**ELEC 60A Course Outline as of Fall 2009**

# CATALOG INFORMATION

Dept and Nbr: ELEC 60A Title: DC AND AC THEORY
Full Title: Direct & Alternating Current Theory
Last Reviewed: 2/23/2015

| Units | | Course Hours per Week | | Nbr of Weeks | Course Hours Total | |
|---|---|---|---|---|---|---|
| Maximum | 6.00 | Lecture Scheduled | 5.00 | 17.5 | Lecture Scheduled | 87.50 |
| Minimum | 6.00 | Lab Scheduled | 3.00 | 10 | Lab Scheduled | 52.50 |
| | | Contact DHR | 0 | | Contact DHR | 0 |
| | | Contact Total | 8.00 | | Contact Total | 140.00 |
| | | Non-contact DHR | 0 | | Non-contact DHR | 0 |

Total Out of Class Hours: 175.00 Total Student Learning Hours: 315.00

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| Title 5 Category: | AA Degree Applicable |
| Grading: | Grade Only |
| Repeatability: | 00 - Two Repeats if Grade was D, F, NC, or NP |
| Also Listed As: | |
| Formerly: | |

**Catalog Description:**
Introduction to electronic components and underlying physics concepts, electrical units, direct current (DC), DC circuit analysis, batteries, magnetism, meters, alternating current (AC), capacitance, inductance, transformers, and AC circuit analysis.

**Prerequisites/Corequisites:**

**Recommended Preparation:**
Suggested preparation is course eligibility for MATH 150A and/or course completion of High School algebra AND course elibility for ENGL 100 or ESL 100.

**Limits on Enrollment:**

**Schedule of Classes Information:**
Description: Introduction to electronic components and underlying physics concepts, electrical units, direct current (DC), DC circuit analysis, batteries, magnetism, meters, alternating current (AC), capacitance, inductance, transformers, and AC circuit analysis. (Grade Only)
Prerequisites/Corequisites:
Recommended: Suggested preparation is course eligibility for MATH 150A and/or course

completion of High School algebra AND course elibility for ENGL 100 or ESL 100.
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

## ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

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|---|---|---|---|---|---|
| **AS Degree:** | **Area** | | | Effective: | Inactive: |
| **CSU GE:** | **Transfer Area** | | | Effective: | Inactive: |
| **IGETC:** | **Transfer Area** | | | Effective: | Inactive: |
| **CSU Transfer:** | Transferable | Effective: | Fall 2009 | Inactive: | Fall 2016 |
| **UC Transfer:** | | Effective: | | Inactive: | |

**CID:**

**Certificate/Major Applicable:**
Both Certificate and Major Applicable

## COURSE CONTENT

**Outcomes and Objectives:**
Upon completion of this course the student will be able to:
1. Use algebraic functions, signed numbers and metric notations, make circuit calculations using Ohm's Law, Watt's Law and Kirchoff's Laws.
2. Use algebraic expressions and numerical representations to analyze and evaluate series, parallel, and series-parallel circuits.
3. Summarize the basic characteristics of magnetism.
4. Identify alternating current (AC) units.
5. Use signed numbers to calculate values in an AC resistive circuit.
6. Identify and describe the characteristics of capacitors, inductors and transformers using trigonometric functions.
7. Analyze and evaluate resistor-capacitor (RC), resistor-inductor (RL) and resistor-inductor-capacitor (RLC) circuits through the application of right angle trigonometry and geometry.

**Topics and Scope:**

I. Atoms
 A. Bohr model structure
 B. quantum mechanical model structure
II. Review of elementary algebra
III. Basic laws of physics
 A. Ohm's law
 B. Watt's law
 C. Kirchoff's laws
IV. Direct current (DC) circuits
 A. digital volt meters
 B. series circuits
 C. parallel circuits

D. series-parallel circuits
V. Unloaded voltage dividers
VI. Conductors and insulators
VII. Control components
A. switches
B. fuses
C. circuit breakers
VIII. Resistors, fixed and variable
IX. Batteries
X. Magnetism
XI. Right angle trigonometry
XII. Alternating current (AC)
A. oscilloscope operation
B. frequency
C. sine wave values
XIII. Capacitors and capacitance
A. resistor-capacitor (RC) time constant
B. capacitive reactance
C. RC circuit impedance
1. series
2. parallel
3. series-parallel
XIV. Inductors and inductance
A. resistor-inductor (RL) time constant
B. inductive reactance
C. RL circuit impedance
1. series
2. parallel
3. series-parallel
XV. Resistor, inductor, capacitor (RLC) circuits
A. series
B. parallel
C. admittance, conductance and susceptance
D. transformers

LABORATORY MATERIAL
I. Ohm's Law simple circuits
II. Series Circuits - Kirchoff's Laws, Watt's Law, & Ohm's Law. Voltage dividers
III. Parallel Circuits - Kirchoff's Laws, Watt's Law, & Ohm's Law. Current dividers
IV. Complex Circuits - Kirchoff's Laws, Watt's Law, & Ohm's Law. Maximum Power Transfer.
V. Construction and basic soldering techniques including safety
VI. Basic oscilloscope operation and measurements
VII. Resistor - Capacitor (RC) circuits, impedance measurements & calculations including RC time constant
VIII. Resistor - Inductor (RL) circuits, impedance measurements & calculations
IX. RLC circuits - impedance measurements & calculations

**Assignment:**

1. Textbook readings, 20 - 30 pages per week.
2. 1-2 weekly homework/lab assignments.

3. 8-10 lab reports
4. 4-8 quizzes; midterm; final exam.

**Methods of Evaluation/Basis of Grade:**

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

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| Lab reports | Writing<br>20 - 30% |

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

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| Homework problems, lab assignments | Problem solving<br>30 - 40% |

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

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| None | Skill Demonstrations<br>0 - 0% |

**Exams:** All forms of formal testing, other than skill performance exams.

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| Quizzes; midterm and final exam: objective examinations include multiple choice, true/false, matching items, completion | Exams<br>30 - 40% |

**Other:** Includes any assessment tools that do not logically fit into the above categories.

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|---|---|
| None | Other Category<br>0 - 0% |

**Representative Textbooks and Materials:**
Electric Circuit Fundamentals, 7th edition. Thomas L. Floyd. Prentice Hall: 2007.
Basic Electronics, 9th edition. Grob/Schultz. Glencoe McGraw Hill: 2003.