

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: L1400 GAS TUNGSTEN ARC WELDING (GTAW)

Number: L1400 **Hours:** 115.00

Dates: Spring 2025

Description/Objectives:

Student will demonstrate theoretical knowledge and comprehension along with practical ability in Gas Tungsten Arc Welding

Tasks:

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Instructional Activities:

Knowledge:

- Complete reading assignments
- Complete assigned worksheets
- Participate in lecture discussions and respond to questions
- Participate in group activities
- Complete individual assignments
- Maintain work area
- Complete time card
- Define brazing
- Define soldering
- Define capillary action with regards to brazing

Skill:

- Demonstrate ability to maintain a clearance between the base metals to allow capillary action to work most effectively
- Demonstrate proper allowance for expansion and contraction
- Demonstrate understanding of the nature and sizes of the metals being joined and the configuration of the joint
- Demonstrate proper cleaning of metals
- Demonstrate proper handling of metals to prevent contamination
- Demonstrate proper use of flux
- Demonstrate use of a variety of holding devices and methods
- Demonstrate brazing joint by heating the assembly to brazing temperature, and flowing the filler metal through the joint
- Demonstrate cleaning of the joint
- Demonstrate the two-step operation of cleaning:
 - Removal of the flux residues
 - Pickling to remove any oxide scale formed during the brazing process
- Identify soldering irons and solder
- Make certain that all parts to be soldered are free from grease, oxidation and other contamination
- Thin soldering contacts
- Heat the components to be soldered and understand the process of soldering
- Clean the soldering iron tip
- Use the appropriate safety equipment

Remediation:

- Review with teacher assistance
- Worksheets
- Reading Comprehension packets

Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
 Graphic Organizer
 Chunking of Assignments/Material
 Directions/Comprehension Check (frequent checks for understanding)
 Study Guide
 Directions and/or Tests Read Aloud
 Adapted Tests and/or Assignments
 Use of Calculator
 Taking Tests in Alternate Setting (or if requested)
 Verbal/Gestural Redirection (prompts to remain on task)
 Drill and Practice (Repetition of Material)
 No Penalization for Spelling
 Small Group Instruction
 Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
 Teacher Modeling
 Use of Computer (Access to)
 Positive Reinforcement
 Have Student Repeat Directions
 Access to School Counselor
 Positive Reinforcement
 Provide Frequent Feedback
 Variety of Assessment Methods
 Regular Notebook Check
 Use of Assistive Device (i.e. notepad, laptop, ect.)
 Highly Structured Classroom
 Syllabus for Major Projects
 Limited, Short Directions
 Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions
 Use of Multisensory Approach
 Provide Opportunities to Retest
 Frequent Review Sessions
 Use a variety of Modalities when Introducing Skills/Concepts
 Allow Oral Answers for Testing
 Copies of Text for Home
 De-Escalation Opportunities
 Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

Safety:

Student must:

Wear safety glasses, Fire-resistant head covering, Leather sleeves/Cape/Gauntlet gloves, Welding hood, Steel toed 8" all leather work boots, required shop uniform
 Handle material in a safe and work like manner
 Use protective clothing and equipment
 Use hand tools in a safe manner
 Use adequate ventilation when working in enclosed area
 Follow manufacturer's directions when using any product, tool, equipment, etc.
 Use proper safety precautions when using/operating hand tools
 Use tools and equipment in a professional work like manner according to OSHA standards
 Know and follow the established safety rules at all times

Assessment:

Tests
 Worksheets
 Quizzes
 Time cards
 Rubrics
 Checklists
 Individual projects

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Theory Modules/Handouts Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment Tools: Supplied cleaning equipment Grading rubric Daily assignment checklist Supplies and student purchased safety attire Tape measures Calipers Squares 6-inch squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/Chop Saw Horizontal Band Saw Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps Bench Vises Vice Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion, Horizontal band saws Hydraulic bending press Pedestal and Manual Power grindersHyperlinks:
<http://www.monroecti.org/Domain/141>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: L1500 AMERICAN WELDING SOCIETY - ENTRY LEVEL WELDER WORKMANSHIP QUALIFICATIONS

Number: L1500 **Hours:** 70.00

Dates: Spring 2025

Description/Objectives:

Student will demonstrate theoretical knowledge and comprehension along with practical ability in Entry Level Welder Workmanship Qualifications

Tasks:

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

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CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

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INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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content.

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

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Demonstrate cleaning of the joint

Demonstrate the two-step operation of cleaning:

Removal of the flux residues

Pickling to remove any oxide scale formed during the brazing process

Identify soldering irons and solder

Make certain that all parts to be soldered are free from grease, oxidation and other contamination

Thin soldering contacts

Heat the components to be soldered and understand the process of soldering

Clean the soldering iron tip

Use the appropriate safety equipment

Remediation:

Review with teacher assistance

Worksheets

Reading Comprehension packets
 Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
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 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

Safety:

Student must:

Wear safety glasses, Fire-resistant head covering, Leather sleeves/Cape/Gauntlet gloves, Welding hood,
Steel toed 8" all leather work boots, required shop uniform
Handle material in a safe and work like manner
Use protective clothing and equipment
Use hand tools in a safe manner
Use adequate ventilation when working in enclosed area
Follow manufacturer's directions when using any product, tool, equipment, etc.
Use proper safety precautions when using/operating hand tools
Use tools and equipment in a professional work like manner according to OSHA standards
Know and follow the established safety rules at all times

Assessment:

Tests
Worksheets
Quizzes
Time cards
Rubrics
Checklists
Individual projects

Resources/Equipment:

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Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 100 OCCUPATIONAL ORIENTATION AND SAFETY

Number: 100 **Hours:** 30.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate basic knowledge and comprehension of theory and practical laboratory organization and structure and all safety standards for trade and education facilities.

Tasks:

PA101 - Complete time or job sheet, reports or records.

PA102 - Perform housekeeping duties daily.

PA103 - Follow verbal instructions to complete work assignments and rules.

PA104 - Follow written instructions to complete work assignments and rules.

PA105 - Inspect and use Personal Protection Equipment (PPE) daily.

PA106 - Maintain proper organization and operation of work area

PA107 - Demonstrate proper use of ventilation equipment.

PA108 - Discuss proper hot work operation.

PA109 - Demonstrate knowledge of proper work actions for working in confined spaces.

PA110 - Identify Safety Data Sheets (SDS) and precautionary labeling.

PA111 - Inspect welding and thermal cutting equipment for safe operation.

PA112 - Display familiarity with industrial and OSHA safety standards.

PA113 - Identify oxyfuel safety procedures.

PA114 - Identify arc welding/cutting safety procedures.

PA115 - Follow emergency action plan.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Connecting Anchor/Standard:

- Career Education and Work Standards
13.3. Career Retention and Advancement

Supporting Anchor/Standards:

13.3.11 E. Evaluate time management strategies and their application to both personal and work situations

Instructional Activities:

Knowledge:

Complete reading assignments
 Complete assigned worksheets
 Participate in lecture discussions and respond to questions
 Participate in group activities
 Complete individual assignments
 Maintain work area
 Complete time card

Skill:

Complete required shop equipment qualifications
 Theory and qualification tests for all shop equipment including:
 Cold Saw
 Chop Saw
 Horizontal Band Saw
 Pedestal Grinder
 Belt Sander
 Manual Grinder
 Hydraulic Shear
 Oxy-Acetylene Equipment
 Arc Welder
 Hand Drill
 Drill Press
 Jig Saw
 Operate Forced Draft Ventilation Equipment

Remediation:

Review with teacher assistance
 Worksheets
 Reading Comprehension Strategies
 Max Teaching
 Retest or alternative assessment
 Study guides

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
 Graphic Organizer
 Chunking of Assignments/Material
 Directions/Comprehension Check (frequent checks for understanding)
 Study Guide
 Directions and/or Tests Read Aloud
 Adapted Tests and/or Assignments
 Use of Calculator
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 Drill and Practice (Repetition of Material)
 No Penalization for Spelling
 Small Group Instruction
 Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
 Teacher Modeling
 Use of Computer (Access to)
 Positive Reinforcement
 Have Student Repeat Directions
 Access to School Counselor
 Positive Reinforcement

Provide Frequent Feedback
 Variety of Assessment Methods
 Regular Notebook Check
 Use of Assistive Device (i.e. notepad, laptop, ect.)
 Highly Structured Classroom
 Syllabus for Major Projects
 Limited, Short Directions
 Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions
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 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
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 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

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 adequate ventilation when working in enclosed area
 Follow manufacturer's directions when using any product, tool, equipment, etc.
 Use proper safety precautions when using /operating hand tools
 Use tools and equipment in a professional work like manner according to OSHA standards
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Assessment:

Tests
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Resources/Equipment:

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assignment checklist Supplies and student purchased safety attire Tape measures Calipers Squares 6-inch
squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/ Chop Saw Horizontal Band Saw
Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill
Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench
Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps Bench Vises Vice
Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective
Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig
Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes
Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units
GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion, Horizontal band saws
Hydraulic bending press Pedestal and Manual Power grindersHyperlinks:
<http://www.monroecti.org/Page/404>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 200 PRINCIPLES OF WELDING

Number: 200 **Hours:** 58.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to identify, describe and select various types of metals and describe their reaction to heat. Student also will know and be able to use standard hand tools and measuring equipment to calculate material and cost.

Tasks:

PA201 - Identify major types of metals (ferrous and nonferrous) used in welding.

PA202 - Describe the basic principles of heat, expansion and contraction as they relate to metals.

PA204 - Describe the industry accepted welding codes, standards and procedures and their use.

PA205 - Identify various joint designs (joint geometry).

PA206 - Clean and prepare materials for welding and/or cutting.

PA207 - Demonstrate proper use of hand tools.

PA208 - Demonstrate proper use of standard measuring and layout tools.

PA209 - Demonstrate proper use of power equipment.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Connecting Anchor/Standard:

- Science, Technology & Engineering, and Environmental Literacy & Sustainability Standards
 - 3.5.9-12.1 Strand: Nature and Characteristics of Technology and Engineering
 - 3.5.9-12.2 Strand: Applying, Maintaining, and Assessing Technological Products and Systems

Supporting Anchor/Standards:

3.5.9-12.OO Use project management tools, strategies, and processes in planning, organizing, and controlling work.

3.5.9-12.QQ Implement quality control as a planned process to ensure that a product, service, or system meets established criteria.

3.5.9-12.F Evaluate a technological innovation that arose from a specific society's unique need or want.

3.5.9-12.E Evaluate how technology and engineering advancements alter human health and capabilities

Instructional Activities:

Knowledge:

Demonstrate proper material handling methods

Explain how to avoid electric shock during welding

Identify some common hazards in welding.storing and handling cylinders.

Demonstrate safety techniques for storing and handling cylinders

Explain and identify proper personal protection used in welding.

Demonstrate how to avoid welding fumes

Identify and explain uses for material safety data sheets

Demonstrate safety techniques for

Complete reading assignments

Complete assigned worksheets

Participate in lecture discussions and respond to questions

Participate in group activities
Complete individual assignments
Maintain work area
Complete time card
Interpret a blueprint and sketches
Understand drawing sequential notes
Follow in order processing steps
Identify and describe properties and characteristics of the following metals:
Steel
Stainless Steel
Aluminum
Identify and explain job code specifications
Use fit-up gages and measuring devices to check joint fit-up
Identify and explain distortion and how it is controlled
Fit-up joints using plate and pipe fit-up tools
Check for joint misalignment and poor fit-up before and after welding
Identify types of current
Identify arc, voltage and travel speed
Identify joint design and tolerances
Identify methods of joint and surface preparation
Perform tack welding
Identify positions of welding
Perform peening
Demonstrate techniques for preventing or reducing distortion by understanding the coefficient of thermal expansion and the specific heat per unit volume
Understand proper welding sequences

Skill:

Identify various joint designs (joint geometry)
Clean and prepare materials for welding and/or cutting
Use hand tools:
Ball Peen Hammers
Chipping Hammers
Files
Wrenches
Screwdrivers
Hand brushes
Chisels
Clamps
Vises
Vice Grips
M.S.D.S.
Welding Helmet/ Shields
Grinding Shields
Protective Leather
Leather Gloves
Ground Clamps
Electrode Holders
Use standard measuring and layout tools:
Tape Measure
Wooden Rules
Caliper
Straight edges
levels
Hi-lo gages
Fillet gauges
Use power equipment:
Cold Saw
Chop Saw
Horizontal Band Saw
Pedestal Grinder
Belt Sander
Manual Grinder

Hydraulic Shear

Oxy-Acetylene Equipment

Arc Welder

Hand Drill

Drill Press

Jig Saw

Demonstrate Proficiency in Welding Techniques:

Determining appropriate electrical amperage/voltage

Determining proper welding electrodes and filler wires to match base material

Place Welding bead layout appropriate to strength demands

Manipulate electrode and filler metal beads to meet demands of visual and mechanical inspection.

Remediation:

Review with teacher assistance

Worksheets

Reading Comprehension packets

Retest or alternative assessment

Study guides

Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)

Graphic Organizer

Chunking of Assignments/Material

Directions/Comprehension Check (frequent checks for understanding)

Study Guide

Directions and/or Tests Read Aloud

Adapted Tests and/or Assignments

Use of Calculator

Taking Tests in Alternate Setting (or if requested)

Verbal/Gestural Redirection (prompts to remain on task)

Drill and Practice (Repetition of Material)

No Penalization for Spelling

Small Group Instruction

Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)

Teacher Modeling

Use of Computer (Access to)

Positive Reinforcement

Have Student Repeat Directions

Access to School Counselor

Positive Reinforcement

Provide Frequent Feedback

Variety of Assessment Methods

Regular Notebook Check

Use of Assistive Device (i.e. notepad, laptop, ect.)

Highly Structured Classroom

Syllabus for Major Projects

Limited, Short Directions

Grading Rubric

Communication Regarding Behavior & Consequences (PBS)

Clear Language for Directions

Use of Multisensory Approach

Provide Opportunities to Retest

Frequent Review Sessions

Use a variety of Modalities when Introducing Skills/Concepts

Allow Oral Answers for Testing

Copies of Text for Home

De-Escalation Opportunities
 Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

Safety:

Student must wear:
 Safety Glasses
 Fire-resistant Head Covering
 Leather Sleeves/Cape/gauntlet gloves
 Welding Hood
 Steel Toed 8" all Leather Work Boots
 Required shop uniform

Assessment:

Tests
 Worksheets
 Quizzes
 Time cards
 Rubrics
 Checklists
 Individual projects

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Supplied cleaning equipment Grading rubric Daily assignment checklist Supplies and student purchased safety attire Supplied cleaning equipment Grading rubric Daily assignment checklist Supplies and student purchased safety attire Tape measures Calipers Squares 6-inch squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/ Chop Saw Horizontal Band Saw Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps Bench Vises Vice Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion, Horizontal band saws Hydraulic bending press Pedestal and Manual Power grindersHyperlinks:
<http://www.monroecti.org/Page/404>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 300 WELDING, DRAWING, AND WELD SYMBOL INTERPRETATION

Number: 300 **Hours:** 46.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to read and interpret technical drawings and sketches, applying measurement and angle specifications while complying to all notes, both general and specific.

Tasks:

PA301 - Interpret basic elements of a drawing or sketch.

PA302 - Interpret welding symbol information.

PA303 - Fabricate parts from a drawing or sketch (class project).

PA304 - Identify structural materials used in the metal fabrication field.

PA305 - Perform basic metric conversion.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

comprehend technical texts independently and proficiently.

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Connecting Anchor/Standard:

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

Instructional Activities:

Knowledge:

- Complete reading assignments
- Complete assigned worksheets
- Participate in lecture discussions and respond to questions
- Participate in group activities
- Complete individual assignments
- Maintain work area
- Complete time card

Skill:

- Fabricate parts from a drawing or sketch
- Identify and explain the various parts of a welding symbol
- Identify and explain fillet and groove weld symbols
- Read welding symbols on drawings, specifications and welding procedure specifications (WPSs)
- Interpret welding symbols from a print
- Draw welding symbols based on the observation of actual welds
- Identify and explain a welding detail drawing
- Identify and explain lines, material fills and sections
- Identify and explain object views
- Identify and explain dimensioning
- Identify and explain notes and bill of materials
- Interpret basic elements of a welding detail drawing
- Develop basic welding drawings

Remediation:

Review with teacher assistance
 Worksheets
 Reading Comprehension packets
 Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
 Graphic Organizer
 Chunking of Assignments/Material
 Directions/Comprehension Check (frequent checks for understanding)
 Study Guide
 Directions and/or Tests Read Aloud
 Adapted Tests and/or Assignments
 Use of Calculator
 Taking Tests in Alternate Setting (or if requested)
 Verbal/Gestural Redirection (prompts to remain on task)
 Drill and Practice (Repetition of Material)
 No Penalization for Spelling
 Small Group Instruction
 Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
 Teacher Modeling
 Use of Computer (Access to)
 Positive Reinforcement
 Have Student Repeat Directions
 Access to School Counselor
 Positive Reinforcement
 Provide Frequent Feedback
 Variety of Assessment Methods
 Regular Notebook Check
 Use of Assistive Device (i.e. notepad, laptop, ect.)
 Highly Structured Classroom
 Syllabus for Major Projects
 Limited, Short Directions
 Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions
 Use of Multisensory Approach
 Provide Opportunities to Retest
 Frequent Review Sessions
 Use a variety of Modalities when Introducing Skills/Concepts
 Allow Oral Answers for Testing
 Copies of Text for Home
 De-Escalation Opportunities
 Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment

Encouragement to Participate in Positive Leadership Roles
Student Self-Evaluation for Behavior

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 adequate ventilation when working in enclosed area

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Assessment:

Tests

Worksheets

Quizzes

Time cards

Rubrics

Checklists

Individual projects

Resources/Equipment:

American Welding Society, 2003 Welding Levels I and II, "National Center for Construction Education and Research Welding" Technical drawings with welding symbols, notes, diagrams and measurement standards National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Supplied cleaning equipment Grading rubric Daily assignment checklist Supplies and student purchased safety attireHyperlinks: <http://www.monroecti.org/Page/404>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 400 VISUAL EXAMINATION, INSPECTION, AND TESTING

Number: 400 **Hours:** 20.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate theoretical knowledge and comprehension along with practical ability in Visual Welding Inspection.

Tasks:

PA401 - Evaluate cut surfaces and edges of prepared base metal parts for testing.

PA402 - Identify and evaluate weld discontinuities as per accept/reject criteria.

PA403 - Perform visual inspection, destructive and non destructive testing.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Standard - 3.5.9-12.QQ

Students who demonstrate understanding can implement quality control as a planned process to ensure that a product, service, or system meets established criteria.

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0Standard - 3.5.9-12.QQ

Students who demonstrate understanding can implement quality control as a planned process to ensure that a product, service, or system meets established criteria.

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS

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

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

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

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

Instructional Activities:

Knowledge:

Identify and explain codes governing welding

Identify and explain weld imperfections and their causes

Identify and explain nondestructive examination practices

Identify and explain welder qualification tests

Explain the importance of quality workmanship

Identify common destructive testing methods

Complete reading assignments

Complete assigned worksheets

Participate in lecture discussions and respond to questions
 Participate in group activities
 Complete individual assignments
 Maintain work area
 Complete time card
 Interpret a blueprint and sketches
 Understand drawing sequential notes
 Follow in order processing steps

Skill:

Evaluate cut surfaces and edges of prepared base metal parts for testing
 Identify and evaluate weld discontinuities as per accept/ reject criteria
 Identify and explain codes governing welding
 Identify and explain weld imperfections and their causes
 Identify and explain nondestructive examination practices
 Explain the importance of quality workmanship
 Identify common destructive testing methods

Remediation:

Review with teacher assistance
 Worksheets
 Reading Comprehension Strategies (Max Teaching)
 Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
 Graphic Organizer
 Chunking of Assignments/Material
 Directions/Comprehension Check (frequent checks for understanding)
 Study Guide
 Directions and/or Tests Read Aloud
 Adapted Tests and/or Assignments
 Use of Calculator
 Taking Tests in Alternate Setting (or if requested)
 Verbal/Gestural Redirection (prompts to remain on task)
 Drill and Practice (Repetition of Material)
 No Penalization for Spelling
 Small Group Instruction
 Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
 Teacher Modeling
 Use of Computer (Access to)
 Positive Reinforcement
 Have Student Repeat Directions
 Access to School Counselor
 Positive Reinforcement
 Provide Frequent Feedback
 Variety of Assessment Methods
 Regular Notebook Check
 Use of Assistive Device (i.e. notepad, laptop, ect.)
 Highly Structured Classroom
 Syllabus for Major Projects
 Limited, Short Directions
 Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions

Use of Multisensory Approach
 Provide Opportunities to Retest
 Frequent Review Sessions
 Use a variety of Modalities when Introducing Skills/Concepts
 Allow Oral Answers for Testing
 Copies of Text for Home
 De-Escalation Opportunities
 Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

Safety:

Student must:

Wear:

Safety Glasses
 Fire-resistant Head Covering
 Leather Sleeves/Cape/gauntlet gloves
 Welding Hood
 Steel Toed 8" all Leather Work Boots
 Required shop uniform

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

Assessment:

Tests
 Worksheets
 Quizzes
 Time cards
 Rubrics
 Checklists
 Individual projects

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Supplied cleaning equipment Grading rubric Daily

assignment checklist Supplies and student purchased safety attire Supplied cleaning equipment Grading rubric Daily assignment checklist Supplies and student purchased safety attire Tape measures Calipers Squares 6-inch squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/ Chop Saw Horizontal Band Saw Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps Bench Vises Vice Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion, Horizontal band saws Hydraulic bending press Pedestal and Manual Power grindersHyperlinks:
<http://www.monroecti.org/Page/404>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 500 SHIELDED METAL ARC WELDING (SMAW)

Number: 500 **Hours:** 864.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate theoretical knowledge and comprehension along with practical ability in Shielded Metal Arc Welding in Flat, Horizontal, Vertical and Overhead fillet and groove welding on Carbon Steel plate utilizing 6011, 7018 welding electrodes and Flat, Horizontal, Vertical fillet and groove welding of Stainless Steel plate using compatible electrodes.

Tasks:

PA501 - Perform safety inspections of SMAW equipment.

PA502 - Make minor external repairs to SMAW equipment.

PA503 - Set up and operate SMAW equipment.

PA507 - Perform qualification test.

PA508 - Pass fillet weld performance test in flat position.

PA509 - Pass fillet weld performance test in horizontal position.

PA510 - Pass fillet weld performance test in vertical position.

PA511 - Pass fillet weld performance test in overhead position.

PA512 - Pass groove weld performance test in flat position.

PA513 - Pass groove weld performance test in horizontal position.

PA514 - Pass groove weld performance test in vertical position.

PA515 - Pass groove weld performance test in overhead position.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:**TEXT TYPES AND PURPOSE GRADES 9-10-11-12**

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Instructional Activities:**Knowledge:**

Identify and explain shielded metal arc welding safety

Identify and explain welding electrical current

Identify and explain arc welding machines

Explain setting up arc welding equipment

Set up an machine for welding

Identify and explain tools for weld cleaning

Identify factors that affect electrode selection

Explain the A.W.S. and A.S.M.E. filler metal classification systems

Identify different types of filler metals

Explain the storage and control of filler metals

Explain filler metal tracability requirements and how to use applicable code requirements

Identify and select the proper electrode for an identified welding task

Set up shielded metal arc welding equipment

Describe methods of striking an arc
 Properly strike and extinguish an arc.
 Describe causes of arc blow and wander
 Identify and explain groove welds
 Identify and explain groove welds with backing
 Identify and explain open root v-groove pipe welds

Skill:

Demonstrate:

000500 SHIELDED METAL ARC WELDING (SMAW)
 000501 Perform safety inspections of SMAW equipment and accessories.
 000502 Make minor external repairs to SMAW equipment and accessories.
 000503 Set up and operate SMAW equipment.
 000504 Make fillet welds in all positions.
 000505 Make groove welds in all positions.
 000506 Pass performance test in all positions.
 000507 Perform qualification test.
 000508 Make fillet welds in vertical position.
 000509 Make fillet welds in horizontal position.
 000510 Make fillet welds in overhead position.
 000511 SM-1 6011 Learning to strike an arc.
 000512 SM-1 7018 Learning to strike an arc.
 000513 SM-1 SW 6011 Surfacing welding.
 000514 SM-1 SW 7018 Surfacing welding.
 000515 SM-1F 6011 Lap welding.
 000516 SM-1F 7018 Lap welding.
 000517 SM-1F T6011 Fillet weld, T Joint
 000518 SM-1F T7018 Fillet weld, T Joint
 000519 SM-1F 6011 Fillet weld, corner joint.
 000520 SM-1F 7018 Fillet weld, corner joint.
 000521 SM-1G -BS-6011 Backstrap weld.
 000522 SM-1G -BS-7018 Backstrap weld.
 000523 SM-1G -FP-6011 Full penetration weld.
 000524 SM-1G -FP-7018 Full penetration weld.
 000525 A.W.S. 1G Flat qualification test.
 000526 SM2 SW-6011 Surfacing welds-horizontal position.
 000527 SM2 SW-7018 Surfacing welds-horizontal position.
 000528 SM2 F-T 6011 Fillet weld-T-joint-Horizontal position.
 000529 SM2 F-T 7018 Fillet weld-T-joint-Horizontal position.
 000530 SM2G-BS-6011 Groove weld-Backstrap Horizontal position.
 000531 SM2G-BS-7018 Groove weld-Backstrap Horizontal position.
 000532 SM2G-FP-6011 Groove weld-Full penetration-Horizontal position.
 000533 SM2G-FP-7018-Groove weld-Full penetration-Horizontal position
 000534 A.W.S. 2G-Horizontal Qualification Test.
 000535 SM3 SW-6011-S Stringer surfacing vertical position.
 000536 SM3 SW-7018-S Stringer surfacing vertical position.
 000537 SM3 SW-6011-W-Weave surfacing vertical position.
 000538 SM3 SW-7018-W-Weave surfacing vertical position.
 000539 SM3F-T-6011-Fillet weld-T-joint-vertical position.
 000540 SM3F-T-7018-Fillet weld-T-joint-vertical position.
 000541 SM3G-BS-6011-Groove weld-Backstrap-vertical position.
 000542 SM3G-BS-7018-Groove weld-Backstrap-vertical position.
 000543 SM3G-FP-6011-Groove weld-Full penetration-vertical weld.
 000544 SM3G-FP-7018-Groove weld-Full penetration-vertical weld.
 000545 A.W.S. 3-G Vertical Qualification Test.
 000546 SM4-SW-6011-Surfacing weld-Overhead position.
 000547 SM4-SW-7018-Surfacing weld-Overhead position.
 000548 SM4F-T-6011-Fillet weld-T-joint-Overhead position.
 000549 SM4F-T-7018-Fillet weld-T-joint-Overhead position.
 000550 SM4G-BS-6011-Groove weld-Backstrap-Overhead position.
 000551 SM4G-BS-7018-Groove weld-Backstrap-Overhead position.
 000552 SM4G-FP-6011-Groove weld-Full penetration-Overhead position.
 000553 SM4G-FP-7018-Groove weld-Full penetration-Overhead position.

000554 A.W.S. 4G-Overhead Qualification Test.
 000555 SM1 SW-S/S Flat surfacing weld-Stainless steel.
 000556 SM1 F-T-S/S Flat fillet weld-T-joint Stainless steel.
 000557 SM1 G-FP-S/S Flat groove weld-Full penetration-Stainless steel.
 000558 SM2 SW-S/S Horizontal surfacing weld-Stainless steel.
 000559 SM2 F-T-S/S Horizontal fillet weld-T-joint-Stainless steel.
 000560 SM2 G-FP-S/S Horizontal groove weld-Full penetration-Stainless steel.
 000561 SM3 SW-S/S Vertical surfacing weld-Stainless steel.
 000562 SM3 F-T-S/S Vertical fillet weld-T-joint-Stainless steel.
 000563 SM3 G FP-S/S Vertical groove weld-Full penetration-Stainless steel.

Remediation:

Review with teacher assistance
 Worksheets
 Reading Comprehension Strategies (Max Teaching)
 Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assess

Special Adaptations:

Extended Time (assignments and/or testing)
 Graphic Organizer
 Chunking of Assignments/Material
 Directions/Comprehension Check (frequent checks for understanding)
 Study Guide
 Directions and/or Tests Read Aloud
 Adapted Tests and/or Assignments
 Use of Calculator
 Taking Tests in Alternate Setting (or if requested)
 Verbal/Gestural Redirection (prompts to remain on task)
 Drill and Practice (Repetition of Material)
 No Penalization for Spelling
 Small Group Instruction
 Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
 Teacher Modeling
 Use of Computer (Access to)
 Positive Reinforcement
 Have Student Repeat Directions
 Access to School Counselor
 Positive Reinforcement
 Provide Frequent Feedback
 Variety of Assessment Methods
 Regular Notebook Check
 Use of Assistive Device (i.e. notepad, laptop, ect.)
 Highly Structured Classroom
 Syllabus for Major Projects
 Limited, Short Directions
 Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions
 Use of Multisensory Approach
 Provide Opportunities to Retest
 Frequent Review Sessions
 Use a variety of Modalities when Introducing Skills/Concepts
 Allow Oral Answers for Testing
 Copies of Text for Home
 De-Escalation Opportunities

Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

Safety:

Student must:

Wear:

Safety Glasses

Fire-resistant Head Covering

Leather Sleeves/Cape/gauntlet gloves

Welding Hood

Steel Toed 8" all Leather Work Boots

Required shop uniform

Handle material in a safe and work like manner

Use protective clothing and equipment

Use hand tools in a safe manner

Use adequate ventilation when working in enclosed area

Follow manufacturer's directions when using any product, tool, equipment, etc.

Use proper safety precautions when using /operating hand tools

Use tools and equipment in a professional work like manner according to OSHA standards

Know and follow the established safety rules at all times

Remediation and Enrichment

Assessment:

Tests

Worksheets

Quizzes

Time cards

Rubrics

Checklists

Individual projects

Remediation:

Review with teacher assistance

Worksheets

Reading Comprehension packets

Retest or alternative assessment

Study guides

Checklists

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Supplied cleaning equipment Grading rubric Daily

assignment checklist Supplies and student purchased safety attire Tape measures Calipers Squares 6-inch squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/ Chop Saw Horizontal Band Saw Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps Bench Vises Vice Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion, Horizontal band saws Hydraulic bending press Pedestal and Manual Power grindersHyperlinks:
<http://www.monroecti.org/Page/404>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 600 GAS METAL ARC WELDING (GMAW)

Number: 600 **Hours:** 235.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate theoretical knowledge and practical comprehension and ability in Gas Metal Arc welding in the flat, horizontal, vertical and overhead welding positions in fillet and groove joint configurations on plate carbon steel, stainless steel and aluminum.

Tasks:

PA601 - Perform safety inspections of GMAW equipment.

PA602 - Make minor external repairs to GMAW equipment.

PA603 - Set up and operate GMAW equipment.

PA606 - Pass performance test.

PA607 - Pass fillet weld performance test in flat position.

PA608 - Pass fillet weld performance test in horizontal position.

PA609 - Pass fillet weld performance test in vertical position.

PA610 - Pass fillet weld performance test in overhead position.

PA611 - Pass groove weld performance test in flat position.

PA612 - Pass groove weld performance test in horizontal position.

PA613 - Pass groove weld performance test in vertical position.

PA614 - Pass groove weld performance test in overhead position.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

NUMBERS AND OPERATIONS

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

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

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

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

Instructional Activities:

Knowledge:

Complete reading assignments
 Complete assigned worksheets
 Participate in lecture discussions and respond to questions
 Participate in group activities
 Complete individual assignments
 Maintain work area
 Complete time card
 Perform safety inspections of protective clothing and equipment, hand tools, shielded metal arc welding equipment and accessories as well as of the work area
 Make minor external repairs to shielded metal arc welding equipment and accessories
 Understand how to set up and prepare to perform shielded metal arc welding operations on plain carbon steel
 Perform shielded metal arc welding operations
 Interpret a blueprint and sketches
 Understand drawing sequential notes
 Follow in order processing steps
 Explain flux core arc welding (FCAW) safety
 Explain the characteristics of welding current and power sources
 Identify and explain the use of FCAW equipment:
 Spray transfer
 Globular
 Short circuiting pulse
 Identify and explain the use of GMAW shielding gases and filler metals
 Explain gas tungsten arc welding (GTAW) safety
 Identify and explain the use of GTAW equipment
 Identify and explain the use of GTAW filler metals
 Identify and explain the use of GTAW shielding gases

Skill:

000601 Perform safety inspections of GMAW equipment and accessories.
 000602 Make minor external repairs to GMAW equipment and accessories.
 000603 Set up and operate GMAW equipment.
 000607 GM 1 SW-GMAW-Flat surfacing weld.
 000608 GM 1 F-T-GMAW-Flat fillet weld-T-joint.
 000609 GM 1 G-BS-GMAW-Flat groove weld-back strap.
 000610 GM 1 G-SQ-GRV-GMAW-Flat square groove weld.
 000611 GM 2 SW-GMAW-Horizontal surfacing weld.
 000612 GM 2F-T-GMAW-Horizontal fillet weld-T-joint.
 000613 GM 2G-BS-GMAW-Horizontal groove weld-back strap.
 000614 GM 2G-SQ-GRV-GMAW-Horizontal square groove weld.
 000615 GM 3-SW-GMAW-Vertical surfacing weld.
 000616 GM 3-F-T-GMAW-Vertical fillet weld-T-joint.
 000617 GM 3-G-BS-GMAW-Vertical groove weld-back strap.
 000618 GM 3-G-SQ-GRV-GMAW-Vertical square groove weld.
 000619 GM 3-G-SW-Down-GMAW-Vertical down surfacing weld.
 000620 GM 3-F-T-Down-GMAW-Vertical down fillet weld-T-joint.
 000621 GM 3G-BS-Down-GMAW-Vertical down groove weld-back strap.
 000622 GM 3GFP-SQ-GRV-GMAW-Vertical down square groove weld.
 000623 GM 4-SW-GMAW-Overhead surfacing weld
 000624 GM 4-F-T-GMAW-Overhead surfacing welding overhead fillet weld T-joint.
 000625 GM 1-SW-AL-GMAW-Flat surfacing weld-aluminum.
 000626 GM 1FT-AL-GMAW-Flat fillet weld-T-joint--aluminum.
 000627 GM 1FG-FP-AL-GMAW-Flat groove weld-full penetration-aluminum.
 000628 GM-2SW-AL-GMAW-Horizontal surfacing weld-aluminum.
 000629 GM-2F-T-AL-GMAW-Horizontal fillet weld-T-joint-aluminum.
 000630 GM-2G-BS-AL-GMAW-Horizontal groove weld-back strap-aluminum.
 000631 GM-2G-FP-AL-GMAW-Horizontal groove weld-full penetration-aluminum.
 000632 GM-3SW-AL-GMAW-Vertical up surfacing weld-aluminum.
 000633 GM-3F-T-AL-GMAW-Vertical up fillet weld -T-joint-aluminum.
 000634 GM-3G-BS-AL-GMAW-Vertical up groove weld-back strap-aluminum.

000635 GM-3G-FP-AL-GMAW-Vertical up full penetration weld-aluminum.
 000636 GM-3SW- down-GMAW-Vertical down surfacing weld-aluminum.
 000637 GM-3F-T- down-GMAW-Vertical down fillet weld-T-joint-aluminum.
 000638 GM-3G-FP- down-GMAW-Vertical down groove-full penetration-aluminum.
 000639 GM-1SW-S/S- down-GMAW-Flat surfacing weld-stainless steel.
 000640 GM-1F-T-S/S- down-GMAW-Flat fillet weld-T-joint-stainless steel.
 000641 GM-1G-BS-S/S- down-GMAW-Flat groove weld-back strap-stainless steel.
 000642 GM-1SW spray-GMAW-Flat surfacing weld-spray transfer.
 000643 GM-1F-T-STspray-GMAW-Flat fillet weld-T-joint spray transfer.
 000644 GM-1G-BS-STspray-GMAW-Flat groove weld-back strap-spray transfer.
 000645 GM-2SW-STspray-GMAW-Horizontal surfacing weld-spray transfer.
 000646 GM-2F-T-STspray-GMAW-Horizontal fillet weld-T-joint-spray transfer.
 000647 GM-2G-BS-STspray-GMAW-Horizontal groove weld-back strap-spray transfer.
 000604 Make fillet welds in all positions.
 000605 Make groove welds in all positions.
 000606 Pass performance test
 Set up GMAW equipment and identify tools for weld cleaning.
 Perform GMAW multipass fillet welds on plate in multiple positions using flux cord wire and, if required, shielding gas
 Perform GMAW multipass groove welds on plate in multiple positions using flux corded wire and, if required, shielding gas
 Perform GMAW spray fillet and groove welds on plate, using solid or composite wire and shielding gas, in flat and horizontal positions.
 Set up GTAW equipment
 Build a pad in the flat position with stringer beads using GTAW and carbon steel filler metal
 Make a multipass open V-groove welds on carbon steel plate in the 1C (flat) position using GTAW and carbon steel filler metal
 Make a multipass open V-groove welds on carbon steel plate in the 2C (horizontal) position using GTAW and carbon steel filler metal
 Make a multipass open V-groove welds on carbon steel plate in the 3C (vertical) position using GTAW and carbon steel filler metal
 Make a multipass open V-groove welds on carbon steel plate in the 4C (overhead) position using GTAW and carbon steel filler metal

Remediation:

Review with teacher assistance
 Worksheets
 Reading Comprehension packets
 Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
 Graphic Organizer
 Chunking of Assignments/Material
 Directions/Comprehension Check (frequent checks for understanding)
 Study Guide
 Directions and/or Tests Read Aloud
 Adapted Tests and/or Assignments
 Use of Calculator
 Taking Tests in Alternate Setting (or if requested)
 Verbal/Gestural Redirection (prompts to remain on task)
 Drill and Practice (Repetition of Material)
 No Penalization for Spelling
 Small Group Instruction
 Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)

Teacher Modeling
 Use of Computer (Access to)
 Positive Reinforcement
 Have Student Repeat Directions
 Access to School Counselor
 Positive Reinforcement
 Provide Frequent Feedback
 Variety of Assessment Methods
 Regular Notebook Check
 Use of Assistive Device (i.e. notepad, laptop, ect.)
 Highly Structured Classroom
 Syllabus for Major Projects
 Limited, Short Directions
 Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions
 Use of Multisensory Approach
 Provide Opportunities to Retest
 Frequent Review Sessions
 Use a variety of Modalities when Introducing Skills/Concepts
 Allow Oral Answers for Testing
 Copies of Text for Home
 De-Escalation Opportunities
 Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

Safety:

Student must:
 Wear:
 Safety Glasses
 Fire-resistant Head Covering
 Leather Sleeves/Cape/gauntlet gloves
 Welding Hood
 Steel Toed 8" all Leather Work Boots
 Required shop uniform
 Handle material in a safe and work like manner
 Use protective clothing and equipment
 Use hand tools in a safe manner
 Use adequate ventilation when working in enclosed area
 Follow manufacturer's directions when using any product, tool, equipment, etc.
 Use proper safety precautions when using /operating hand tools
 Use tools and equipment in a professional work like manner according to OSHA standards
 Know and follow the established safety rules at all times

Assessment:

Tests
 Worksheets
 Quizzes
 Time cards

Rubrics
 Checklists
 Individual projects

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Supplied cleaning equipment Grading rubric Daily assignment checklist Supplies and student purchased safety attire Tape measures Calipers Squares 6-inch squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/ Chop Saw Horizontal Band Saw Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps Bench Vises Vice Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion, Horizontal band saws Hydraulic bending press Pedestal and Manual Power grinders

Hyperlinks:
<http://www.monroecti.org/Page/404>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 700 FLUX CORED ARC WELDING (FCAW)

Number: 700 **Hours:** 70.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate theoretical knowledge and practical comprehension and ability in Gas Metal Arc welding utilizing Flux cored filler wire with and without gas shielding in the flat, horizontal, vertical welding positions in fillet and groove joint configurations on plate carbon steel.

Tasks:

PA701 - Perform safety inspections of FCAW equipment.

PA702 - Make minor external repairs to FCAW equipment.

PA703 - Set up and operate FCAW equipment.

PA705 - Pass performance test.

PA707 - Pass fillet weld performance test in flat position.

PA708 - Pass fillet weld performance test in horizontal position.

PA709 - Pass fillet weld performance test in vertical position.

PA710 - Pass fillet weld performance test in overhead position.

PA711 - Pass groove weld performance test in flat position.

PA712 - Pass groove weld performance test in horizontal position.

PA713 - Pass groove weld performance test in vertical position.

PA714 - Pass groove weld performance test in overhead position.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Instructional Activities:

Knowledge:

Complete reading assignments

Complete assigned worksheets

Participate in lecture discussions and respond to questions

Participate in group activities

Complete individual assignments

Maintain work area

Complete time card

Explain flux core arc welding (FCAW) safety

Explain the characteristics of welding current and power sources

Identify and explain the use of FCAW equipment:

Spray transfer

Globular

Short circuiting

pulse

Identify and explain the use of FCAW sheilding gases and filler metals

Set up FCAW equipment and identify tools for weld cleaning.

Perform FCAW multipass fillet welds on plate in multiple positions using flux cord wire and, if required, shielding gas

Perform FCAW multipass groove welds on plate in multiple postitions using flux corded wie and, if required, shielding gas

Skill:

000701 Perform safety inspections of Flux Cored Arc equipment and accessories.

000702 Make minor external repairs to Flux Cored Arc equipment and accessories.

000703 Set up and operate FCAW equipment.

000706 FC-1SW-FCAW-Flat surfacing weld

000707 FC-1F-T-FCAW-Flat fillet weld-T-joint.

000708 FC-1G-BS-FCAW-Flat groove weld-back strap.

000709 FC-2SW-FCAW-Horizontal surfacing weld.

000710 FC-2F-T-FCAW-Horizontal fillet weld-T-joint.

000711 FC-2G-BS-FCAW-Horizontal groove weld-back strap.

000712 FC-3SW-FCAW-Vertical surfacing weld.

000713 FC-3F-T-FCAW-Vertical fillet weld-T-joint..

000714 FC-3G-BS-FCAW-Vertical groove weld-back strap.

Remediation:

Review with teacher assistance

Worksheets

Reading Comprehension packets

Retest or alternative assessment

Study guides

Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)

Graphic Organizer

Chunking of Assignments/Material

Directions/Comprehension Check (frequent checks for understanding)

Study Guide

Directions and/or Tests Read Aloud

Adapted Tests and/or Assignments

Use of Calculator

Taking Tests in Alternate Setting (or if requested)

Verbal/Gestural Redirection (prompts to remain on task)

Drill and Practice (Repetition of Material)

No Penalization for Spelling

Small Group Instruction

Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)

Teacher Modeling

Use of Computer (Access to)

Positive Reinforcement

Have Student Repeat Directions

Access to School Counselor

Positive Reinforcement

Provide Frequent Feedback

Variety of Assessment Methods

Regular Notebook Check

Use of Assistive Device (i.e. notepad, laptop, ect.)

Highly Structured Classroom

Syllabus for Major Projects

Limited, Short Directions

Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions
 Use of Multisensory Approach
 Provide Opportunities to Retest
 Frequent Review Sessions
 Use a variety of Modalities when Introducing Skills/Concepts
 Allow Oral Answers for Testing
 Copies of Text for Home
 De-Escalation Opportunities
 Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

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

Assessment:

Tests
 Worksheets
 Quizzes
 Time cards
 Rubrics
 Checklists
 Individual projects

Remediation:

Review with teacher assistance
 Worksheets
 Reading Comprehension packets
 Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II,
 Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research

(NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Supplied cleaning equipment Grading rubric Daily assignment checklist Supplies and student purchased safety attire Tape measures Calipers Squares 6-inch squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/ Chop Saw Horizontal Band Saw Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps Bench Vises Vice Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion, Horizontal band saws Hydraulic bending press Pedestal and Manual Power grindersHyperlinks:
<http://www.monroecti.org/Page/404>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 800 GAS TUNGSTEN ARC WELDING (GTAW)

Number: 800 **Hours:** 190.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate theoretical knowledge and comprehension along with practical ability in Gas Tungsten Arc Welding in Flat, Horizontal, Vertical and Overhead fillet and groove welding on Carbon Steel, Stainless Steel, Aluminum plate and Flat, Horizontal, Vertical fillet and groove welding of Carbon Steel, Stainless Steel and Aluminum plate using compatible filler metals.

Tasks:

PA801 - Perform safety inspections of GTAW equipment.

PA802 - Make minor external repairs to GTAW equipment.

PA803 - Set up and operate GTAW equipment.

PA805 - Pass performance test on ferrous materials.

PA806 - Set up and operate GTAW on nonferrous materials.

PA808 - Pass performance test on nonferrous materials.

PA809 - Pass fillet weld performance test in flat position on ferrous materials.

PA810 - Pass fillet weld performance test in horizontal position on ferrous materials.

PA811 - Pass fillet weld performance test in vertical position on ferrous materials.

PA812 - Pass fillet weld performance test in overhead position on ferrous materials.

PA813 - Pass fillet weld performance test in flat position on nonferrous materials.

PA814 - Pass fillet weld performance test in horizontal position on nonferrous materials.

PA815 - Pass fillet weld performance test in vertical position on nonferrous materials.

PA816 - Pass fillet weld performance test in overhead position on nonferrous materials.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among

concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Connecting Anchor/Standard:

- Pennsylvania Core Standards for Mathematics Standard 2.0

Supporting Anchor/Standards:

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

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

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

reporting quantities.

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

Instructional Activities:

Knowledge:

Complete reading assignments

Complete assigned worksheets

Participate in lecture discussions and respond to questions

Participate in group activities

Complete individual assignments

Maintain work area

Complete time card

Explain gas tungsten arc welding (GTAW) safety

Identify and explain the use of GTAW equipment

Identify and explain the use of GTAW filler metals

Identify and explain the use of GTAW shielding gases

Set up GTAW equipment

Interpret a blueprint and sketches

Understand drawing sequential notes

Follow in order processing steps

Perform safety inspections of protective clothing and equipment, hand tools, gas tungsten arc welding equipment and accessories, shielding gas equipment and accessories, as well as of the work area

Make minor external repairs to gas tungsten arc welding equipment and accessories, and shielding gas equipment and accessories

Understand how to set up and prepare to perform gas tungsten arc welding operations on plain carbon steel, aluminum, and stainless steel

Make fillet welds on aluminum plate in the following positions:

1F Flat

2F Horizontal

3F Vertical

4F Overhead

Make multipass open V-groove welds with backing on aluminum plate in the following positions:

1F Flat

2F Horizontal

3F Vertical

4F Overhead

Skill:

000801 Perform safety inspections of GTAW equipment and accessories.

000802 Make minor external repairs to GTAW equipment and accessories.

000803 Set up and operate GTAW equipment.

000809 GT-1SW-GTAW-Flat surfacing weld-Ferrous materials (carbon steel).

000810 GT-1F-T-GTAW-Flat fillet weld T-joint-Ferrous materials (carbon steel).

000811 GT-1G-FP-GTAW-Flat groove weld-full penetration-Ferrous materials (carbon steel).

000812 GT-2SW-GTAW-Horizontal surfacing weld-Ferrous materials (carbon steel).

000813 GT-2F-T-GTAW-Horizontal fillet weld-T-joint-Ferrous materials (carbon steel).

000814 GT-2G-GTAW-Horizontal groove weld-full penetration-Ferrous materials (carbon steel).

000815 GT-3SW-GTAW-Vertical surfacing weld-Ferrous materials (carbon steel).

000816 GT-3F-T-GTAW-Vertical fillet weld-T-joint-Ferrous materials (carbon steel).

000817 GT-3G-FP-GTAW-Vertical groove weld-full penetration-Ferrous materials (carbon steel).

000818 GT-1SW-S/S-GTAW-Vertical surfacing weld-Non-Ferrous materials (stainless steel).

000819 GT-1F-T-S/S-GTAW-Vertical fillet weld-T-joint-Non-Ferrous materials (stainless steel).

000820 GT-1G-FP-S/S-GTAW-Vertical groove weld-full penetration-Non-Ferrous materials (stainless steel).

000821 GT-2SW-S/S-GTAW-Horizontal surfacing weld-full penetration-Non-Ferrous materials (stainless steel).

000822 GT-2F-T-S/S-GTAW-Horizontal fillet weld-T-joint-Non-Ferrous materials (stainless steel).

000823 GT-2G-FP-S/S-GTAW-Horizontal groove weld-full penetration-Non-Ferrous materials (stainless steel).

000824 GT-3SW-S/S-GTAW-Vertical surfacing weld-Non-Ferrous materials (stainless steel).

000825 GT-3F-T-S/S-GTAW-Vertical fillet weld-T-joint-Non-Ferrous materials (stainless steel).
 000826 GT-3G-FP-S/S-GTAW-Vertical groove weld-full penetration-Non-Ferrous materials (stainless steel).
 000827 GT-1SW-AL-GTAW-Flat surfacing weld-Non-Ferrous materials (aluminum).
 000828 GT-1F-T-AL-GTAW-Flat fillet weld-T-joint-Non-Ferrous materials (aluminum).
 000829 GT-1G-FP-AL-GTAW-Flat groove weld-full penetration-Non-Ferrous materials (aluminum).
 000830 GT-2GW-AL-GTAW-Horizontal surfacing weld-Non-Ferrous materials (aluminum).
 000831 GT-2F-T-AL-GTAW-Horizontal fillet weld-T-joint-Non-Ferrous materials (aluminum).
 000832 GT-2G-FP-AL-GTAW-Horizontal groove weld-full penetration-Non-Ferrous materials (aluminum).
 000833 GT-3SW-AL-GTAW-Vertical surfacing weld-Non-Ferrous materials (aluminum).
 000834 GT-3G-FP-AL-GTAW-Vertical groove weld-full penetration-Non-Ferrous materials (aluminum).

Remediation:

Review with teacher assistance
 Worksheets
 Reading Comprehension packets
 Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
 Graphic Organizer
 Chunking of Assignments/Material
 Directions/Comprehension Check (frequent checks for understanding)
 Study Guide
 Directions and/or Tests Read Aloud
 Adapted Tests and/or Assignments
 Use of Calculator
 Taking Tests in Alternate Setting (or if requested)
 Verbal/Gestural Redirection (prompts to remain on task)
 Drill and Practice (Repetition of Material)
 No Penalization for Spelling
 Small Group Instruction
 Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
 Teacher Modeling
 Use of Computer (Access to)
 Positive Reinforcement
 Have Student Repeat Directions
 Access to School Counselor
 Positive Reinforcement
 Provide Frequent Feedback
 Variety of Assessment Methods
 Regular Notebook Check
 Use of Assistive Device (i.e. notepad, laptop, ect.)
 Highly Structured Classroom
 Syllabus for Major Projects
 Limited, Short Directions
 Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions
 Use of Multisensory Approach
 Provide Opportunities to Retest
 Frequent Review Sessions
 Use a variety of Modalities when Introducing Skills/Concepts
 Allow Oral Answers for Testing
 Copies of Text for Home
 De-Escalation Opportunities

Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

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

Assessment:

Tests
 Worksheets
 Quizzes
 Time cards
 Rubrics
 Checklists
 Individual projects
 Remediation:
 Review with teacher assistance
 Worksheets
 Reading Comprehension packets
 Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Theory Modules/Handouts Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment Tools: Tape measures Calipers Squares 6-inch squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/ Chop Saw Horizontal Band Saw Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps

Bench Vises Vice Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion, Horizontal band saws Hydraulic bending press Pedestal and Manual Power grindersHyperlinks:
<http://www.monroecti.org/Page/396>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 900 MANUAL OXYFUEL GAS CUTTING (OFC)

Number: 900 **Hours:** 68.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate theoretical knowledge and comprehension along with practical ability in Oxygen and Acetylene cutting using a manual torch to cut straight lines and bevels to measurement standards and cut shapes to templates.

Tasks:

PA901 - Perform safety inspections of OFC equipment.

PA902 - Make minor external repairs to OFC equipment.

PA903 - Set up for manual OFC operations on steel.

PA904 - Operate manual OFC equipment.

PA905 - Perform straight cutting operations on steel.

PA906 - Perform shape cutting operations on steel.

PA907 - Perform bevel cutting operations on steel.

PA908 - Perform piercing operations on steel.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

Standard CC.3.5.11-12. G Integrate and evaluate multiple sources of information presented in

diverse formats...to solve a problem.

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Instructional Activities:

Knowledge:

Identify and explain the use of oxyfuel cutting equipment

Set up oxyfuel equipment

Light and adjust an oxyfuel torch

Shut down oxyfuel cutting equipment

Disassemble oxyfuel equipment

Change empty cylinders

Perform oxyfuel cutting:

Straight line and square shapes

Piercing and slot cutting

Bevels

Washing

Gouging

Operate a motorized, portable oxyfuel gas cutting machine

Complete reading assignments

Complete assigned worksheets

Participate in lecture discussions and respond to questions

Participate in group activities

Complete individual assignments

Maintain work area

Complete time card

Skill:

Identify and explain the use of oxyfuel cutting equipment
 Set up oxyfuel equipment
 Light and adjust an oxyfuel torch
 Shut down oxyfuel cutting equipment
 Disassemble oxyfuel equipment
 Change empty cylinders
 Perform oxyfuel cutting:
 Straight line and square shapes
 Piercing and slot cutting
 Bevels
 Washing
 Gouging
 Operate a motorized, portable oxyfuel gas cutting machine
 Using oxyfuel equipment that has been completely disassembled, demonstrate how to:
 Set up the oxyfuel equipment in the correct sequence
 Ignite and adjust flame - carburizing, neutral, oxidizing
 Demonstrate that there are no leaks
 Properly adjust all three flames
 Shut off torch in the correct sequence
 Shut down oxyfuel equipment
 Using carbon steel plate, lay out and cut the shape and holes shown in the given figures according to the criteria for acceptance

Remediation:
 Review with teacher assistance
 Worksheets
 Reading Comprehension packets
 Retest or alternative assessment
 Study guides
 Checklists

Enrichment:
 Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
 Graphic Organizer
 Chunking of Assignments/Material
 Directions/Comprehension Check (frequent checks for understanding)
 Study Guide
 Directions and/or Tests Read Aloud
 Adapted Tests and/or Assignments
 Use of Calculator
 Taking Tests in Alternate Setting (or if requested)
 Verbal/Gestural Redirection (prompts to remain on task)
 Drill and Practice (Repetition of Material)
 No Penalization for Spelling
 Small Group Instruction
 Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
 Teacher Modeling
 Use of Computer (Access to)
 Positive Reinforcement
 Have Student Repeat Directions
 Access to School Counselor
 Positive Reinforcement
 Provide Frequent Feedback
 Variety of Assessment Methods
 Regular Notebook Check
 Use of Assistive Device (i.e. notepad, laptop, ect.)
 Highly Structured Classroom

Syllabus for Major Projects
 Limited, Short Directions
 Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions
 Use of Multisensory Approach
 Provide Opportunities to Retest
 Frequent Review Sessions
 Use a variety of Modalities when Introducing Skills/Concepts
 Allow Oral Answers for Testing
 Copies of Text for Home
 De-Escalation Opportunities
 Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

Safety:

Student must:

Wear safety glasses, Fire-resistant head covering, Leather sleeves/Cape/Gauntlet gloves, Welding hood,
 Steel toed 8" all leather work boots, required shop uniform
 Handle material in a safe and work like manner
 Use protective clothing and equipment
 Use hand tools in a safe manner
 Use adequate ventilation when working in enclosed area
 Follow manufacturer's directions when using any product, tool, equipment, etc.
 Use proper safety precautions when using/operating hand tools
 Use tools and equipment in a professional work like manner according to OSHA standards
 Know and follow the established safety rules at all times

Assessment:

Tests
 Worksheets
 Quizzes
 Time cards
 Rubrics
 Checklists
 Individual projects

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Supplied cleaning equipment Grading rubric Daily assignment checklist Supplies and student purchased safety attire Tape measures Calipers Squares 6-inch

squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/ Chop Saw Horizontal Band Saw
Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill
Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench
Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps Bench Vises Vice
Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective
Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig
Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes
Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units
GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion, Horizontal band saws
Hydraulic bending press Pedestal and Manual Power grindersHyperlinks:
<http://www.monroecti.org/Page/396>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 1000 MECHANIZED OXYFUEL GAS CUTTING (OFC)

Number: 1000 **Hours:** 20.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate theoretical knowledge and comprehension along with practical ability in oxygen and acetylene cutting using a self-guided track burner automatic torch to cut straight lines and bevels to measurement standards.

Tasks:

PA1001 - Perform safety inspections of mechanized OFC equipment.

PA1002 - Make minor external repairs to mechanized OFC equipment.

PA1003 - Set up and operate mechanized OFC equipment on steel.

PA1004 - Perform straight mechanized OFC operations on steel.

PA1005 - Perform bevel mechanized OFC operations on steel.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Instructional Activities:

Knowledge:

Complete reading assignments

Complete assigned worksheets

Participate in lecture discussions and respond to questions

Participate in group activities

Complete individual assignments

Maintain work area

Complete time card

Skill:

Demonstrate setting up, adjusting, and shutting down oxyfuel equipment

Demonstrate cutting a shape from thin steel to meet criteria for acceptance

Demonstrate cutting a shape from thick steel to meet criteria for acceptance

Demonstrate proper use of a portable oxyfuel cutting machine

Demonstrate straight-line cuts

Demonstrate bevel or chamfer cuts

Demonstrate operation of the speed control

Demonstrate operation of the clutch control

Demonstrate operation of the directional control

Demonstrate torch adjustment

Remediation:

Review with teacher assistance

Worksheets
 Reading Comprehension packets
 Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
 Graphic Organizer
 Chunking of Assignments/Material
 Directions/Comprehension Check (frequent checks for understanding)
 Study Guide
 Directions and/or Tests Read Aloud
 Adapted Tests and/or Assignments
 Use of Calculator
 Taking Tests in Alternate Setting (or if requested)
 Verbal/Gestural Redirection (prompts to remain on task)
 Drill and Practice (Repetition of Material)
 No Penalization for Spelling
 Small Group Instruction
 Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
 Teacher Modeling
 Use of Computer (Access to)
 Positive Reinforcement
 Have Student Repeat Directions
 Access to School Counselor
 Positive Reinforcement
 Provide Frequent Feedback
 Variety of Assessment Methods
 Regular Notebook Check
 Use of Assistive Device (i.e. notepad, laptop, ect.)
 Highly Structured Classroom
 Syllabus for Major Projects
 Limited, Short Directions
 Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions
 Use of Multisensory Approach
 Provide Opportunities to Retest
 Frequent Review Sessions
 Use a variety of Modalities when Introducing Skills/Concepts
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 Copies of Text for Home
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 Opportunities for Repeated Practice of MATH Skills
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 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

Safety:

Student must:

- Wear safety glasses, Fire-resistant head covering, Leather sleeves/Cape/Gauntlet gloves, Welding hood, Steel toed 8" all leather work boots, required shop uniform
- Handle material in a safe and work like manner
- Use protective clothing and equipment
- Use hand tools in a safe manner
- Use adequate ventilation when working in enclosed area
- Follow manufacturer's directions when using any product, tool, equipment, etc.
- Use proper safety precautions when using/operating hand tools
- Use tools and equipment in a professional work like manner according to OSHA standards
- Know and follow the established safety rules at all times

Assessment:

- Tests
- Worksheets
- Quizzes
- Time cards
- Rubrics
- Checklists
- Individual projects

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Theory Modules/Handouts Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment Tools: Supplied cleaning equipment Grading rubric Daily assignment checklist Supplies and student purchased safety attire Tape measures Calipers Squares 6-inch squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/Chop Saw Horizontal Band Saw Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps Bench Vises Vice Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion, Horizontal band saws Hydraulic bending press Pedestal and Manual Power grinders

Hyperlinks:
<http://www.monroecti.org/Page/396>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 1100 MANUAL PLASMA ARC CUTTING (PAC)

Number: 1100 **Hours:** 24.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate theoretical knowledge and comprehension along with practical ability in Plasma Arc Cutting of Carbon Steel, Stainless Steel and Aluminum to measurement standards.

Tasks:

PA1101 - Perform safety inspections of PAC equipment.

PA1102 - Make minor external repairs to PAC equipment.

PA1103 - Set up and operate manual PAC operations on ferrous and nonferrous materials.

PA1104 - Perform shape PAC operations on ferrous and nonferrous materials.

PA1105 - Perform gouging and scarfing PAC operations, to remove base and weld metal on ferrous and nonferrous materials.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

Standard CC.3.5.11-12. I Synthesize information from a range of sources into a coherent

understanding.

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:

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

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Instructional Activities:

Knowledge:

Complete reading assignments

Complete assigned worksheets

Participate in lecture discussions and respond to questions

Participate in group activities

Complete individual assignments

Maintain work area

Complete time card

Interpret a blueprint and sketches

Understand drawing sequential notes

Follow in order processing steps

Skill:

Identify and understand plasma arc cutting processes

Identify plasma arc cutting equipment

Prepare and set up plasma arc cutting equipment

Use plasma arc cutting equipment to make various types of cuts

Properly store equipment and clean work area after use

Demonstrate proper safety practices while cutting or welding

Demonstrate transferred arc process

Demonstrate nontransferred arc process

Identify basic plasma arc cutting equipment:

Demonstrate use of the Power source control unit

Demonstrate use of the Plasma arc cutting torch with torch cable

Demonstrate use of Workpiece lead and lead assembly

Demonstrate use of Plasma, shielding, and cooling gases, and gas control components

Demonstrate setting correct cutting amperage

Demonstrate installing gas cylinder and setting gas parameters

Demonstrate square-cutting metal

Demonstrate bevel-cutting metal

Demonstrate piercing and slot-cutting in metal

Demonstrate regular maintenance of equipment

Remediation:

Review with teacher assistance

Worksheets

Reading Comprehension packets

Retest or alternative assessment

Study guides

Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)

Graphic Organizer

Chunking of Assignments/Material

Directions/Comprehension Check (frequent checks for understanding)

Study Guide

Directions and/or Tests Read Aloud

Adapted Tests and/or Assignments

Use of Calculator

Taking Tests in Alternate Setting (or if requested)

Verbal/Gestural Redirection (prompts to remain on task)

Drill and Practice (Repetition of Material)

No Penalization for Spelling

Small Group Instruction

Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)

Teacher Modeling

Use of Computer (Access to)

Positive Reinforcement

Have Student Repeat Directions

Access to School Counselor

Positive Reinforcement

Provide Frequent Feedback

Variety of Assessment Methods

Regular Notebook Check

Use of Assistive Device (i.e. notepad, laptop, ect.)

Highly Structured Classroom

Syllabus for Major Projects

Limited, Short Directions

Grading Rubric

Communication Regarding Behavior & Consequences (PBS)

Clear Language for Directions

Use of Multisensory Approach

Provide Opportunities to Retest

Frequent Review Sessions

Use a variety of Modalities when Introducing Skills/Concepts

Allow Oral Answers for Testing

Copies of Text for Home

De-Escalation Opportunities
 Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

Safety:

Student must:

Wear safety glasses, Fire-resistant head covering, Leather sleeves/Cape/Gauntlet gloves, Welding hood, Steel toed 8" all leather work boots, required shop uniform
 Handle material in a safe and work like manner
 Use protective clothing and equipment
 Use hand tools in a safe manner
 Use adequate ventilation when working in enclosed area
 Follow manufacturer's directions when using any product, tool, equipment, etc.
 Use proper safety precautions when using/operating hand tools
 Use tools and equipment in a professional work like manner according to OSHA standards
 Know and follow the established safety rules at all times

Assessment:

Tests
 Worksheets
 Quizzes
 Time cards
 Rubrics
 Checklists
 Individual projects

Resources/Equipment:

National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Student. Pearson Prentice Hall, Upper Saddle River, NJ. Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Student. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels I and II, Annotated Instructor's Guide. Pearson Prentice Hall, Upper Saddle River, NJ. National Center for Construction Education and Research (NCCER). (2003). Welding Levels II, Annotated Instructor's Guide. National Center for Construction Education and Research Welding. Pearson Prentice Hall, Upper Saddle River, NJ. Theory Modules/Handouts Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment Tools: Supplied cleaning equipment Grading rubric Daily assignment checklist Supplies and student purchased safety attire Tape measures Calipers Squares 6-inch squares Weld fillet Gage V-WAC Gage Weld reinforcement Gage Cold/Chop Saw Horizontal Band Saw Belt Sander Hydraulic Shear Oxy-Acetylene Equipment Oxy-acetylene cutting tools Arc Welder Hand Drill Drill Press Jig Saw Hand Tools; Ball Peen Hammers Chipping Hammers Metal Files Box end wrench Socket wrench sets Screwdrivers Cold Chisels Hold down C-clamps Ground Clamps Bench Vises Vice Grips Power/ manual wire brushes M.S.D.S. Welding / Grinding helmets Shields Leather gloves Protective Leather Jacket Safety glasses 8-inch high safety steel-toed work boots Electrode Holders Tig Torches, Mig Guns Forced Draft Ventilation Equipment Electric Arc Welding Machine Appropriate Welding Electrodes Base Metal Preparation Equipment SMAW, GMAW, GTAW Power sources GTAW High frequency units GMAW Wire feeders Plasma arc cutting machines Hydraulic shears Abrasion,

Horizontal band saws Hydraulic bending press Pedestal and Manual Power grindersHyperlinks:
<http://www.monroecti.org/Page/396>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 1200 MANUAL AIR CARBON ARC CUTTING (CAC-A)

Number: 1200 **Hours:** 48.00

Dates: Spring 2025

Description/Objectives:

Student will know and be able to demonstrate theoretical knowledge and comprehension along with practical ability in Air-Carbon Arc Cutting of Carbon Steel, Stainless Steel and Aluminum.

Tasks:

PA1201 - Perform safety inspections of CAC-A equipment and accessories.

PA1202 - Make minor external repairs to CAC-A equipment and accessories.

PA1203 - Set up and operate manual CAC-A gouging and cutting operations on steel.

PA1204 - Perform gouging and scarfing operations, to remove base and weld metal, on steel.

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

Standard CC.3.5.9-10.E / Standard CC.3.5.11-12.E Analyze the structure of the relationships among concepts in a text, etc.

Standard CC.3.5.9-10.F / Standard CC.3.5.11-12.F Analyze the author's purpose in providing an explanation, describing a procedure...and Analyze the structure of the relationships among concepts in a text.

INTEGRATE KNOWLEDGE & IDEAS GRADES 9-10

Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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

RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

- Pennsylvania Core Standards for Writing for Technical Subjects Standard 3.6

Supporting Anchor/Standards:**TEXT TYPES AND PURPOSE GRADES 9-10-11-12**

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

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

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

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

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

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

RESEARCH GRADES 9-10-11-12

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

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

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

RANGE OF WRITING GRADES 9-10-11-12

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

Instructional Activities:**Knowledge:**

- Complete reading assignments
- Complete assigned worksheets
- Participate in lecture discussions and respond to questions
- Participate in group activities
- Complete individual assignments
- Maintain work area
- Complete time card
- Interpret a blueprint and sketches
- Understand drawing sequential notes
- Follow in order processing steps

Skill:

- Identify and explain the air carbon arc cutting (CAC-A) process and equipment
- Select and install CAC-A electrodes
- Prepare the work area and CAC-A equipment for safe operation
- Use CAC-A equipment for washing and gouging activities
- Perform storage and housekeeping activities for CAC-A equipment
- Make minor repairs to CAC-A equipment
- Perform air carbon arc washing
- Perform air carbon arc gouging

Remediation:

- Review with teacher assistance
- Worksheets
- Reading Comprehension packets
- Retest or alternative assessment
- Study guides
- Checklists

Enrichment:

- Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
 Graphic Organizer
 Chunking of Assignments/Material
 Directions/Comprehension Check (frequent checks for understanding)
 Study Guide
 Directions and/or Tests Read Aloud
 Adapted Tests and/or Assignments
 Use of Calculator
 Taking Tests in Alternate Setting (or if requested)
 Verbal/Gestural Redirection (prompts to remain on task)
 Drill and Practice (Repetition of Material)
 No Penalization for Spelling
 Small Group Instruction
 Provide Visual Model to Accompany Verbal Directions (Written/Oral Directions)
 Teacher Modeling
 Use of Computer (Access to)
 Positive Reinforcement
 Have Student Repeat Directions
 Access to School Counselor
 Positive Reinforcement
 Provide Frequent Feedback
 Variety of Assessment Methods
 Regular Notebook Check
 Use of Assistive Device (i.e. notepad, laptop, ect.)
 Highly Structured Classroom
 Syllabus for Major Projects
 Limited, Short Directions
 Grading Rubric
 Communication Regarding Behavior & Consequences (PBS)
 Clear Language for Directions
 Use of Multisensory Approach
 Provide Opportunities to Retest
 Frequent Review Sessions
 Use a variety of Modalities when Introducing Skills/Concepts
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 De-Escalation Opportunities
 Daily Classwork Check
 Encourage Student to Check Work Before Turning In
 Opportunities for Repeated Practice of MATH Skills
 Provide repetition During Initial Instruction
 Allow Pre-read of Questions Before Reading Written Passage
 Provide Verbal and Written Directions
 Multiplication Chart
 All Vocabulary to be Defined Before Testing
 Time out
 Monitor Speed/Accuracy in which Student Completes Assignment
 Encouragement to Participate in Positive Leadership Roles
 Student Self-Evaluation for Behavior

Safety:

Student must:
 Wear safety glasses, Fire-resistant head covering, Leather sleeves/Cape/Gauntlet gloves, Welding hood,
 Steel toed 8" all leather work boots, required shop uniform
 Handle material in a safe and work like manner
 Use protective clothing and equipment
 Use hand tools in a safe manner
 Use adequate ventilation when working in enclosed area

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

Assessment:

Tests
 Worksheets
 Quizzes
 Time cards
 Rubrics
 Checklists
 Individual projects

Resources/Equipment:

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<http://www.monroecti.org/Domain/141>

Monroe Career & Technical Institute

Course: Welding Technology

Unit Name: 1300 RESERVED

Number: 1300 Hours: 136.00

Dates: Spring 2025

Description/Objectives:

Student will demonstrate theoretical knowledge and comprehension along with practical ability in Brazing and Soldering.

Tasks:

Standards / Assessment Anchors

Focus Anchor/Standard #1:

- Pennsylvania Core Standards for Reading for Technical Subjects Standard 3.5

Supporting Anchor/Standards:

KEY IDEAS/DETAILS GRADES 9-10-11-12

Standard CC.3.5.9-10.A / Standard CC.3.5.11-12A Cite specific textual evidence, etc.

Standard CC.3.5.9-10 B / Standard CC.3.5.11-12 B Determine the central ideas or conclusions of a text; etc.

Standard CC.3.5.9-10.C / Standard CC.3.5.11-12.C Follow precisely a complex multistep procedure, etc.

CRAFT & STRUCTURE GRADES 9-10-11-12

Standard CC.3.5.9-10. D / Standard CC.3.5.11-12.D Determine the meaning of symbols, key terms, and other domain specific words.

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Standard CC.3.5.9-10.G Translate quantitative or technical information expressed in a text into visual form (e.g. a table or chart).

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

INTEGRATE KNOWLEDGE & IDEAS GRADES 11-12

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

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

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RANGE OF READING GRADES 9-10-11-12

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

Focus Anchor/Standard #2:

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Supporting Anchor/Standards:

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

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

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

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

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

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

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RANGE OF WRITING GRADES 9-10-11-12

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

Instructional Activities:

Knowledge:

- Complete reading assignments
- Complete assigned worksheets
- Participate in lecture discussions and respond to questions
- Participate in group activities
- Complete individual assignments
- Maintain work area
- Complete time card
- Define brazing
- Define soldering
- Define capillary action with regards to brazing

Skill:

- Demonstrate ability to maintain a clearance between the base metals to allow capillary action to work most effectively
- Demonstrate proper allowance for expansion and contraction
- Demonstrate understanding of the nature and sizes of the metals being joined and the configuration of the joint
- Demonstrate proper cleaning of metals
- Demonstrate proper handling of metals to prevent contamination
- Demonstrate proper use of flux
- Demonstrate use of a variety of holding devices and methods
- Demonstrate brazing joint by heating the assembly to brazing temperature, and flowing the filler metal through the joint
- Demonstrate cleaning of the joint
- Demonstrate the two-step operation of cleaning:
 - Removal of the flux residues
 - Pickling to remove any oxide scale formed during the brazing process
- Identify soldering irons and solder
- Make certain that all parts to be soldered are free from grease, oxidation and other contamination
- Thin soldering contacts
- Heat the components to be soldered and understand the process of soldering
- Clean the soldering iron tip
- Use the appropriate safety equipment

Remediation:

- Review with teacher assistance
- Worksheets
- Reading Comprehension packets

Retest or alternative assessment
 Study guides
 Checklists

Enrichment:

Provide real world practical assignments for extra credit and assessments

Special Adaptations:

Extended Time (assignments and/or testing)
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Student must:

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