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:

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

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


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


- 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:**

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

**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 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


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


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

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>301</td>
<td>RESERVED</td>
</tr>
<tr>
<td>302</td>
<td>Use electric hammer drill.</td>
</tr>
<tr>
<td>303</td>
<td>Use reciprocating saw.</td>
</tr>
<tr>
<td>304</td>
<td>Use portable hand-held band saw.</td>
</tr>
<tr>
<td>305</td>
<td>RESERVED</td>
</tr>
<tr>
<td>306</td>
<td>Use a drill.</td>
</tr>
<tr>
<td>307</td>
<td>RESERVED</td>
</tr>
<tr>
<td>308</td>
<td>RESERVED</td>
</tr>
<tr>
<td>309</td>
<td>RESERVED</td>
</tr>
<tr>
<td>310</td>
<td>Use oscillating multi purpose tool.</td>
</tr>
<tr>
<td>311</td>
<td>Use impact driver.</td>
</tr>
</tbody>
</table>

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


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


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:

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>401</td>
<td>Identify types of blueprint plans.</td>
</tr>
<tr>
<td>402</td>
<td>Identify blueprint symbols.</td>
</tr>
<tr>
<td>403</td>
<td>Interpret blueprint plans.</td>
</tr>
<tr>
<td>404</td>
<td>RESERVED</td>
</tr>
<tr>
<td>405</td>
<td>Develop electrical details on a residential blueprint.</td>
</tr>
<tr>
<td>406</td>
<td>Use a measuring tool to scale.</td>
</tr>
</tbody>
</table>

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 an 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:
Resources/Equipment:
2015, NCCER, Pearson education, fifth edition
2003, Delmar Learning. Electrical Principals. Stephan L. Herman

Measuring and drawing tools
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:**


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


Various types of anchors and supports
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:

<table>
<thead>
<tr>
<th></th>
<th>RESIDENTIAL CABLING TECHNOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>600</td>
<td>Install non-metallic (NM) Cable for connection to an electrical device.</td>
</tr>
<tr>
<td>601</td>
<td>Install metal-clad cable (MC).</td>
</tr>
<tr>
<td>602</td>
<td>RESERVED</td>
</tr>
<tr>
<td>604</td>
<td>RESERVED</td>
</tr>
<tr>
<td>605</td>
<td>Terminate a coaxial cable.</td>
</tr>
<tr>
<td>606</td>
<td>RESERVED</td>
</tr>
<tr>
<td>607</td>
<td>RESERVED</td>
</tr>
<tr>
<td>608</td>
<td>RESERVED</td>
</tr>
<tr>
<td>609</td>
<td>Identify telecommunications cable types.</td>
</tr>
<tr>
<td>610</td>
<td>Terminate an RJ45 connector.</td>
</tr>
<tr>
<td>611</td>
<td>Install SE cable.</td>
</tr>
</tbody>
</table>

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:


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


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:

<table>
<thead>
<tr>
<th>Task Num.</th>
<th>Task Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>701</td>
<td>Install a duplex receptacle.</td>
</tr>
<tr>
<td>702</td>
<td>Install a single pole switch.</td>
</tr>
<tr>
<td>703</td>
<td>Install a 3-way switch.</td>
</tr>
<tr>
<td>704</td>
<td>Install a 4-way switch.</td>
</tr>
<tr>
<td>705</td>
<td>Install a split-wired duplex receptacle.</td>
</tr>
<tr>
<td>706</td>
<td>Install a Ground Fault Circuit Interrupter (GFCI) Receptacle.</td>
</tr>
<tr>
<td>707</td>
<td>Install an Arc-Fault Circuit Interrupter (AFCI).</td>
</tr>
<tr>
<td>708</td>
<td>Install a time control switch.</td>
</tr>
<tr>
<td>709</td>
<td>Install a range receptacle.</td>
</tr>
<tr>
<td>710</td>
<td>Install a dryer receptacle.</td>
</tr>
</tbody>
</table>

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:

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

Hand tools
Power tools
Drawing paper
JHA paper
Material closet
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:

<table>
<thead>
<tr>
<th>Number</th>
<th>Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>801</td>
<td>Install surface-mounted lighting fixture.</td>
</tr>
<tr>
<td>802</td>
<td>Install recessed lighting fixtures.</td>
</tr>
<tr>
<td>803</td>
<td>Install a ceiling fan.</td>
</tr>
<tr>
<td>804</td>
<td>Install LED lighting.</td>
</tr>
<tr>
<td>805</td>
<td>Identify IC and non-IC recessed lighting fixtures.</td>
</tr>
</tbody>
</table>

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:**


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

Hand tools
Power tools
Drawing paper
JHA paper
Material closet
Unit Description/Objectives:
Student will know and be able to install a variety of raceways dependent upon installation requirements.

Tasks:

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

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
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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:**


**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:

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1001</td>
<td>Install a hard wired smoke detector.</td>
</tr>
<tr>
<td>1002</td>
<td>Install door-bell system.</td>
</tr>
<tr>
<td>1003</td>
<td>Trim out electrical devices.</td>
</tr>
<tr>
<td>1004</td>
<td>Install an occupancy sensor.</td>
</tr>
<tr>
<td>1005</td>
<td>Install a photocell.</td>
</tr>
</tbody>
</table>

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:**

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:

<table>
<thead>
<tr>
<th>Task Number</th>
<th>Task Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1101</td>
<td>Use a multimeter.</td>
</tr>
<tr>
<td>1102</td>
<td>Use a continuity tester.</td>
</tr>
<tr>
<td>1103</td>
<td>Use a plug-in circuit tester.</td>
</tr>
<tr>
<td>1104</td>
<td>Use a clamp-on ammeter.</td>
</tr>
<tr>
<td>1105</td>
<td>RESERVED</td>
</tr>
<tr>
<td>1106</td>
<td>Use a circuit tracer.</td>
</tr>
<tr>
<td>1107</td>
<td>Use a network cable tester.</td>
</tr>
<tr>
<td>1108</td>
<td>Apply Ohm’s/Watt's Law calculations to electrical applications.</td>
</tr>
</tbody>
</table>

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 ammeter
- 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 multimeter 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:**


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


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:

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1201</td>
<td>Install an overhead service.</td>
</tr>
<tr>
<td>1202</td>
<td>Identify parts of an underground service.</td>
</tr>
<tr>
<td>1203</td>
<td>RESERVED</td>
</tr>
<tr>
<td>1204</td>
<td>RESERVED</td>
</tr>
<tr>
<td>1205</td>
<td>RESERVED</td>
</tr>
<tr>
<td>1206</td>
<td>RESERVED</td>
</tr>
<tr>
<td>1207</td>
<td>RESERVED</td>
</tr>
<tr>
<td>1208</td>
<td>RESERVED</td>
</tr>
<tr>
<td>1209</td>
<td>Identify types of safety disconnect switches.</td>
</tr>
<tr>
<td>1210</td>
<td>Terminate a service panel/load center.</td>
</tr>
</tbody>
</table>

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
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Supporting Standard

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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:
Resources/Equipment:


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


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:

<table>
<thead>
<tr>
<th>Task</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1301</td>
<td>Identify the purpose of the National Electrical Code (NEC).</td>
</tr>
<tr>
<td>1302</td>
<td>Use Chapter 9 Tables.</td>
</tr>
<tr>
<td>1303</td>
<td>Use the NEC as a reference to questions and competencies that students perform for all electrical installations.</td>
</tr>
<tr>
<td>1304</td>
<td>Identify the publisher of the National Electrical Code (NEC).</td>
</tr>
<tr>
<td>1305</td>
<td>Identify the code cycle of the National Electrical Code (NEC).</td>
</tr>
<tr>
<td>1306</td>
<td>Identify NFPA70E (Arc Flash).</td>
</tr>
</tbody>
</table>

Standards / Assessment Anchors

Focus Standard

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

Supporting Standard

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Supporting Standard

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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:


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

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 installing a wind energy source.
PA1406 - Demonstrate knowledge of the operation of solar cells.

<table>
<thead>
<tr>
<th>1401</th>
<th>Identify renewable energy sources.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1402</td>
<td>Identify procedures for installing a wind turbine system.</td>
</tr>
<tr>
<td>1403</td>
<td>RESERVED</td>
</tr>
<tr>
<td>1404</td>
<td>Identify procedures for installing a solar energy source system.</td>
</tr>
<tr>
<td>1405</td>
<td>RESERVED</td>
</tr>
<tr>
<td>1406</td>
<td>RESERVED</td>
</tr>
<tr>
<td>1407</td>
<td>Evaluate the demand and consumption of electrical energy.</td>
</tr>
</tbody>
</table>

Standards / Assessment Anchors

Focus Standard

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

Supporting Standard

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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
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Supporting Standard

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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:

