Course Description
This course is designed to acquaint the student with the basic mathematical tools used in electrical and computer engineering. The concepts covered in this course will be used in higher level courses and, more importantly, throughout your career as an engineer. Major topics of the course include complex numbers, real and complex functions, signal representation, elementary matrix algebra, solutions to linear systems of equations, linear differential equations, Laplace transforms used for solving linear differential equations, Fourier Transforms and their uses in solving electrical engineering problems.

Prerequisite:
ECE 200 and the material in chapter 1 of the textbook.
The student should be able to write simple programs in a high level programming language.
The course will make heavy use of the MATLAB software package. For on-site students, MATLAB is available on the EOS system.

Textbook and additional references.

Additional References:


Course objectives
1) Use MATLAB to solve computational problems and generate publishable graphics.
2) Use complex arithmetic and complex functions to describe applied problems. Describe complex numbers and functions in rectangular and exponential forms. Graph the magnitude and phase of complex functions.
3) Use matrix forms to describe and solve linear systems of equations and systems of differential equations.
4) Solve first and second order linear differential equations with constant coefficients both analytically and numerically. Use the analytic methods of undetermined coefficients and Laplace transforms. Use the MATLAB routine ODE23 to solve DEs numerically.
5) Define the Fourier series for a periodic signal. Define the Fourier transform of a non-periodic signal. Compute the Fourier series and transform from their definitions as integrals.
6) Determine the Fourier series of the summation of sinusoids directly from the definition by using Euler's formula.
7) Use the properties of linearity, time-shifting and time-scaling to compute the Fourier series of complex functions from the Fourier series of simple functions.

Grading:

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<td>Homework</td>
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<td>Final</td>
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<td>Problem Lab</td>
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Email Correspondence:
ALL email correspondence to your respective instructor should start with a subject line: ECE220-Section #.

Homework:
All homework assignments will be completed and turned in via the Webworks systems. Homework assignments are due 7 days after they are assigned at 11:59pm. Any homework problems submitted during this time period will count for max credit if correct. A 24hr reduced scoring period will be assigned for each homework assignment. Problems completed/submitted during this time will incur a 30% reduction in credit (70% max credit) for that problem. Any exceptions to this policy will require university acceptable documentation.

Tests:
There will be no make up tests. The grade for excused absences (requires documentation on test days) will be the same as final exam grade.

Note to On-Campus Students:
Captured Lectures: This on campus course will be captured and distributed via the Internet and/or electronic media as part of the Engineering Online (EOL) program for the distance students. These video recordings may contain an image of you entering the classroom, asking questions or being a part of the studio class. Please notify Dr. Linda Krute, Director of EOL, in writing at ldkrute@ncsu.edu if you DO NOT want your image to be included in the lecture presentation. If we do not hear from you after the first week of the class, we will assume that you are in agreement with this procedure.

Distance Education Students
DE Office Hours: Office hours for Distance Education Students will be held on T 3:30-5pm or by Appointment. Recommended ways to contact the instructor during DE office hours include
- Google Chat: ece220.ncsu@gmail.com
- Email: cmwilli5@ncsu.edu (Subject: ECE220-DE)
- Course Message Board
- Office Phone: 919-513-1923

DE Homework Assignment Submission: Distance students will turn in all homework assignments via the Webworks system (see above).
**DE Message Board:** A single message board will be created for the on campus and distance sections. This message board can be accessed at [http://courses.ncsu.edu/ece220](http://courses.ncsu.edu/ece220)

**Further DE Comments:** All other section of the syllabus, unless otherwise stated, pertain to both on campus and distance education students.

**Audit and Credit Only requirements:**
Students auditing or taking the course for ‘credit only’ are required to turn in 50% of the homework assignments and obtain a minimum grade of C to earn credit.

**Problem Laboratories:**
Problem labs are required. They are carefully designed to provide additional practice to the concepts taught in class by using demonstrations or built–in MATLAB functions. The contents are monitored to be in sync with the class material.

**Academic Integrity**
Students are expected to work within the letter and spirit of the NCSU Code of Student Conduct. Refer to NCSU web page for code of student:

[http://www.fis.ncsu.edu/ncsulegal/41.03-codeof.htm](http://www.fis.ncsu.edu/ncsulegal/41.03-codeof.htm)

**Students with Disabilities**
Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of available accommodations, student must register with the Disability Services Office ([http://www.ncsu.edu/dso](http://www.ncsu.edu/dso)) located at 1900 Student Health Center, Campus Box 7509, 515-7653. For more information on NC State's policy on working with students with disabilities, please see the Academic Accommodations for Students with Disabilities Regulation at [http://www.ncsu.edu/policies/academic_affairs/courses_undergrad/REG02.20.1.php](http://www.ncsu.edu/policies/academic_affairs/courses_undergrad/REG02.20.1.php).