Virginia Western Community College
ETR 113
D.C. and A.C. Circuit Fundamentals I

Prerequisites

MTE 1, 2 and 3.

Course Description

ETR 113 DC and AC Fundamentals I (4 CR). Studies DC and AC circuits, basic electrical components, instruments, network theorems, and techniques used to predict, analyze and measure electrical quantities. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

Course credits: 4 cr. Lecture Hours: 3 Lab Hours: 3

Required Materials

Text:

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

VIRGINIA WESTERN COMMUNITY COLLEGE
School of Science, Technology, Engineering and Mathematic
(540)-857-7273

3097 Colonial Ave. SW
Roanoke, VA 24015

Other Required Materials:

Software:
1) OrCad PSpice 9.1 with Schematic Capture
2) ETCAI Circuits Challenge.
These will be discussed in the first class meeting.

Scientific Calculator. TI-30 or equivalent is recommended. A TI-89, or equivalent, calculator is recommended for EET students or those who will be taking ETR 114.

Course Outcomes

At the end of the semester, the student will be able to:

1. Explain electrical terminology and 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, both DC and AC, including an introduction to multiple-source DC circuits. Use of computer software to solve problems will be introduced.
4. Measure electrical quantities.
5. Demonstrate proficiency and teamwork skills in the laboratory.

Topical Description

Course Outline:

Class	Topic	Text Reference
1	1. Campus Safety, Course Policies and Administrative Stuff. 2. Units and Notation 3. Lab–Math Review/Units Conversion/Introduction to ETCAI software	Chapters 1 and 2 (Partial)
2	1. Atomic Structure 2. Electrical Units (Voltage, Current, Resistance, Power, Conductance) 3. Conductors, Semiconductors, and Insulators. 4. Effects of Temperature on Conductors 5. Types of Resistors (thermistors, photoresistors, etc.) 6. Lab–Resistance Measurement.	Chapter 2 (cont'd) Chapter 3 (Partial)
3	1. Ohm's Law and Power 2. Energy and Efficiency 3. Circuit Breakers & Fuses 4. Lab–Ohm's Law / intro to MicroSim Pspice Software	Chapter 4 (Partial)
4	1. Test #1 2. Series Circuits 3. Kirchoff's Voltage Law 4. Voltage Divider Rule 5. Lab–Series Circuits	Chapter 5
5	1. Parallel Circuits 2. Kirchoff's Current Law 3. Current Divider Rule 4. Lab–Parallel Circuits	Chapter 6
6	1. Test #2 2. Series-Parallel Circuits 3. Applications 4. Troubleshooting 5. Lab–Series-Parallel Circuits #1	Chapters 7

7	1. Series-Parallel Circuits #2 2. Lab–Series-Parallel Circuits Problem Lab with Pspice	Chapter 7 (cont'd)
8	1. Introduction to Network Analysis 2. More Problems!!!	Chapter 8
9	1. Test #3 2. Lab–Mesh and Nodal Lab	Chapter 8 (cont'd)
10	1. Capacitance 3. Lab–Capacitor Time Constant and Reactance	Chapter 10 and 1 (Partial)
11	1. Magnetism 2. Inductance 3. Lab–Magnetism/Inductance Demonstration	Chapter 12 and 13 (Partial)
12	1. Alternating Current and Voltage 2. Lab–Oscilloscope Usage	Chapter 15 (Partial) Handout
13	1. AC Circuit Analysis I 2. Lab–AC Circuits (RLC)	Chapter 16 (Partial) Handout
14	1. AC Circuit Analysis II 2. AC Power 3. Lab–AC Induction Motor Power Factor	Chapter 16 and 17 (Partial) Take Notes!
15	1. Supplemental Topics/Review for final exam	TBA
16	Final Exam	

Notes to Instructors

1. Suggested Grading Scheme:

Scheduled Tests	55%
Labs and Homework	25%
Comprehensive Final Exam	20%

Grading Scale:
A = 91 – 100
B = 81 – 90
C = 71 – 80
D = 60 – 70
F = below 60

2. Recommended lab materials, sample tests and supplemental handouts are available from the program head.

3. Instructors should notify the program head at least a day in advance for any special accommodations or materials that will be needed for class.