EE-4211
Computer-Aided Circuit Design

Curricular Designation:  CpE: Elective  EE: Elective

Catalog Description: Basic techniques in computer aided analysis and design of networks. Includes automatic formulation of equations and fundamental programming techniques pertinent to computer-aided network analysis and modeling. Special topics may include sensitivity calculation, system analogies, and/or design optimization. Credits: 3.0 Lec-Rec-Lab: (0-3-0) Semesters Offered: Fall Summer Restrictions: Must be enrolled in one of the following Major(s): Computer Engineering, Electrical Engineering Pre-requisites: EE 2110

Textbooks(s) and/or Other Required Materials:

Prerequisites by Topic:
Familiarity with the methods of circuit analysis and computer programming skills.

Course Objectives:
1. Familiarity with the mathematical techniques used for computer-aided circuit analysis.
2. Familiarity with computer programming for circuit analysis.
**Topics Covered:**

1. Fundamental concepts of circuit analysis and design
2. Network equations and their solution
3. Graph theoretic formulation of network equations and general formulation methods
4. Numerical integration of differential equations
5. Network functions in the frequency domain
6. DC solution of networks
7. Sensitivity calculations
8. Computer-Aided Projects: Nodal formulation generator; Linear equations solver with real & complex coefficients; Ordinary differential equations solver; Transfer function generator; Nonlinear equations solver

**Relationship of Course to Program Outcomes** (See UPAC SOP, Tables 1 and 2):

**EE:**
- Outcome: a via topic(s): 1, 2, 3, 4, 5, 6, 7
- Outcome: k via topic(s): 8
- Outcome: n via topic(s): 2, 3, 4, 5, 6, 7

**CpE:**
- Outcome: a via topic(s): 1, 2, 3, 4, 5, 6, 7
- Outcome: k via topic(s): 8

**Contribution of Course to Meeting the Professional Component:**

**EE:** Engineering Topics

**CpE:** Engineering Topics

**Class/Laboratory Schedule** (note: 1 hour = 50 minutes):

Lecture: 30 hours = 2 hours/week for 15 weeks
Computer-aided design: 15 hours = 1 hour/week for 15 weeks

**Prepared by:**
Ashok Goel, Associate Professor, February 23, 2004