Steel Center
Course Name: Electrical Construction

Unit Name: PA100 - BASIC SAFETY

Dates: Fall 2019 **Hours:** 111

Unit Description/Objectives:

Student will know and be able to demonstrate or describe training and career opportunities and characteristics of a professional in the electrical construction industry, identify and avoid hazardous conditions on the job site, identify safe methods and equipment of aerial work, and demonstrate basic fire safety and basic electrical safety.

Tasks:

101	Inspect and use personal protective equipment
102	Identify causes of job site accidents.
103	RESERVED
104	RESERVED
105	Properly don fall protection
106	Identify four classes of fire extinguishers
107	Confirm circuits are de-energized before working on them.
108	Perform lockout/tagout.
109	Inspect and use ladders
110	Complete jobsite hazard analysis form
111	Identify Arc-flash hazards and protection

Standards / Assessment Anchors

Focus Standard #1

CC.3.5.11-12. C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text

Supporting Standard

CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 11–12 texts and topics.

CC.3.5.11-12.G. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

Connecting Standard

CC.3.5.9-10. I Compare and contrast findings presented in a text to those from other sources, etc.

Supporting 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)

CC.3.5.9-10. H Assess the reasoning in a text to support the author's claim for solving a technical problem.

Instructional Activities:

Knowledge:

Read Chapter 1 House Wiring
View types of equipment in the shop
Observe demonstrations
Participate in theory lesson
Take notes
Respond to questions
List safety practice for ladders
Describe the proper use of the different types of fire extinguishers
Explain the purpose of OSHA and how it promotes safety on the job
Explain safety issues concerning lockout/tagout procedures
Explain personal protection using fall protection systems
Explain the role that safety plays in the construction crafts
Describe what job-site safety means
Explain the appropriate safety precautions around common job-site hazards
Explain the importance of SDS formerly known as MSDS.

Skill:

Demonstrate an understanding of both General Safety and Electrical
Demonstrate lockout/tagout procedure
Demonstrate proper use and inspection of PPE such as boots, and safety glasses
Use a Material Safety Data Sheet
Find information in the National Electrical Code
Identify different types of ladders
Inspect ladders for damage and safety issues
Demonstrate the proper use of the different types of ladders
Demonstrate the use and care of appropriate personal protective equipment
Follow safe procedures for lifting heavy objects
Define safe work procedures around electrical hazards
Demonstrate an understanding of the electrical hazards associated with electrical work.
Demonstrate an understanding of the purpose of the National Electrical Code®.
Demonstrate an understanding of the arrangement of the National Electrical Code®.
Identify common electrical hazards and how to avoid them on the job.

Remediation:

Re-teach major concepts
Worksheets
Individual assistance
Peer Tutoring
Study Guides

Enrichment:

Conduct a shop safety audit using a JHA
Complete a safety review of the program
Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
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 and according to OSHA standards
Know and follow the established safety rules at all times
Wear work boots
Wear safety glasses at all times while working
Any tool not in your hand is to be in your tool pouch
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using / operating hand tools

Assessment:

Rubrics
Quizzes
Worksheets
Projects
Tests
Complete packet questions
Answer questions

Resources/Equipment:

2015, NCCER, Pearson education, fifth edition

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Ladders
Lockout/tagout kit

NEC Book Version 2011
Workstation/Booth area
Fire Extinguishers
Electricians Tool Pouch with assorted tools:
Utility knife
PPE: safety glasses, goggles, boots

Steel Center
Course Name: Electrical Construction

Unit Name: PA200 - HAND TOOLS
Unit Number: PA-200

Dates: Fall 2019 **Hours:** 35

Unit Description/Objectives:

Student will know and be able to identify, safely use and maintain hand tools.

Tasks:

201	Use screwdrivers.
202	Use pliers.
203	Use keyhole/drywall saw.
204	Use hydraulic knockout/punch tool.
205	Use a tape measure.
206	Use wire strippers.
207	Use wire cutters.
208	Use utility knife.
209	Use torpedo level.
210	Use a hammer.
211	Use a conduit reamer.
212	Use a hacksaw.
213	Use a roto-split.
214	Use adjustable or non adjustable wrenches.
215	Use ratchet and sockets.
216	Use nut drivers.

Standards / Assessment Anchors

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Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standard

CC.3.5.11-12 A Cite specific textual evidence
CC.3.5.11-12. B Determine the central ideas or conclusions of a text
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats

Connecting Standard

CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding of a process or concept.

Supporting Standard

CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Instructional Activities:

Knowledge:

Read Chapter 3 House Wiring
Study glossary of terms
Complete projects
Participate in theory lesson, take notes, and respond to questions
Complete individual and group projects
Memorize essential vocabulary
Identify common electrical hand tools and their uses in the electrical trade
Identify common specialty tools and their uses in the electrical trade

Skill:

Complete assigned project
Read a ruler or measuring tape
Identify tools and their use
Understand safety with tools
Choose the right tool for the job at hand
Identify and describe the use of hand tools that are most commonly used by electricians
Use hand tools in a safe and appropriate manner
Maintain hand tools in suitable working condition
Demonstrate an understanding of the procedures for using several common hand tools such as:
Hammers
Pliers
Saws
Wire Cutters
Screwdrivers
Wrenches
Chisels

Remediation:

Re-teach major concepts
Individual Tutoring
Peer Tutoring
Study Guides

Enrichment:

Complete a safety review of the program
Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
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
Wear work boots
Wear safety glasses at all times while working
Any tool not in your hand is to be in your tool pouch
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using / operating hand tools

Assessment:

Rubrics
Quizzes
Worksheets
Project
Tests
Complete packet questions

Resources/Equipment:

2015, NCCER, Pearson education, fifth edition

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

screwdrivers
pliers
wire cutters
hammers
saws
chisels
hydraulic tool systems
PPE: safety glasses, work boots or work shoes, pants.

Steel Center
Course Name: Electrical Construction

Unit Name: PA300 - POWER TOOLS
Unit Number: PA-300

Dates: Fall 2019 **Hours:** 35

Unit Description/Objectives:

Student will know and be able to identify, safely use and maintain power tools.

Tasks:

301	RESERVED
302	Use electric hammer drill.
303	Use reciprocating saw.
304	Use portable hand-held band saw.
305	RESERVED
306	Use a drill.
307	RESERVED
308	RESERVED
309	RESERVED
310	Use oscillating multi purpose tool.
311	Use impact driver.

Standards / Assessment Anchors

Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standards/Anchors

CC.3.5.11-12. D Determine the meaning of symbols, key terms, and other domain specific words

CC.3.5.11-12. E Analyze the structure of the relationships among concepts in a text

Connecting Standard

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

Supporting Standards/Anchors

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

CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.

Instructional Activities:

Knowledge:

Read Chapter 3 House Wiring
Participate in theory lesson, take notes, and respond to questions
Review safety standards
Complete Assignment Sheet
Memorize essential vocabulary
List several guidelines for the care and safe use of power tools
Identify common electrical power tools and their uses in the electrical trade

Skills:

Drill holes with electric hammer drill
Cut wood or metal with reciprocating saw
Cut conduit or strut with portable hand-held saw
Cut wood with circular saw
Drill holes with electric/cordless drill
Identify common power tools and their uses in the residential electrical trade
Demonstrate an understanding of the procedures for using power tools

Remediation:

Re-teach major concepts
Individual Tutoring
Practice with the construction aide

Enrichment:

Complete a safety review of the program
Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
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 power 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
Wear safety glasses at all times while working

Assessment:

Rubrics
Quizzes
Performance

Resources/Equipment:

2015, NCCER, Pearson education, fifth edition

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Electric hammer drill
Reciprocating saw
Portable hand-held band saw
Circular saw
Electric/cordless drill
Portable jig saw

Steel Center
Course Name: Electrical Construction

Unit Name: PA400 - BLUEPRINT READING
Unit Number: PA-400

Dates: Fall 2019 **Hours:** 44

Unit Description/Objectives:

Student will know and be able to plan branch circuits for blueprint development and incorporate electrical details to residential blueprint.

Tasks:

401	Identify types of blueprint plans.
402	Identify blueprint symbols.
403	Interpret blueprint plans.
404	RESERVED
405	Develop electrical details on a residential blueprint.
406	Use a measuring tool to scale.

Standards / Assessment Anchors

Focus Standard

CC.3.5.9-10.D. Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9–10 texts and topics.

Supporting Standards

CC.2.1.HS.F.5 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

Connecting 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).

Supporting Standards/Anchors

2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems
2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multistep problems

Instructional Activities:

Knowledge:

Read Chapter 5 House Wiring
Complete questions
Participate in theory lesson, take notes, and respond to questions
Memorize essential vocabulary
Memorize electrical symbols

Skills:

Recognize and identify basic blueprint terms, components, and symbols
Relate information on blueprints to actual locations on the print
Recognize the different classifications of drawings
Interpret and use drawing dimensions
Demonstrate an understanding of residential building plans
Identify common architectural symbols found on residential building plans
Determine specific dimensions on a building plan using scale
Demonstrate and understanding of residential building plan specifications

Remediation:

Re-teach major concepts
Worksheets
Individual Tutoring
Peer Tutoring
Study guides

Enrichment:

Make blueprints of the shop and work areas
Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Follow manufacturer's directions when using any product, tool, equipment, etc.
Know and follow the established safety rules at all times
Wear work boots
Wear safety glasses at all times

Assessment:

Rubrics
Quizzes
Drawings

Resources/Equipment:

2015, NCCER, Pearson education, fifth edition

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Measuring and drawing tools

Steel Center
Course Name: Electrical Construction

Unit Name: PA500 - ANCHORS AND SUPPORTS

Unit Number: PA-500

Dates: Fall 2019 **Hours:** 95

Unit Description/Objectives:

Student will know and be able to identify and install various types of anchors and supports.

Tasks:

PA501 - Identify, select and install various types of anchors and supports.

Standards / Assessment Anchors

Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standards/Anchors

CC.3.5.11-12. D Determine the meaning of symbols, key terms, and other domain specific words

CC.3.5.11-12. E Analyze the structure of the relationships among concepts in a text

Connecting Standard

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

Supporting Standards/Anchors

CC.2.1. HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.
CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.

Instructional Activities:

Knowledge:

Read Chapter 2 house wiring
Complete assigned questions
Identify different types of anchors and supports
Participate in theory lesson, take notes, and respond to questions
Memorize essential vocabulary

Skills:

Install various anchors and supports

Remediation:

Re-teach major concepts
Worksheets
Individual Tutoring
Peer Tutoring
Study Guides

Enrichment:

Complete a safety review of the program
Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
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
Wear work boots
Wear safety glasses at all times while working
Check that work station disconnect is in the off position

Assessment:

Rubrics
Quizzes
Worksheets
Project
Practical
Tests
Complete packet questions
Complete questions

Resources/Equipment:

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Various types of anchors and supports

Steel Center
Course Name: Electrical Construction

Unit Name: PA600 - RESIDENTIAL CABLING TECHNOLOGY
Unit Number: PA-600

Dates: Fall 2019 **Hours:** 226

Unit Description/Objectives:

Student will know how to prepare NM/MC cable for connection to devices in accordance with NEC standards and install several types of circuits and rough wiring in a residence and finish wiring. Demonstrate knowledge and skill in installing communication systems.

Tasks:

600	**RESIDENTIAL CABLING TECHNOLOGY**
601	Install non-metallic (NM) Cable for connection to an electrical device.
602	Install metal-clad cable (MC).
603	RESERVED
604	RESERVED
605	Terminate a coaxial cable.
606	RESERVED
607	RESERVED
608	RESERVED
609	Identify telecommunications cable types.
610	Terminate an RJ45 connector.
611	Install SE cable.

Standards / Assessment Anchors

Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standard

CC.3.5.11-12 A Cite specific textual evidence
CC.3.5.11-12. B Determine the central ideas or conclusions of a text
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats

Connecting Standard

CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding of a process or concept.

Supporting Standard

CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Instructional Activities:

Knowledge:
Read chapters 9, 10,11 and 16 in the house wiring text
Complete assigned study guides
Participate in theory lesson, take notes, and respond to questions
Memorize essential vocabulary
Take quizzes
Take written tests

Skill:
Demonstrate the proper preparation of NM Cable for connection to devices
Layout projects
Mount boxes
Drill holes
Install various cables
Support cables
Terminate various devices
Self-assess using the NEC as a guide

Remediation:
Re-teach major concepts
Worksheets
Individual Tutoring
Peer Tutoring
Study Guides

Enrichment:

Complete a safety review of the program with a job hazard analysis
Assist another student

Safety:
Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
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
Wear work boots
Wear safety glasses at all times while working
Any tool not in your hand is to be in your tool pouch
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using / operating hand or power tools.

Assessment:

Complete study guide questions
Written test
Self Review
NEC performance rubric

Resources/Equipment:

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Hand tools
Power tools
Drawing paper
JHA paper
Material closet

Steel Center
Course Name: Electrical Construction

Unit Name: PA700 - SWITCHES AND RECEPTACLES
Unit Number: PA-700

Dates: Fall 2019 **Hours:** 190

Unit Description/Objectives:

Student will know and be able to install a duplex receptacle, single pole switch, timer 3-way switch, 4-way switch, a split-wired duplex receptacle, a AFCI and a Ground Fault Circuit Interrupter (GFCI) in accordance with current NEC standards.

Tasks:

701	Install a duplex receptacle.
702	Install a single pole switch.
703	Install a 3-way switch.
704	Install a 4-way switch.
705	Install a split-wired duplex receptacle.
706	Install a Ground Fault Circuit Interrupter (GFCI) Receptacle.
707	Install an Arc-Fault Circuit Interrupter (AFCI).
708	Install a time control switch.
709	Install a range receptacle.
710	Install a dryer receptacle.

Standards / Assessment Anchors

Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standard

CC.3.5.11-12 A Cite specific textual evidence
CC.3.5.11-12. B Determine the central ideas or conclusions of a text
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats

Connecting Standard

CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding of a process or concept.

Supporting Standard

CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Instructional Activities:

Knowledge:

Read chapters 13,14, 15 and 18 in the house wiring text
Complete assigned study guides
Participate in theory lesson, take notes, and respond to questions
Memorize essential vocabulary
Take quizzes
Take written tests

Skill:

Demonstrate the proper preparation of NM Cable for connection to devices
Layout projects
Mount boxes
Drill holes
Install various cables
Support cables
Terminate various devices
Self-assess using the NEC as a guide

Remediation:

Re-teach major concepts
Worksheets
Individual Tutoring
Peer Tutoring
Study Guides

Enrichment:

Complete a safety review of the program with a job hazard analysis
Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
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
Wear work boots
Wear safety glasses at all times while working
Any tool not in your hand is to be in your tool pouch
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using / operating hand or power tools.

Assessment:

Complete study guide questions
Written test
Self Review
NEC performance rubric

Resources/Equipment:

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Hand tools
Power tools
Drawing paper
JHA paper
Material closet

Steel Center
Course Name: Electrical Construction

Unit Name: PA800 - FIXTURES
Unit Number: PA-800

Dates: Fall 2019 **Hours:** 30

Unit Description/Objectives:

Student will know and be able to install a surface-mounted light fixture, recessed light fixture and fan all in accordance with the NEC standards.

Tasks:

801	Install surface-mounted lighting fixture.
802	Install recessed lighting fixtures.
803	Install a ceiling fan.
804	Install LED lighting.
805	Identify IC and non-IC recessed lighting fixtures.

Standards / Assessment Anchors

Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standard

CC.3.5.11-12 A Cite specific textual evidence
CC.3.5.11-12. B Determine the central ideas or conclusions of a text
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats

Connecting Standard

CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding of a process or concept.

Supporting Standard

CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Instructional Activities:

Knowledge:

Read chapters 10 and 17 in the house wiring text
Complete assigned study guides
Participate in theory lesson, take notes, and respond to questions
Memorize essential vocabulary
Take quizzes
Take written tests

Skill:

Demonstrate the proper preparation of NM Cable for connection to fixtures
Layout projects
Mount boxes
Drill holes
Install various cables
Support cables
Terminate various fixtures
Self-assess using the NEC as a guide

Remediation:

Re-teach major concepts
Worksheets
Individual Tutoring
Peer Tutoring
Study Guides

Enrichment:

Complete a safety review of the program with a job hazard analysis
Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
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
Wear work boots
Wear safety glasses at all times while working
Any tool not in your hand is to be in your tool pouch
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using / operating hand or power tools.

Assessment:

Complete study guide questions
Written test
Self Review
NEC performance rubric

Resources/Equipment:

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Hand tools
Power tools
Drawing paper
JHA paper
Material closet

Steel Center
Course Name: Electrical Construction

Unit Name: PA900 - RACEWAYS
Unit Number: PA-900

Dates: Fall 2019 **Hours:** 26

Unit Description/Objectives:

Student will know and be able to install a variety of raceways dependent upon installation requirements.

Tasks:

901	Install Electrical Metallic Tubing (EMT).
902	Install Poly-Vinyl Chloride conduit (PVC).
903	Identify surface metal and non-metal raceways (Wiremold).
904	Identify flexible raceway.
905	RESERVED
906	RESERVED
907	RESERVED
908	Bend a stub 90°.
909	Bend an offset.
910	Bend a back to back 90°.
911	Cut, ream and deburr raceway systems.
912	Install conductors in a raceway system.

Standards / Assessment Anchors

Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standard

CC.3.5.11-12 A Cite specific textual evidence
CC.3.5.11-12. B Determine the central ideas or conclusions of a text
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats

Connecting Standard

CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding of a process or concept.

Supporting Standard

CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Instructional Activities:

Knowledge:

Read Chapter 12 in the house wiring text
Complete assigned study guide questions
Install various anchors and supports chapter 2 house wiring
Participate in theory lesson, take notes, and respond to questions
Memorize essential vocabulary

Skill:

Select an appropriate raceway size and type for a residential application
Demonstrate an understanding of the proper techniques for cutting, threading, and bending electrical conduit for residential applications
Demonstrate an understanding of the proper installation techniques for common raceway types used in residential wiring
Demonstrate an understanding of the common installation techniques for installing conductors in an installed raceway system
Identify the methods of hand bending conduit
Identify the various methods used to install conduit
Make 90 degree bends, back-to-back bends, offsets, kicks, and saddle bends using a hand bender

Remediation:

Re-teach major concepts
Worksheets
Individual Tutoring
Peer Tutoring
Study Guides

Enrichment:

Complete a safety review of the program with a job hazard analysis
Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
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
Wear work boots

Wear safety glasses at all times while working
Any tool not in your hand is to be in your tool pouch
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using / operating hand or power tools.

Assessment:

Complete study guide questions
Written test
Self Review
Performance industry rubric for conduit

Resources/Equipment:

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Materials for project:
anchors
EMT
Hacksaw
Bender
Hand tools

Steel Center
Course Name: Electrical Construction

Unit Name: PA1000 - WIRED DEVICES

Unit Number: PA-1000

Dates: Fall 2019 **Hours:** 45

Unit Description/Objectives:

Student will know and be able to install a hard wired smoke detector and door-bell system according to NEC Standards.

Tasks:

1001	Install a hard wired smoke detector.
1002	Install door-bell system.
1003	Trim out electrical devices.
1004	Install an occupancy sensor.
1005	Install a photocell.

Standards / Assessment Anchors

Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standard

CC.3.5.11-12 A Cite specific textual evidence
CC.3.5.11-12. B Determine the central ideas or conclusions of a text
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats

Connecting Standard

CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding of a process or concept.

Supporting Standard

CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Instructional Activities:

Knowledge:

Read chapter 14 in the house wiring text
Complete assigned study guides
Participate in theory lesson, take notes, and respond to questions
Memorize essential vocabulary
Take quizzes
Take written tests

Skill:

Demonstrate the proper preparation of NM Cable for connection to devices
Layout projects
Mount boxes
Drill holes
Install various cables
Support cables
Terminate bells, and smoke detectors
Self-assess using the NEC as a guide

Remediation:

Re-teach major concepts
Worksheets
Individual Tutoring
Peer Tutoring
Study Guides

Enrichment:

Complete a safety review of the program with a job hazard analysis
Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
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
Wear work boots
Wear safety glasses at all times while working
Any tool not in your hand is to be in your tool pouch

Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using / operating hand or power tools.

Assessment:

Complete study guide questions
Written test
Self Review
NEC performance rubric

Resources/Equipment:

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Hand tools
Power tools
Drawing paper
JHA paper
Boxes
Cable
Bell kit
Smoke detectors

Steel Center
Course Name: Electrical Construction

Unit Name: PA1100 - TESTING EQUIPMENT
Unit Number: PA-1100

Dates: Fall 2019 **Hours:** 130

Unit Description/Objectives:

Student will know and be able to use a multimeter, a continuity tester, a plug-in circuit tester and a clamp-on ammeter. The students will identify a megger and circuit tracer.

Tasks:

1101	Use a multimeter.
1102	Use a continuity tester.
1103	Use a plug-in circuit tester.
1104	Use a clamp-on ammeter.
1105	RESERVED
1106	Use a circuit tracer.
1107	Use a network cable tester.
1108	Apply Ohm's/Watt's Law calculations to electrical applications.

Standards / Assessment Anchors

Focus Standard

- CC.3.5.11-12.C. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

  Supporting Standards

  CC.3.5.11-12.D. Determine the meaning of symbols, key terms, and other domain-specific words

  CC.3.5.11-12.E. Analyze how the text structures information

Connecting Standard

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

  Supporting Standards

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

CC.2.1.HS.F.4 Use units as a way to understand problems and to guide the solution of multi-step problems.

Instructional Activities:

Knowledge:

Read chapter 4 house wiring
Participate in theory lesson, take notes, and respond to questions
Complete study guide
Memorize essential vocabulary

Skill:

Demonstrate the ability to use a multimeter to measure low voltage and resistance.
Use a continuity tester to check for opens, shorts and to test loads.
Demonstrate and understanding of the differences between a voltage tester and voltmeter
Demonstrate an understanding of the differences between an in-line ammeter and a clamp-on anmeter
Connect and properly use a clamp-on meter on a de-energized circuit.
Identify a megohmmeter insulation tester.
Identify and use a circuit tester.
Connect and properly use a mulitmeter to test for voltage, current, resistance, and continuity
Demonstrate an understanding of a plug in tester and use one to test a de-energized receptacle.
Demonstrate an understanding of safe practices to follow when using test and measurement instruments
Demonstrate an understanding of the proper care and maintenance of test and measurement instruments

Remediation:

Re-teach major concepts
Individual Tutoring
Practice with the construction aide

Enrichment:

Complete a safety review of the program
Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
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 power 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
Wear safety glasses at all times while working

Assessment:

Rubrics
Quizzes
Performance

Resources/Equipment:

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Multimeter
Continuity tester
Plug-in circuit tester
Clamp-on meter
Megger
Circuit tracer

Steel Center
Course Name: Electrical Construction

Unit Name: PA1200 - ELECTRICAL SERVICE
Unit Number: PA-1200

Dates: Fall 2019 **Hours:** 66

Unit Description/Objectives:

Student will know and be able to install a 100 amp overhead service safely according to NEC Standards. Student will identify a 100/200 amp underground service and 3 phase safety switch.

Tasks:

1201	Install an overhead service.
1202	Identify parts of an underground service.
1203	RESERVED
1204	RESERVED
1205	RESERVED
1206	RESERVED
1207	RESERVED
1208	RESERVED
1209	Identify types of safety disconnect switches.
1210	Terminate a service panel/load center.

Standards / Assessment Anchors

Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standard

CC.3.5.11-12 A Cite specific textual evidence
CC.3.5.11-12. B Determine the central ideas or conclusions of a text
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats

Connecting Standard

CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding of a process or concept.

Supporting Standard

CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats...to solve a problem.

Instructional Activities:

Knowledge:
Read Chapters 7 and 8 house wiring
Participate in theory lesson, take notes, and respond to questions
Complete Study guide
Memorize essential vocabulary

Skill:
Demonstrate an understanding of an overhead and an underground residential service entrance
Define common residential service entrance terms
Demonstrate and understanding of NEC requirements for residential service
Demonstrate an understanding of grounding and bonding requirements for residential service entrances
Identify several NEC requirements that apply to residential service entrances
Demonstrate an understanding of common electric utility company requirements
Identify common overhead service entrance equipment and materials
Identify common underground service entrance equipment and materials
Demonstrate an understanding of common installation techniques for overhead services
Demonstrate an understanding of common installation techniques for underground services
Demonstrate an understanding of voltage drop in service conductors
Demonstrate an understanding of service panel installation techniques

Remediation:
Re-teach major concepts
Individual Tutoring
Practice with the construction aide

Enrichment:
Complete a safety review of the tasks
Assist another student

Safety:
Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
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
Wear safety glasses at all times while working
Use proper safety precautions when using / operating hand tools

Assessment:

Rubrics
Quizzes
Performance

Resources/Equipment:

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala

Ladders
100 amp Service Kit
Disconnect switch
Panels
Various wire sizes and connectors

Steel Center
Course Name: Electrical Construction

Unit Name: PA1300 - NATIONAL ELECTRICAL CODE

Unit Number: PA-1300

Dates: Fall 2019 **Hours:** 164

Unit Description/Objectives:

Student will know and be able to identify publisher, purpose, and layout of NEC and identify code cycle.

Tasks:

1301	Identify the purpose of the National Electrical Code (NEC).
1302	Use Chapter 9 Tables.
1303	Use the NEC as a reference to questions and competencies that students perform for all electrical installations.
1304	Identify the publisher of the National Electrical Code (NEC).
1305	Identify the code cycle of the National Electrical Code (NEC).
1306	Identify NFPA70E (Arc Flash).

Standards / Assessment Anchors

Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standard

CC.3.5.11-12 A Cite specific textual evidence
CC.3.5.11-12. B Determine the central ideas or conclusions of a text
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats

Connecting Standard

CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding of a process or concept.

Supporting Standard

CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats…to solve a problem.

Instructional Activities:

Knowledge:

Read Chapter 1 housewiring and NEC
Understand the layout of the book
Understand the code cycle

Skill:

Use the NEC for all projects

Remediation:

Re-teach major concepts
Individual Tutoring
Practice with the construction aide

Enrichment:

Assist another student

Safety:

Student must:
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
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
Wear safety glasses at all times while working
Any tool not in your hand is to be in your tool pouch

Assessment:

Tests
Quizzes
Worksheets

Resources/Equipment:

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

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Steel Center
Course Name: Electrical Construction

Unit Name: PA1400 - GREEN TECHNOLOGY
Unit Number: PA-1400

Dates: Fall 2019 **Hours:** 24

Unit Description/Objectives:

Student will know and be able to identify renewable energy resources and safely use energy saving devices.

Tasks:

PA1401 - Describe and explain the uses of wind power and solar power.

PA1402 - Demonstrate knowledge of installation procedures for a wind turbine system.

PA1403 - Demonstrate knowledge of installation procedures for photovoltaic systems.

PA1404 - Demonstrate knowledge of installation procedures for a solar energy source.

PA1405 - Demonstrate knowledge of installation procedures for a installing a wind energy source.

PA1406 - Demonstrate knowledge of the operation of solar cells.

1401	Identify renewable energy sources.
1402	Identify procedures for installing a wind turbine system.
1403	RESERVED
1404	Identify procedures for installing a solar energy source system.
1405	RESERVED
1406	RESERVED
1407	Evaluate the demand and consumption of electrical energy.

Standards / Assessment Anchors

Focus Standard

CC.3.5.11-12.C Follow precisely a complex multistep procedure

Supporting Standard

CC.3.5.11-12 A Cite specific textual evidence
CC.3.5.11-12. B Determine the central ideas or conclusions of a text
CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats

Connecting Standard

CC.3.5.11-12. I Synthesize information from a range of sources into a coherent understanding of a process or concept.

Supporting Standard

CC.3.5.11-12. H Evaluate the hypotheses, data, analysis, and conclusions in a technical text, verifying the data when possible

CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in diverse formats…to solve a problem.

Instructional Activities:

Knowledge:

Read chapter 21 housewiring
Participate in theory lesson, take notes, and respond to questions
Memorize essential vocabulary

Skill:

Determine when green wiring is practical

Remediation:

Peer Tutoring
Study Guides

Enrichment:

Assist another student

Safety:

Student must:

Assessment:

Write a research paper on Green Wiring Practices

Resources/Equipment:

2012, 2005 Delmar, Cengage Learning. House Wiring 3rd edition. Greg Fletcher

2010, National Fire Protection Association. National Electrical Code. NFPA

2003, Delmar Learning. Electrical Principals. Stephan L. Herman

2001, Delmar Learning. Electricity one 7th edition. Thomas Kubala