

ECE3100: Network Analysis

Required Course

2006-2007 Catalog Data

Network Analysis (3-0). Classical and transform methods of network analysis, signals and waveforms. Fourier Series, Fourier Transforms, and Frequency response. Prerequisites: ECE 2100.

Textbooks

- **Required**

Fundamentals of Electric Circuits, Alexander and Sadiku, McGraw-Hill, 3rd edition, 2007.

- **Recommended**

None

Coordinator: Ikhlas Abdel-Qader, Associate Professor, ECE

Instructors: Ikhlas Abdel-Qader, Associate Professor, ECE

Prerequisites by topic:

1. Methods of Circuit Analysis (Superposition, NA, MA, Thevenine and Norton equivalents)
2. Operational Amplifiers and Energy-Storage Elements
3. Transient analysis and forced response
4. Sinusoidal steady state analysis
5. AC Power Analysis
6. Complex Algebra, Matrix Algebra, and integration

Course Objectives (Corresponding with ABET Outcomes)

ABET learning outcome assigned to this course be ECE assessment plan: a, and e.

1. Understand the concept of a system and basic system properties (a and e)
2. Understand the concepts of linear and shift invariant systems and convolution (a and e)
3. Be able to perform Convolution integrals (a, e, and k)
4. Understand and apply Laplace Transform to signals (a, e, and k)
5. Use Laplace Transform to analyze circuits (a, e, and k)
6. Understand and use Transfer Function to solve for circuit response (a, e, c, and k)
7. Have the ability to represent signals in different domains such as Laplace, Fourier, and Fourier series (a, e, c, and k).
8. Learn how to use Fourier series for circuit analysis (a, e, and k).
9. Learn Fourier Transform, spectrum concept, and frequency response (a, e, and k)
10. Learn and perform frequency circuit analysis (a, c, e, g and k)
11. Learn and generate Bode Plots for circuits (a, e, and k).

Course Topics

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| 1. Basic concepts of signals and systems | Lecture notes |
| 2. Introduction to the Laplace Transform | Ch 15 |
| 3. Applications of the Laplace transform | Ch 16 |
| 4. The Fourier Series and Circuit analysis | Ch 17 |
| 5. Fourier Transform and Circuit analysis | Ch 18 |
| 6. Frequency Response | Ch 14 |
| 7. Bode Plots | Ch. 14 |

Course/Laboratory Schedule

Three 50-minute lectures per week, two 1-hour exams, a two-hour final exam, frequent homework assignments and quizzes, and team of two work on several computer assignments.

Contribution to Professional Component

ABET professional component content as estimated by faculty member who prepared this course description:

Engineering Science: 3 credits or 100%

Engineering Design: 0 credit or 0%

Contribution to Program Objectives

This course contributes to program objectives Breath and Depth

Prepared by: Ikhlas Abdel-Qader

Date: January 11, 2007