ELEC A140: TECHNICAL ELECTRONICS

Item	Value
Curriculum Committee Approval Date	12/08/2021
Top Code	093400 - Electronics and Electric Technology
Units	3 Total Units
Hours	54 Total Hours (Lecture Hours 54)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	Yes
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)

Course Description

An introduction to electricity and electronics for non-technicians. Vocabulary, power, voltage, current, resistance, safety, test equipment, circuits and devices are studied. Students will build, test, and troubleshoot circuits and devices. In addition, students will learn how to read documentation commonly found in industry, i.e., schematics, specifications, assembly and test procedures. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Communicate using industry standard nomenclature to discuss electronic systems and circuits.
2. Apply generalized theories to real life experiences.
3. Explain electrical systems, circuits, and circuit function.
4. Demonstrate critical thinking skills that apply technical abilities.
5. Perform diagnostics including test and trouble-shooting of electrical and electronic circuits.

Course Objectives

- 1. Explain atomic theory
- 2. Define and use electrical terms
- 3. Explain the operation of simple electric circuits
- 4. Explain the operation of complex electric circuits
- 5. Calculate electrical forces using correct application of formulas
- 6. Identify components
- 7. Determine component specifications
- 8. Describe the operation of fundamental electrical circuits and devices.
- 9. Build prototype electrical circuits
- 10. Assemble electronic kit.
- 11. Operate test equipment including: Ohm meter, volt meter, current meter, and oscilloscope
- 12. Follow and write procedures including: safety, assembly, and test.
- 13. Prepare a technical report documenting lecture notes and Project data,
- 14. Explain the operation of DC circuits
- 15. Explain the operation of AC circuits
- 16. Analyze applications of electrical DC and AC circuits
- 17. Construct electronic circuits from schematics.
- 18. Select test instruments and measure electronic circuits.
- 19. Diagnose errors and /or component changes

Lecture Content

Basic Electricity Ohms Law/Power D.C. Circuits Magnetics Alternating Voltage and Current Inductance and Inductive Reactance A.C. Circuits and Resonance Passive Filters Diodes Transistors Linear Electronic Circuits Digital Electronic Circuits Microcomputer Basics Test equipment Construction techniques Test Techniques

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)

Instructional Techniques

Lecture, class discussion, small group work, videos, demonstrations, and homework assignments to reinformce content delivered in class.

Reading Assignments

Chapters from assigned text Instructor handouts

Writing Assignments

Engineering journal Technical reports Engineering portfolio of all work completed during the semester

Out-of-class Assignments

Students will complete homework related to course topics: Measure Resistance and determine Resistor Power Ratings Resistor Color Code Measure Voltage Measure Current Build and Test Series Circuits Build and Test Parallel Circuit Resistor Power Ratings Oscilloscope Familiarization Oscilloscope Practice Series Resonance Rectifiers and Filters Transistor Amplifier

Demonstration of Critical Thinking

Pre-test, written examinations, a final exam will assess mastery of the subject. Formal and informal peer review and discussion. Formal discussions are moderated by the instructor. Informal discussions are motivated by the team working on project assignments. Instructors observe and verbally interrogate the student with: inquiry based, open ended, analytical, and hypothetical questions. The student will demonstrate proficiency with scientific calculators and test equipment during each of the lecture periods. Practical examinations that require students to construct circuits using schematics, use appropriate equipment to test and diagnose circuits.

Required Writing, Problem Solving, Skills Demonstration

The student will keep an engineering journal, prepare technical reports for the class projects, and keep an engineering portfolio of all work completed during the course. In the portfolio the student will monitor their progress against the course syllabi.

Textbooks Resources

1. Required Grob, B. Basic Electricity, latest ed. New York: McGraw-Hill Science, 2010 Rationale: -

Other Resources

1. Instructor handouts