Course Syllabus

ELCT 350 – Computer Modeling of Electrical Systems

Course Coordinator: Undergraduate Program Committee

Catalog Description: Use of appropriate computer and applications software and languages for modeling electrical and electronic systems

Credit Hours 3

Prerequisite(s) by course CSCE 145 and ELCT 222

Prerequisite by topics Signals, Convolution, Differential Equation, Laplace transform, Z-transform, Fourier series, Basic MATLAB commands, Computer Organization, Microprocessor, Arithmetic

Required Textbook None

Other Materials Class notes posted on Blackboard

Course Outcomes:
Students who successfully complete the course will be able to:

- formulate a physics-based dynamic model of an electrical or electromechanical system.
- apply numerical integration to solve a set of dynamic equations in discrete time.
- identify the most suitable modeling approach according to simulation objectives.
- use object oriented programming language (C++) to implement the solution to a set of equations.
- develop models from physics-based equations and to implement these models in reusable form by using object oriented programming language (C++).
- identify and use good software engineering practices in the implementation of modeling and simulation programs.
- use simulation tools and understand their structures (MATLAB, VTB).

Course Topics:

- Introduction to Circuit Simulation
- Linear DC Nodal Analysis
- Solution of Linear Equations
- Linear Transient Analysis
- State Space formulation of dynamic circuit
- Signal flow representation of dynamic circuit
- From State Space representation to Laplace representation
- C++ Programming for Circuit Simulation
- Using simulation tools: Matlab, VTB

Course Contribution to Program Outcomes:

ELCT 350 contributes to an achievement of:

- Outcome A – an ability to apply knowledge of mathematics, science and engineering
- Outcome E - an ability to identify, formulate, and solve engineering problems
- Outcome I – a recognition of the need for, and an ability to engage in life-long learning.
- Outcome K -- an ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
General Course Policies

Academic Integrity
Unless otherwise stated, assignments and examination work are expected to be the sole effort of the student submitting the work. Students are expected to follow the University of South Carolina Honor Code and they should expect that every instance of a suspected violation will be reported. Students found responsible for violations of the Code will be subject to academic penalties under the Code in addition to whatever disciplinary sanctions are applied.

Accommodating Disabilities
Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, contact the Office of Student Disability Services: 777-6142, TDD 777-6744, email sasds@mailbox.sc.edu, or stop by LeConte College Room 112A. All accommodations must be approved through the Office of Student Disability Services.

Diversity
When scheduling exams, I have attempted to avoid conflicts with major religious holidays. If, however, I have inadvertently scheduled an exam or major deadline that creates a conflict with your religious observances, please let me know as soon as possible so that we can make other arrangements.

Recommended Study Habits
- Read the assigned material before class.
- Bring thoughtful questions to class for discussion.
- Prepare for the exams in study groups.
- Take notes during class discussions and while completing reading assignments.

Deviations
Minor deviations from the syllabus are a normal part of any adaptive teaching and learning process.