

Lassen Community College Course Outline

WT-31 - GTAW For Gunsmiths

3.0 Units

I. Catalog Description

This course is designed to develop the manipulative skills, technical knowledge and application of the tungsten arc welding (GTAW) process as they relate to firearm repair. The student will be required to provide their own tungsten welding electrodes for this course at a cost of approximately \$30.00. Must be accepted into the gunsmithing program prior to enrollment. This course has been approved for hybrid delivery.

Transfers to CSU only

17 Hours Lecture, 102 Hours Lab, 34 Hours Outside Class, 153 Total Student Learning Hours Scheduled: Fall

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II. Coding Information

Repeatability: Not Repeatable, Take 1 Time

Grading Option: Graded or Credit/No Credit

Credit Type: Credit - Degree Applicable

TOP Code: 095650

III. Course Objectives

A. Course Student Learning Outcomes

1. Students will complete ten of the weld joint designs using the Gas Tungsten Arc Welding process (GTAW) on mild steel.
2. Students will complete all four of their Gas Tungsten Arc Welding (GTAW) projects.

B. Course Objectives

Upon completion of this course the student will be able to:

1. Demonstrate safe handling and use of gas tungsten arc welding (GTAW) equipment.
2. Demonstrate the manipulative skills necessary to weld selected joint designs with the gas tungsten arc welding (GTAW) process which meet critical industry standards.
3. Demonstrate the manipulative skills necessary to fabricate and/or repair selected projects using the gas tungsten arc welding equipment (GTAW).
4. Demonstrate the manipulative skills necessary to perform soft soldering on selected joint designs.
5. Demonstrate safe handling and use of oxyacetylene equipment.
6. Demonstrate the manipulative skills necessary to perform brazing and braze welding.

IV. Course Content

A. Safety Precautions

1. Electrical shock
2. Radiation hazards
3. Compressed gases
4. Air contamination

5. Emergency shop procedures
 6. Oxyacetylene equipment
 7. Oxygen and acetylene cylinders
 8. Oxygen and acetylene regulators
 9. Oxyacetylene welding torches and tips
 10. Oxyacetylene flame types and adjustments
- B. GTAW Torch Set-up
1. Torch set-up
 2. Collet bodies
 3. Collet
 4. Ceramic cups
 5. Tails/caps
 6. Tungsten electrodes
- C. GTAW Power Source Settings
1. Polarity settings
 2. Amperage control
 3. High frequency adjustments
 4. High frequency adjustments
- D. GTAW Flowmeter
1. Shielding gas selection
 2. GTAW flowmeter components
 3. Flowmeter settings
- E. Establishing an Arc
1. Assembling the GTAW torch
 2. Tungsten electrode extension
 3. Torch angle and distance from work piece
- F. Weld Bead Parameters
1. Bead width
 2. Penetration
 3. Ripple appearance
 4. Travel speed
- G. Selected Joint Designs - Mild Steel
1. Flat - no filler
 2. Flat - filler
 3. Closed butt - flat and vertical
 4. T-joint - horizontal
 5. T-joint - vertical
 6. Lap joint - bend test
 7. Edge joints - single and double
 8. Corner joint (Outside) - bend test
 9. Water tight joint
 10. Air tight joint
- H. GTAW Projects
1. Barrel spinner
 2. Action wrench handles
 3. Firing pin holes
 4. Bolt handles
- I. Soft Soldering
1. Types of solder
 2. Soldering devices

3. Soldering techniques
 4. Lap joint bend test
 5. Soft solder project
- J. Brazing and Braze Welding Mild Steel and Cast Iron
1. Lap joint - mild steel
 2. T-joint - mild steel
 3. Cast iron

V. Assignments

- A. Appropriate readings
Text: "Welding Principles and Applications," and trade manuals will be primary reference sources for course readings. Additional information sources will include product and use guides from industry manufacturers to enhance the learning process.
- B. Writing assignments or skills demonstration
Students will apply technical skills and understanding of course content by demonstrating application of the gas tungsten arc welding process on specific joint designs which meet industry standards.
- C. Out of class assignments
May include:
1. Pertinent supplementary literature
 2. Design and fabrication of gunsmithing equipment using the gas tungsten arc welding process
- D. Assignments that demonstrate critical thinking
Students will be required to demonstrate understanding of gas tungsten arc welding (GTAW) concepts and practices by applying the technical information to multiple manipulative performance objectives and projects which meet critical industry and shop specifications.

VI. Methods of Evaluation

Traditional Classroom Evaluation

Methods for determining student grades will be accomplished by the following:

- A. Completion of required manipulative performance objectives and projects.
- B. Participation in classroom learning activities.

Hybrid Evaluation

Students will be expected to complete all quizzes, exams, online assignments and activities equivalent to in class assignments and activities for the online portion of the course. Electronic communication, both synchronous and asynchronous (chat/forum) will be evaluated for participation and to maintain effective communication between instructor and students.

VII. Methods of Delivery

Check those delivery methods for which, this course has been separately approved by the Curriculum/Academic Standards Committee.

Traditional Classroom Delivery Correspondence Delivery

Hybrid Delivery Online Delivery

Tradition Classroom Delivery
Demonstration/Laboratory

Hybrid Delivery

A combination of traditional classroom and online instruction will be utilized. Each semester a minimum of 102 hours will be taught face-to face by the instructor and the remaining hours will be instructed online through the technology platform adopted by the District. Traditional class instruction will consist of exercises/assignments, lectures, visual aids, and practice exercises. Online delivery will consist of exercises/assignments, lecture posts, discussions, adding extra resources and other media sources as appropriate.

VIII. Representative Texts and Supplies

Jeffus, Larry; *"Welding Principles & Applications"*, 2017, 8th Edition, Delmar Cengage Learning, ISBN: 978-1-305-494695-5

SUPPLIES: (Required)

- A. Gauntlet leather welding gloves
- B. Safety glasses
- C. Leather "logging type" boots
- D. Cuffless, heavy cotton workpants, in good repair
- E. 2% Thoriated tungsten electrodes

IX. Discipline/s Assignment

Welding Technology

X. Course Status

Current Status: Active

Original Approval Date: 2/27/1990

Revised By: Kory Konkol

Latest Curriculum/Academic Standards Committee Revision Date: 02/15/2022