Fall 2016

ETR-114
D.C. & A.C. Fundamentals II

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COURSE OUTLINE

Prerequisites:

Prerequisite: ETR 113. Prerequisite or co-requisite: MTH 115.

Course Description:

This course covers basic concepts and theory used to analyze and measure electrical quantities for D.C. and A.C. circuits. Also included: basic electrical components, measuring instruments, network theorems, and techniques used to predict analyze and measure electrical quantities. Course credit: 4 Credit-hours consisting of 3 lecture hours and 3 lab hours per week.

Semester Credits: 4 hours, **Lecture Hours:** 3 hours, **Lab/Recitation Hours:** 3 lab hours

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Course Outcomes

At the completion of this course, the student should be able to:

1. Define electrical quantities including current, voltage, resistance, power, energy, efficiency, capacitance, inductance, reactance, impedance
2. Explain and use Ohm's Law, Kirchoff's voltage and current Laws, voltage divider rule, current divider rule, Faraday's law, and Lenz's law
3. Analyze series, parallel and series-parallel circuits and complex (multiple source circuits with interdependency), both DC and AC.
4. Measure electrical quantities.
5. Demonstrate proficiency and teamwork skills in the laboratory.
6. Acquire basic soldering and electronic component assembly skills.

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Required Materials:

1. Scientific Calculator (Will be discussed during first class period.)
2. Safety Glasses. Safety glasses must be worn in the laboratory when constructing circuits or taking measurements.
3. Electronic Kit and personal soldering equipment.

Textbook:

Circuit Analysis Theory and Practice, 5th Edition, Allen H. Robbins and Wilhelm C. Miller, Thomson Delmar Learning, ISBN 13: 9781133281009.

Supplementary Materials (Provided to Student):

1. Various handouts and other references will be used—make sure you attend class and get handouts.
2. Software: 1) MicroSim Pspice with Schematic Capture 2) ETCAI Circuits Challenge

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Course Outline:

Week	**Topic**	**Text Reference**
1. 1/7-11	Course Introduction, Policies, Rules, Safety, Evacuation, etc. Superposition Theorem, DC Circuits Lab: Superposition	Chapter 9
2. 1/14-18	Thevenin and Norton Theorems, DC Circuits Lab: Thevenin and Norton Theorem Problem	Chapter 9
3. 1/21-25	Thevenin, Norton, and Maximum Power Transfer Theorem, DC Lab: Thevenin and Norton	Chapter 9
4. 1/28-2/1	Mesh and Nodal, DC Circuits Lab: Mesh, DC Circuits	Chap. 8 and Mesh-Nodal Handout
5. 2/4-2/8	Mesh and Nodal, DC Circuits Lab: Nodal, DC Circuits	Chapter 8
6. 2/11-15	**Test#1 (Chapters 8 and 9)** Capacitive Transients	Chapter 11 (Partial)
7. 2/18-22	Inductive Transients Lab: Capacitive and Inductive Transient Lab	Chapter 14 (Partial)
8. 2/25-3/1	RLC Elements and Impedance Concepts, Phasors, and j Operator Lab: Problem Lab	Chapter 16
9. 3/4 – 3/8	**Spring Break**	
10. 3/11-15	AC Series-Parallel Circuits Lab: Series RC and RL Problem Labs	Chapter 18
11. 3/218-3/22	**Test#2 (Chapters 11, 14, and 16)** AC Series-Parallel Circuits Lab: RCL PSpice Analysis of AC circuits Lab	Chapter 18
12. 3/25-3/29	AC Power – Real, Reactive, and Apparent Power Lab: AC Power Problem Lab	Chapter 17
13. 4/1-4/5	AC Power – Real, Reactive, and Apparent Power Lab: Power Factor Correction Problem Lab	Chapter 17
14. 4/8-4/12	Introduce Student Projects Soldering	Project Handouts
15. 4/15-4/19	**Test#3 (Chapters 17 and 18)** Individual Student Project	Project Handouts
16. 4/22-4/26	Individual Student Project Exam Review	
17. 4/30	**Final Exam: 10 a.m. Tuesday, April 30**	

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Notes to Instructors
(List information about optional topics, departmental exams, etc)

(N.A)

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