ECE 431/531 Microwave Circuit Design I  
Winter 2011  
Syllabus  
Updated on 1/6/2011

Course Objectives:

This class is designed for senior undergraduates, first year graduate students, and practical electrical engineers to understand the principles of passive microwave components, design micro-strip circuits, and analyze active high frequency devices. The required backgrounds for this class are circuit theory, electromagnetics, signals and systems, and CMOS analog circuit design.

Prerequisite:

ECE 332 ENGINEERING ELECTROMAGNETICS II (4).

Course Outcomes:

(1) To use transmission line theory, S-parameters, and Smith chart for microwave circuit analysis.
(2) To design passive microwave matching circuits.
(3) To design microwave resonators and micro-strip circuits.
(4) To understand the features of active high-frequency devices.
(5) To use a microwave CAD tool for the above design problems.

Required Textbook:


Optional Textbooks:


Instructor: Dr. David H. Chiang  
E-mail: chiang@ece.pdx.edu  
Telephone: 503-725-2829 (Office)  
Office Location: FAB 40-21  
Office Hours: Sunday: 8:30 am to 10:30 am.
Class Time: Tuesday & Thursday: 6:40 pm – 8:30 pm  
Classroom: URBN 250

Outlines:

(1) Review of Electromagnetic Theory (3 Classes)  
(2) Transmission Line Theory and Smith Chart (3 Classes)
(2) Transmission Lines and Waveguides (3 Classes)
(3) Microwave Network Analysis (3 Classes)
(4) Impedance Matching and Tuning (3 Classes)
(5) Microwave Resonators (2 Classes)
(6) Active RF Components (2 Classes)

Grading Policy:

(1) Undergraduate: Homework: 20 %, mid-term exam: 20 %, Labs: 30 %, final exam: 30 %.
   A (100 – 90), A- (89 – 85) B+ (84 – 80) B (79 – 75) B- (74 – 70), C+ (69 - 65), C (64 – 60),
   C- (59 – 55), D+ (54 – 50), D (49 – 45), F (Below 45)

(2) Graduate: Homework: 15 %, mid-term exam: 20 %, Labs: 25 %, Presentation: 10 %, final exam: 30 %.
   A (100 – 90), A- (89 – 85) B+ (84 – 80) B (79 – 75) B- (74 – 70), C+ (69 - 65), C (64 – 60),
   F (Below 60)

ADS Lab Assignments and Microwave Circuit Demos:

Several ADS labs will be assigned this term. All ADS labs are done individually. The usage of microwave
test equipments and the passive microwave circuits will be shown in EMAG lab in FAB 60-08.

Microwave Computer Aided Design Tool: Advanced Design System (ADS) from Agilent Technologies

Midterm Exam: 6:40 pm – 8:30 pm, Thursday, 2/10/2011

Final Exam: 6:40 pm – 8:30 pm, Thursday, 3/17/2011

Class Policy:

The cellular phone must be turned it off during the class. No make-up exams will be given and no late
homework and ADS lab will be accepted unless a sincere excuse has been told in advance or an accident has
happened during the homework/ADS lab due days or exam days. The student who asks for submitting a late
homework or having a make-up exam needs to submit a valid document to the instructor to prove the excuse
or accident. New homework problems will be assigned for the late homework submission if the solutions of
the homework are released before the late homework due date. Different exam problems will be given for
the make-up exam. Final ADS lab and exam will not be returned to students. Only a scientific or a
graphical calculator can be used for calculations during the exams.

Academic Honesty Policy:

If a student is caught for cheating on an exam, the student will receive zero point for that exam.

Disability:

If you are a student with a documented disability and are registered with the Disability Resource Center
(DRC), please contact the instructor at the beginning of the course to set up appropriate academic
accommodation or testing services.