ECE 4324: Computer-Aided Circuit Analysis

Credit / Contact hours: 3 / 3
Course coordinator: Donald Y.C. Lie

Textbook(s) and/or other required material: (1) Recktenwald, Introduction to Numerical Methods and MATLAB: Implementations and Applications, Prentice Hall, 0-201-30860-6 (Recommended); (2) Fletcher, MOSFET Modeling with SPICE: Principles and Practice, Prentice Hall, 0-13-227935-5 (Recommended); (3) MATLAB Student License (Recommended)

Catalog description: Introduction to the concepts, use, and limitations of computer-aided circuit and system analysis techniques and tools. Discussion of numerical analysis techniques and their applications to circuit and system analysis.

Pre-requisite(s) or co-requisites: ECE 3312 (Electronics II)

Designation: Required

Course learning outcomes: Upon completion of this course, students should be able to do the following:

1. Apply specific computer-aided analysis tools to complex circuits and systems.
2. Describe the characteristics and limitations of the tools.

Student outcomes addressed: a, e, and k.

Topics covered
Overview of MATLAB - 2 hours
Numerical techniques and roots - 3 hours
Linear algebra and solving systems of equations - 3 hours
Fitting curves to data - 3 hours
Interpolation and integration - 3 hours
Engineering applications - 8 hours
Overview of SPICE - 2 hours
Analysis and simulation capabilities - 3 hours
Macromodels and macromodeling techniques - 3 hours
Engineering applications - 8 hours
Tests and reviews - 4 hours