Course Syllabus

ELCT 102 – Electrical Science

Course Coordinator: Undergraduate Program Committee


Credit Hours 3

Prerequisite(s) by course MATH 141 (or coreq)

Prerequisite by topics Calculus of single variables I


Course Outcomes:
Students who are successful in this class (i.e. earn a C or better) will demonstrate at least the abilities to:

- apply mathematical skills, up to single-variable calculus, to problems in electrical engineering
- solve Coulomb's law for force between charged particles, forces on particles in fields, and energy of a particle at some electric potential.
- calculate the resistance, capacitance, and inductance of simple electronic components based on physical parameters and dimensions.
- find currents and voltages in series and parallel resistive networks for constant excitation
- apply Kirchhoff's voltage and current laws to find voltages and currents in resistive circuits
- calculate power and energy absorbed or supplied by a component from its terminal currents and voltages, for constant and linearly varying V or I
- evaluate the equivalence of series and parallel connections of resistors, capacitors, and inductors
- use MATLAB to apply matrix methods to solve two simultaneous equations, and to create basic two dimensional plots

Students who demonstrate higher proficiency will earn higher grades.

Course Topics:

- Electrical charges and electrical forces
- Free electrons, conductors and insulators
- Electrical current and voltage
- Ohm’s law, resistance, and resistivity
- Kirchhoff’s Voltage and Current conservation laws (KCL and KVL)
- Electrical power and energy
- Batteries and power sources.
- Resistors, capacitors, and inductors.
- Functional behavior of diodes and transistors
- Introduction to MATLAB
- Why lifelong learning is essential in the EE profession

Course Contribution to Program Outcomes:
ELCT 102 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. (Matlab)
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.