MONROE COUNTY COMMUNITY COLLEGE

Course Outcome Summary

Required Program Core Course

ELEC 135 Digital Electronics

Course Information

Division	**Applied Science and Engineering Technology**
Contact Hours	**90**
Total Credits	**4.0**

Prerequisites

ELEC 125
Taking ELEC 132 concurrently is recommended

Course Description

An introduction to digital components, circuitry, and systems. Topics covered are: logic gates, networks, and truth tables; logic-network description and simplification using Boolean algebra; binary and hexadecimal numbers and arithmetic; various types of integrated-circuit flip-flops; digital counters and registers; digital arithmetic circuits; astable clocks; one-shots; decoders; memories and display devices.

This course is a required core course for students pursuing a 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.

MONROE COUNTY COMMUNITY COLLEGE

Course Outcome Summary

Required Program Core Course

ELEC 135 Digital Electronics

Course Outcomes

1. Recognize each of the five basic logic gates and flip-flops, by schematic symbol, and truth table
   Applies to Program Outcome

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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
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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 the truth tables for all of the common flip-flops, including dynamic triggers and static set and clear options
   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
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MONROE COUNTY COMMUNITY COLLEGE

Course Outcome Summary

Required Program Core Course

ELEC 135 Digital Electronics

3. Recognize data transfer in serial fashion and data transfer in parallel fashion
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
J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)

4. Recognize numbers written in strict binary, binary-coded decimal (BCD), and hexadecimal systems
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
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MONROE COUNTY COMMUNITY COLLEGE

Course Outcome Summary

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ELEC 135 Digital Electronics

5. Recognize the following circuits from their electronic schematic appearance: flip-flop (bistable multivibrator); one-shot (monostable multi vibrator); free-running clock (astable multivibrator)
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
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J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)

6. Demonstrate/Practice: the writing of the truth tables for AND, OR, NAND and NOR gates with any general number of inputs
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
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7. Demonstrate/Practice: simplification of a logic network of inverting and noninverting gates, using Boolean algebra techniques
   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
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8. Demonstrate/Practice: the wiring, on a protoboard, of dual-in-line packaged integrated circuit logic gates and logic gate networks, including power supply connections
   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.
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MONROE COUNTY COMMUNITY COLLEGE

Course Outcome Summary

Required Program Core Course

ELEC 135 Digital Electronics

9. Demonstrate/Practice: the process of testing a logic gate network for every one of its possible input combinations - that is, for every one of its truth table rows
   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
   J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)

10. Demonstrate/Practice: the process of converting among the following number systems: decimal/binary; binary/hexadecimal; decimal/BCD; binary BCD
    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
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    J. Develop and demonstrate the synergistic relationship and integration of various technical and academic fields into the study of Electronics (i.e. Mechatronics)

Updated: 4/3/2019
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