Course Syllabus

ELCT 221 - CIRCUITS

Course Coordinator: Undergraduate Program Committee

Catalog Description: Linear circuit analysis and design

Credit Hours 3

Prerequisite(s) by course MATH 142 and ELCT 102 or 220

Prerequisite by topics Electrical Charges & Forces, Current & Voltage, Ohm’s Law, Calculus


Course Outcomes:

Students who successfully complete the course will be able to:

- solve problems on DC and AC linear circuit analysis using nodal, mesh and source transformation (Thevenin and Norton) techniques.
- find the impedance of and power in R, L, C network components.
- use MATLAB (or equivalent) tool to solving mesh and nodal matrix equations, calculating voltages, currents, impedances and powers in linear circuits.
- use SPICE simulations to build the schematics and generate frequency dependencies of currents and voltages in linear circuits.

Course Topics:

- Potential and Voltage (review)
- Current and Ohm’s Law (review)
- KCL & Parallel Circuits, KVL & Series Circuits (Review)
- Nodal and Mesh Analysis
- MATLAB (FreeMAT) tool
- Thevenin and Norton transformations
- Superposition and Linearity Techniques
- Sinusoidal (AC) Signals
- Capacitors and inductors in AC circuits
- Phasors and complex numbers
- Nodal and Mesh Analysis of AC circuits
- Thevenin and Norton transformations in AC circuits
- Power in AC Circuits
- SPICE simulations of RLC circuits
- Three-phase circuits

Course Contribution to Program Outcomes:

ELCT 221 contributes to an achievement of:

- Outcome A – an ability to apply knowledge of mathematics, science and engineering
- 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**
In addition to 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.