

NEWARK COLLEGE OF ENGINEERING

SYLLABUS AND COURSE INFORMATION

Course Name: Circuit Analysis: Transform Methods

Course Number: ECET 300

Course Structure: 3-0-3 (lecture hr/wk – lab hr/wk – course credits)

Course Description: The principles, theorems and techniques of circuit analysis are reviewed. The technique of waveform and circuit transforms is introduced. Laplace transforms are studied and applied in the solution of circuit problems with a variety of input functions. Fourier analysis also is introduced. Extensive use of computer simulation software.

Prerequisites: (ECET 303 or ECE 232) & (Math 238 or Math 112) & (ECET 205 or ECE 271)

Corequisites: Math 322 or Math 222

**Required, Elective,
or Selected Elective:** Required

Required Materials: **Text:** Name: Transform Circuit Analysis for Engineering and Tech
Author: William D. Stanley
Year: 2002
ISBN: 978-0-13-060259-6

Course Outcomes: By the end of the course students are able to:

1. Demonstrate the proper use of MATLAB to perform data analysis and graphing to solve technical problems.
2. Use Laplace Transforms to solve various RLC circuit problems.
3. Identify the best circuit theory to apply to various RLC circuits to solve for voltage and current measurements, and utilize these theories to solve these circuit problems.
4. Simulate a circuit with the use of Multisim to obtain a prior understanding of a circuit's behavior, and incorporate these results in a laboratory report.
5. List the differences between time and frequency analysis.
6. Theoretically and experimentally generate a Bode plot, as well as simulate these results with Multisim.
7. Write an effective laboratory report according to acceptable criteria.
8. Demonstrate solutions of differential equations using transforms
9. Calculate integration and differentiation of various waveforms using graphical methods.
10. Demonstrate the relationship between various signals and their spectrum.
11. Design circuits with particular frequency response characteristics.

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Class Topics: Complex Numbers Elementary Functions
Addition of Sinusoids Shifted Functions
Impulse Functions Differentiation and Integration
Laplace Transforms Capacitors and Inductors
Inverse Laplace Transforms System Considerations
Steady State Analysis Bode Plots
Fourier Series and Transforms

Student Outcomes: The Course Learning Outcomes support achievement of the following Student Outcomes from the ETAC of ABET Criterion 3 requirements.

Student Outcome 1: An ability to apply knowledge, techniques, skills and modern tools of mathematics, science, engineering, and technology to solve broadly defined engineering problems appropriate to the discipline.

Related Course Learning Outcomes: 3, 4, and 6

Student Outcome 3: An ability to design systems, components, or processes meeting specified needs for broadly defined engineering problems appropriate to the discipline.

Related Course Learning Outcomes: 11

Academic Integrity: Academic Integrity is the cornerstone of higher education and is central to the ideals of this course and the university. Cheating is strictly prohibited and devalues the degree that you are working on. As a member of the NJIT community, it is your responsibility to protect your educational investment by knowing and following the academic code of integrity policy that is found at:

<http://www5.njit.edu/policies/sites/policies/files/academic-integrity-code.pdf>

Please note that it is my professional obligation and responsibility to report any academic misconduct to the Dean of Students Office. Any student found in violation of the code by cheating, plagiarizing or using any online software inappropriately will result in disciplinary action. This may include a failing grade of F, and/or suspension or dismissal from the university. If you have any questions about the code of Academic Integrity, please contact the Dean of Students Office at dos@njit.edu

Modification to Course: The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the Course Outline.

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Updated: 11 March 2023