ELEC A172: ELECTRONICS LABORATORY 2

Item	Value
Curriculum Committee Approval Date	02/12/2014
Top Code	093400 - Electronics and Electric Technology
Units	1 Total Units
Hours	54 Total Hours (Lab 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
Open Entry/Open Exit	No
Grading Policy	Standard Letter (S)

Course Description

Second semester laboratory will reinforce safe shop practices, maintenance & instrument handling procedures, technical documentation, and workspace preparation. Student will work on AC and/or DC circuit projects. Mastery of theory, technical documentation, assembly skills, and teamwork skills will be emphasized. PREREQUISITE: ELEC A150 or ELEC A201 or ELEC A246 or concurrent enrollment. Transfer Credit: CSU.

Course Level Student Learning Outcome(s)

1. Analyze, evaluate and diagnose sub-assemblies functions per specifications.
2. Demonstrate safe working practices in an industrial environment.
3. Construct sub-assemblies per specifications i.e.: electrical, electronic, electro-mechanical, instrumentation, robotic, and automation systems.
4. Generate technical reports to approved Engineering Technology standards.
5. Collaborate with student technical team members.

Course Objectives

- 1. demonstrate the ability to operate and maintain a safe work area.
- 2. demonstrate the ability to properly identify and re-stock: components, assemblies, and tools.
- 3. assemble, to industry standards: electrical circuits, electronic components, electro-mechanical systems, robotics, and automation systems.
- 4. use industry standard test equipment to test electrical circuits, electronic components, electro-mechanical systems, robotic, and automation systems.

Lecture Content

not applicable

Lab Content

Safety: OSHA GMP Standards, Shop Maintenance, Duty Roster Safety Zones, walkways, work benches, ladders, shelves, cabinets, doors, work spaces Proper selection and operation of: safety equipment, hand-tools and, power tools Comprehend and follow verbal and written instructions Inventory: Identify and Re-stock: Components: mechanical, electro-mechanical, electrical, electronics Tools: Hand tools, power tools, tool chests Test equipment: Test Leads, test equipment, prototype Computers, computer hardware, cables Technical Library Assembly and Test Procedures: Documentation: Drawings: wiring, assembly, schematic, orthographic, isometric, oblique Technical Specifications: component specifications, test equipment manuals, Time Log Projects: Laboratory assignments Assembly project Soldering Splice Circuit board practice De-soldering Cabling and Wire management Sub-Assembly Project 1 Sub-Assembly Project 2 Design, construct, measure, perform diagnostics, and effect repairs to D.C. electrical circuits Prepare schematic drawings. Construct circult Select proper test equipment and correctly connect and accurately read the instruments. Analyze data, verify the circuit is performing as expected. Perform circuit diagnostics to isolate and repair circuit faults. DC circuit projects appropriately chosen from the following list to reinforce application of concepts. The DVOM - Resistance Resistor Color Cod The DVOM - DC Volts Measuring Current and Voltage Ohm s Law Resistor Power Ratings The VTM - Resistance The TVM - DC AC Voltages Series Parallel Circuits Loaded Voltage Divider Potentiometer Graphing Techniques Source Resistance Effects of Source Resistance Thevenin s Theorem Oscilloscope Familiarization Computer installation and repair projects Pre-Test Assessment Introduction Perform system diagnostics on PC workstations; configure workstations for ELEC A146 course. Install Peripheral Devices Hardware Power Supplies Motherboards Remove Replace (RR) Mother Boards I.D. server types Server Architecture Install and diagnose server memory Install Multiboot, Win 7, Server 2008 I/O Systems Hardware Network cables, patch panels Raid Systems PERC RAID RAID failure rebuild Server Operating Systems Install Server 2008/2012 With Raid 1,5 Mechanical Hardware Install Server Core System Developer Passmark Benchmarking Game standards Hardware rating System upgrade and tune up Industrial Networks Network tools WDS, Windows deployment services WinPE N. Local Computing Virtual Machine Final Assessment Diagnostics: RR, reload O.S. Design, Build, Configure LAN hardware and software per "Client Specifications" System Commissioning

Method(s) of Instruction

- Lab (04)

Instructional Techniques

This laboratory will provide an opportunity for students to practice fundamental skills essential for success in the workplace. They will complete projects discussed and assigned in Elec A150, Elect A246 and Elect A201 (as needed). Instructors will provide Quality Assurance monitoring and engineering reviews of student design projects to ensure skill development.

Reading Assignments

Shop maintenance duty roster Sub-Assembly construction

Writing Assignments

Engineering Journal Hourly Log Written technical report

Out-of-class Assignments

Not required for lab-only course

Demonstration of Critical Thinking

Participation in laboratory assignments Skills Proficiency: The studetn will learn to self-regulate the maintenace requirements of the Laboraorty faciltites and equipment. Projects evaluated per industry standards and design criteria Communication Documentation: Engineering Journal will be review by instructor during each class session, and at the end of the semester Demonstrate the ability to research specifications and engineering solutions. One Technical Report Demonstrate the ability to discuss: mission critical objectives, Team goals, system operation, assembly and test procedures.

Required Writing, Problem Solving, Skills Demonstration

Participation: Hourly Log of the student s attendance is required Demonstrate the ability to perform shop duties without supervision. Engineering Review Board made up of student peers will provide feedback of the individual student s team participation Skills Proficiency: Projects evaluated per industry standards and design criteria Communication Documentation: A quarterly review of the Engineering Journal and Hourly Log by instructor specifications and engineering solutions. One Technical Report Demonstrate the ability to discuss: mission critical objectives, Team goals, system operation, assembly and test procedures.

Eligible Disciplines

Electricity (electrical power distribution): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Electromechanical technology (industrial mechanical technology): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Electronic technology (radio, television, computer repair, avionics): Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Electronics: Any bachelor's degree and two years of professional experience, or any associate degree and six years of professional experience. Engineering: Master's degree in any field of engineering OR bachelor's degree in any of the above AND master's degree in mathematics, physics, computer science, chemistry, or geology OR the equivalent. (NOTE: A bachelor's degree in any field of engineering with a professional engineer's license is an alternative qualification for this discipline.) Master's degree required. Title 5, section 53410.1 Engineering technology: Master's degree in any field of engineering technology or engineering OR bachelor's degree in either of the above AND master's degree in physics, mathematics, computer science, biological science, or chemistry, OR bachelor's degree in industrial technology, engineering technology or engineering AND a professional engineer's license OR the equivalent. Master's degree required.

Other Resources

1. Selected handout materials to be provided and distributed by the instructor.