

**EE 432 – UHF and Microwave Engineering**  
Urbina  
Spring 2010

**H.O. #1**  
Jan. 12, 2010

### **COURSE OUTLINE**

**INSTRUCTOR:** Dr. Julio V. Urbina  
315 EE East, 863-5327, urbina@psu.edu  
Office hours: Thursdays 9:00 A – 11:00 A or by appointment

**WEB SITE:** Available on Penn State's Course Management System (ANGEL) at <http://cms.psu.edu>

**CATALOG DESCRIPTION:** Transmission line and waveguide characteristics and components; design of UHF-microwave amplifiers, oscillators, and filters; measurement techniques; design projects.

**COURSE:** This course provides education in microwave systems and techniques in-depth.

**LECTURES:** TR 1:00 P-2:15P 225 EE West

**TEXTBOOK:** Pozar D., Microwave Engineering, ISBN: 978-0-471-44878-5, Third Edition.

**REFERENCES:** Gonzalez G., Microwave Transistor Amplifiers Analysis and Design, ISBN: 0-13-254335-4.  
Scott A. W. and F. Rex, RF Measurements for Cellular Phones and Wireless Data Systems, ISBN: 978-0-470-12948-7.

**PREREQUISITE:** EE 310, EE 330.

**HOMEWORK:** Generally assigned every week and must be dropped off in the homework slot (wall next to 121 EE East) on the indicated due date before 4:30 PM. The solutions of the homework will normally be posted on EE 432 web site shortly after the assignment is due. The graded work should normally be returned one week after it is collected. Students can collaborate on the homework but the work turned in must be independent and not copied from collaborators.

**LATE POLICY:** Each student is allowed to turn in one homework (of their choice) late during the semester.

**EXAMS:** Three (one optional) in class exams will be held. The third exam (optional) will be held during Finals Week on the scheduled time.

#### **EXAM DATES:**

**Exam 1:** **Tuesday, February 23, 2010** (225 EE West, 1:00 to 2:20 PM).  
One (1) 8.5"x11" sheet of notes allowed.

**Exam 2:** **Tuesday, April 20, 2010** (225 EE West, 1:00 to 2:20 PM).  
Two (2) 8.5"x11" sheets of notes allowed.

**Final Exam:** TBA during Final Week on May 2010 (Optional) (2 hours)

Three (3) 8.5"x11" sheets of notes allowed.

**GRADING:** HW = 10%; Each Exam = 25% (50% total for exams); Labs 15%; Final Project = 25%.

**Teaching Assistant:** TBA

**ACADEMIC :** Incidents of academic dishonesty will be dealt with according to University policy.

**DISHONESTY** The current policy may be found at <http://www.psu.edu/dept/oue/aappm/G-9.html>

**COURSE CONTENT AND LESSON SCHEDULE (Tentative):**

Chapter	Topic	Date	Assignment
1	Introduction and Plane Waves 1.1 - 1.4, 1.5 - 1.9	2 (1/12, 1/14)	HW#1: 1.5, 1.8, 2.8, 2.9, 2.12, 2.14 Due: January 21
2	Transmission Lines, Smith Chart, and Matching 2.1 - 2.3, 2.3 - 2.6, 2.6 - 2.7	3 (1/19, 1/21, 1/26)	
3	Rectangular Waveguides and Microstrip 3.1 - 3.3, 3.7 - 3.11	2 (1/28, 2/2)	
4	S Parameters and Matrix Analysis 4.1 - 4.3, 4.4 - 4.8	2 (2/4, 2/9)	
5	Matching Networks and Reflection Coefficients 5.1 - 5.5, 5.6 - 5.9	2 (2/11, 2/16)	
	Review	1 (2/18)	
	<b>Exam #1</b>	<b>Tuesday, February 23</b>	
6	Microwave Resonators and Dielectric Resonators 6.1-6.3, 6.4-6.7	2 (2/25, 3/2)	
7	Dividers/Couplers and Quadrature Couplers 7.1-7.4, 7.5-7.8	2 (3/4, 3/16)	
10	Noise/ Mixers, Switches, and MMIC 10.1-10.2, 10.3	2 (3/18, 3/23)	
11	Amplifier Design and Broadband Amplifiers 11.1-11.3, 11.4-11.6	2 (3/25, 3/30)	
12	Oscillators, Frequency Multiplier, and Mixers 12.1-12.3, 12.3-12.5, 12.6	3 (4/1, 4/6, 4/8)	
13	Wireless Communications, 13.1-13.3	1 (4/13)	
	Review	1 (4/15)	
	<b>Exam #2</b>	<b>Tuesday, April 20</b>	
	Software Defined Radios, and Cognitive Radars	1 (4/22)	
	Project Presentations in Class	2 (4/27, 4/29)	
	<b>Total lectures</b>	30	