Faculty is required to have the outline submitted to the Academic Affairs Office. The course outline is the form used for approval of new courses by the Academic Affairs and Standards Council.

DEPT. WELD                          COURSE NUMBER:  WELD 1310
NUMBER OF CREDITS:  4 Credits   (0/4)
COURSE TITLE:  Advanced Gas Metal Arc Welding

CATALOG DESCRIPTION: Evaluate advanced procedures, techniques, and skills necessary for proficiency in Gas Metal Arc Welding (GMAW) and Flux Cored Welding (FCAW) in the horizontal, vertical, and overhead positions on various thicknesses of metal to AWS and ASME standards.

AUDIENCE: All secondary and post-secondary students interested in welding.

FULFILLS MN TRANSFER CURRICULUM AREA(S) *(Leave blank if not applicable)*
Area:  N/A by meeting the following competencies:
Area:  N/A by meeting the following competencies:
Area:  N/A by meeting the following competencies:

PREREQUISITES OR NECESSARY ENTRY SKILLS/KNOWLEDGE:

LENGTH OF COURSE: 1 Semester

THIS COURSE IS USUALLY OFFERED:
Every other year ☐  fall ☒  spring ☒  summer ☐  undetermined ☐

Four goals are emphasized in course at Minnesota West Community & Technical College:

1) ACADEMIC CONTENT: The academic objectives of this course are:
   a. Reading for understanding, standards and codes for welding
   b. Evaluating welds for compliance with standards and codes

2) THINKING SKILLS: This course will help students improve the effectiveness of their thinking skills through:
   a. Completing Homework
   b. Participating in Classroom discussions
   c. Taking open and closed book tests and quizzes
   d. Critical thinking

3) COMMUNICATIONS SKILLS: This course will help students improve their oral and written communication skills through:
a. Participating in class discussions and reports
b. Participating in assignments. Worksheets, and reports

4) HUMAN DIVERSITY: This course will help students recognize, understand, and appreciate human diversity through:
   a. Working with students of other cultures
   b. Working with students of another gender

TOPICS TO BE COVERED:
Gas Metal Arc Welding Equipment, setup and operation
Metal transfer, Filler metal specifications, wire melting and deposition rates
Welding power supplies
Molten metal pool control
GMAW Equipment (power source, electrode feed unit, push type system, pull type system, push-pull system, spool gun, welding gun)
GMAW setup, gas density and flow rates, Arc voltage and amperage characteristics, gun angle, effect of the shielding gas
Metal preparation
Flat position, 1G and 1F positions
Vertical up 3G and 3F positions
Vertical down 3G and 3F positions
Horizontal 2G and 2F positions
Overhead 4G and 4F positions
Axial spray transfer
Flux cored welding equipment, advantages and limitations
FCAW electrodes and flux
Flux cored welding in all positions

LIST OF EXPECTED COURSE OUTCOMES:
The students will:
  Prepare time or job cards, reports or records
  Perform housekeeping duties
  Follow verbal instructions to complete work assignments
  Follow written instructions to complete work assignments
  Perform safety inspections of FCAW equipment and accessories
  Make minor external repairs to FCAW equipment and accessories
  Set up and operate FCAW-G/GM operations on carbon steel
  Make FCAW-G/GM fillet welds, in all positions, on carbon steel
  Make FCAW-G/GM groove welds, in all positions on carbon steel
  Pass the FCAW G/GM performance testing (workmanship sample) on carbon steel
  Set up FCAW-S operations on carbon steel
  Make FCAW-S fillet welds, in all positions, on carbon steel
  Make FCAW-S groove welds, in all positions, on carbon steel
  Pass FCAW-S welder performance qualification test (workmanship sample) on carbon steel
  Examine cut surfaces and edges of prepared base metal parts
  Examine tacks, root passes, intermediate layers, and completed welds

LEARNING/TEACHING TECHNIQUES used in the course are:
ASSIGNMENTS AND ASSESSMENTS FOR THIS CLASS INCLUDE:

- Reading
- Oral Presentations
- Textbook Problems
- Group Problems
- Other (describe below)

- Tests
- Worksheets
- Papers
- Term Paper
- Individual Projects
- Collaborative Projects
- Portfolio
- Other (describe below)

EXPECTED STUDENT LEARNING OUTCOMES:
Students will have a technical understanding of the FCAW process. Students will be able to demonstrate safe and proper use of FCAW equipment and components. Students will perform quality welds in all positions.

Veteran Services: Minnesota West is dedicated to assisting veterans and eligible family members in achieving their educational goals efficiently. Active duty and reserve/guard military members should advise their instructor of all regularly scheduled military appointments and duties that conflict with scheduled course requirements. Instructors will make every effort to work with the student to identify adjusted timelines. If you are a veteran, please contact the Minnesota West Veterans Service Office.

The information in this course outline is subject to revision.

To receive reasonable accommodations for a documented disability, please contact the campus Student Services Advisor or campus Disability Coordinator as arrangements must be made in advance. In addition, students are encouraged to notify their instructor.

This document is available in alternative formats to individuals with disabilities by contacting the Student Services Advisor or by calling 800-658-2330 or via your preferred Telecommunications Relay Service.

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