Electronic and Electrical Troubleshooting
Outline of Instruction

Course Information

Organization	Monroe County Community College, Applied Science and Engineering Technology
Developers	Thomas Harrill
Development Date	8/26/2009
Course Number	ELEC-200
Potential Hours of Instruction	90

Description
This course introduces the logic and concepts of a systematic approach to troubleshooting and repair of a variety of electrical and electronic equipment. Emphasis on efficiency and time management in the troubleshooting process will be highlighted.

Major Units:

1. Introduction to Troubleshooting
2. Electrical and Electronics Theory Review
3. Instrument Usage and Measurements
4. Troubleshooting Relays and Motor Starters
5. Troubleshooting Motor Electrical and Mechanical Problems
6. Troubleshooting Power Distribution and Quality
7. Troubleshooting Motor Controls and Drives
8. Troubleshooting Lighting Circuits
9. Troubleshooting Solenoids and Heating Elements
10. Troubleshooting Mechanical and Solid State Switches
11. Troubleshooting Diodes, Transistors, Thyristors and Integrated Circuits
12. Troubleshooting Programmable Controllers
13. Troubleshooting Alternative Energy Systems
14. Prevententive Maintenance

Types of Instruction

Instruction Type	Contact Hours	Credits
Classroom Presentation	30	
On-Campus Lab	60	

Textbooks
Mazur and Proctor. *Troubleshooting Electrical/Electronic Systems*.

Learner Supplies
Proto-board.

Scientific Calculator.

Optional: Needle-Nose pliers, Diagonal Cutters and Wire Strippers.

Prerequisites

ELEC 132 (Electronics 1)

Exit Learning Outcomes

Program Outcomes

A. Develop and Demonstrate Problem Solving Skills.
B. Develop a willingness to learn independently.
C. Develop and demonstrate effective wiring and laboratory skills.
D. Demonstrate Equipment/Instrumentation Competence.
E. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams.
F. Value Safety Training, Safe Work Practices and acknowledge Safety Standards.
G. Demonstrate a thorough understanding of DC and AC theory and operating concepts.
H. Design, Construct, and Troubleshoot AC and DC Motor Control Circuits and an demonstrate an understanding of process control.
I. Utilize Virtual Instrumentation, Data Acquisition (LabView), CAI, Schematic Capture and Test and Applications software packages to refine skills and to analyze and design various electronic circuits.

General Education Outcomes

A. Apply mathematical approaches to the interpretation of numerical information
B. Use computer technology to communicate information
C. Communicate ideas in writing using the rules of standard English
D. Apply mathematical approaches to the analysis of numerical information
E. Demonstrate an understanding of the process of scientific inquiry
F. Use computer technology to retrieve information

Course Outcomes

1. **Indentify/Recognize Troubleshooting Levels, Logic and Procedure**
2. **Utilize Ohm's Law to form expectations to assist in troubleshooting circuits**
3. **Utilize Instrumentation to diagnose a circuit fault**
4. **Demonstrate/Practice Troubleshooting Relay and Motor starter faults**
5. **Demonstrate/Practice Troubleshooting Motor Mechanical and Electrical faults**
6. **Demonstrate/Practice Troubleshooting Power Distribution and Power Quality faults**
7. **Demonstrate/Practice Troubleshooting Motor Control and Drive faults**
8. **Demonstrate/Practice Troubleshooting Lighting circuit faults**
9. **Demonstrate/Practice Troubleshooting Solenoid, Heating Element and Switch faults**
10. **Demonstrate/Practice Testing Diodes, Transistors and Thyristor faults**
11. **Demonstrate/Practice Troubleshooting Programmable Logic Controller faults**
12. **Demonstrate/Practice Troubleshooting Alternative Energy system faults**
13. **Indentify/Recognize Preventitive Maintenance Procedures**