



Philadelphia University

Faculty of Engineering - Department of Communications and
Electronics Engineering

Course Information

Title: Antenna and Microwave Engineering (650427)

Prerequisite: Analog Communications – (0650420)

Credit Hours: 3 credit hours (16 weeks per semester, approximately 44 contact hours)

Textbook: " RF and Microwave Wireless Systems". Kai Chang Copyright at 2000 John Wiley & Sons, Inc.

References: 1- HarveyLehpamer"Microwave TransmissionNetwork: Planning, design, and Deployment"2nd Edition, Chicago, San Francisco, Lisbon, London,Madrid, Mexico City, Milan, New Delhi,San Juan, Seoul,Singapore,Sydney,Toronto.Copyright/Pub. Date:2010The McGraw-Hill Companies.

2- David M.Pozar "Microwave Engineering" 4th Edition, University of Massachusetts at Amherst , 4th edition (2011).

3- E. A. Wolff and R. Kaul, Microwave Engineering andsystems applications, John Wiley and Sons, New York, 1988.

Catalog

Description:

This course aims to provide students with capabilities to be able to design and implement Microwave system and antenna and to understand the effect of the frequency over the implemented and designed hardware. Moreover, choosing the matching hardware that is regarded optimum in term of power losses, reflection and transmission.

Course Topics

W	Basic and support material to be covered	HW, and Duties
1	RF and Microwave systems introduction	Homework (Two Home work is given)
2	Transmission lines at Microwave frequencies including the mathematic method and the Smith Chart method, VSWR , gain and losses of the power, ..., ets.	
1	Principle of wave guide, conventional wave guide and integrated circuit wave guide	
2	Microwave parameters, S-Parameters, parameters for Micoorstrip lines, Lumped elements, impedance matching network, matching stubs, and wave guide	
3	Antenna system design and arrays including: introduction, Isotropic Radiator and Plane Wave, Far-Field Region, Antenna Analysis, antenna characteristics and Parameters, Bandwidth, Power radiation Patterns, Polarization and Cross-Polarization Level	
3	Antenna types: Monopole and Dipole Antennas, Horn Antennas, Parabolic Dish Antennas, Microstrip Patch Antennas, Antenna Arrays and Phased Arrays	
1	Antenna Measurement	
3	Various Components and Their System Parameters, Couplers, Hybrids, and Power Dividers and Combiners, Resonators, Filters, and multiplexers, Isolators and Circulators,ets	

Course Learning Outcomes and Relation to ABET Student Outcomes:

Upon successful completion of this course, a student should be able to:

1.	Understand Microwave parameters, S-Parameters, parameters for Micro-strip lines, Lumped elements, and impedance matching networks.	[a, e]
2.	Compare different microwave elements in terms of reflection coefficient, transmission factor, power losses, and size to determine the most effective elements for a design requirement.	[c, e]
3.	Design microwave systems for the different applications.	[c]
4.	Analyze common antenna system design issues related to communication systems	[j]

Assessment Instruments:

Evaluation of students' performance (final grade) will be based on the following categories:

Exams: Two written exams are given. Each cover about 4-weeks of lectures

Quizzes: 10-minute quizzes will be given to the students during the semester. These quizzes will cover material discussed during the previous lecture(s).

Homework: Problem sets will be given to students. Homework should be solved individually and submitted before the due date.

Copying homework is forbidden, any student caught copying the homework or any part of the homework will receive zero mark for that homework

Participation: Questions will be asked during lecture and the student is assessed based on his/her response

Final Exam: The final exam will cover all the class material.

Grading policy:

First Exam	20%
Second Exam	20%
Homework, Quizzes and participation	20%
Final Exam	40%
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Total:	100%

Attendance policy:

Absence from classes and/or tutorials shall not exceed 15%. Students who exceed the 15% limit without a medical or emergency excuse, acceptable to and approved by the Dean of the relevant college/faculty, shall not be allowed to take the final examination and shall receive a mark of zero for the course. If the excuse is approved by the Dean, the student shall be considered to have withdrawn from the course.