

Implementation date

Fall 2010

**PROGRAM CONCENTRATION:**

**Architecture, Construction,  
Communications & Transportation**

**CAREER PATHWAY:**

**METALS TECHNOLOGY**

**COURSE TITLE:**

**Welding II**

**PREREQUISITE:**

**Welding I**

**COURSE DESCRIPTION:** This course is designed to provide all students with the basic knowledge and safe operating skills required to perform industry entry-level skills in the use of shielded metal arc welding equipment (SMAW) and an introduction to gas metal arc welding (GMAW) setup and operations. In SMAW welding students will produce welds using 6010 and 7018 electrodes in the flat (1F), horizontal (2F), and vertical (3F) fillet welds using the procedure in the flat, vertical, and horizontal positions using E-6010 and E-7018 electrodes. In GMAW welding students will produce fillet welds in the flat (1F) position. 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, WORK ETHICS AND HISTORY OF SMAW AND GMAW WELDING PROCEDURES.**

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 SMAW and GMAW welding, comparing techniques of the past to modern day techniques and equipment.

### **SMAW**

**ACCT-WII-1. Students will make fillet welds using the Shielded Metal Arc Welding (SMAW) process to the instructor's discretion and satisfaction in the horizontal (2F) positions using E-6010 and/or E-7018 electrodes.**

- a. Demonstrate a working knowledge of the equipment and the safe operation of the equipment.
- b. Demonstrate knowledge of the equipment needed to perform this task.
- c. Demonstrate knowledge of the equipment by evaluating equipment setup and making judgments as to settings to create fillet welds in the horizontal (2F) position on a variety of joints using E-6010 and/or E-7018 electrodes.

Implementation date  
Fall 2010

***Academic Standards:***

**MM4P1. Students will solve problems (using appropriate technology)**

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

**SCSh3. Students will identify and investigate problems scientifically.**

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

**SMAW**

**ACCT-WII-2. Students will make fillet welds using the Shielded Metal Arc Welding (SMAW) process to the instructor's discretion and satisfaction in the Vertical (3F) positions using E-6010 and/or E-7018 electrodes.**

- a. Demonstrate a working knowledge of the equipment and the safe operation of the equipment.
- b. Demonstrate knowledge of the equipment needed to perform this task.
- c. Demonstrate knowledge of the equipment by evaluating equipment setup and making judgments as to settings to create single and multiple pass fillet welds in the vertical position on a variety of joints using E-6010 and/or E-7018 electrodes.

***Academic Standards:***

**MM4P1. Students will solve problems (using appropriate technology)**

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

**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.

**GMAW**

**ACCT-WII-3. Students will demonstrate understanding of the Gas Metal Arc Welding (GMAW) process.**

- a. Identify the parts of a GMAW welding machine.

Implementation date

Fall 2010

- b. Demonstrate knowledge of the equipment and its safe operation.
- c. Demonstrate a knowledge of the different types of gases to be used in the GMAW welding process including 75/25, CO<sub>2</sub>, 95/5 and Tri-Mix and make judgments as to what gas is used in different applications.
- d. Run beads and create fillet welds using the GMAW process in the flat position.

**Academic Standards:**

**MM4P1. Students will solve problems (using appropriate technology)**

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

**SCSh2. Students will use standard safety practices for all classroom laboratory and field investigations.**

- a. Follow correct procedures for use of scientific apparatus.
- b. Demonstrate appropriate techniques in all laboratory situations.
- c. Follow correct protocol for identifying and reporting safety problems and violations.

## 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.

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

Implementation date  
Fall 2010

- 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 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.

Implementation date  
Fall 2010

**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.