ECE69500.3

RF Design: Passive and Active Components

Course Run

ECE695: RF Design: Passive and Active Components 2T2020

Instructor

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Audience

This course covers the fundamentals of RF passive and active devices. It is designed for students or engineers with basic background in high-frequency electronics as covered in the 'Primer on RF Design' course. By the end of this class students will be able to learn the necessary techniques and tools for designing high-performance passive and active RF components.

Course Description

Following the 'Primer on RF Design' course, this class focuses on passive and active components. We use the techniques learnt in the previous course, to design advanced RF devices including couplers, filters and amplifiers. Current research topics are discussed as appropriate.

Course Learning Outcomes

After successfully completing this class, students will be able to

- Describe and articulate the basic design principles of RF passive and active components.
- Design RF couplers, filters and amplifiers.
- Use CAD tools and analysis techniques to support the design of RF filters and amplifiers.

Required Text and Materials

Textbook

Steer, Michael. Microwave and RF Design Modules. Volumes 4 and 5. (Third Edition), NC State University, 2019.. https://repository.lib.ncsu.edu/handle/1840.20/36776

This book is available to be downloaded for free (open access ebook editions) from here: https://repository.lib.ncsu.edu/handle/1840.20/36776.

Each volume can also be purchased by NC State Press (e.g., volume 1 can be purchased here: https://uncpress.org/book/9781469656908/microwave-and-rf-design-volume-1/) for $14-$16 (paperback edition) or from any major bookstore online.

Some additional class notes will be distributed through the LMS.

Prerequisites

Primer on RF Design (ECE695.1)

Assignments (Course Requirements)

Homework: There will be a total of 3 homework assignments. Homework will normally be due every Monday at 11:59pm ET.

Projects: Two design projects that will need the CAD tool will be required.

Exam: There will no final exam for this class.

Grading

This course will be graded based on the following criteria:

- Homework : 40%
- Design project 1 : 30%
- Design project 2 : 30%

TOTAL : 100%

Course Content and Activities

Week	Dates	Topic	Tasks	Due
1	11/2 – 11/8	1. Basic Filter Design Concepts	• Lecture videos 1-20 • Read supplementary material from Chapter 2 (vol. 4) • All homeworks released • Projects 1 & 2 released	-
2	11/9 – 11/15	2. Advanced Filter Design	• Lecture videos 21-32 • Read supplementary material from Chapter 2 (vol. 4)	HW 1 due **Monday 11/09/2020 by 11:59 pm (ET)** [11/10/2020, 04:59 am UTC]
3	11/16 – 11/22	3. Linear Amplifiers I	• Lecture videos 33-40	-

			• Read supplementary material from Chapter 2 (vol. 5)	
4	11/23 – 11/29	4. Linear Amplifiers II	• Lecture videos 41-47 • Read supplementary material from Chapter 6 (vol. 3)	HW 2 due **Monday 11/23/2020 by 11:59 pm (ET)** [11/24/2020, 04:59 am UTC] Project 1 due **Monday 11/23/2020 by 11:59 pm (ET)** [11/24/2020, 04:59 am UTC]; extension to 11/30 possible
5	11/30 – 12/5	5. Couplers	• Lecture videos 48-63 • Read provided supplementary material	HW3 due **Monday 12/07/2020 by 11:59 pm (ET)** [12/08/2020, 04:59 am UTC] Project 2 due **Monday 12/07/2020 by 11:59 pm (ET)** [12/08/2020, 04:59 am UTC]; extension to 12/9 possible

Estimated Effort

- 6-9h hours/week depending on background
- 5 weeks total

Languages

Content: English | Videos: English | Transcripts: English

Course Difficulty
Advanced

Accessibility Support
Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let an instructor know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: mailto:drc@purdue.edu or by phone: 765-494-1247.

Visit edX's Website Accessibility Policy for information about accessibility on edX.

Course Help
This course will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates, the TA, and myself. Rather than emailing questions to the teaching staff, I encourage you to post your questions on Piazza. *It is likely that you will get an answer to your question much faster if you post it in piazza.com rather than if you email it to me or the TA.* The class on piazza is structured so you can discuss each homework and topics on each exam. Please post to the relevant thread to ensure a proper response.
You will receive an invitation to join piazza.

Technical Help
For general questions about using the edX platform, please refer to these resources:

- Technical Documentation: https://docs.edx.org
- Learner Help Center: https://support.edx.org/hc/en-us
- To get help with a technical problem, visit the *Help* link to contact edX Support.

Discussion Guidelines
Please follow the Discussion Guidelines when contributing to discussions in this course. Here are a few of the key points you should remember:

- Do not use offensive language. Present ideas appropriately.
- Be cautious in using Internet language. For example, do not capitalize all letters since this suggests shouting.
- Avoid using vernacular and/or slang language. This could possibly lead to misinterpretation.
- Keep an "open-mind" and be willing to express even your minority opinion.
- Make substantive posts or comments. Avoid comments that do not contribute to the discussion, like "thanks" or "good post."
- Do not hesitate to ask for feedback.
- Be concise and to the point. Give other students the opportunity to join in the discussion.
- Think and edit before you push the "Send" button.

Academic Integrity

Academic integrity is one of the highest values that Purdue University holds. Individuals are encouraged to alert university officials to potential breaches of this value by either emailing or by calling 765-494-8778. While information may be submitted anonymously, the more information that is submitted provides the greatest opportunity for the university to investigate the concern.

The Purdue Honor Pledge

"As a boilermaker pursuing academic excellence, I pledge to be honest and true in all that I do. Accountable together - we are Purdue"

Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity, promotes the exchange of ideas, and enriches campus life. Link to Purdue's nondiscrimination policy statement.