



Course Information

Division	Applied Science and Engineering Technology
Contact Hours	60
Total Credits	3.0

Prerequisites	MATH 090 and RDG 090 or qualifying scores on accepted placement tests and one year high school algebra
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Course Description

This course is designed as a survey for electronics majors and non-majors. It covers safety, basic electrical theory (AC and DC), Ohm's Law, reading schematic drawings, electrical component identification and functions, sources of electrical power, motors, power distribution, and basic solid-state devices. Laboratory exercises will include measurement of resistance, voltage, and current with analog and digital meters, basic oscilloscope use, relays and transformers, circuit design and construction, and component testing. Student must have one year of high school algebra.

This course is a required core course for students pursuing a(n) degree in
Electrical Engineering Technology

Program Outcomes Addressed by this Course:

Upon successful completion of this course, students should be able to meet the program outcomes listed below:

- A. Acquire and apply technical expertise in the areas of Circuit analysis, Analog electronics, Digital electronics, Microprocessors, and Communication systems.
- B. Utilize Virtual Instrumentation, Data Acquisition, Schematic Capture and Test and Applications software packages to refine skills and to analyze and design various electronic circuits.
- C. Develop and Demonstrate Problem Solving Skills.
- D. Develop a willingness to learn independently.
- E. Develop and demonstrate effective wiring and laboratory skills.
- F. Demonstrate Equipment/Instrumentation Competence
- G. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams
- H. Demonstrate effective Oral Presentation Skills
- I. Value Safety Training, Safe Work Practices and acknowledge Safety Standards
- J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)
- K. Design, Construct, and Troubleshoot AC and DC Motor Control Circuits and demonstrate an understanding of process control.
- L. Demonstrate a thorough understanding of DC and AC theory and operating concepts.



Course Outcomes

In order to evidence success in this course, the students will be able to:

1. Identify/Recognize: good and poor practices with regard to electrical safety
Applies to Program Outcome
 - C. Develop and Demonstrate Problem Solving Skills.
 - D. Develop a willingness to learn independently.
 - E. Develop and demonstrate effective wiring and laboratory skills.
 - F. Demonstrate Equipment/Instrumentation Competence
 - I. Value Safety Training, Safe Work Practices and acknowledge Safety Standards
 - J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)

2. Identify/Recognize: electrical components including resistors, capacitors, inductors, transformers, switches, fuses, diodes, and transistors and their values using coding procedures
Applies to Program Outcome
 - C. Develop and Demonstrate Problem Solving Skills.
 - D. Develop a willingness to learn independently.
 - E. Develop and demonstrate effective wiring and laboratory skills.
 - F. Demonstrate Equipment/Instrumentation Competence
 - G. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams
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3. Identify/Recognize: electrical test instruments, including power supplies, signal generators, analog and digital multimeters, and oscilloscopes
Applies to Program Outcome
 - C. Develop and Demonstrate Problem Solving Skills.
 - D. Develop a willingness to learn independently.
 - E. Develop and demonstrate effective wiring and laboratory skills.
 - F. Demonstrate Equipment/Instrumentation Competence
 - G. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams
 - J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)



4. Demonstrate/Practice: calculate current and voltage values in series, parallel and compound DC circuits, using Ohm's Law and Kirchhoff's Voltage laws

Applies to Program Outcome

- A. Acquire and apply technical expertise in the areas of Circuit analysis, Analog electronics, Digital electronics, Microprocessors, and Communication systems.
 - B. Utilize Virtual Instrumentation, Data Acquisition, Schematic Capture and Test and Applications software packages to refine skills and to analyze and design various electronic circuits.
 - C. Develop and Demonstrate Problem Solving Skills.
 - D. Develop a willingness to learn independently.
 - E. Develop and demonstrate effective wiring and laboratory skills.
 - F. Demonstrate Equipment/Instrumentation Competence
 - G. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams
 - H. Demonstrate effective Oral Presentation Skills
 - I. Value Safety Training, Safe Work Practices and acknowledge Safety Standards
 - J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)
 - K. Design, Construct, and Troubleshoot AC and DC Motor Control Circuits and demonstrate an understanding of process control.
 - L. Demonstrate a thorough understanding of DC and AC theory and operating concepts.
5. Demonstrate/Practice: construct a series, parallel and compound resistive DC circuit(s) and measure current and voltage drops, using both digital and analog multimeters

Applies to Program Outcome

- B. Utilize Virtual Instrumentation, Data Acquisition, Schematic Capture and Test and Applications software packages to refine skills and to analyze and design various electronic circuits.
- C. Develop and Demonstrate Problem Solving Skills.
- D. Develop a willingness to learn independently.
- E. Develop and demonstrate effective wiring and laboratory skills.
- F. Demonstrate Equipment/Instrumentation Competence
- J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)



Course Outcome Summary

Required Program Core Course

ELEC 125 Fundamentals of Electricity

6. Identify/Recognize: principles of Magnetism

Applies to Program Outcome

- C. Develop and Demonstrate Problem Solving Skills.
- D. Develop a willingness to learn independently.
- F. Demonstrate Equipment/Instrumentation Competence
- G. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams
- H. Demonstrate effective Oral Presentation Skills
- J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)

7. Demonstrate/Practice: soldering Techniques

Applies to Program Outcome

- C. Develop and Demonstrate Problem Solving Skills.
- D. Develop a willingness to learn independently.
- E. Develop and demonstrate effective wiring and laboratory skills.
- F. Demonstrate Equipment/Instrumentation Competence
- I. Value Safety Training, Safe Work Practices and acknowledge Safety Standards
- J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)



8. Identify/Recognize: principles of Alternating Current (AC)

Applies to Program Outcome

- A. Acquire and apply technical expertise in the areas of Circuit analysis, Analog electronics, Digital electronics, Microprocessors, and Communication systems.
- C. Develop and Demonstrate Problem Solving Skills.
- D. Develop a willingness to learn independently.
- E. Develop and demonstrate effective wiring and laboratory skills.
- F. Demonstrate Equipment/Instrumentation Competence
- G. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams
- J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)
- K. Design, Construct, and Troubleshoot AC and DC Motor Control Circuits and demonstrate an understanding of process control.
- L. Demonstrate a thorough understanding of DC and AC theory and operating concepts.

9. Demonstrate/Practice: use an oscilloscope to study basic wave shapes and measure frequency and period and DC and AC voltages

Applies to Program Outcome

- C. Develop and Demonstrate Problem Solving Skills.
- D. Develop a willingness to learn independently.
- E. Develop and demonstrate effective wiring and laboratory skills.
- F. Demonstrate Equipment/Instrumentation Competence
- G. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams
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- L. Demonstrate a thorough understanding of DC and AC theory and operating concepts.



10. Demonstrate/Practice: calculate R-C and R-L and RLC time constants and capacitive and inductive reactance, and confirm by laboratory measurement

Applies to Program Outcome

- C. Develop and Demonstrate Problem Solving Skills.
- D. Develop a willingness to learn independently.
- E. Develop and demonstrate effective wiring and laboratory skills.
- F. Demonstrate Equipment/Instrumentation Competence
- G. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams
- H. Demonstrate effective Oral Presentation Skills
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- L. Demonstrate a thorough understanding of DC and AC theory and operating concepts.

11. Demonstrate/Practice: build solid state half and full wave filtered DC power supplies

Applies to Program Outcome

- C. Develop and Demonstrate Problem Solving Skills.
- D. Develop a willingness to learn independently.
- E. Develop and demonstrate effective wiring and laboratory skills.
- F. Demonstrate Equipment/Instrumentation Competence
- G. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams
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- L. Demonstrate a thorough understanding of DC and AC theory and operating concepts.



MONROE COUNTY
COMMUNITY COLLEGE

Course Outcome Summary

Required Program Core Course

ELEC 125 Fundamentals of Electricity

12. Demonstrate/Practice: construct basic control circuits using transistors and diodes

Applies to Program Outcome

- A. Acquire and apply technical expertise in the areas of Circuit analysis, Analog electronics, Digital electronics, Microprocessors, and Communication systems.
- C. Develop and Demonstrate Problem Solving Skills.
- D. Develop a willingness to learn independently.
- E. Develop and demonstrate effective wiring and laboratory skills.
- F. Demonstrate Equipment/Instrumentation Competence
- G. Develop and demonstrate Technical Documentation/Lab Report writing skills and the ability to comprehend Technical Documentation including Schematic Diagrams
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Date Updated: 4/3/2019

By: Mark G. Locher Sr