ELCT 350 - Computer Modeling of Electrical Systems

CREDITS/CONTACT HOURS: Credits: 3, Contact Hours: 42

COORDINATOR: Dr. Viji R. Avali

TEXTBOOKS AND OTHER REQUIRED MATERIAL: Notes provided by Instructor

SUPPLEMENTAL MATERIALS: None

CATALOG DATA: (Prerequisite: Grade of C or better in ELCT 222, CSCE 146, CSCE 212).
Lecture: 2 periods of 50 minutes per week
Recitation: 0 periods per week
Laboratory: 1 period of 50 minutes per week

REQUIRED/ELECTIVE: Required

TOPICS COVERED:
1. Introduction to Circuit Simulation – 3 hours
2. Linear DC Nodal Analysis – 2 hours
3. Solution of Linear Equations – 2 hours
4. Linear Transient Analysis – 4 hours
5. State Space formulation of circuit dynamic -8 hours
6. Java Programming for Circuit Simulation – 8 hours
7. Using simulation tools: Matlab, VTB – 10 hours
8. Tests and Labs - 5 hours

COURSE OUTCOMES:
1. Be able to create a physics-based dynamic model of an electrical or electromechanical system.
2. Be able to use numerical integration to solve a set of dynamic equations in discrete time.
3. Be able to use object oriented programming language(s) to implement the solution to a set of equations.
4. Be able to create models from physics-based equations and to implement these models in reusable form by using object oriented programming languages.
5. Identify and use good software engineering practices in the implementation of modeling and simulation programs.
6. Be able to use commercial simulation tools, understanding their structures.
Relation of course outcomes to program outcomes

H = major importance, M = moderate importance, L = minor importance, blank indicates no relation

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<tr>
<th>Program Outcomes</th>
<th>Course Outcomes</th>
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<tr>
<td>an ability to apply knowledge of math, science and eng. (a)</td>
<td>M</td>
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<td>an ability to design and conduct experiments, as well as to analyze and interpret data (b)</td>
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<td>an ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability (c)</td>
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<td>an ability to function on multidisciplinary teams (d)</td>
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<td>an ability to identify, formulate, and solve engineering problems (e)</td>
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<td>a recognition of the need for, and an ability to engage in life-long learning (i)</td>
<td>M</td>
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<td>a knowledge of contemporary issues (j)</td>
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<td>an ability to use the techniques, skills, and modern eng. tool necessary (k)</td>
<td>M</td>
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ASSESSMENT METHODS:

1. Written examinations
2. Written homework assignments
3. Homework assignments using computer analysis
4. Oral presentation