

Course Syllabus
ECE 648—Electrical Network Theory

Department: Electrical and Computer Engineering
Course Number: ECE 648
Course Title: Electrical Network Theory
Credit Units: 3

Course Description

The analysis and synthesis of passive networks using two port theory. Matrix, signal flow and computerized techniques in active network design with emphasis on signal processing.

Prerequisite by Topic:

Students taking this course should have graduate standing in electrical or computer engineering. They must be familiar with linear system theory, both continuous and discrete. They must be able to solve S-domain and Z-domain problems; these are the main prerequisites for this course.

Text and Software:

Reference Text:

Budak, Aram: Passive and Active Network Analysis and Synthesis, Waveland
Other material will be taken from recent IEEE and AES Journals.

Course Objectives

After completing this course the student will be able to

1. Analyze any filter configuration
2. Synthesize within a reasonable percentage error any given filter specification
3. Design the synthesized circuit with practical parts
4. Test and improve the design if required

Topics Covered/Course Outline

1. The System Function
2. Characterization and Discussion of Responses in Networks
3. Properties of Input Impedance
4. Synthesis of LC or RC input impedances
5. Transfer Function Synthesis
6. Second Order Systems
 - A. Low Pass
 - B. High Pass
 - C. Band Pass
 - D. Band Stop
 - E. All Pass
7. RC Oscillators
8. Magnitude and Phase Functions
9. Approximations
 - A. Butterworth
 - B. Chebyshev
 - C. Linear Phase
 - D. Phase Equalization

Relationships to Program Outcomes

This course supports the achievement of all the outcomes from (a)- (h).

Prepared by :

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