Syllabus
Engineering Technology
University of North Texas
Course Title: Fundamentals of Electrical Engineering
Course Prefix and Number: ENGR 2415
Semester: Spring 2015

The Engineering Technology Department, in cooperation with the Office of Disability Accommodation, complies with the Americans with Disabilities Act in making reasonable accommodations for qualified students with disabilities. Please present your written accommodation request to the instructor prior to the fourth day.

SAFETY CATEGORY: 1

ENGINEERING TECHNOLOGY
COLLEGE OF ENGINEERING
UNT RESEARCH PARK
940/565-2022
COURSE NUMBER, TITLE, CREDIT HOURS:
ENGR 2415, Circuit Analysis Lab, 1 (0; 3) credit hour.

DESCRIPTION:
Laboratory portion to be taken concurrently with ENGR 2405, Circuit Analysis.

PREREQUISITES:
MATH 1720 and concurrent enrollment in ENGR 2405

REQUIRED TEXTBOOKS:
NA

SUPPLEMENTAL TEXTS AND MATERIALS:
1. Mathworks, MATLAB & SIMULINK Student Version.  
   (See WWW.mathworks.com)
2. Each student will be provided a laboratory kit.

COURSE OBJECTIVES:
1. Understand complex DC and AC series, parallel, series-parallel circuits.
2. Work complex DC and AC networks using branch, mesh and nodal theorems.
3. Comprehend magnetic circuits.
4. Accomplish power analysis.
5. Understand transient analysis of capacitive and inductive circuits.
6. Understand DC and AC circuits.
7. Know PSpice, LabView, and MatLab software.
8. Know laboratory report procedures.
9. Prepare and deliver oral presentations.

APPROPRIATE PROGRAM OUTCOMES
a. an appropriate mastery of the knowledge, techniques, skills and modern tools of their disciplines,
c. an ability to conduct, analyze and interpret experiments and apply experimental results to improve processes,
f. an ability to identify, analyze and solve technical problems,
g. an ability to communicate effectively,
l. knowledge and hands-on competencies in the application of the following to the building, testing, operation, maintenance of electrical/electronic systems:
• circuit analysis and design
• computer programming
• associated software
• analog and digital electronics, and
• microcomputers

STUDENT LEARNING OUTCOMES: (Program Outcomes Supported)

1. Diagnose and analyze series, parallel and series-parallel DC and AC circuits (f).
2. Diagnose and analyze complex DC and AC networks using branch, mesh and nodal theorems (a,f).
3. Diagnose and analyze magnetic circuits (f).
4. Identify power in series, parallel and series-parallel DC and AC circuits (f).
5. Demonstrate proficiency in transient and steady-state analysis (a,f).
6. Demonstrate proficiency in capacitive and inductive circuits (a,f).
7. Demonstrate the construction and analyze of DC and AC circuits in the laboratory (c,l).
8. Collect current, voltage and impedance data on DC and AC circuits in the laboratory (c,l).
9. Demonstrate the operation of laboratory instrumentation and PSpice, LabView, and MatLab software (l).
10. Produce a well researched and grammatically correct technical report on the experiment being orally presented and assigned laboratory experiments (g).
11. Prepare and present a PowerPoint presentation incorporating the objectives, circuitry and expected results of the assigned laboratory experiment (g).

INSTRUCTIONAL OBJECTIVES

1. Conditions:
   a) Students can use pens, paper, calculator and textbooks during laboratories.
   b) Students are allowed to down-load supplemental information from the web.
   c) Students are permitted to use electronic equipment, software, computer-aided techniques, and parts kits in the laboratory.

2. Criteria:
   a) Students are required to attend laboratory classes.
   b) Laboratory reports will be turned in on the due date.
   c) Two makeup laboratories will be allowed.

3. Outcome Competencies:
   a) Examinations will be used to assess understanding of materials covered during the semester in the laboratory.
   b) Laboratory reports will be used to assess hands-on application of theory and use of test equipment and software.
LABORATORY OUTLINE:

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<td>Resistor color codes</td>
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*** This lab’s outline is subject to change based on students’ class and lab progress.

COMPUTER USAGE:

The student will use Multisim and MatLab software on computers in the analog laboratory. Also, the student can use Microsoft office software on computers in the analog laboratory to prepare presentations and laboratory reports.

LAB REPORTS:

The guidelines for lab reporting are covered in a separate document.
Laboratory Safety Guidelines

General Lab Rules

1. Know emergency contact numbers.
2. Use safe laboratory practices at all times.
3. No food or drink is allowed in the laboratory.
4. Do not write on bench surfaces or equipment.
5. Report defective equipment and blown fuses to the instructor.
6. Students must not move instruments from one station to another or turn on the main or secondary circuit breakers.
7. The instructor has to inspect and initial your data before circuit disassembly.
8. Return all equipment and supplies to proper storage locations.
9. Leave lab station in a neat and orderly condition.

Electrical Circuit Safety

1. Do not work alone on energized electrical equipment.
2. Power must be switched off whenever an experiment or project is being assembled or disassembled.
3. Make measurements in live circuits with well insulated probes. Do not allow any part of your body to contact any part of the circuit or equipment connected to the circuit.
4. Never handle wet, damp or ungrounded electrical equipment.
5. Wearing a ring or watch can be hazardous in an electrical laboratory since such items make good electrodes for the human body.
6. Never touch two pieces of equipment simultaneously.
7. Avoid heat dissipating surfaces of high wattage resistors and loads because they can cause severe burns. Take extra care when working with these components.
8. Ask the instructor to check out your constructed circuit before applying power.
Laboratory Instrument Safety

1. Do not drop or bang instruments on the lab tables. The equipment is durable but not indestructible.

2. Never short circuit a power source. (e.g., 1. never connect an ammeter in parallel with the power source, 2. an oscilloscope ground effectively grounds the node it is connected to in an electrical circuit, a good practice is to have the oscilloscope ground in common with the power supply ground.)

3. When using instruments which are connected to the power line, connect all ground leads to the same point. Otherwise, a short circuit may result.


5. Keep instruments away from the edge of the work bench.