Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 100 SAFETY
Number: 100 **Hours:** 12.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain safety concepts and procedures for electronic engineers and technicians as it applies to the electronics industry.

Tasks:

PA101 - Follow OSHA safety regulations.

PA102 - Identify, select, and demonstrate proper hand tool use for electronics work.

PA103 - Recognize the types and usages of fire extinguishers.

PA104 - Interpret Safety Data Sheets (SDS).

PA106 - Explain the chemical and environmental hazards for disposal of electronics equipment.

PA107 - Describe electrical shock and list the effects of electric current on the human body.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.

RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:
Research hazardous chemical safety information in the home
Interpret Material Safety Data Sheets (MSDS)
Explain the environmentally-safe disposal procedures for electronics equipment.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Practice safety techniques for electronics work
Demonstrate an understanding of proper fire drill procedures
Safely discharge a Cathode Ray Tube (CRT picture tube)
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on One with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in an enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA Standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Tests
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software - DC Challenge ETCAI Software - AC Challenge ETCAI Software - Solid-State Challenge ETCAI Software - Power Supply Challenge ETCAI Software - Digital Challenge Trax-Maker CAD Software Circuit Cam Boardmaster Software Multisim Electronic Simulator DC Power Supply AC Function Generator Dual-Channel Oscilloscope Multimeter Test Equipment Leads Protoboard Circuit Board CAD System / Milling Machine Discrete Electronic Components Hand tools Soldering Equipment Safety Glasses Programmable Electronic Circuit BoardsHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 200 ELECTRICAL QUANTITIES AND COMPONENTS
Number: 200 **Hours:** 80.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain and apply units of measurement used in the electronics industry.

Tasks:

PA201 - Describe electronic measurements and their applications.

PA202 - Identify the fundamental SI units.

PA203 - Apply proper scientific and engineering notation.

PA205 - Identify resistor values by color code and numerical markings

PA206 - Identify component symbols used in electronic schematic diagrams.

PA207 - Identify schematic symbols for various types of electrical and electronic components.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
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CRAFT & STRUCTURE GRADES 9-10-11-12
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12

Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:
Explain current flow in solids, liquids, and gases
List and explain the factors that determine the resistance
of an object
List four sources of voltage
List and explain the base units of charge, current, voltage, resistance, and power
Convert base units of electric quantities to subunits and
multiple units
Research hazardous chemical safety information in the home
Interpret Material Safety Data Sheets (MSDS)
Explain the environmentally-safe disposal procedures for electronics equipment.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides
(Chapter 2 - Electricity)
Describe and correctly use units of charge, current, voltage, resistance, and power
Describe current in solids, liquids, and gases
Convert quantities from base units to submultiple or multiple units and vice versa
Express the relationship between energy, charge and voltage
List and explain ways of producing voltage

Skill:
Apply resistor color code for component selection
Use electronic test equipment to measure various electrical potentials
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

- Extended Time (assignments and/or testing)

- Graphic Organizer

- Chunking of Assignments/Material

- Preferential Seating

- Directions/Comprehension Check (frequent checks for understanding)

- Study Guide

- Directions and/or Tests Read Aloud

- Adapted Tests and/or Assignments

- Use of Calculator

- Taking Tests in Alternate Setting (or if requested)

- Verbal/Gestural Redirection (prompts to remain on task)

- Drill and Practice (Repetition of Material)

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Analog Software EKI Digital Software EKI Challenge Software ETCAI DC Circuit Challenge Software ETCAI AC Circuit Challenge Software ETCAI Solid-State Circuit Challenge Software ETCAI Digital Circuit Challenge Software Multisim Electronic Simulator Traxmaker Circuit-Cam Board Master Digital Multimeter (DMM) Analog Meter Oscilloscope DC Power Supply AC Signal Generator Logic Probe Soldering Station ComputerHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 300 INSTRUMENTATION
Number: 300 **Hours:** 14.00
Dates: Spring 2023

Description/Objectives:

Student will know and be able to identify and properly use various electronic test instruments in a safe manner.

Tasks:

PA301 - Utilize multi-meters, function generators, and frequency counters.

PA304 - Utilize a variable output power supply.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
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CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
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RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12

Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12

Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS

  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:

Understand how to use a multimeter to measure circuit variables
State the insertion techniques for safe measurement
Demonstrate the use of an ohmmeter to measure resistance
Use an analog or digital multimeter to measure circuit parameters
Properly insert an ammeter into a live circuit to measure current
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:

Use an analog or digital multimeter to measure circuit parameters
Properly insert an ammeter into a live circuit to measure current

Use an ohmmeter to measure circuit resistance
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets
Portfolio
Projects

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Analog Software EKI Digital Software EKI Challenge Software ETCAI DC Circuit Challenge Software ETCAI AC Circuit Challenge Software ETCAI Solid-State Circuit Challenge Software ETCAI Digital Circuit Challenge Software Multisim Electronic Simulator Traxmaker Circuit-Cam Board Master Digital Multimeter (DMM) Analog Meter Oscilloscope DC Power Supply AC Signal Generator Logic Probe Soldering Station ComputerHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 400 OHM
Number: 400 **Hours:** 80.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to apply Ohm's Law to explain the relationship of voltage, current and resistance.

Tasks:

PA401 - Apply the concept of Ohm's law to determine current, voltage, or resistance.

PA402 - Identify the relationship between voltage, current, resistance, and power in DC using the 12 basic common formulas derived from Ohm's law and Watt's pie chart.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
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CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
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Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
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Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
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  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
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  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Solve circuits problems using Ohms law
Understand the relationship of current, voltage and resistance
Graph the relationship of current and voltage
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes

Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Apply Ohms law to both simulated and actual circuits
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
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Safety:

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Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA Standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets

Resources/Equipment:

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Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 500 SERIES CIRCUITS
Number: 500 **Hours:** 60.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to to solve, construct and test series connected circuits.

Tasks:

PA501 - Apply Kirchhoff's voltage law in a series circuit.

PA504 - Design/build a series circuit and solve for its equivalent resistance.

PA505 - Analyze power consumption, dissipation and energy units in a series circuit.

PA506 - Analyze the affects of open circuits and short circuits in series circuits.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
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Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
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Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Discuss Kirchoff' voltage principle to voltage in a series circuit
Explain Watt's law for solving power in a circuit
Contrast the terms short and open to electrical circuits
Discuss polarity as it relates to circuit components
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Apply Kirchoff's law to actual circuit measurements
Test electric circuits for malfunctions such as shorts or opens
Observe polarity when using test equipment in a circuit
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in an enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA Standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets
Portfolio
Projects

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Analog Software EKI Digital Software EKI Challenge Software ETCAI DC Circuit Challenge Software ETCAI AC Circuit Challenge Software ETCAI Solid-State Circuit Challenge Software ETCAI Digital Circuit Challenge Software Multisim Electronic Simulator Traxmaker Circuit-Cam Board Master Digital Multimeter (DMM) Analog Meter Oscilloscope DC Power Supply AC Signal Generator Logic Probe Soldering Station ComputerHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 600 PARALLEL CIRCUITS
Number: 600 **Hours:** 60.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to calculate and apply an electrical variable to a parallel circuit.

Tasks:

PA601 - Design/build a parallel circuit and solve for its equivalent resistance.

PA602 - Explain voltage in a parallel circuit.

PA603 - Apply Kirchhoff's current law in a parallel circuit.

PA605 - Analyze power consumption, dissipation, and energy units in a parallel circuit.

PA606 - Analyze the effects of open circuit and short circuit conditions in parallel circuits.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

  Supporting Anchor/Standards:

  KEY IDEAS/DETAILS GRADES 9-10-11-12
  Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
  Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
  Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
  CRAFT & STRUCTURE GRADES 9-10-11-12
  Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
  Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
  Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
  Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
  Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
  Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
  Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
  Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
  Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
  RANGE OF READING GRADES 9-10-11-12
  Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and

comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Explain and measure current in parallel circuits.
State specific concepts about parallel circuits
Discuss Kirchoff's current law as it pertains to parallel circuits
Use Ohm's and Watt's law to solve for applicable circuit parameters
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets

Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Design and test a parallel circuit
Measure values such as current, voltage and resistance
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets
Portfolio
Projects

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Analog Software EKI Digital Software EKI Challenge Software ETCAI DC Circuit Challenge Software ETCAI AC Circuit Challenge Software ETCAI Solid-State Circuit Challenge Software ETCAI

Digital Circuit Challenge Software Multisim Electronic Simulator Traxmaker Circuit-Cam Board Master Digital Multimeter (DMM) Analog Meter Oscilloscope DC Power Supply AC Signal Generator Logic Probe Soldering Station ComputerHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 700 SERIES-PARALLEL CIRCUITS
Number: 700 **Hours:** 100.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to calculate and analyze variables in a series-parallel circuit.

Tasks:

PA701 - Design/build a series-parallel combination circuit and solve for its equivalent resistance.

PA702 - Apply Kirchhoff's current and voltage law to a series-parallel circuit.

PA703 - Analyze and troubleshoot DC combination/complex circuits.

PA704 - Use network theorem to the solutions of series-parallel circuits.

PA705 - Measure and calculate maximum power transfer.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

  Supporting Anchor/Standards:

  KEY IDEAS/DETAILS GRADES 9-10-11-12
  Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
  Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
  Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
  CRAFT & STRUCTURE GRADES 9-10-11-12
  Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
  Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
  Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
  Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
  Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
  Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
  Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
  Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
  Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
  RANGE OF READING GRADES 9-10-11-12
  Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Simplify and solve problems involving complicated series-parallel circuits
Determine maximum power transfer
Explain the relationship between power transfer and efficiency
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

- Extended Time (assignments and/or testing)

- Graphic Organizer

- Chunking of Assignments/Material

- Preferential Seating

- Directions/Comprehension Check (frequent checks for understanding)

- Study Guide

- Directions and/or Tests Read Aloud

- Adapted Tests and/or Assignments

- Use of Calculator

- Taking Tests in Alternate Setting (or if requested)

- Verbal/Gestural Redirection (prompts to remain on task)

- Drill and Practice (Repetition of Material)

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in an enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 800 RESERVED
Number: 800 **Hours:** 12.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain and solve electronic circuit parameters using Thevenin, Norton and Superposition Theorems.

Tasks:

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge
Identify complex circuits
Select appropriate techniques for analyzing a given complex circuit
Explain how a current source differs from a voltage source
Reduce a complex circuit to a simple equivalent circuit
Convert from a voltage source to a current source and vice versa
Use simultaneous-equations techniques to solve sets of loop equations
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment

Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - Circuit Construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to Electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 900 ALTERNATING CURRENT
Number: 900 **Hours:** 75.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to describe and explain the fundamental concepts of an alternating current.

Tasks:

PA901 - Calculate the period and frequency of the waveform.

PA902 - Determine the peak-to-peak, average and RMS values of a sine-wave.

PA903 - Identify various waveforms (sine wave, square wave, triangle wave, sawtooth wave).

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Science, Technology & Engineering, and Environmental Literacy & Sustainability Standards (STEELS), 12th Grade
  3.5.6-8.2 Strand: Applying, Maintaining, and Assessing Technological Products and Systems

  Supporting Anchor/Standards:

  3.5.6-8.A Research information from various sources to use and maintain technological products or systems.
  3.5.6-8.B Use instruments to gather data on the performance of everyday products.
  3.5.6-8.J Use tools, materials, and machines to safely diagnose, adjust, and repair systems.
  3.5.6-8.K Use devices to control technological systems.
  3.5.6-8.O Interpret the accuracy of information collected.
  3.5.6-8.P (ETS) Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

  Standard - 3.2.1.A Students who demonstrate understanding can plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
  Standard - 3.2.3.C Students who demonstrate understanding can ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.
  Standard - 3.2.3.D Students who demonstrate understanding can define a simple design problem that can be solved by applying scientific ideas about magnets.
  Standard - 3.2.4.B Students who demonstrate understanding can make and communicate observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific

content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Graphically illustrate a sine wave, a square wave, and a sawtooth wave
List and explain three ways of specifying the amount of alternating current
List the advantages of alternating current over direct current
Explain the relationship between period, frequency, and cycle
List the advantages of three-phase alternating current over single-phase alternating current.
articipate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Test - Prototype and Circuit board Fabrication
Oral Presentations
Individual Projects
Group Projects
Research Papers

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC Overhead / Transparencies Electronic Simulation - Electronics Workbench - Multisim Multimedia - Digital Circuit Challenge On line ResourcesHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 1000 OSCILLOSCOPE
Number: 1000 **Hours:** 10.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate the function, operation and application of the oscilloscope.

Tasks:

PA1001 - Describe the basic sections of an oscilloscope.

PA1002 - Measure voltage using an oscilloscope.

PA1003 - Measure frequency using an oscilloscope.

PA1004 - Measure phase relationships using an oscilloscope.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS
Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.
GEOMETRY

Instructional Activities:

Knowledge:
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
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Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

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Use proper safety precautions when using /operating hand tools
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Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - Circuit Construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to Electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 1100 INDUCTANCE
Number: 1100 **Hours:** 15.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to discuss the fundamental principles of inductors.

Tasks:

PA1101 - Calculate the value of the inductor based on physical properties.

PA1103 - Calculate and measure the total inductance of inductors connected in series or parallel circuits.

PA1104 - Calculate and measure RL time constant.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
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Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12

Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12

Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS

  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

  ALGEBRA

  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

  GEOMETRY

Instructional Activities:

Knowledge:

Identify various types of inductors.

Write complete specifications for inductors.

List uses of inductors.

Determine reactance of inductors at various frequencies.

Calculate total inductance for series and parallel combinations of inductances.

Participate in classroom instruction

Participate in related lab activities

Complete textbook assignment

Watch video/dvd

Give oral presentation

Complete worksheets

Take notes

Respond to questions

Participate in design projects

Work on group projects

Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - Circuit Construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to Electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 1200 INDUCTIVE REACTANCE
Number: 1200 **Hours:** 15.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to describe inductive reactance and how it is quantified.

Tasks:

PA1201 - Measure and calculate the effect of inductive reactance on current.

PA1202 - Measure and calculate the effect of change in frequency on current.

PA1203 - Identify the phase (lead-lag) relationship between current and applied voltage in a series RL circuit.

PA1204 - Calculate the total inductive reactance in series and parallel circuits.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

  Supporting Anchor/Standards:

  KEY IDEAS/DETAILS GRADES 9-10-11-12
  Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
  Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
  Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
  CRAFT & STRUCTURE GRADES 9-10-11-12
  Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
  Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
  Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
  Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
  Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
  Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
  Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
  Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
  Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
  RANGE OF READING GRADES 9-10-11-12
  Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and

comprehend technical texts independently and proficiently.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Determine reactance of inductors at various frequencies.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
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Assessment:

Test
Quizzes
Practical Evaluations - Circuit Construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to Electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 1300 RESISTOR INDUCTOR (RI) CIRCUITS IN ALTERNATING CURRENT (AC)
Number: 1300 **Hours:** 120.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain and apply how an R L circuit operates.

Tasks:

PA1301 - Use vectors to describe magnitude and direction of voltages.

PA1302 - Use vectors in determining total current or voltage in series and parallel RL circuits.

PA1303 - Measure and calculate the effect of a series resistive-inductive (RI) circuit on AC voltage and current.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
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CRAFT & STRUCTURE GRADES 9-10-11-12
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Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
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Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
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RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

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Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

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Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

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Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS

  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

  ALGEBRA

  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

Determine resonant frequency.

Calculate impedance for a variety of combinations of R,

C, and L circuits.

Graphically and mathematically add phasors representing electrical quantities.

Determine phase angles for circuits containing different filters

combinations of R, C, and L.

List and explain the characteristics of four basic types of

Participate in classroom instruction

Participate in related lab activities

Complete textbook assignment

Watch video/dvd

Give oral presentation

Complete worksheets

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Respond to questions

Participate in design projects

Work on group projects

Develop study guides

Skill:
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Remediation:
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Assessment:

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Quizzes
Practical Evaluations - Circuit Construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to Electronics
Worksheets

Resources/Equipment:

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Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 1400 TRANSFORMERS
Number: 1400 **Hours:** 24.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain the operation of a transformer.

Tasks:

PA1401 - Identify transformer windings, types and usages.

PA1402 - Calculate and measure voltage-turns ratio.

PA1403 - Measure the effect of secondary load on primary current.

PA1404 - Troubleshoot transformers for open and short circuit conditions.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Determine the efficiency of a transformer.
Connect three-phase transformers in delta and wye connections.
Use a transformer for impedance matching.
Connect secondary winding in series-aiding or series-opposing configurations to obtain different voltages.
List and explain three common uses of transformers.
Explain why transformers have volt-ampere ratings.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment

Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - Circuit Construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to Electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 1500 CAPACITANCE
Number: 1500 **Hours:** 10.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to describe the operation and application of capacitors.

Tasks:

PA1501 - Identify the effect of capacitance in AC and DC circuits.

PA1502 - Calculate and measure for equivalent capacitance in series and parallel circuits.

PA1503 - Calculate and measure RC time constants.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
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Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
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RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Describe the behavior of a capacitor in ac and dc circuits.
Write specifications for ordering capacitors from electrical supply distributors.
List several types of capacitors and describe their major
uses.
Calculate current and voltage distributions in capacitive
circuits.
Explain phase shift in a capacitor.
Determine when a capacitor is open or shorted.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects

Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - Circuit Construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to Electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 1600 CAPACITIVE REACTANCE
Number: 1600 **Hours:** 25.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to solve for capacitive reactance in an AC circuit.

Tasks:

PA1601 - Measure and calculate the effect of capacitive reactance on current.

PA1602 - Measure and calculate the effect of change in frequency on circuit current.

PA1603 - Identify phase (lead-lag) relationship between current and applied voltage in a series RC circuit.

PA1604 - Calculate the total capacitive reactance in series and parallel circuits.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12
  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
  Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Determine the reactance of a capacitor at any specified frequency.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects

Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
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Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Test
Quizzes
Practical Evaluations - Circuit Construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to Electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 1700 RESISTANCE CAPACITANCE (RC) CIRCUITS
Number: 1700 **Hours:** 15.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to calculate and solve RC circuit parameters.

Tasks:

PA1701 - Describe magnitude and direction of voltages using vectors.

PA1702 - Determining total current or voltage in series and parallel RC circuits using vectors.

PA1704 - Measure and calculate the effect of a series capacitive-resistive circuit on AC voltage and current.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

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Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS

  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

  ALGEBRA

  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

Determine resonant frequency.

Graphically and mathematically add phasors representing electrical quantities

List and explain the characteristics of four basic types of

filters.

Participate in classroom instruction

Participate in related lab activities

Complete textbook assignment

Watch video/dvd

Give oral presentation

Complete worksheets

Take notes

Respond to questions

Participate in design projects

Work on group projects

Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
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Peer mentoring
One-on one with teacher
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Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA Standards
Know and follow the established safety rules at all times

Assessment:

Tests
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 1800 RESISTANCE INDUCTANCE CAPACITANCE (RLC) CIRCUITS
Number: 1800 **Hours:** 24.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to solve circuit parameters and explain the circuit operation.

Tasks:

PA1801 - Calculate total current in series RLC circuits.

PA1802 - Calculate total current in parallel RLC circuits.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
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RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.

RESEARCH GRADES 9-10-11-12

Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.

Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.

Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.

RANGE OF WRITING GRADES 9-10-11-12

Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS

  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

  ALGEBRA

  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

Calculate impedance for a variety of combinations of R,

C, and L circuits.

Graphically and mathematically add phasors representing electrical quantities.

Determine phase angles for circuits containing different

combinations of R, C, and L

Participate in classroom instruction

Participate in related lab activities

Complete textbook assignment

Watch video/dvd

Give oral presentation

Complete worksheets

Take notes

Respond to questions

Participate in design projects

Work on group projects

Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in an enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA Standards
Know and follow the established safety rules at all times

Assessment:

Tests
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets
Resources / Equipment
Textbook: "Electricity Principles and Applications", 5th Edition, Fowler 2000
Lab Manuals; Energy Concepts DC
EKI Software
ETCAI Software
Multisim Electronic Simulator
Electronic Test Equipment

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 1900 RESONANCE
Number: 1900 **Hours:** 100.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to calculate parameters and describe application for resonant circuits.

Tasks:

PA1901 - Calculate and measure the resonant frequency of a series RLC circuit.

PA1903 - Calculate the Q of a series resonant circuit.

PA1904 - Calculate and measure the resonant frequency of a parallel RLC circuit.

PA1906 - Graph a response curve on a series RLC circuit.

PA1907 - Graph a response curve on a parallel RLC circuit.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

  Supporting Anchor/Standards:

  KEY IDEAS/DETAILS GRADES 9-10-11-12
  Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
  Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
  Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
  CRAFT & STRUCTURE GRADES 9-10-11-12
  Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
  Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
  Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
  Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
  Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
  Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
  INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
  Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
  Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
  Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
  RANGE OF READING GRADES 9-10-11-12
  Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
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  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
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  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Determine resonant frequency
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in an enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA Standards
Know and follow the established safety rules at all times

Assessment:

Tests
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 2000 SOLDERING
Number: 2000 **Hours:** 10.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to use several techniques to perform various soldering tasks.

Tasks:

PA2001 - Demonstrate types and usage of soldering/desoldering equipment.

PA2002 - Desolder components from a circuit board.

PA2003 - Solder components to a circuit board.

PA2004 - Demonstrate soldering and de-soldering surface mount device (SMD) methods.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
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Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
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Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
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RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
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Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
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Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
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Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
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Know and follow the established safety rules at all times

Assessment:

Tests
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 2100 DIODES
Number: 2100 **Hours:** 10.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate and explain several characteristics of the diode.

Tasks:

PA2101 - Test diodes and identify the cathode and anode.

PA2102 - Analyze the voltage-current relationship of diodes by plotting the characteristic curve.

PA2103 - Distinguish the correct bias for the operation of a LED.

PA2104 - Compare the forward and reverse characteristics of a Zener diode.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
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Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
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  Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
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  Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
  RANGE OF WRITING GRADES 9-10-11-12
  Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
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Participate in related lab activities
Complete textbook assignment
Watch video/dvd
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Complete worksheets
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Skill:
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Remediation:
Use tutorial software
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One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in an enclosed area
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Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA Standards
Know and follow the established safety rules at all times

Assessment:

Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 7th Edition, Schuler 2008 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 2200 POWER SUPPLIES
Number: 2200 **Hours:** 24.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to identify and explain the operation of various power supply configurations.

Tasks:

PA2201 - Identify common rectifier circuits (half-wave and full-wave).

PA2202 - Construct and analyze the operation of a rectifier circuit.

PA2203 - Investigate the cause and effect of power supply filtering, hum and common filter types.

PA2205 - Measure and calculate power supply ripple percentage and voltage regulation.

PA2208 - Measure and identify the regulation properties of a shunt type Zener regulator.

PA2209 - Select switch mode power supply for different applications.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
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Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
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  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
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  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Recognize common rectifier configurations and list their characteristics
Recognize common filter configurations and list their characteristics.
Measure and calculate power-supply ripple percentage and voltage regulation.
Predict and measure dc output voltage for filtered and unfiltered power supplies.
Troubleshoot common power-supply malfunctions.
Select replacement parts for power-supply circuits.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/ dvd
Give oral presentation
Complete worksheets

Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in an enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA Standards
Know and follow the established safety rules at all times

Assessment:

Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets
Resources / Equipment
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 7th Edition, Schuler 2008 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 2300 TRANSISTOR CHARACTERISTICS
Number: 2300 **Hours:** 15.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain transistor characteristics that apply to the electronics industry.

Tasks:

PA2301 - Identify base, emitter, and collector terminals of PNP and NPN transistors.

PA2302 - Locate the ratings, characteristics and operating parameters listed on a typical transistor specification/data sheet.

PA2303 - Determine the type of transistor, NPN or PNP, and operating condition.

PA2304 - Identify schematic symbols and uses for various types of transistors.

PA2305 - Compare FET and BJT devices.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author’s purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author’s claim for solving a technical problem.
Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
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RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:
NPN and PNP transistors
N- and P-channel JFETs
N- and P-channel MOSFETs
Depletion- and enhancement-mode MOSFETs
Research hazardous chemical safety information in the home
Interpret Material Safety Data Sheets (MSDS)
Explain the environmentally-safe disposal procedures for electronics equipment.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Practice safety techniques for electronics work

Demonstrate an understanding of proper fire drill procedures
Safely discharge a Cathode Ray Tube (CRT picture tube)
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on One with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
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Special Adaptations:

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Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 2400 SMALL-SIGNAL AMPLIFIERS
Number: 2400 **Hours:** 15.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to predict the gain of a small-signal amplifier.

Tasks:

PA2401 - Use biasing polarity of NPN or PNP transistors.

PA2402 - Calculate and measure gain.

PA2403 - Distinguish between basic amplifier configurations.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
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Standard CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.
INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
Standard CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible.
Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

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PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.

Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

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Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS

Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

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Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

ALGEBRA

Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

Calculate amplifier gain.

Estimate gain and loss in decibels.

Describe the operation of a common-emitter voltage amplifier.

Define clipping.

Draw a dc load line for a simple common-emitter am plifier.

Calculate the operating point for a simple common emitter amplifier.

Calculate the operating point for a ß-independent com mon-emitter amplifier.

Calculate voltage gain for a common-emitter amplifier.

Identify and list characteristics for the common-base and common-collector amplifier configurations.

Demonstrate the need for impedance matching in elec tronic circuits.

Describe the general methods of modeling as used in circuit simulation

Research hazardous chemical safety information in the home

Interpret Material Safety Data Sheets (MSDS)

Explain the environmentally-safe disposal procedures for electronics equipment.

Participate in classroom instruction

Participate in related lab activities

Complete textbook assignment

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Give oral presentation
Complete worksheets
Take notes
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Work on group projects
Develop study guides

Skill:
Practice safety techniques for electronics work
Demonstrate an understanding of proper fire drill procedures
Safely discharge a Cathode Ray Tube (CRT picture tube)
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Remediation:
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Enrichment:
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Special Adaptations:

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Resources/Equipment:

Textbook: "Electricity Principles and Applications", 7th Edition, Schuler 2008 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 2500 OPERATIONAL AMPLIFIERS
Number: 2500 **Hours:** 40.00
Dates: Spring 2023

Description/Objectives:

Student will know and be able to identify and explain operational amplifier configurations.

Tasks:

PA2501 - Construct and analyze the phase shift between input and output of an inverting IC Op-Amp.

PA2502 - Construct and analyze the phase shift between input and output of a non-inverting IC Op-Amp.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
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RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12

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Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.

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RANGE OF WRITING GRADES 9-10-11-12

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Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.

  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.

  Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers ALGEBRA

  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:

Identify differential amplifiers.

Identify differential inputs, common-mode inputs, sin gle-ended outputs, and differential outputs.

Predict the phase relationships for differential amplifiers.

Find the gain for a basic differential amplifier.

Find common-mode gain.

Calculate the CMRR for basic differential amplifiers.

Identify operational amplifiers and their schematic sym bols.

List the typical performance specifications for ordinary op amps.

Calculate the power bandwidth for an op amp using its slew-rate specification.

Calculate voltage gain for inverting and noninverting op-amp circuits.

Define the virtual ground and use this concept to ex plain the input impedance of inverting op-amp circuits.

Use Bode plots to predict the small-signal bandwidth of op-amp circuits.

Describe frequency compensation and stability in op -amp circuits.

Identify and describe op-amp applications such as ac tive filters, adders, subtractors, integrators, and voltage-to-frequency

converters.

Explain how to operate an op-amp from a single polar ity power source.

Explain comparators and their applications

Research hazardous chemical safety information in the home

Interpret Material Safety Data Sheets (MSDS)
Explain the environmentally-safe disposal procedures for electronics equipment.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
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Skill:
Practice safety techniques for electronics work
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Safely discharge a Cathode Ray Tube (CRT picture tube)
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Remediation:
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Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 2600 BASIC DIGITAL ELECTRONICS
Number: 2600 **Hours:** 20.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain logic circuits and their operation.

Tasks:

PA2601 - Convert between numbering systems (decimal, binary, octal and hexadecimal).

PA2603 - Identify the operation and develop the truth tables for the seven basic logic gates.

PA2604 - Connect combinational logic (multiplexer, demultiplexer, half-adder, full-adder).

PA2605 - Apply Boolean reduction and construct Karnaugh mapping for complex logic circuits.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
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Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
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Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
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Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
Standard 2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers
ALGEBRA
Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
The student will memorize and be able to recall 100 percent of the time the name, symbol, truth table, function, and Boolean expression for the eight basic logic gates
Using the appropriate chart, the student will be able, from 2-input gates, to create in schematic form gates with more than two inputs
The student will be able to convert whole numbers from binary to decimal and decimal to binary
The student will be able to convert hexadecimal to binary, binary to hexadecimal, hexadecimal to decimal, and decimal to hexadecimal numbers
Given a Boolean expression, the student will draw a network of logic symbols which will perform that function and fill in the truth table for that logic function
Given a truth table, the student will first develop a

Boolean expression and then draw a network of logic symbols that will perform according to the truth table
The student will be able to translate from one code to another in whole numbers.
Given the correct table, the student will be able to convert characters to ASCII code and ASCII code to letters and numbers
The student will demonstrate the coding of a seven-segment display by drawing the display and listing the segments that light when decimals 0 through 9 appear
The student will memorize and be able to draw 100 percent of the time a block diagram of each of the four types of flip-flops in this chapter.
The student will memorize and be able to fill in a blank truth table for a D and a J-K flop-flop.
The student will interpret waveform diagrams to determine the type of triggering used by a flip-flop.
Given any set of flip-flop inputs, the student will be able to determine the unit's mode of operation and outputs
Given any set of latch inputs, the student will be able to determine the unit's mode of operation and outputs
The student will be able to draw from memory a circuit diagram of a ripple counter using J-K flipflops.
Given the counting sequence and the circuit diagram, the student will be able to analyze the circuit action of any synchronous modulo-3 through modulo-8 counter by drawing its waveform diagram
The student will draw a block diagram of a frequency divider circuit
The student will interpret manufacturers' data sheets for the 7493 and 74192 TTL IC counters by answering selected questions about their operation.
The student will interpret manufacturers' data sheets for the 74HC193 and 74HC393 CMOS IC counters
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/ dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in an enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA Standards
Know and follow the established safety rules at all times

Assessment:

Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets
Resources / Equipment
Practical Evaluations - circuit construction actual and simulated
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Resources/Equipment:

Textbook: "Electricity Principles and Applications", 7th Edition, Fowler 2008 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 2700 RESERVED
Number: 2700 **Hours:** 0.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain how nanotechnology is used in the electronics industry.

Tasks:

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12
Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.
Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.
Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.
CRAFT & STRUCTURE GRADES 9-10-11-12
Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.
Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.
Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.
INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10
Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).
Standard CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.
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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12
Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.
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Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding.
RANGE OF READING GRADES 9-10-11-12
Standard CC.3.5.9-10.J / Standard CC.3.5.11-12.J By the end of grades 9-10, AND 11- 12, read and comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12
Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including

the narration of technical processes, etc.
PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
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RESEARCH GRADES 9-10-11-12
Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

  Supporting Anchor/Standards:

  NUMBERS AND OPERATIONS
  Standard 2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
  Standard 2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems.
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  ALGEBRA
  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Safety:

Student must:
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Assessment:

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Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 2800 TROUBLESHOOTING
Number: 2800 **Hours:** 15.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain techniques for diagnosing circuit faults.

Tasks:

PA2801 - Utilize the order of the troubleshooting process to detect failures in electrical and electronic circuits.

PA2802 - Analyze and troubleshoot failures in electrical and electronic circuits.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

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  Standard 2.2.HS.C.9 Prove the Pythagorean identity and use it to calculate trigonometric ratios.

Instructional Activities:

Knowledge:
Describe the system view as used in troubleshooting.
Properly identify symptoms in malfunctioning equipment and systems.
Make preliminary checks and eliminate obvious problems.
Localize difficulties in the signal chain by using injec tion techniques.
Localize difficulties in the signal chain by using tracing techniques.
Isolate difficulties at the component level by using volt age analysis.
Troubleshoot intermittents by using heat, cold, and vi bration.
Troubleshoot op-amp circuits.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
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Work on group projects
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Skill:
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Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 2900 ELECTRONIC COMMUNICATIONS
Number: 2900 **Hours:** 60.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to describe various methods of electronic communications.

Tasks:

PA2901 - Identify and explain the major components of a basic communication system.

PA2903 - Measure and calculate maximum power transfer.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

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RANGE OF READING GRADES 9-10-11-12
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Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

TEXT TYPES AND PURPOSE GRADES 9-10-11-12

Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.

Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.

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RANGE OF WRITING GRADES 9-10-11-12

Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Supporting Anchor/Standards:

CC.2.1.7.D.1 Analyze proportional relationships and use them to model and solve real-world and mathematical problems.

Instructional Activities:

Knowledge:
Define modulation and demodulation.
List the characteristics of AM, FM, and SSB.
Explain the operation of simple radio receivers.
Predict the bandwidth of AM signals.
Calculate the oscillator frequency in a superheterodyne receiver.
Calculate the image frequency in a superheterodyne re ceiver.
Troubleshoot simple superheterodyne receivers.
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
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Respond to questions
Participate in design projects
Work on group projects
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Skill:
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Special Adaptations:

1. Use of calculator
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Student must:
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Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 3000 MOTORS
Number: 3000 **Hours:** 80.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain the operation of a motor.

Tasks:

PA3001 - Describe the characteristics of AC and DC motors.

PA3002 - Describe characteristics of induction and Stepper motors.

PA3003 - Explain the difference between brushed and brushless motors.

PA3004 - Explain the use and function of a servomechanism.

PA3005 - Explain and use motor controllers and speed controllers.

Standards / Assessment Anchors
Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

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  Standard 2.1.HS.F.6 Extend the knowledge of arithmetic operations and apply to complex numbers

Instructional Activities:

Knowledge:
Identify various types of motors
Explain how a single-phase motor produces torque
Explain and compare the characteristics of single-phase induction motors
Calculate synchronous speed, horsepower, and torque for various motors
Explain the operating characteristics of series, shunt, and compound dc motors
Explain the operation of a universal motor
Interpret and use the information given on the nameplate of a motor
Participate in classroom instruction
Participate in related lab activities

Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Special Adaptations:

1. Use of calculator
2. Extended time on tests
3. Study Guides for tests
4. Preferential seating
5. Word bank for tests

Safety:

Student must:
Observe electrical safety procedures outlined in safety training
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in an enclosed area
Follow manufacturer’s directions when using any product, tool, equipment, etc
Use proper safety precautions when using /operating hand tools
Use tools and equipment in a professional work like manner according to OSHA Standards
Know and follow the established safety rules at all times

Assessment:

Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics
Worksheets
Resources / Equipment
Practical Evaluations - circuit construction actual and simulated
Lab Report
Presentations- PowerPoint on topics related to electronics

Resources/Equipment:

Textbook: "Electricity Principles and Applications", 8th Edition, Fowler 2011 Lab Manuals; Energy Concepts DC EKI Software ETCAI Software Multisim Electronic Simulator Electronic Test EquipmentHyperlinks:

Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 3100 HISTORY OF ELECTRONICS - PAST, PRESENT AND FUTURE
Number: 3100 **Hours:** 12.00
Dates: Spring 2025

Description/Objectives:

Student will know and be able to explain the historical evolution of the electronics industry as it realtes to their career.

Tasks:

PA3101 - Examine the cause and effect of past, present and future technologies.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Career Education and Work Academic Standards
  13.1: Career Awareness and Preparation

  Supporting Anchor/Standards:

  Standard - 13.1.11.A Relate careers to individual interests, abilities, and aptitudes.
  Standard - 13.1.11.B Analyze career options based on personal interests, abilities, aptitudes, achievements and goals.
  Standard - 13.1.11.C Analyze how the changing roles of individuals in the workplace relate to new opportunities within career choices.
  Standard - 13.1.11.D
  Evaluate school-based opportunities for career awareness/preparation, such as, but not limited to:

  Career days
  Career portfolio
  Community service
  Cooperative education
  Graduation/senior project
  Internship
  Job shadowing
  Part-time employment
  Registered apprenticeship
  School-based enterprise

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

  Supporting Anchor/Standards:

  TEXT TYPES AND PURPOSE GRADES 9-10-11-12
  Standard CC.3.6.9-10.A Standard CC.3.6.11-12.A Write arguments focused on discipline specific content.
  Standard CC.3.6.9-10.B Standard CC.3.6.11-12.B Write informative or explanatory texts, including the narration of technical processes, etc.
  PRODUCTION & DISTRIBUTION OF WRITING GRADES 9-10-11-12
  Standard CC.3.6.9-10.C Standard CC.3.6.11-12 C Produce clear and coherent writing...appropriate to task, purpose, and audience.
  Standard CC.3.6.9-10 D Standard CC.3.6.11-12.D Develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on addressing what is most significant for a specific purpose and audience.
  Standard CC.3.6.9-10.E Standard CC.3.6.11-12.E. Use technology, including the internet, to produce, publish, and update individual or shared writing products.
  RESEARCH GRADES 9-10-11-12

Standard CC.3.6.9-10.F Standard CC.3.6.11-12.F Conduct short and more sustained research to answer a question or solve a problem.
Standard CC.3.6.9-10.G. Standard CC.3.6.11-12.G Gather relevant information from multiple authoritative print and digital sources, following a standard format for citation.
Standard CC.3.6.9-10.H. Standard CC.3.6.11-12.H. Draw evidence from informational texts to support analysis, reflection, and research.
RANGE OF WRITING GRADES 9-10-11-12
Standard CC.3.5.9-10.I & Standard CC.3.5.11-12.I. Write routinely over extended time frames and shorter time frames for a range of tasks, purposes and audiences...etc.

Instructional Activities:

Knowledge:
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
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Work on group projects
Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
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Enrichment:
Complete design and engineering projects
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Special Adaptations:

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Assessment:

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Resources/Equipment:

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Monroe Career & Technical Institute

Course: Electronics Technology

Unit Name: 3200 Microcontrollers
Number: 3200 **Hours:** 12.00
Dates: Spring 2025

Description/Objectives:

Student will be able to be able to program various digital devices.

Tasks:

PA3201 - Program and use a microcontroller to read an input and control an output (digital, analog, PWM, and display).

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- 15.4.8.E Explain the different operating systems.

Supporting Anchor/Standards:

CCR.R.6-12.10 Read and comprehend complex literary and informational texts independently and proficiently.

Focus Anchor/Standard #2:

- 15.4.2.G With help and support, select and use various software/applications for an intended purpose.

Supporting Anchor/Standards:

CCR.R.6-12.7 Integrate and evaluate content presented in diverse formats and media, including visually and quantitatively, as well as in words.

Instructional Activities:

Knowledge:
Participate in classroom instruction
Participate in related lab activities
Complete textbook assignment
Watch video/dvd
Give oral presentation
Complete worksheets
Take notes
Respond to questions
Participate in design projects
Work on group projects

Develop study guides

Skill:
Complete tutorial software assignments

Remediation:
Use tutorial software
Peer mentoring
One-on one with teacher
Review with instructional assistant

Enrichment:
Complete design and engineering projects
Complete interdisciplinary design projects

Resources/Equipment:

Arduino Microcontroller Board or other

Hyperlinks: