Course Syllabus

California State University, Bakersfield (CSUB)
Department of Electrical & Computer Engineering & Computer Science
ECE 3320: Fields and Waves

Instructor
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Office: Room 322, Science Building III
Office hours: Wednesday, 2:00PM – 4:00PM

Lecture and Lab Sections
Lecture: Tu/Th 10:00AM - 11:15AM, Science III, Room 313
Laboratory: We 10:00AM - 12:30PM, Science III, Room 309

Prerequisite:
Prerequisite for ECE 3320 is MATH 203 or 233 and ENGR 207 or PHYS 207

Recommended Textbooks

Supplementary books:

Course Description:
Vector analysis, electrostatic and magnetic fields, Maxwell’s equations, plane waves. Reflection, attenuation, and impedance.

Course Objectives:
In this course students will learn to:
• Understand and apply the basic laws of vector algebra
• Select and use the appropriate orthogonal coordinate systems to solve engineering problems
• Analyze vector fields using various operations such as gradient, divergence, curl, and Laplacian.
• Solve transmission line problems in time domain and frequency domain.
• Find the relationship between load impedance, input impedance etc. Match the load to the transmission line using quarter wave transformer, single or double stub tuners.
• Understand Smith Chart and learn how to use it for solving transmission line problems.
• Design impedance-matching networks.
Laboratory
The laboratory of this course consists of a set of experiments to complement the material covered in the lecture course. Attendance in lab is mandatory.

Laboratory Topics:
- Measurement of voltage standing wave ratio (VSWR)
- Measurement of diode detector law
- Measurement of impedance and impedance matching
- Measurement of radiation diagram of a horn antenna
- Use of directional couplers in power transmission and reflection measurement
- Series, shunt & hybrid tee waveguide junctions
- Waveguide-to-coaxial transformers
- Microwave radio link investigations

You will be using a microwave sets as shown in the following figures to observe the effects of wave propagation and the various behaviors these waves can exhibit. The equipment you will be using utilizes an oscillator to modulate an input signal to very high frequencies. These frequencies are then sent to the transmitter, a horn antenna, and is sent through space. At the receiver side, a similar horn antenna intercepts the signal, and then demodulates the high frequency signal back to the original input signal. This concept is the basis of nearly all digital and analog telecommunication.
Course Syllabus

Homework
Homework will be assigned on a weekly basis, covering the material discussed in class. It is due at the beginning of class on the date specified. Problems in each homework will be graded on the following basis: a correct answer gets 100%, a reasonable attempt gets 50%, and no attempt or a very poor attempt gets 0%.

Late policy: No late submissions will be accepted, as solutions will be posted on the day after it is due.

Grading
Your final grade will be the weighted average of the homework, Lab, midterm and final exams, as calculate from the formula below:

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<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
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<tr>
<td>Labs</td>
<td>20%</td>
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<tr>
<td>Midterm exam</td>
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<td>Final exam</td>
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All students enrolled in this course must attend Final Exam. An absence at final exam will result in an ‘F’ grade in the course. If you have any conflict with the final exam date, you must notify me two weeks prior to the final exam.
Course Syllabus

Accessibility
California State University, Bakersfield attempts to guarantee access to all classes by all students. Students can find CSUB’s accessibility policies and services by going to the website for the Office of Services for Students with Disabilities. In addition, E-Learning Services at CSUB has its own policy for guaranteeing access to students in online classes:
"California State University, Bakersfield is committed to providing equal access to Web-based information for people with disabilities. This is in accordance with Section 504 of the 1973 Rehabilitation Act, Section 508 of the Rehabilitation Act Amendment of 1998 and the 1990 Americans with Disabilities Act, and Executive Order 926 of California State University."
To achieve the goal of universal accessibility, CSUB uses Blackboard as its Learning Management System (LMS), the first LMS to receive the Nonvisual Accessibility Gold Certification by The National Federation of the Blind. Students can read more about Blackboard’s guarantee of accessibility and its accessibility programs at its website.

Technical Requirements and Support
All of the lectures in this class were given in PDF. Adobe Acrobat Reader is available on every computer on the CSUB campus. If students have difficulty with the content of the class, they need to contact the instructor. If students are having any technical problems with Blackboard, or loading the IPA fonts from Blackboard to their own computers, then students need to contact the Blackboard Help Desk, either by telephone (661) 654-2315 or by email lmssupport@csub.edu. Students may also go to the E-Learning Services Building on the east side of the Walter Stiern Library.