes which are consistent with our identity. Similar to the General Education program, each degree program, or major, at Chapman has a unique set of learning outcomes, or student abilities that are not only related to Chapman's institutional mission and goals, but also unique to the student's discipline or field of study. For more information, **Fowler School of Engineering Program Learning Outcomes**.

Overview
The course is intended to provide students with an introductory class to radio frequency (RF) theory and hands-on on small signal measurements.

Schedule:
1. Course and Introduction
2. Basic Concepts: Impedances, Power, …
3. Waves
4. Transmission Lines
5. S-Parameters
6. Smith Chart
7. Components
8. Network Analyzer
9. Calibration

Design, build and perform RF measurements on two PCB boards.

Required Text

- Books
  - Microwave Engineering, David M. Pozar (Wiley)
  - RF and Microwave Engineering, Frank Gustrau (Wiley)
- Website:
  - Keysight - Application's notes
    - https://www.keysight.com/us/en/search.html/application-notes
  - Rohde & Schwarz (R&S) – Knowledge center
    - https://www.rohde-schwarz.com/us/knowledge-center/knowledge-plus/overview_255227.html
  - Microwaves 101
    - https://www.microwaves101.com/

Course Materials

All course materials will be made available via the course site on Canvas when possible.

Course Grade Breakdown

Grades will be based on attendance/participation, assignment, and mainly the final project.

The final project consists of designing, build and measure two PCB boards. The instructor will provide two PCB boards. Students will design their components, solder down and perform RF measurements. Prepare a presentation to show differences between theoretical design and experimental.

This course is graded on a P/NP basis.

Assignments

Assignments will consist of solving analytical problems or create scripts to solve particular problems (Python) to reinforce material covered in class. Assignments will be due one hour before the class day. Grading will be based on correct solution, but also comments and problems faced through the task.

Late Policy

No late work will be accepted. However, as unexpected things might happen, please communicate with your teacher not later than 2 days of the assignment time. Each case will be solved individually. No communication after this grace period might cause a class failure (NP).

Participation

It is expected that students attend every lecture. Participation in these sessions will contribute to the final course grade.

Final Presentation
There will be one final presentation based on a project defined at the beginning of the course.

Grading Percentages Breakdown (subject to change):

Attendance/Participation	*10 %*
Assignments	*40 %*
Final Presentation	*50 %*

Assignment Grading
All assignment will be graded by myself. Any questions concerning late submission or assignment grade inquiries should be directed to me via email. By all means approach me before or after class to ask questions, but I will request a follow-up email to make sure I don't overlook any action items.

Final Exam Time
The final presentation will be scheduled the last two days of the course at regular class time *Monday 7:00 – 7:50 pm*

Collaboration Policy
You have much to learn from your colleagues, and so I encourage you to discuss and study course material together. However, all work you submit for this course must be your own, and must be completed individually unless otherwise specified. More specifically, you may not present source code or programs copied from the Internet, other texts, other students, etc. as your own work. Of course, you are free to use whatever *reference* materials you like, but please cite them in a README turned in with your assignments. A README is a .txt document with a list of all reference materials used to aid in the assignment as well as names of other classmates you collaborated with. I assume you are familiar with Chapman's policy on academic misconduct, it is presented below and any incidents of academic misconduct or dishonesty will be dealt with severely in accordance with this policy.

Expectations and Technology Use
I expect that everyone will maintain a classroom conducive to learning. I like an informal atmosphere, but it must be orderly. Thus, everyone is expected to behave with basic politeness, civility, and respect for others. In particular, talking in class is okay if it's part of a class discussion or with me. Private communications are not permitted, especially during exams. Neither are reading extraneous materials, using electronic equipment off task, or sleeping. As this is a Computer Science class, technology is allowed to aid in learning and understanding material. However, please do not use a personal device for any purpose unrelated to our class. All devices should be silenced. Cell phones should be put away. Suggestions for improvement are welcome at any time. Any concern about the course should be brought first to my attention.

Chapman University's Academic Integrity Policy
Chapman University is a community of scholars that emphasizes the mutual responsibility of all members to seek knowledge honestly and in good faith. Students are responsible for doing their own work and academic dishonesty of any kind will be subject to sanction by the instructor/administrator and referral to the university Academic Integrity Committee, which may impose additional sanctions including expulsion. Please see the full description of Chapman University's policy on Academic Integrity.

Chapman University's Students with Disabilities Policy
In compliance with ADA guidelines, students who have any condition, either permanent or temporary, that might affect their ability to perform in this class are encouraged to contact the Office of Disability Services. If you will need to utilize your approved accommodations in this class, please follow the proper notification procedure for informing your professor(s). This notification process must occur more than a week before any accommodation can be utilized. Please contact Disability Services at (714) 516–4520 if you have questions regarding this procedure or for information or to make an appointment to discuss and/or request potential accommodations based on documentation of your disability. Once formal approval of your need for an accommodation has been granted, you are encouraged to talk with your professor(s) about your accommodation options. The granting of any accommodation will not be retroactive and cannot jeopardize the academic standards or integrity of the course.

Chapman University's Equity and Diversity Policy
Chapman University is committed to ensuring equality and valuing diversity. Students and professors are reminded to show respect at all times as outlined in Chapman's Harassment and Discrimination Policy. Please review the full description of Harassment and Discrimination Policy. Any violations of this policy should be discussed with the professor, the Dean of Students and/or otherwise reported in accordance with this policy."

Student Support at Chapman University
Over the course of the semester, you may experience a range of challenges that interfere with your learning, such as problems with friend, family, and or significant other relationships; substance use; concerns about personal adequacy; feeling overwhelmed; or feeling sad or anxious without knowing why. These mental health concerns or stressful events may diminish your academic performance and/or reduce your ability to participate in daily activities. You can learn more about the resources available through Chapman University's Student Psychological Counseling Services.

Fostering a community of care that supports the success of students is essential to the values of Chapman University. Occasionally, you may come across a student whose personal behavior concerns or worries you, either for the student's well-being or yours. In these instances, you are encouraged to contact the Chapman University Student Concern Intervention Team who can respond to these concerns and offer

assistance. While it is preferred that you include your contact information so this team can follow up with you, you can submit a report anonymously. 24-hour emergency help is also available through Public Safety at 714-997-6763.

Religious Accommodation
Religious Accommodation at Chapman University Consistent with our commitment of creating an academic community that is respectful of and welcoming to persons of differing backgrounds, we believe that every reasonable effort should be made to allow members of the university community to fulfill their obligations to the university without jeopardizing the fulfillment of their sincerely held religious obligations. Please review the syllabus early in the semester and consult with your faculty member promptly regarding any possible conflicts with major religious holidays, being as specific as possible regarding when those holidays are scheduled in advance and where those holidays constitute the fulfillment of your sincerely held religious beliefs.

Changes
This syllabus is subject to change only under extenuating circumstances. Updates will be posted on the course website.