

Implementation date

Fall 2010

PROGRAM CONCENTRATION:

**Architecture, Construction,
Communications & Transportation**

CAREER PATHWAY:

METALS TECHNOLOGY

COURSE TITLE:

Welding III

PREREQUISITE:

Welding II

COURSE DESCRIPTION: This course is designed to provide all students with the basic knowledge and safe operating skills required to perform more advance industry entry-level skills in the use of Gas Metal Arc Welding (GMAW), introduction to Flux Cored Arc Welding (FCAW) process, and arc cutting and gouging processes using Plasma Arc and Air Carbon Arc equipment. In GMAW processes students will create fillet welds in the flat (1F), horizontal (2F), and vertical (3F) positions. In FCAW students will learn and demonstrate equipment setup and create fillet welds in the flat (1F) position. Course will also provide the student access to other cutting processes which include Plasma Arc, Air Carbon Arc Cutting and Gouging procedures. Minimum performance requirements for this course are based on successful student completion according to the American Welding Society (AWS) and the National Center for Construction Education and Research Center (NCCER) Occupation Standards. Students who successfully complete the course in accordance with NCCER standards are eligible for registration with the NCCER National Craft Worker Registry.

CAREERS, ETHICS, AND HISTORY OF GMAW, FCAW, CARBON ARC CUTTING

Students will explore different types of careers that are available in the welding industry and list careers they judge as meaningful. Evaluate their own skill level and determine skills needed to reach career choices through research. Students will learn the importance of good work ethics in the workplace and model that behavior. Students will learn the history of GMAW, FMAW, and Carbon arc cutting, comparing techniques of the past to modern day techniques and equipment.

GMAW

ACCT-WIII-1. Students will produce fillet welds using the GMAW welding process to the instructor's discretion and satisfaction in the flat (1F) or horizontal (2F) position using any of the gases discussed in the previous course.

- a. Demonstrate a working knowledge of the GMAW equipment and safe operation skills in use of GMAW equipment.
- b. Demonstrate knowledge of the equipment by evaluating equipment setup and making judgments as to settings to create fillet welds in the flat position.
- c. Demonstrate proper weld procedures by producing single and multiple pass fillet welds in the flat and/or horizontal position on a variety of joints using the GMAW welding process.

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Academic Standards:

SCSh3. Students will identify and investigate problems scientifically.

- a. Suggest reasonable hypotheses for identified problems

SEV5. Students will recognize that human beings are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems.

- a. Explain how human activities affect global and local sustainability.
- b. Describe the effects and potential implications of pollution and resource depletion on the environment at the local and global levels (e.g. air and water pollution, solid waste disposal, depletion of the stratospheric ozone, global warming, and land uses).

GMAW

ACCT-WIII-2. Students will produce fillet welds using the GMAW welding process to the instructor's discretion and satisfaction in the Vertical (3F) position using any of the gases discussed in the previous course.

- a. Demonstrate proper weld procedures by producing single and multiple pass fillet weld in the vertical position on a Tee-joint using the GMAW welding process.
- b. Demonstrate knowledge of the equipment needed to perform this task.
- c. Demonstrate a working knowledge of the GMAW equipment and the safe operation of the GMAW equipment.

Academic Standards:

SCSh3. Students will identify and investigate problems scientifically.

- a. Suggest reasonable hypotheses for identified problems.

SEV5. Students will recognize that human beings are part of the global ecosystem and will evaluate the effects of human activities and technology on ecosystems.

- a. Explain how human activities affect global and local sustainability.
- b. Describe the effects and potential implications of pollution and resource depletion on the environment at the local and global levels (e.g. air and water pollution, solid waste disposal, depletion of the stratospheric ozone, global warming, and land uses).

PAC

ACCT-WIII-3. Students will demonstrate an understanding of the Plasma Arc Cutting process and identify the parts of the Plasma Arc Cutting Machine.

- a. Identify the different parts of the Plasma Arc Cutting Machine by taking apart the gun assembly and putting it back together again while explaining the Plasma Arc Cutting process to the instructor as this task is being done.

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- a. Demonstrate a working knowledge of the Plasma Arc Cutting machine by making different cuts with the machine according to each instructor's discretion and instruction.
- b. Demonstrate how to make different cuts with the machine according to each instructor's discretion and instruction.

Academic Standards:

SCSh3. Students will identify and investigate problems scientifically.

- a. Suggest reasonable hypotheses for identified problems.
- b. Develop procedures for solving scientific problems.
- c. Collect, organize and record appropriate data.

ACCT-WIII-4. Students will demonstrate knowledge of the Air Carbon Arc Cutting and Gouging process by identifying the parts of the Air Carbon Arc Cutter and Gouger and using the machine.

- a. Demonstrate their knowledge of the Air Carbon Arc Cutter by making straight line cuts and circle cuts on $\frac{1}{4}$ " plate.
- b. Demonstrate their knowledge of the Air Carbon Arc Gouger by gouging out welds previously made on projects in prior courses.

Academic Standards:

SCSh3. Students will identify and investigate problems scientifically.

- a. Suggest reasonable hypotheses for identified problems.
- b. Develop procedures for solving scientific problems.
- c. Collect, organize and record appropriate data.

Reading Across the Curriculum

Reading Standard Comment

After the elementary years, students engage in reading for learning. This process sweeps across all disciplinary domains, extending even to the area of personal they experience text in all genres and modes of discourse. In the study of various disciplines of learning (language arts, mathematics, science, social studies), students must learn through reading the communities of discourse of each of those disciplines. Each subject has its own specific vocabulary, and for students to excel in all subjects, they must learn the specific vocabulary of those subject areas in context.

Beginning with the middle grades years, students begin to self-select reading materials based on personal interests established through classroom learning. Students become curious about science, mathematics, history, and literature as they form contexts for those subjects related to their personal and classroom experiences. As students explore academic areas through reading, they develop favorite subjects and become confident in their verbal discourse about those subjects.

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Reading across curriculum content develops both academic and personal interests in students. As students read, they develop both content and contextual vocabulary. They also build good habits for reading, researching, and learning. The Reading Across the Curriculum standard focuses on the academic and personal skills students acquire as they read in all areas of learning.

CTAE-RC-1 Students will enhance reading in all curriculum areas by:

- a. Reading in all curriculum areas
 - Read a minimum of 25 grade-level appropriate books per year from a variety of subject disciplines and participate in discussions related to curricular learning in all areas.
 - Read both informational and fictional texts in a variety of genres and modes of discourse.
 - Read technical texts related to various subject areas.
- b. Discussing books
 - Discuss messages and themes from books in all subject areas.
 - Respond to a variety of texts in multiple modes of discourse.
 - Relate messages and themes from one subject area to messages and themes in another area.
 - Evaluate the merit of texts in every subject discipline.
 - Examine author's purpose in writing.
 - Recognize the features of disciplinary texts.
- c. Building vocabulary knowledge
 - Demonstrate an understanding of contextual vocabulary in various subjects.
 - Use content vocabulary in writing and speaking.
 - Explore understanding of new words found in subject area texts.
- d. Establishing context
 - Explore life experiences related to subject area content.
 - Discuss in both writing and speaking how certain words are subject area related.
 - Determine strategies for finding content and contextual meaning for unknown words.

CTAE Foundation Skills

The Foundation Skills for Career, Technical and Agricultural Education (CTAE) are critical competencies that students pursuing any career pathway should exhibit to be successful. As core standards for all career pathways in all program concentrations, these skills link career, technical and agricultural education to the state's academic performance standards.

The CTAE Foundation Skills are aligned to the foundation of the U. S. Department of Education's 16 Career Clusters. Endorsed by the National Career Technical Education

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Foundation (NCTEF) and the National Association of State Directors of Career Technical Education Consortium (NASDCTEc), the foundation skills were developed from an analysis of all pathways in the sixteen occupational areas. These standards were identified and validated by a national advisory group of employers, secondary and postsecondary educators, labor associations, and other stakeholders. The Knowledge and Skills provide learners a broad foundation for managing lifelong learning and career transitions in a rapidly changing economy.

CTAE-FS-1 Technical Skills: Learners achieve technical content skills necessary to pursue the full range of careers for all pathways in the program concentration.

CTAE-FS-2 Academic Foundations: Learners achieve state academic standards at or above grade level.

CTAE-FS-3 Communications: Learners use various communication skills in expressing and interpreting information.

CTAE-FS-4 Problem Solving and Critical Thinking: Learners define and solve problems, and use problem-solving and improvement methods and tools.

CTAE-FS-5 Information Technology Applications: Learners use multiple information technology devices to access, organize, process, transmit, and communicate information.

CTAE-FS-6 Systems: Learners understand a variety of organizational structures and functions.

CTAE-FS-7 Safety, Health and Environment: Learners employ safety, health and environmental management systems in corporations and comprehend their importance to organizational performance and regulatory compliance.

CTAE-FS-8 Leadership and Teamwork: Learners apply leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.

CTAE-FS-9 Ethics and Legal Responsibilities: Learners commit to work ethics, behavior, and legal responsibilities in the workplace.

CTAE-FS-10 Career Development: Learners plan and manage academic-career plans and employment relations.

CTAE-FS-11 Entrepreneurship: Learners demonstrate understanding of concepts, processes, and behaviors associated with successful entrepreneurial performance.