Syllabus
ECE 5324/6324 – Spring 2016
Antenna Theory and Design
3.0 Credits

Pre-requisites:	ECE 3300
Time:	Tuesday/Thursday 3:40 PM-5:00 PM
Location:	WEB L126

Instructor:	David Schurig
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TA	Tom Wilenski
TA Office Location & Hours:	TBA

Course Overview
General theory of conduction current antennas; linear antennas including dipoles and monopoles; antenna equivalent impedance; design of AM, FM, TV and shortwave broadcast antennas of one or more elements including ground and mutual impedance effects; matching techniques including lumped, shunt, and series elements, transmission lines and conjugate matching; receiving antennas; antennas used for mobile communication systems and their radiation characteristics; antenna arrays and their design; wave propagation including propagation via ionosphere or troposphere; loop antennas and Yagi-Uda arrays; antenna synthesis for specified radiation patterns. UHF and microwave antennas including corner reflector antennas, helical antennas, theory of aperture antennas including rectangular and circular apertures; broadband log-periodic antennas; microstrip antennas and phased arrays including applications for wireless communication systems; slot antennas, turnstile, horn and parabolic radiators; considerations for radar antennas and communication links. Antenna ranges and measurement techniques.

Course Objectives
In this course, students will obtain:
1. Understanding of antenna fundamentals
2. Ability to design, and analyze the performance of, common antenna types.
3. Understand when to use analytical versus numerical techniques.

Required Texts
Antenna Theory and Design (3rd Edition), by Warren L Stutzman and Gary A. Thiele.
If you already own the second edition that will probably be fine, but you may need to reference the 3rd edition due to problem renumbering or changes.

Teaching and Learning Methods
Class meeting time will used for deriving core concepts (in real time on the board), working through problems, and exploring interactive demonstrations developed in Mathematica. Students are encouraged to bring laptop computers to class to interact with the downloadable demonstrations while in class. The majority of learning will occur as students work out the assigned problem sets. Because significant time will be spent working out problems in class, students will be expected to read and understand some material without the benefit of lecture.

Policies

Exams:

There will be three exams, two midterm exams and a final exam. These exams will take place in class, and will be "open book" - any printed resource or online material may be used.

Academic Integrity:

Students may work together on assignments, but every student must be able to explain their submitted work. Students may not work together on exams. Students are expected to exhibit integrity in their conduct and are subject to the University of Utah Code of Student Rights and Responsibilities (http://www.regulations.utah.edu/academics/6-400.html).

Americans with Disabilities Act (ADA) Statement

The University of Utah seeks to provide equal access to its programs, services and activities for people with disabilities. If you will need accommodations in the class, reasonable prior notice needs to be given to the Center for Disability Services, 162 Olpin Union Building, 581-5020 (V/TDD). CDS will work with you and the instructor to make arrangements for accommodations. All information in this course can be made available in alternative format with prior notification to the Center for Disability Services. (www.hr.utah.edu/oeo/ada/guide/faculty/)

Wellness Statement

Personal concerns such as stress, anxiety, relationship difficulties, depression, cross-cultural differences, etc., can interfere with a student's ability to succeed and thrive at the University of Utah. For helpful resources contact the Center for Student Wellness - www.wellness.utah.edu; 801-581-7776.

Assignments

Problem Sets:

There will be about six problem sets. You may work together on these but every student is responsible for being able to explain their submitted work. Please consider the importance of aesthetics and clarity when submitting your work. Typeset solutions will be greatly appreciated. Also, work the problems analytically to a reasonable conclusion before plugging in the numbers. Computational systems, such as MATLAB or Mathematica are recommended for numerical, or symbolic, evaluation. (Calculators are not really useful for reliable evaluation and debugging of complex evaluations.)

Grading Policy (Evaluation Methods & Criteria)

Grades will be based on: assigned problem sets and the project (~30%), the mid-term exams (~20% x 2), and the final exam (~30%).

Tentative Schedule

Introduction	Chapter 1	2 lectures
Antenna Fundamentals	Chapter 2	5 lectures
Simple Radiating Systems	Chapter 3	2 lectures
February 11, Midterm Exam 1		
Simple Radiating Systems (continued)	Chapter 3	1 lecture
System Applications for Antennas	Chapter 4	3 lectures
Wire Antennas	Chapter 6	4 lectures
Broadband Antennas	Chapter 7	1 lectures
March 24, Midterm Exam 2		
Broadband Antennas (continued)	Chapter 7	2 lectures
Array Antennas	Chapter 8	4 lectures
Aperture Antennas	Chapter 9	3 lectures
April 28, Final Exam		