EEE 4373 and EEL 5934 Radio Frequency Electronics Syllabus 2016

Course Outline:

Weekly Date, (No. of Classes) Class topics, Readings, In Class Notes in pdf form.

01/06 (2) Syllabus, Permission and Survey, Intro to RF Technology, Agilent ADS PC Installation, ADS on the 2nd Floor of NEB, MOS Transistor Review, MOS Amp Practice Problem, Homework 1: Due Friday January 15.

Please install ADS on a PC or use ADS in the 2nd Floor NEB, You can use VMware to get off campus access to the NEB PCs too.

Good starting ADS Tutorial lecture, Click the link: http://rfmw.em.keysight.com/flash/eesof/ADS_QuickStart_2012_for_NEWUSERS/player.html

You can also view the Video "Basics of ADS" on Youtube

https://www.youtube.com/watch?v=ChZcUpH0rmk

Other videos on youtube are at

www.youtube.com/keysighteesof

If you register for an account on the online Keysight EEsof and EDA knowledge center there are many documents and files you can use for learning about Advanced Design system

http://edadocs.software.keysight.com/display/support/Knowledge+Center

Read Chapter 1, Sections 2.1 and 2.2

In Class Notes Lecture 1, In Class Notes Lecture 2

Audio Lecture1, Audio Lecture 2

Homework 1: Due Friday January 15.

01/11 (3) MOS Transistor Review, Amplifier Design Strategy, CMOS CE, CB and Cascode Amplifier Circuits, MOS Amp Practice Problem, Basic RF concepts, Nonlinearity, RF Microelectronics Errata, MOS Differential Circuits, MOS Practice Problem Solution16.
Homework 2: Due Friday January 22

Read Sections 2.2, and 2.3

In Class Notes Lecture 3, In Class Notes Lecture 4, In Class Notes Lecture 5,
Audio Lecture 3, Audio Lecture 4, Audio Lecture 5

01/20 (2) Martin Luther King Holiday Day January 18, 2016, Nonlinearity, Nolinearity Problem 2.1, Noise, Noise Calculation

Read Sections 2.3 and 2.4

Homework 3 Assigned

In Class Notes Lecture 6, In Class Notes Lecture 7
Audio Lecture 6, Audio Lecture 7.

01/25 (3) Noise, Noise Calculation, Basic S-parameter Analysis, Second Noise Calculation Examples, MOS Amps and S-parameters Notes, Sensitivity and Dynamic Range, Analog Modulation

Homework 4 Assigned

Homework 1 Solution

Homework 2 Solution

Read Sections 2.5, and 2.6

In Class Notes Lecture 8, In Class Lecture 9, In Class Notes Lecture 10,
Audio Lecture 8, Audio Lecture 9, Audio Lecture 10,

02/01 (3) Analog Modulation, S-parameter Supplemental Calculations, Digital Modulation, Transformers, Capacitive Transformers, Series to Parallel Conversions in Amplifiers,

Homework 3 Solution

Homework 5 Assigned

Read Sections 3.2, 4.2.1,

In Class Lecture 11, In Class Lecture 12, In Class Lecture 13
02/08 (3) Basic Heterodyne Receivers, Modern Receivers

Exam 1 Solution 2013

Exam 1 Solution 2015

Homework 3 Solution

Read Sections 4.1, to 4.2.3 page 186.

Homework 4 Solution

In Class Lecture 14, In Class Lecture 15, In Class Lecture 16

Audio Lecture 14, Audio Lecture 15, Audio Lecture 16

02/15 (3) Introduction to LNAs, Sliding IF Calculation, Exam 1, Wednesday February 17, LNA Topologies, Review amplifier calculations

Homework 6 Assigned

Homework 5 Solution

Read Sections 5.1 and 5.2

In Class Lecture 17, In Class Lecture 18

Audio Lecture 17, Audio Lecture 18

2/22 (3) Using ADS Slides, LNA Topologies, Basic Filter Analysis, Bipolar Transistor Review, Time Constant Analysis

Read Section 5.2

In Class Lecture 19, In Class Lecture 20, In Class Lecture 21

Audio Lecture 19, Audio Lecture 20, Audio Lecture 21

02/29 (0) University of Florida Spring Break, February 29 to March 4, Have a great vacation, no classes.
03/07 (3) Basic Filter Analysis, Bipolar Transistor Review, Time Constant Analysis, Time Constant Analysis MOS, Time Constant Calculation Examples BJT, LNA Topologies, LNA Design CS and CG,

ADS Design Project Assigned to Graduate Students Due April 20

Solution to Exam 1

Homework 6 Solution

Homework 7 Assigned, I will give many hints on how to analyze the BJTs and filter circuits in Homework 7 during class. But, you must attend class and ask questions during class to get help.

Review lessons for Homework 7 Transformers, Capacitive Transformers, Series to Parallel Conversion


Read Section 5.2

In Class Lecture 21, In Class Lecture 22, In Class Lecture 23

Audio Lecture 21, Audio Lecture 22, Audio Lecture 23

03/14 (3) Noise Calculation Example, Noise LNA circuit calculation Example, LNA Design CS and CG, Advanced LNA Design, Noise Analysis CG CS Example

Homework 8 Assigned

Homework 7 Solution

Read Sections 5.2 and 5.3

In Class Lecture 24, In Class Lecture 25, In Class Lecture 26

Audio Lecture 24, Audio Lecture 25, Audio Lecture 26

03/21 (3) Introduction to Mixers, File for tsmc 250nm technology, PDF of tsmc 250nm technology, Advanced Mixer Design

Exam II Study Guide

Solution to Homework 6
Solution to Homework 7
Solution to Homework 8
Read Section 5.3, 6.1 and 6.2
In Class Lecture 27, In Class Lecture 28, In Class Lecture 29
Audio Lecture 27, Audio Lecture 28, Audio Lecture 29

03/28 (3) Inductors and Passive Elements, Exam II, Inductor Calculation Example 2
Read Section 6.1, 6.2, 6.3 and 6.4
Homework 9 Assigned, Due April 8.
In Class Lecture 30, In Class Lecture 31
Audio Lecture 30, Audio Lecture 31

04/04 (3) Inductors and Passive Elements, Exam III Solution 2013, Inductor Calculation Example Oscillator Design

Exam III Solution 2015
Exam II Solution
Study Guide for Exam III
Homework 9 Solution
Read Sections 7.2 and 7.3
In Class Lecture 32, In Class Lecture 33, In Class Lecture 34
Audio Lecture 32, Audio Lecture 33, Audio Lecture 34

04/11 (3) Oscillator Design, Oscillators Basics, Example Problems Chapter 7 & 8, Example Problems Chapter 8, Exam 3
Read Chapter 8
In Class Lecture 35, In Class Lecture 36
Audio Lecture 36, Audio Lecture 37

04/18 (2) Power Amplifiers, Multicore Wireless On-chip, Graduate Student Project Due April 20, 2016

Read Chapter 8

Exam III Solution

In Class Lecture 38, In Class Lecture 39

Audio Lecture 38, Audio Lecture 39

There will be NO Final Exam.

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Web: http://www.tec.ufl.edu/~wre/

Class Period and Location: 8th period, MWF, 3:00pm to 3:50pm, Room LAR 310.

Office Hours: MWF 1:45pm to 2:45pm

TA: Arun Javvaji, arun.javvaji@UFL.EDU

Course Goals: To develop proficiency in analyses, design and implementation of radio frequency circuits. To develop expertise in using the Agilent ADS design system for circuit design.

Course Materials: I will be using the Syllabus to index of the daily class materials posted for you to review and to learn from. So, you can find most learning materials by clicking on a link from the Syllabus. I try to post all written materials and video materials used in the lectures to assist in your learning. I also post class lecture materials at least 24 hours ahead of time. I post 5 years of old quizzes or exams a week before the in class quiz. There will be folders that contain course materials (Course Notes, Audio Recordings, In Class Notes, etc) in the Files section of Canvas (see tabs on the left of this section).

Computer and Software Required:
PCs with Analog Design system on campus and a link to the ECE license file server, off-campus can use X-Windows or an X-terminal on a high-speed internet link to UF Campus Computers.

All students are required to have a Gator link account and use Canvas for course handouts, grade information, course notices, etc., see e-learning support services

Course Study Requirements:
Students are responsible to study all in class materials including those written on the board and presented orally, all Class Handouts all assigned readings, all projects and homework. Absence from class can result in missing materials tested on exams.

Attendance and Expectations: Attendance will be taken at least 2 times a week. Attendance will be 5% of your grade. There is a no wireless device policy (no cell phones, smart phones, computers, tablets, etc.) during exams.

“Requirements for class attendance and make-up exams, assignments, and other work in this course are consistent with university policies that can be found at: https://catalog.ufl.edu/ugrad/current/regulations/info/attendance.aspx.”

Catalog Description: Fundamental RF theory (such as resonant circuits, matching, noise and transmission lines), radio operation and design of key RF circuit blocks (such as amplifiers, mixers and oscillators).

Make Up Exam Policy: Students are expected to attend exams at the scheduled times. Exams can be made up if there is a genuine medical emergency with a doctor's or clinic medical note or a family emergency with some documentation. Students are NOT excused from exams for job interviews and early holiday travel home. Students with other non-emergency exam scheduling issues must obtain permission from the instructor prior to missing an exam.

Work Requirements:
Homework
Computer Laboratories and projects
Exams: Exam1, Exam 2 and Exam 3

Examinations: Quizzes as assigned
Exam 1: Tentatively, Third week of February
Exam 2: Tentatively, Last week of March
Exam 3: Tentatively, Second week in April

There will be no final.

Preliminary Course Grading Policy:

Homework and Projects - 20%
Exams- 75%
Attendance - 5%

Current UF Grading Policy for assigning grade points


Academic Honesty:
“UF students are bound by The Honor Pledge which states, “We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: “On my honor, I have neither given nor received unauthorized aid in doing this assignment.” The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.”

Students with Disabilities

“Students with disabilities requesting accommodations should first register with the Disability Resource Center (352-392-8565, www.dso.ufl.edu/drc/) by providing appropriate documentation. Once registered, students will receive an accommodation letter which must be presented to the instructor when requesting accommodation. Students with disabilities should follow this procedure as early as possible in the semester.”
Course Evaluations

“Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.”