WELD-703: WELDING LEVEL II

Effective Term
Fall 2025

BOT Approval Date
01/16/2025

Discipline
WELD - Welding Technology
Course Number
703

Course Title
Welding Level II

Short Title
Welding Level II

Credit Status (CB 04)
D - Credit - Degree applicable

Units

Lecture Units
2.00

Lab Units
2.00

Total Units
4.00

Hours

Lecture Contact Hours
32-36
Out of Class Hours Lecture
64-72

Lab Contact Hours
96-108
Out of Class Hours Lab
0.00

Total Contact Hours
128 - 144

Total Out of Class Hours
64 - 72

Total Student Learning Hours
192 - 216

Is this an existing Extensive Lab?
No

Do you want to propose this for Extensive Lab?
Yes

Distance Education
Yes

Distance Education

Distance Education Type
Hybrid Only

What will be done in face-to-face meetings
Students will perform welding/ cutting/ fabricating operations during lab time. Contact in the lab will be twice weekly. The lab will consist of a 15-minute safety briefing, 2 hours and 30 minutes of welding, and 15 minutes to clean their work area and shut down equipment.

Are you using publisher content?
No

Regular Substantive Interaction
Instructor-to-student, student-to-student, and student-to-content contact shall be distributed in a manner that will ensure regular substantive interaction (RSI) is maintained not only weekly but also for the duration of the course. Instructor interactions should be equivalent in time, quality and consistency to the engagement students would receive in a face-to-face course—for example, through announcements, discussion participation, personalized feedback, video messages, or other instructional communications. Instructors are expected to be responsive to student inquiries within a 24-72 hour time frame excluding holidays. RSI will be maintained through a variety of methods: • Orientation - Students must be oriented to the online and face-to-face portions at the start of the course. • Announcements - Announcements using the course management system must be posted at least weekly to keep students current on course events, due dates, materials, etc. • Discussion Forums - Content-related discussion forums within the designated CMS will include appropriate instructor participation and will be initiated and maintained, with timely feedback provided. Instructors are required to monitor the discussions and related activities to provide guidance and direction. Open-ended discussion boards may be used to further learning and interaction. • MSJC Communication – Instructor will use MSJC-administered communication tools (such as email or the designated CMS communication tools) to regularly communicate with and provide ease of access to students. • Timely Feedback - Timely feedback on student work will be provided by the instructor, which may include comments and/or rubrics, within the Grades area of the designated CMS. • Scheduled Meetings – Hybrid and synchronous courses will meet at regularly scheduled times. ADA Compliance - All course interactions and content must be designed with accessibility in mind and meet ADA requirements.

Catalog Description
This course equips students with a comprehensive understanding of welding, focusing on welding metallurgy and the properties of various metals and alloys. Through hands-on training, students develop advanced proficiency in welding techniques, mastering complex welds and joint configurations. The curriculum covers a range of welding processes, including Gas Tungsten Arc Welding (GTAW), Flux-Cored Arc Welding (FCAW), and oxyfuel cutting. With an emphasis on practical skills and theoretical knowledge, students gain industry-relevant expertise to excel as welding professionals.

Attach Supporting Documents
Welding Technology_095650_2307.pdf

Requisites

Prerequisite(s)

Prerequisite(s) (must be taken before)
WELD-702 (with a grade of C or better).

Codes

TOP Code (CB 03)
0956.50* - *Welding Technology

CIP Code
48.0511 - Metal Fabricator.

Repeatability Code

No

Grading Option

Letter grade OR P/NP

Learning Objectives

Learning Objectives

Learning Objective
1. Demonstrate advanced proficiency in welding techniques, including Gas Tungsten Arc Welding (GTAW), Flux-Cored Arc Welding (FCAW), and oxyfuel cutting.
2. Apply a comprehensive understanding of welding metallurgy, including physical and chemical properties of different metals and alloys.
3. Analyze the impact of socioeconomic barriers on access to welding education and propose strategies to create equitable opportunities for students from underserved communities.
4. Inspect welds to ensure they meet industry standards and project specifications, using advanced non-destructive testing (NDT) methods and equipment.
5. Assess and qualify welding procedures per industry codes and standards.
6. Develop the critical importance of proper procedure documentation and being capable of developing welding processes that consistently deliver reliable results.
7.Create a comprehensive framework that leverages cultural diversity to enhance teamwork, communication, and problem-solving in welding projects while evaluating its effectiveness in fostering inclusive collaboration.

Learning Outcome Information

Course Learning Outcomes

Learning Outcome
1. Students will demonstrate the advanced application of welding techniques, including Gas Tungsten Arc Welding (GTAW), Flux-Cored Arc Welding (FCAW), and oxyfuel cutting, ensuring precision and proficiency in their execution.
2. Students will analyze systemic factors and biases contributing to the underrepresentation of diversity and the existence of discrimination, particularly against women and people of color in the welding industry, fostering a deeper understanding of these challenges.
3. Students will evaluate proper procedure documentation and demonstrate competence in executing welding processes that consistently yield dependable results, emphasizing procedural compliance.
4. Students will formulate material selection, considering the environmental and ethical aspects of welding materials, emphasizing their commitment to responsible and inclusive material choices.

Program Learning Outcomes

Learning Outcome
Demonstrate an understanding of welding safety practices and procedures as per AWS and NCCER standards.
Interpret welding symbols and technical drawings for welding requirements.
Apply proper welding techniques to join different metal types using specified processes.
Analyze welding defects, determine causes, and inspect welds for compliance with AWS and NCCER standards.

Institutional Learning Outcomes

Communication: The student will effectively express and exchange ideas through listening, speaking, reading, writing, visual works, and other modes of interpersonal expression.
Critical Thinking: The student will analyze problems, gather and synthesize relevant information, evaluate ideas, information, and evaluate alternative points of view to create, innovate and implement effective solutions.
Civic
Personal
and Professional Responsibility

Content

Course Lecture Content

I. Welding Symbols
- a. Introduction to Welding Symbols
- b. Introduction to Diverse Welding Innovators
- c. Identifying Systemic Factors Limiting Diversity in Welding
- d. Welding symbol structure
- e. Female Welding Innovators and Their Contributions

II. Reading Welding Detail Drawings
- a. Basic Welding Detail Drawings Overview
- b. Object Views (Isometric, Multiview, Sections)
- c. Essential Drawing Components
- d. Lines, Material Fill Symbols, Bar Stock, Pipe Breaks, and Revolved Sections
- e. Scale, Dimensions, and Tolerance Data
- f. Importance of Notes and Bills of Material

III. Physical Characteristics and Mechanical Properties of Metals
- a. Ferrous Metals and Low Alloy Steel Classification
- b. Common-Grade and Specialty-Grade Stainless Steel Classification
- c. Nonferrous Metals Classification
- d. Physical and Mechanical Characteristics of Metals
- e. Identifying Base Metals in Field Conditions
- f. Metallurgy-Related Considerations for Welding
- g. Explain Alloy Content in Welding Materials Selection
- h. Common Structural Steel Shapes and Metal Forms

IV. Preheating and Postheating of Metals
- a. Temperature and Metal Relationship
- b. Preheating Methods and Temperature Measuring Devices
- c. Inter-Pass Temperature Control
- d. Heat Treatment Processes (Stress Relieving, Annealing, Tempering, Hardening)
- e. Heat Treatment Devices and Time-at-Temperature Considerations

V. GMAW and FCAW - Equipment and Filler Metals
- a. GMAW/FCAW Safety Practices
- b. GMAW/FCAW Process Overview
- c. Metal Transfer Modes for GMAW/FCAW
- d. GMAW/FCAW Equipment Overview
- e. Power Source Control, Welding Cables, and Termination Considerations
- f. Shielding Gases and Related Equipment
- g. Setup and Operation of GMAW/FCAW Welding Equipment

VI. GMAW - Plate
- a. GMAW Processes Overview
- b. Safety Procedures for GMAW Welding
- c. Preparing the Welding Area and Equipment
- d. Welding Procedures and Basic Beads
- e. Voltage, Amperage, and Travel Speeds Impact on Penetration and Bead Size
- f. Gun Position, Electrode Extension, Stick-Out, and Standoff Distances
- g. Gas Nozzle Cleaning
- h. Acceptable and Unacceptable Groove Weld Profiles
- i. Making Multiple-Pass GMAW Fillet and V-Groove Welds on Carbon Steel Coupons

VII. FCAW - Plate

a. FCAW Processes Overview
b. Safety Procedures for FCAW Welding
c. Preparing the Welding Area and Practice Coupons
d. Welding Procedures and Basic Beads
e. Voltage, Amperage, and Travel Speeds Impact on FCAW Welds
f. Gun Position, Electrode Extension, Stick-Out, and Standoff Distances
g. Nozzle Cleaning
h. Acceptable and Unacceptable Groove Weld Profiles
i. Making Multiple-Pass FCAW Fillet and V-Groove Welds on Carbon Steel Coupons

VIII. GTAW - Equipment and Filler Metals
a. GTAW Safety Information
b. Equipment Requirements for GTAW
c. Torch Assemblies and Proper Disassembly/Reassembly
d. Shielding Gas and Filler Metal Selection
e. Practicing GTAW Process Until Competent

IX. GTAW - Plate
a. GTAW Safety Information
b. Work Area Setup for GTAW

Course Lab Content

I. Introduction to Welding Symbols and Blueprint Interpretation
a. Understanding Welding Symbols
b. Basic Symbol Structure
c. Dimensional Markings
d. Supplemental Symbols
e. Uncommon Symbols

II. Reading Welding Detail Drawings
a. Basic Detail Drawings
b. Object Views
c. Drawing Components
d. Precise Dimensional Information
e. Scale, Dimensions, and Tolerance Data
f. Notes and Bills of Material

III. Physical Characteristics and Mechanical Properties of Metals
a. Ferrous Metals and Low Alloy Steel
b. Stainless Steel
c. Nonferrous Metals
d. Physical and Mechanical Characteristics
e. Base Metal Identification
f. Metallurgy-Related Considerations
g. Common Structural Shapes
h. Other Common Metal Forms

IV. Preheating and Post-heating of Metals
a. Temperature and Metal Relationship
b. Preheating Methods
c. Interpass Temperature Control
d. Heat Treatment Processes
e. Heat Treatment Devices

V. GMAW and FCAW - Equipment and Filler Metals
a. Safety Practices

b. Basic GMAW/FCAW Processes
c. Metal Transfer Modes
d. Standard Equipment
e. Equipment Setup
f. External Wire Feeders
g. Shielding Gases
h. Filler Metals
i. Equipment Setup Demonstration

VI. GMAW - Plate
a. Safety Procedures
b. Welding Area Preparation
c. Welding Procedures
d. Welding Parameters
e. Welding Techniques
f. Gas Nozzle Cleaning
g. Bead Types
h. Fillet Welds
i. Groove Weld Profiles
j. Open V-Groove Welding
k. Welding Demonstration

VII. FCAW - Plate
a. Safety Procedures
b. Welding Area Preparation
c. Welding Procedures
d. Welding Parameters
e. Welding Techniques
f. Gas Nozzle Cleaning
g. Bead Types
h. Fillet Welds
i. Groove Weld Profiles
j. Open V-Groove Welding
k. Welding Demonstration

VIII. GTAW - Equipment and Filler Metals
a. Safety Practices
b. Basic GTAW Processes
c. Metal Transfer Modes
d. Standard Equipment
e. Equipment Setup
f. Shielding Gases
g. Equipment Setup Demonstration

IX. GTAW – Plate
a. Safety Procedures
b. Welding Area Preparation
c. Welding Procedures
d. Welding Parameters
e. Welding Techniques
f. Gas Lens Cleaning
g. Bead Types
h. Fillet Welds

i. Groove Weld Profiles
j. Open V-Groove Welding
k. Welding Demonstration

Methods of Instruction

Method

Lecture

Integration

Lectures will cover key topics related to cultural diversity in welding, including its impact on teamwork, communication, and problem-solving within projects. Students will explore diversity, equity, and inclusion (DEI) in the context of collaborative welding environments. The course will guide students in developing frameworks to enhance inclusivity, providing methods for evaluating the effectiveness of these strategies. Instruction will include virtual lectures, group discussions, and reflective activities to help students create and refine diversity-driven approaches for welding projects.

DE Adaptations for MOI

To promote accessibility and include closed captions for videos, course lectures will be delivered electronically through the CMS platform, with a focus on meeting all accessibility requirements. Each video will be captioned to allow all students to engage with the material. Instructors will utilize different accessibility tools within the CMS platform, such as adjustable text sizes and screen reader compatibility, to support the diverse needs of students.

Method

Lab Activities

Integration

Students will participate in laboratory activities that cover a range of welding concepts, including interpreting welding symbols and blueprints, as well as hands-on practice with various materials. Through virtual simulations and interactive exercises, they will develop skills in equipment setup, welding techniques, and safety for processes like GMAW, FCAW, and GTAW. The course will incorporate diversity, equity, and inclusion (DEI) topics, such as inclusive welding materials selection, into lectures and discussions to enhance understanding of industry practices and support an inclusive learning environment.

DE Adaptations for MOI

Instructors will ensure accessibility and include closed captions for videos, the Welding Symbol & Blueprint Applications course will transform hands-on labs and practical exercises for distance learning through a virtual lab format. Students will engage with simulation software to complete interactive, realistic exercises that closely mirror the course's welding symbol and blueprint applications. These virtual labs allow students to use digital tools, practice welding techniques, and analyze results in a controlled online setting. All labs will be delivered via the CMS platform, fully complying with accessibility standards to guarantee inclusivity for all students.

Method

Observation and Demonstration

Integration

Accessible video demonstrations highlight the correct setup and execution of welding processes such as Gas Metal Arc Welding (GMAW) and Flux-Cored Arc Welding (FCAW), emphasizing safety protocols and equipment management. Virtual labs replicate scenarios where students can practice interpreting welding detail drawings, identifying drawing components, and understanding dimensional details in a virtual setting. Live streaming sessions will offer real-time demonstrations of preheating and post-heating techniques, focusing on temperature regulation and heat treatment methods. Peer-to-peer observation allows students to share videos of their welding work, enabling classmates to offer constructive feedback and recommendations for improvement.

DE Adaptations for MOI

Welding demonstrations will be presented via video with closed captions to ensure accessibility, allowing students to follow step-by-step instructions and grasp key concepts remotely. Students will be encouraged to conduct small-scale experiments at home using provided welding kits or materials, allowing them to practice welding techniques in a safe, controlled environment. Virtual group sessions, facilitated through accessible, closed-captioned video conferencing tools, will support collaborative learning, troubleshooting, and feedback sharing. This approach ensures that students continue to actively apply and reinforce welding skills while adhering to accessibility standards and enhancing the learning experience in a remote setting.

Method

Discussion

Integration

Discussions will be used to enhance instruction on topics like diversity, equity, and inclusion (DEI) within welding education. Video demonstrations will prompt discussions on interpreting welding symbols, blueprint details, and the importance of inclusivity in material selection. Virtual labs will facilitate conversations on the diversity of metal compositions and classifications, while live-streaming sessions will demonstrate preheating and post-heating techniques, linking them to equitable access to heat treatment processes. Peer-to-peer observation discussions will encourage sharing welding procedure videos and embracing diverse techniques. Interactive quizzes with video clips will stimulate conversations on welding processes, safety protocols, and DEI in the welding industry. These discussions will promote critical thinking, deepen welding knowledge, and foster an inclusive learning environment.

DE Adaptations for MOI

To ensure accessibility and closed captioning for videos, course discussions will be conducted through the CMS using accessible tools like discussion boards or closed-captioned video conferencing software. Feedback will be provided promptly, typically within a week of students' initial posts, especially in synchronous online settings. All discussions held within the CMS will comply with accessibility standards, ensuring that closed captioning is available for video content and that all participants can fully engage with the material.

Method

Film/video Viewing and Discussion

Integration

Students watch accessible documentary clips highlighting the history and advancements in welding technology, followed by discussions on how welding processes have evolved, including the transition from traditional methods to modern techniques like GMAW and FCAW. These discussions will also focus on the improvements in efficiency and safety brought about by technological innovations. Additionally, films showcasing diverse welding environments and applications will prompt conversations on inclusivity and equity in the welding profession, emphasizing contributions from individuals of various backgrounds. Instructional videos demonstrating welding procedures and safety protocols will be followed by discussions to reinforce key concepts and address any questions.

DE Adaptations for MOI

Online courses will feature accessible video clips and films related to course content. These videos can be shared synchronously via closed-captioned video conferencing tools or the CMS. To supplement lectures, additional accessible materials such as digital slide presentations, closed-captioned videos, or links to external articles will be provided within the CMS. All materials will adhere to accessibility guidelines to ensure inclusivity for all students.

Method

Group Projects

Integration

Group projects facilitate collaborative learning and practical application of welding concepts. Students participate in virtual group discussions and use online tools to research and evaluate new welding materials and techniques. Each group conducts literature reviews, analyzes properties, and discusses potential applications through virtual meetings and shared documents. Accessible presentations are delivered via video conferencing, enabling groups to present their findings and engage in interactive discussions. Students also collaborate remotely to explore sustainable welding practices, using online resources to investigate eco-friendly processes and develop implementation action plans.

DE Adaptations for MOI

To ensure accessibility and include closed captions, group projects will be supported through accessible CMS tools, assignment boards, or video conferencing platforms. Feedback will be given within a week of students' initial posts, especially in synchronous online sessions. Students will collaborate on group projects using tools like Google Workspace, Microsoft Teams, or other CMS-integrated platforms. Video conferencing will enable group meetings and discussions, ensuring effective communication and participation for all students.

Methods of Evaluation

Method

Quizzes

Integration

Quizzes are designed to assess students' understanding of key concepts such as metal composition and classification, the physical and mechanical properties of metals, preheating and post-heating processes, and safety practices. They test knowledge of equipment, filler metals, and welding procedures for GMAW, FCAW, and GTAW, ensuring students grasp essential concepts like temperature control, material properties, and welding techniques. By using quizzes, instructors can evaluate students' theoretical understanding and their ability to apply this knowledge in practical welding scenarios, helping to ensure they are well-prepared for real-world applications.

DE Adaptations for MOE

In ensuring accessibility and the provision of closed captions for videos, exams and tests conducted entirely online will be facilitated, graded, and evaluated within the CMS platform. Assessments will be designed to assess students' identification, understanding, and application of major topics aligned with the course content and learning objectives. To ensure fairness, exams will consist of a variety of question formats, including true or false, multiple choice, fill-in-the-blanks, and short answer questions, providing an equitable opportunity for all students to demonstrate their knowledge. Upon completion, exams will be submitted to the online grading system within the CMS, where they will be assessed for accuracy and completeness. Students will receive feedback within two weeks via the grade book, chat, or other accessible conferencing tools, with additional time allocated if necessary, depending on the exam's type and complexity.

Method

Homework

Integration

Homework allows students to demonstrate their understanding of key topics such as metal composition, physical and mechanical properties, preheating and post-heating processes, and welding safety. Assignments can focus on applying theoretical knowledge to real-world scenarios, such as identifying metal types, understanding welding procedures, and selecting appropriate equipment and filler metals. Homework also encourages students to research welding techniques for GMAW, FCAW, and GTAW, reinforcing their comprehension of safety protocols, welding parameters, and material properties. This method provides instructors with insights into students' ability to independently apply learned concepts and problem-solve outside of the classroom environment.

DE Adaptations for MOE

In ensuring accessibility and the provision of closed captions for videos, homework conducted entirely online will be facilitated, graded, and evaluated within the CMS platform. Assessments will be designed to assess students' identification, understanding, and application of major topics aligned with the course content and learning objectives. To ensure fairness, homework will consist of a variety of question formats, including true or false, multiple choice, fill-in-the-blanks, and short answer questions, providing an equitable opportunity for all students to demonstrate their knowledge. Upon completion, homework will be submitted to the online grading system within the CMS, where it will be assessed for accuracy and completeness. Students will receive feedback within two weeks via the grade book, chat, or other accessible conferencing tools, with additional time allocated if necessary, depending on the homework's type and complexity.

Method

Class Performance

Integration

The class performance will allow instructors to assess students' practical skills in real-time, focusing on their ability to apply welding techniques, safety protocols, and equipment usage during hands-on activities. This includes evaluating students' proficiency in identifying metal compositions, demonstrating GMAW, FCAW, and GTAW welding processes, and effectively using preheating and post-heating methods. Performance assessments can involve observing students as they prepare welding areas, set up equipment, and execute welds in various positions, ensuring they meet industry standards for safety, technique, and quality. By observing class performance, instructors can gauge students' overall mastery of welding concepts, as well as their ability to troubleshoot and adapt to different welding scenarios.

DE Adaptations for MOE

In ensuring accessibility and incorporating closed captions for videos, online evaluation and interpretation of research will be facilitated collaboratively and/or individually through the CMS platform. These assessments may take various forms, such as discussion forums, blogs, essays, audio/video presentations, live streams, or other digital presentation methods. Access to instructional materials will be available through online resources via the MSJC Library and presented using various features within the CMS. Assessments will be evaluated based on criteria including organization, clarity, critical thinking, and the demonstration of identification, understanding, and application of welding concepts and their applications. Instructor feedback will be promptly provided through multiple components of the CMS, including gradebook comments, discussion forums, video conferencing software, or inbox messaging, ensuring accessibility for all students. Additionally, all materials and delivery methods will adhere to accessibility guidelines, and instructor-student communication will comply with accessibility and confidentiality standards. Instructors will offer feedback to individual students based on assignment results within one week of completion to support timely progress and learning.

Method

Final Performance

Integration

The final performance evaluation will assess students' mastery of key welding skills through a hands-on demonstration, culminating in an American Welding Society (AWS) D1.1 plate test in the 3G and 4G positions. Students will be required to perform welds that meet industry standards for safety, technique, and procedural accuracy. This will include correctly identifying metal compositions, preparing and setting up equipment, and applying GMAW, FCAW, and GTAW techniques. Students will also demonstrate proficiency in preheating and post-heating methods, filler metal selection, and adhering to safety protocols. By completing the AWS D1.1 test in both the 3G and 4G positions, students will showcase their ability to meet industry standards for welding proficiency, ensuring they are capable of executing complex welding tasks independently.

DE Adaptations for MOE

In ensuring accessibility and integrating closed captions for videos, exams and/or tests conducted entirely online will be administered and assessed within the CMS platform. The exam format may encompass multiple choice, short answer, essay, or other appropriate formats. Assessments will be evaluated based on the demonstration of identification, understanding, and application of major topics aligned with the course content and learning objectives. All exams/tests will adhere strictly to accessibility guidelines to accommodate diverse student needs. Instructors will offer feedback to individual students based on their performance in final exams/tests within one week of completion, promoting timely support and learning enhancement.

Assignments

Assignment Type

Other

In-class and/or outside of class

In-class

Formative or Summative

Formative

Assignment

Metallurgical Test Exercise
Title: Microstructure Examination Exercise

Objective:
To apply your understanding of metallurgical concepts by conducting a microstructure examination of a given metal sample and analyzing the results.

Instructions:

Receive the metal sample: Each student will be provided with a metal sample for analysis.

Conduct a Microstructure Examination:

Prepare the sample using metallographic techniques.
Use optical microscopy to examine the microstructure.
Document Your Observations:

Record key features observed in the microstructure (e.g., grain size, phase distribution).
Analyze the Microstructure:

Discuss what the observed microstructure indicates about the metal's properties and potential welding applications.
Prepare a Brief Report:

Introduction: Purpose of the microstructure examination.
Results: Key observations, including any sketches or micrographs.
Discussion: Analysis of the metal's microstructure in relation to its mechanical properties.
Submit Your Report by the end of the class session.

Evaluation Criteria:

Completeness: All required observations and analysis are documented.
Accuracy: Precise identification of microstructural features.
Clarity: Clear and concise presentation of findings.
Engagement: Active participation in the lab activity.

How assignment will be adapted in online format

Instructors will ensure accessibility and utilize closed captions for videos incorporating welding demonstrations, offering step-by-step guidance and emphasizing essential concepts. To enrich remote learning, students may be prompted to conduct safe, small-scale experiments at home using welding kits or provided materials. Virtual collaborative sessions via accessible video conferencing tools will support group discussions, troubleshooting, and feedback sharing, enabling active application and reinforcement of welding topics despite the distance. Feedback from instructors will be provided within a week through one of the CMS tools and individual personal feedback, ensuring accessibility requirements are met to support all students.

Assignment Type

Reading

In-class and/or outside of class

Outside of class

Formative or Summative

Formative

Assignment

Overview:
For this assignment, you must read the article "Why Women Are the Blueprint for the Future of Construction" by Suzanne McCoy. The article highlights women's significant role in the construction industry, addressing labor shortages, fostering innovation, and promoting a more inclusive and dynamic work environment. Additionally, it discusses the impact of initiatives like women-focused employee resource groups (ERGs) in driving positive change within companies.
Task:
Summarize the key points of the article. Focus on:
The contributions of women to the construction industry.
The importance of diversity in construction teams and how women are helping to foster innovation and better project outcomes.
Initiatives like the Women at Work ERG and their role in supporting women in construction.
Reflection: In 200–300 words, reflect on how the presence of women in the construction industry is reshaping its future. Consider:
What challenges do women face in the construction industry, and how do they overcome them?
How are initiatives like the Women at Work ERG helping to support women's growth in the field?
The broader implications of women's contributions to the construction industry for future generations.
Discussion Questions: Answer the following in 100–150 words each:
What stood out to you the most about the role of women in the construction industry, as described in the article? Why?
How do you think promoting women's participation in construction can address the industry's challenges, like the labor shortage?
What additional steps can companies take to further support women in construction and ensure long-term success?
Format:
Your summary should be 150–200 words.

The reflection should be 200–300 words.
Each discussion question response should be 100–150 words.
Use clear headings for each section (Summary, Reflection, and Discussion Questions).
Submission:
Submit your responses as a typed document or PDF, ensuring your work is well-organized and free from grammatical errors.
Grading and Feedback:
The instructor will review your report to ensure it is well-organized, plagiarism-free, and properly cited. Utilize a consistent citation style, such as APA or MLA, for your sources. Your evaluation in this assignment will be based on the quality of your research, the clarity of your report, and your ability to convey the individual's significance in the welding industry. Remember to submit your completed report by the specified deadline.

How assignment will be adapted in online format

Incorporating closed captions for videos, papers and reports will be assigned within the CMS platform using tools such as pages or assignments. Students will submit their papers via assignment submission links within the CMS or discussion boards to have students make comments on needed changes. The instructor will provide feedback within a week through one of the CMS tools and individual personal feedback within a week; it will also meet accessibility requirements.

Assignment Type

Writing

In-class and/or outside of class

Outside of class

Formative or Summative

Summative

Assignment

Title: "Addressing Socioeconomic Barriers in Welding Education: Strategies for Equity and Access"

Objective:
The objective of this writing assignment is to analyze the impact of socioeconomic barriers on access to welding education and propose strategies to create equitable opportunities for students from underserved communities.

Instructions:
I. Research the Socioeconomic Barriers:
Investigate the key socioeconomic factors that limit access to welding education, particularly for students from underserved communities. Focus on aspects such as financial constraints, lack of resources, transportation challenges, and limited access to mentorship or support networks.
II. Explore the Impact of These Barriers:
Analyze how these socioeconomic barriers affect students' ability to enter and succeed in welding programs. Discuss the broader implications for career opportunities, economic mobility, and workforce diversity in the welding industry.
III. Propose Equitable Strategies:
Develop and propose strategies to overcome these barriers and promote equitable access to welding education. Consider approaches such as scholarship programs, mentorship opportunities, partnerships with local industries, and community outreach initiatives.
IV. Write a Comprehensive Essay that Addresses the Following Key Points:
a. Introduction: Provide an overview of the current landscape of welding education, highlighting the role of socioeconomic factors in shaping access to training programs.
b. Socioeconomic Barriers: Discuss the specific socioeconomic challenges faced by students in underserved communities and how these barriers impact access to welding education.
c. Impact on Career Opportunities: Analyze how limited access to welding education affects students' career prospects and the welding industry's workforce diversity.
d. Proposed Strategies for Equity: Present actionable strategies to reduce socioeconomic barriers and create more equitable opportunities for students. Discuss the potential impact of these strategies on enrollment, retention, and success rates in welding programs.
e. Conclusion: Summarize the importance of addressing socioeconomic barriers in welding education and the role of these strategies in fostering a more inclusive and diverse workforce.
V. Ensure your essay is well-organized, logically structured, and supported by evidence from credible sources (e.g., academic journals, textbooks, industry reports, and policy papers).
VI. Use proper citation format (e.g., APA, MLA) to reference sources and provide bibliographic information.

VII. Aim for clarity, coherence, and conciseness in your writing, demonstrating your ability to communicate complex social issues and educational strategies effectively.
VIII. Submit your completed essay by the specified deadline, adhering to any formatting and submission guidelines provided by your instructor.

Evaluation:
Your essay will be evaluated based on the following criteria:
I. Depth of Understanding: Demonstrated comprehension of the socioeconomic barriers affecting access to welding education and their broader implications.
II. Critical Analysis: The ability to critically evaluate the impact of these barriers and propose feasible, effective strategies for overcoming them.
III. Clarity and Coherence: Clarity of expression, logical coherence, and effective organization of ideas in the essay.
IV. Use of Evidence: Integrating relevant evidence from scholarly sources and real-world examples to support your analysis and proposed solutions.
V. Writing Mechanics: Adherence to grammar, punctuation, spelling, and citation conventions.

Note: This writing assignment provides an opportunity to demonstrate your understanding of the social challenges affecting welding education and propose concrete strategies to enhance access and equity. It is a key component of your summative assessment for this course and will contribute to your overall learning outcomes. Please contact your instructor if you have any questions or need clarification on the assignment requirements.

How assignment will be adapted in online format

Incorporating closed captions for videos, papers, and reports will be assigned within the CMS platform using tools such as pages or assignments. Students will submit their documents via assignment submission links within the CMS or discussion boards to have students make comments on needed changes. The instructor will provide feedback through one of the CMS tools and individual personal input within a week; it will also meet accessibility requirements.

Course Materials

Textbooks

NCCER Welding Level II 6th Edition Published by Pearson (January 30, 2024) © 2024.
ISBN-13: 9780138216160

Class Size Information

Class Size

30

Class Size Category

F - Individualized, skills#based instruction/field practice 30

Diversity and Inclusion

Explain how diversity and inclusion(e.g., gender, culture/race, sexuality, etc.) is infused into the course.

Diversity and inclusion are subtly integrated into the welding level II course through various aspects of the curriculum. While the course primarily focuses on technical skills and knowledge related to welding processes and metallurgy, there are opportunities to promote diversity and inclusion awareness. For instance, the section on "Introduction to Diverse Welding Innovators" acknowledges the contributions of individuals from diverse backgrounds to the welding field, showcasing the importance of inclusivity in recognizing achievements regardless of gender, culture, or race. Additionally, discussions on safety procedures, such as those in the GMAW and FCAW sections, emphasize the importance of creating inclusive work environments by addressing protective clothing and ventilation issues that can affect individuals differently based on their gender, physical abilities, or cultural preferences. Moreover, as discussed in the Physical Characteristics and Mechanical Properties of Metals section, the consideration of inclusivity in welding materials selection highlights the importance of accessibility and affordability in ensuring equal opportunities for participation in welding practices across diverse communities. While the course primarily focuses on technical skills, these subtle incorporations of diversity and inclusion topics help foster a learning environment that values and respects the contributions of individuals from all backgrounds.

Describe how assignments, instruction, evaluation, course content, and interactions are contextualized for diverse learners promoting an equitable course.

In the welding level II course, every aspect is tailored to promote equity and inclusivity, considering the specifics outlined in the course content. Assignments are designed to accommodate diverse learning styles and abilities. For example, while written assignments allow individual expression, hands-on welding tasks cater to kinesthetic learners. Instructions are provided in various formats, ensuring accessibility for all learners. This includes verbal explanations, written materials, and visual demonstrations, supporting students with different preferences and needs. Moreover, assignments are scaffolded to help learners at various skill levels, offering growth opportunities regardless of prior experience.

The course's instruction embraces inclusive practices that value diverse perspectives. For instance, discussions on welding symbols and detail drawings incorporate examples from various cultural contexts to illustrate the universality of certain principles while acknowledging unique approaches in different regions. Additionally, instructors integrate real-world examples and case studies that reflect the diversity of the welding industry, showcasing contributions from individuals of various backgrounds and cultures.

Evaluation methods are structured to be fair and equitable, considering learners' diverse strengths and challenges. Assessments encompass a mix of written exams, practical demonstrations, and project-based evaluations, allowing students to demonstrate their understanding and skills in myriad ways. Rubrics provided for each assessment outline clear criteria for success, ensuring transparency in the evaluation process. Furthermore, instructors offer flexibility in assessment deadlines and formats to accommodate individual needs and circumstances.

Course content is curated to include various perspectives and experiences, promoting inclusivity and cultural competency. Discussions on metallurgy, for instance, highlight the contributions of diverse scholars and practitioners, ensuring the representation and validation of different voices within the welding community. Additionally, welding detail drawings feature examples from diverse cultural contexts, showcasing variations in symbol interpretation and drawing conventions.

Interactions within the course prioritize respect, empathy, and open communication. Instructors foster a supportive learning environment where students feel comfortable expressing themselves and engaging with their peers. Collaborative learning activities, such as group projects and peer review sessions, encourage students to learn from one another and leverage their diverse backgrounds and experiences to enrich the learning process.

By contextualizing every aspect of the course for diverse learners, the welding level II curriculum promotes equity and inclusivity, ensuring all students succeed and thrive in their learning journey.

Interactions

Explain how the course will incorporate student-to-student interaction.

In the welding level II course, student-to-student interaction is seamlessly integrated into various aspects of the curriculum, tailored to the specifics outlined in the course content. Collaborative learning activities, such as group projects and peer review sessions, allow students to engage with their peers and learn from one another. For example, during discussions on welding symbols and detail drawings, students work together in small groups to analyze and interpret complex drawings, sharing their insights and perspectives. Additionally, practical welding exercises, such as those focused on GMAW and FCAW processes, involve peer collaboration and feedback, with students partnering to practice welding techniques and provide constructive critique. Furthermore, interactive discussions and debates on topics related to metallurgy and welding practices encourage students to exchange ideas, challenge assumptions, and broaden their understanding through meaningful dialogue. Through these student-to-student interactions, the welding level II course cultivates a collaborative learning environment where students can actively collaborate and support one another in their learning journey.

Explain how the course will incorporate instructor-to-student interaction.

In the welding level II course, instructor-to-student interaction is prioritized to provide students with personalized support, guidance, and feedback throughout their learning journey. This interaction is woven into various course components, tailored to the specifics outlined in the course content. Firstly, instructors deliver engaging lectures and demonstrations, explaining welding processes, metallurgical principles, and safety procedures clearly. These lectures offer opportunities for students to ask questions, seek clarification, and engage in discussions with the instructor.

Additionally, instructors facilitate hands-on practical sessions where they actively supervise and mentor students as they practice welding techniques. During these sessions, instructors provide individualized coaching, feedback on students' welding skills, technique improvement suggestions, and safety reminders. This direct interaction fosters a supportive learning environment where students feel comfortable seeking assistance and guidance from their instructor.

Furthermore, instructors incorporate interactive activities such as group discussions, case studies, and problem-solving exercises to encourage active participation and critical thinking among students. These activities allow students to interact directly with the instructor, share their insights, and receive immediate feedback on their ideas and contributions.

Moreover, instructors are accessible outside class through office hours, email communication, and online discussion forums. This accessibility allows students to contact their instructor for additional support, clarification on course materials, or assignment guidance. Instructors respond promptly to student inquiries, addressing their concerns and providing personalized assistance as needed.

Overall, the welding level II course ensures robust instructor-to-student interaction by incorporating engaging lectures, hands-on supervision, interactive activities, and accessible communication channels. This interaction enhances the learning experience, promotes student engagement, and facilitates individualized support, ultimately contributing to students' success and mastery of welding skills.

Explain how the course will incorporate student-to-content interaction.

In the welding level II course, student-to-content interaction is facilitated through various activities and assignments that actively engage students with course materials. Tailored to the specifics outlined in the course content, these interactions provide students with opportunities to explore, analyze, and apply welding concepts and techniques in meaningful ways.

One way student-to-content interaction is incorporated is through hands-on welding exercises, where students directly engage with welding equipment and materials to practice and apply the techniques discussed in lectures. For example, in the GMAW and FCAW sections, students interact with welding machines, electrodes, and filler metals to understand the practical aspects of these welding processes. Additionally, during practical sessions on GMAW-Plate and FCAW-Plate, students engage with welding coupons, prepare the welding area, set up equipment, and execute welding procedures under supervision.

Another aspect of student-to-content interaction involves reading welding detail drawings and interpreting welding symbols, as outlined in the course content. Students engage with course materials by analyzing and interpreting complex drawings and identifying dimensional markings, supplemental symbols, and less common symbols. Through these activities, students deepen their understanding of welding symbols and their application in interpreting welding detail drawings, enhancing their ability to read and interpret technical drawings in real-world welding scenarios.

Research assignments and projects that require students to explore metallurgical principles, welding materials, and industry practices also foster student-to-content interaction. For instance, in the Physical Characteristics and Mechanical Properties of Metals section, students research ferrous and nonferrous metals' composition and classification systems, identifying base metals in field conditions and exploring metallurgy-related considerations for welding. These research assignments encourage students to engage with course content actively, apply theoretical knowledge to practical situations, and develop critical thinking and research skills.

Overall, the welding level II course promotes student-to-content interaction by incorporating hands-on welding exercises, welding detail drawing analysis, research assignments, and practical projects that actively engage students with course materials. Through these interactions, students deepen their understanding of welding concepts and techniques, develop useful skills, and gain valuable experience applying welding knowledge to real-world scenarios.

Explain how the course will incorporate student-to-self interaction (metacognitive).

In the welding level II course, student-to-self interaction, explicitly focusing on metacognitive processes, is integrated throughout the curriculum to promote self-awareness, reflection, and goal setting. Tailored to the specifics outlined in the course content, these interactions empower students to take ownership of their learning, monitor their progress, and make informed decisions to enhance their welding skills and knowledge.

Self-assessment activities embedded within assignments and practical exercises incorporate student-to-self interaction. For example, after completing a welding task, students are prompted to reflect on their performance, identify strengths and areas for improvement, and set goals for skill development. This self-assessment process encourages students to reflect on their learning experiences, assess their proficiency in welding techniques, and take proactive steps to enhance their skills.

Additionally, student-to-self interaction is fostered through metacognitive strategies integrated into learning materials and lectures. For instance, during discussions on welding processes and metallurgical principles, instructors prompt students to think critically about their learning process, ask questions, and monitor their understanding of critical concepts. By engaging in metacognitive reflection, students become more aware of their learning strategies, identify practical approaches for mastering welding concepts, and develop a deeper understanding of their learning strengths and weaknesses.

Furthermore, student-to-self interaction is facilitated through learning journals or reflective writing assignments. Students are encouraged to document their learning experiences, record insights gained from lectures, practical exercises, and readings, and

reflect on their personal growth and development as welders. Through regular self-reflection, students gain a deeper understanding of their learning journey, track their progress over time, and identify strategies for continuous improvement in welding proficiency.

Overall, the welding level II course promotes student-to-self interaction by integrating metacognitive strategies such as self-assessment, reflection prompts, and learning journals throughout the curriculum. These interactions empower students to become active participants in their learning process, develop a deeper understanding of welding concepts, and cultivate lifelong learning skills essential for success in welding.

Key: 3113