كلية الهندسة

GE 205 Fundamentals of Electrical Engineering (Required Course)

Code and Name: GE 205 Fundamentals of Electrical Engineering
Credit Hours: 3 (Lecture: 3, Tutorial: 1)

Textbook:
- Fundamentals of Electrical Engineering, Giorgio Rizzoni, 1st Edition, McGraw Hill, 2009.

Other References:
- Fundamentals of Electric Circuits, C. K. Alexander, and M. N. O. Sadiku, 5th Edition, McGraw-Hill, 2006.
- Engineering Circuit Analysis, William Hayt, Jack Kemmerly, and Steven Durbin, 7th Edition, McGraw-Hill, 2007.
- Theory and Problems of Electrical Circuit, Mahmood Nahvi, and Joseph Edminister, 4th Edition, Schaum's Outline Series, 1997.

Course Description:
Basic laws: Ohm's, KVL, KCL. Resistive networks. Circuit analysis techniques: nodal and mesh analysis. Network theorems: Thevenin's, Norton's, source transformations, superposition, maximum power transfer. Energy storage elements. phasor technique for steady-state sinusoidal response. Transient analysis of first-order circuits.

Pre-requisites: MATH 106, PHY 118, PHY 120.
Co-requisites: None

Course Learning Outcomes:
With relation to ABET Student Outcomes (SOs: 1-7)

1. Student will be able to apply basic knowledge of mathematics, science, and engineering to solve fundamental electric circuit problems (1)
2. Student will be able to perform calculations correctly in engineering (1)

Topics to be covered:
- System of Units, Charge, Current, Electrical power
- Resistance and Ohms Law, Kirchhoff's Current Law, Kirchhoff's Voltage Law
- Circuit Elements & their i-v Characteristics, Measuring Devices
- The Node Voltage Method, The Mesh Current Method, The Principle of Superposition
- One port Networks and Equivalent Circuits, Maximum Power Transfer Theorem, Nonlinear Circuit Elements
- Energy Storage Dynamic Circuits, Time dependent Signal Source, Solution for Circuits containing dynamic elements
- Phasor Solution of Circuits with Sinusoidal Excitation
- Transient Analysis, Writing Differential Equations for 1st & 2nd Order Dynamic Circuits, DC steady State Solution, Initial and Final Condition.
- Transient Response of 1st Order Circuits; Transient Response of 2nd Order Circuits
- Power in AC Circuits, Complex Power, Transformers, Three phase Power,
- Residential Wiring, Grounding and Safety. Generation and Distribution of AC Power
- Electrical Conduction in Semiconductor Devices; The p-n Junction and Semiconductor Diode; Circuit Model for Semiconductor Diode

Grading Policy:
The grading for the course are 60% coursework and 40% Final Exam. The course work consists of two Midterm Exams, where each midterm exam is worth 20%. It also includes quizzes, homework, and projects for the remaining 20% that is modified by the course instructor.