Basic Course Information

Semester:	**Spring 2016: Feb 16 – June 10, 2016**	Instructor Name:	**Carlos Araiza**
Course Title & #:	**WELD 125-Gas Tungsten Arc Welding on Plate**	Email:	**carlos.araiza@imperial.edu**
CRN #:		Webpage (optional):	
Classroom:		Office #:	
Class Dates:	**Friday 8:05am-9:55 am Lecture, 10:05am-2:20pm Lab**	Office Hours:	**11:00am – 1:00pm**
Class Days:		Office Phone #:	**Secretary/Division Office 760-355-6361 Secretary/Dean's Office 760-355-6217 Division Coordinator 760-355-6361**
Class Times:		Emergency Contact:	
Units:	3 (2 hours lecture, 4 hours lab)		

Course Description

Theory, practice, and application of Gas Tungsten Arc Welding process on mild steel plate, aluminum, and stainless material. Safe equipment set up, welding symbols, and its application in GTAW process is taught and applied. (Formerly WELD 160) (Nontransferable, AA/AS degree only)

Student Learning Outcomes

1. **Communication Skills** (Reading, Writing, and Speaking)
2. **Critical Thinking** (Problem Solving)
3. **Personal Responsibility** (Meeting Rules, Procedures, Employability Skills, etc.)
4. **Information Literacy** Understanding information sources such as internet, media, etc.)
5. **Global Awareness** (Understanding our position within a Global context.)

Upon course completion, the student will have acquired new skills, knowledge, and or attitudes as demonstrated by being able to:

1. List at least five different articles of personal protective equipment and explain what welding environment hazard is being addressed by each article of PPE. (ILO1, ILO2)
2. Demonstrate proper interpretation of a standard material safety data sheet (MSDS). (ILO1, ILO2).
3. Describe and demonstrate the proper set-up and use of the major components and equipment used in gas tungsten arc welding (GTAW). (ILO1, ILO3).

4. Safely perform acceptable welds on ferrous alloys applying the weld parameters according to the given WPS> (ILO1, ILO2, ILO3).
5. Separate acceptable and unacceptable weld samples in accordance with predetermined specifications, standards and codes. (ILO1, ILO2).

Course Objectives

- **Measurable Course Objectives- Upon successful completion of this course, the student will:**

1. Demonstrate safe working habits in the laboratory component
2. Initiate the set-up of welding equipment while demonstrating safety protocols
3. Illustrate and utilize the theory behind Gas Tungsten Arc Welding (GTAW)
4. Demonstrate the GTAW process by welding mild steel, aluminum,, and stainless steel plates
5. Identify and apply the proper filler material to the base material
6. Identify and interpret welding symbols in accordance with blueprint drawings

- **Core continent to be covered in all sections:**

Core continents approx. % of course:

A. Safety
1.1 shop safety
1.2 electrical safety
1.3 personal protective equipment (PPE)
1.4 equipment safety
1.5 safe proper tool usage
10%

B. Safe GTA welding equipment set up
2.1 set welding machine for mild steel welding
2.2 set welding machine for aluminum welding
2.3 set welding machine for stainless steel welding
2.4 apply proper welding parameter determined by metal thickness
10%

C. Gas Tungsten Arc Welding Theory
3.1 introduction to gas tungsten arc welding
3.2 identify components and understand their functions
3.3 gas shield and its function
3.4 filler metals and its applications
3.5 base metals and its melting points
20%

D. Gas Tungsten Arc Welding Application
4.1 set up welding machine in a safe manner for mild steel, aluminum, and stainless steel welding
4.2 clean and prepare 2"x 4"x 1/8" mild steel, aluminum, and stainless steel coupons
4.3 fit and tack the coupons in a lab joint, butt joint, and T joint design

4.4 weld the coupons in a 1F, 2F, 3F position
40%

E. Identify and apply proper filler material to base metal
5.1 study and identify tensile strength for filler metal
5.2 identify and select proper filler rod for base metal
5.3 5.3 understand and apply filler metal to the weld puddle
10%

F. Blueprint interpretation and welding symbols in GTAW
6.1 identify the information for GTAW process in a bubble drawing
6.2 comprehend the basis welding symbols that apply to welding
6.3 study the difference between weld symbol and welding symbol
10%
TOTAL 100%
INTRUCTIONAL Methodology: Lecture/Demonstration, Group Discussion, Fieldtrip, Outside Class Assignments, Media Presentations.

Textbooks & Other Resources or Links

Equipment and Supplies

- Personal protective Equipment (PPE)
  1. Safety Glasses
  2. Helmet/Hood
  3. Welding Cap
  4. Welding Gloves
  5. Leather Work Boots
  6. Ear plugs/protection
  7. 100% cotton long sleeve shirt and pants
  8. Leather jacket or sleeve

  (NO CONTACT LENSES IN THE LAB)

Course Requirements and Instructional Methods

Out of Class Assignments: The Department of Education policy states that one (1) credit hour is the amount of student work that reasonably approximates not less than one hour of class time and two (2) hours of out-of-class time per week over the span of a semester. WASC has adopted a similar requirement.

Course Grading Based on Course Objectives

This course is designed to be an essential part of the course sequence in the programs or; Welding Technology.

The accumulate effort of the student through the semester will have as an outcome an earned a grade of A, B, C, D, or F.

All assigned activities will be quantifiable based on a designated point value. There will be a total point value per assignment/activity and there will be a total point value for the semester.

1. **Attendance:** first day of class, regular attendance and withdrawal after exceeding the number of class hours per week.
2. **Tardiness:** three times equals one absence (I.V.C. Gen. Catalog pg. 24) 09-10
3. **Absences:** 3 absences= automatic drop (I.V.C. Gen catalog pg.24) 09-10
4. **Student Conduct:** (I.V.C. Gen. catalog pg. 22) 2009-10
5. **Grading System** (I.V.C. Gen catalog pg.17)

   A= 90%-100% of points= Excellent
   B= 80%-89% of points= Good
   C= 70%-79% of points= Satisfactory
   D= 60%-69% of points= Pass, less that satisfactory
   F= Less than 60% of points= Failing

Attendance

- A student who fails to attend the first meeting of a class or does not complete the first mandatory activity of an online class will be dropped by the instructor as of the first official meeting of that class. Should readmission be desired, the student's status will be the same as that of any other student who desires to add a class. It is the student's responsibility to drop or officially withdraw from the class. See General Catalog for details.
- Regular attendance in all classes is expected of all students. A student whose continuous, unexcused absences exceed the number of hours the class is scheduled to meet per week may be dropped. For online courses, students who fail to complete required activities for two consecutive weeks may be considered to have excessive absences and may be dropped.
- Absences attributed to the representation of the college at officially approved events (conferences, contests, and field trips) will be counted as 'excused' absences.

Classroom Etiquette

- Electronic Devices: Cell phones and electronic devices must be turned off and put away during class, unless otherwise directed by the instructor.
- Food and Drink are prohibited in all classrooms. Water bottles with lids/caps are the only exception. Additional restrictions will apply in labs. Please comply as directed by the instructor.
- Disruptive Students: Students who disrupt or interfere with a class may be sent out of the room and told to meet with the Campus Disciplinary Officer before returning to continue with coursework. Disciplinary procedures will be followed as outlined in the General Catalog.
- Children in the classroom: Due to college rules and state laws, no one who is not enrolled in the class may attend, including children.

Online Netiquette

- What is netiquette? Netiquette is internet manners, online etiquette, and digital etiquette all rolled into one word. Basically, netiquette is a set of rules for behaving properly online.

- Students are to comply with the following rules of netiquette: (1) identify yourself, (2) include a subject line, (3) avoid sarcasm, (4) respect others' opinions and privacy, (5) acknowledge and return messages promptly, (6) copy with caution, (7) do not spam or junk mail, (8) be concise, (9) use appropriate language, (10) use appropriate emoticons (emotional icons) to help convey meaning, and (11) use appropriate intensifiers to help convey meaning [do not use ALL CAPS or multiple exclamation marks (!!!!)].

Academic Honesty

Academic honesty in the advancement of knowledge requires that all students and instructors respect the integrity of one another's work and recognize the important of acknowledging and safeguarding intellectual property.

There are many different forms of academic dishonesty. The following kinds of honesty violations and their definitions are not meant to be exhaustive. Rather, they are intended to serve as examples of unacceptable academic conduct.

- Plagiarism is taking and presenting as one's own the writings or ideas of others, without citing the source. You should understand the concept of plagiarism and keep it in mind when taking exams and preparing written materials. If you do not understand how to "cite a source" correctly, you must ask for help.
- Cheating is defined as fraud, deceit, or dishonesty in an academic assignment, or using or attempting to use materials, or assisting others in using materials that are prohibited or inappropriate in the context of the academic assignment in question.

Anyone caught cheating or plagiarizing will receive a zero (0) on the exam or assignment, and the instructor may report the incident to the Campus Disciplinary Officer, who may place related documentation in a file. Repeated acts of cheating may result in an F in the course and/or disciplinary action. Please refer to the General Catalog for more information on academic dishonesty or other misconduct. Acts of cheating include, but are not limited to, the following: (a) plagiarism; (b) copying or attempting to copy from others during an examination or on an assignment; (c) communicating test information with another person during an examination; (d) allowing others to do an assignment or portion of an assignment; (e) using a commercial term paper service.

Additional Student Services

Imperial Valley College offers various services in support of student success. The following are some of the services available for students. Please speak to your instructor about additional services which may be available.

- **Blackboard Support Site.** The Blackboard Support Site provides a variety of support channels available to students 24 hours per day.
- **Learning Services.** There are several learning labs on campus to assist students through the use of computers and tutors. Please consult your Campus Map for the Math Lab; Reading, Writing & Language Labs; and the Study Skills Center.
- **Library Services.** There is more to our library than just books. You have access to tutors in the Study Skills Center, study rooms for small groups, and online access to a wealth of resources.

Disabled Student Programs and Services (DSPS)

Any student with a documented disability who may need educational accommodations should notify the instructor or the Disabled Student Programs and Services (DSP&S) office as soon as possible. The DSP&S office is located in Building 2100, telephone 760-355-6313. Please contact them if you feel you need to be evaluated for educational accommodations.

Student Counseling and Health Services

Students have counseling and health services available, provided by the pre-paid Student Health Fee.

- **Student Health Center**. A Student Health Nurse is available on campus. In addition, Pioneers Memorial Healthcare District provide basic health services for students, such as first aid and care for minor illnesses. Contact the IVC Student Health Center at 760-355-6128 in Room 1536 for more information.
- **Mental Health Counseling Services**. Short-term individual, couples, family, and group therapy are provided to currently enrolled students. Contact the IVC Mental Health Counseling Services at 760-355-6196 in Room 2109 for more information.

Student Rights and Responsibilities

Students have the right to experience a positive learning environment and to due process of law. For more information regarding student rights and responsibilities, please refer to the IVC General Catalog.

Information Literacy

Imperial Valley College is dedicated to helping students skillfully discover, evaluate, and use information from all sources. The IVC Library Department provides numerous Information Literacy Tutorials to assist students in this endeavor.

Anticipated Class Schedule/Calendar

Module 2: Safety and Health of Welders		
1 Demonstrates proper use and inspection of personal protection equipment (PPE).	**Text:** Ch. 1: 14, 16–17, 20–21, 25, 27, 30–33 Ch. 5: 147–150 Ch. 6: 160–161, 186, 228–229 Ch. 7: 228 Ch. 8: 249, 252, 264 Ch. 9: 302 Ch. 10: 311–312 Ch. 11: 349–350 Ch. 12: 392 Ch. 14: 419 Ch. 16: 478–479 Ch. 18: 526 Ch. 22: 621	**Lab Workbook:** Lessons 1A, 1B, 1C, 1D, 5B, 6A, 8A, 9A, 11B, 17A, 23A
2 Demonstrates proper safe operation practices in work area.	**Text:** Ch. 1: 14–15, 18–19, 25–33 Ch. 5: 146 Ch. 10: 311–312 Ch. 12: 392–395 Ch. 14: 410–415, 429–430 Ch. 16: 478–479 Ch. 22: 621 Ch. 32: 825–826, 829–830	**Lab Workbook:** Lessons 1A, 1B, 1C, 1D, 6A, 8A, 9A, 11B, 17A, 23A
3 Demonstrates proper use and inspection of ventilation equipment.	**Text:** Ch. 1: 19–21, 23–24, 27 Ch. 6: 161, 187 Ch. 7: 226 Ch. 22: 621 Ch. 32: 817	**Lab Workbook:** Job 6B-1 Lesson 9A
4 Demonstrates proper Hot Zone operation.	**Text:** Ch. 1: 24–26 Ch. 5: 229 Ch. 6: 160–161 Ch. 12: 393–395 Ch. 14: 419 Ch. 22: 621	**Lab Workbook:** Lessons 1A, 1B, 1C, 1D, 6A, 8A, 11B

5 Demonstrates proper work actions for working in confined spaces.	**Text:** Ch. 1: 20–21, 24 Ch. 7: 226 Ch. 8: 264 Ch. 14: 430 Ch. 22: 621	
6 Demonstrates proper use of precautionary labeling and MSDS information.	**Text:** Ch. 1: 21–22	
7 Demonstrates proper inspection and operation of equipment used for each welding and thermal cutting process used. (This is best done as a part of the process module/unit for each of the required welding or thermal cutting processes.)	**Text:** Ch. 1: 27, 31–33 Ch. 5: 131, 134 Ch. 6: 159–160 Ch. 8: 236–250 Ch. 9: 274–290 Ch. 10: 310–311 Ch. 12: 364–372 Ch. 23: 624–626	**Lab Workbook:** Lessons 1C, 6A, and 7B All welding and cutting jobs
Module 3: Drawing and Welding Symbol Interpretation		
1 Interpret basic elements of a drawing or sketch.	**Text:** Ch. 2: 35–43	**Lab Workbook:** Lesson 2 All Jobs in Lessons 6C, 6D, and 6E Jobs 9D-2 through 9D-7
2 Interpret welding symbol information.	**Text:** Ch. 3: 55–67	**Lab Workbook:** Lesson 3B Jobs 6E-1 through 6E-4 All Jobs in Lesson 8C All Jobs in Lesson 9D Jobs 9E-2 through 9E-6 All Jobs in Lessons 12C, 12D, and 12E Job 12F-1 Job 16A-1 Job 16B-1 Job 20-1 Job 21-1
3 Fabricate parts from a drawing or sketch.	**Text:** Ch. 2: 35–43 Ch. 3: 45–55	**Lab Workbook:** Lesson 2 All Jobs use drawing and AWS weld symbols.

Module 7: Gas Tungsten Arc Welding (GTAW)		
1 Perform safety inspections of GTAW equipment and accessories.	**Text:** Ch. 7: 192–205 Ch. 8: 236, 238	**Lab Workbook:** Lesson 8A
2 Make minor external repairs to GTAW equipment and accessories.	**Text:** Ch. 7: 192–206	**Lab Workbook:** Job 6B-1
Carbon Steel		
3 Set up for GTAW operations on carbon steel.	**Text:** Ch. 7: 192–194, 196–207 Ch. 8: 236–252	**Lab Workbook:** Job 6B-1 Lesson 7A Lesson 8A All Jobs in Lesson 8C require the setting of variables.
4 Operate GTAW equipment on carbon steel.	**Text:** Ch. 8: 245, 252–262	**Lab Workbook:** Lesson 8C All Jobs in Lessons 8C
5 Make fillet welds in all positions on carbon steel.	**Text:** Ch. 8: 254–261	**Lab Workbook:** Job 8C-1 Job 8C-2 Job 8C-4 Job 8C-5 Job 8C-7 Job 8C-8 Job 8C-10 Job 8C-11
6 Make groove welds in all positions on carbon steel.	**Text:** Ch. 8: 254, 256–261	**Lab Workbook:** Job 8C-3 Job 8C-6 Job 8C-9 Job 8C-12
7 Passes GTAW welder performance qualification test on carbon steel.	Ch. 31: 797–799	
Austenitic Stainless Steel		
8 Set up for GTAW operations on austenitic stainless steel.	**Text:** Ch. 8: 236–252 Ch. 20: 568	**Lab Workbook:** Lesson 7A Lesson 20 Job 20-3

9 Operate GTAW equipment on austenitic stainless steel.	**Text:** Ch. 20: 568	**Lab Workbook:** Job 8C-13 Lesson 20 Job 20-3
10 Make fillet welds in the 1F, 2F, and 3F positions on austenitic stainless steel.	**Text:** Ch. 20: 568	**Lab Workbook:** Lesson 20 Job 20-3
11 Make groove welds in the 1G and 2G positions on austenitic stainless steel.	**Text:** Ch. 20: 568	**Lab Workbook:** Job 8C-13
12 Passes GTAW welder performance qualification test on austenitic stainless steel.	Ch. 31: 797–799	
Aluminum		
13 Set up for GTAW operations on aluminum.	**Text:** Ch. 8: 236–252 Ch. 21: 579–582	**Lab Workbook:** Lesson 7A Lesson 8B Lesson 8C Lesson 21 Job 21-1
14 Operate GTAW equipment on aluminum.	**Text:** Ch. 8: 245, 252–262 Ch. 21: 579–582	**Lab Workbook:** Lesson 21 Job 21-1
15 Make fillet welds in the 1F and 2F positions on aluminum.	**Text:** Ch. 8: 245–258 Ch. 21: 579–582	**Lab Workbook:** Lesson 21 Job 21-1
16 Make groove welds in the 1G position on aluminum.	**Text:** Ch. 21: 579–582	**Lab Workbook:** Lesson 21 Job 21-1
17 Passes GTAW welder performance qualification test on aluminum.	Ch. 31: 797–799	
Module 8: Thermal Cutting Processes		
Unit 1: Manual Oxyfuel Gas Cutting (OFC)		
1 Perform safety inspections of manual OFC equipment and accessories.	**Text:** Ch. 1: 32–33 Ch. 11: 328, 333–334	**Lab Workbook:** Lesson 1B Lesson 11B
2 Make minor external repairs to manual OFC equipment and accessories.	**Text:** Ch. 11: 342–344, 347–349, 352–354 Ch. 13: 400–402 Figs. 13-12 to 13-14	

3 Set up for manual OFC operations on carbon steel.	**Text:** Ch. 12: 364–372 Ch. 13: 398–404 Ch. 14: 410–417	**Lab Workbook:** Lesson 14 Job 14-1 Job 14-2
4 Operate manual OFC equipment on carbon steel.	**Text:** Ch. 14: 417–426	**Lab Workbook:** Job 14-1 Job 14-2 Job 14-3
5 Perform straight, square edge cutting operations in the flat position on carbon steel.	**Text:** Ch. 13: 402–405 Ch. 14: 417–422	**Lab Workbook:** Job 14-1
6 Perform shape, square edge cutting operations in the flat position on carbon steel.	**Text:** Ch. 13: 405 Ch. 14: 417–422	**Lab Workbook:** Job 14-2
7 Perform straight, bevel edge cutting operations in the flat position on carbon steel.	**Text:** Ch. 14: 422–423	**Lab Workbook:** Job 14-1
8 Perform scarfing and gouging operations to remove base and weld metal in flat and horizontal positions on carbon steel.	**Text:** Ch. 14: 426	**Lab Workbook:** Job 14-3
Unit 2: Mechanized Oxyfuel Gas Cutting (OFC) [e.g. Track Burner]		
1 Perform safety inspections of mechanized OFC equipment and accessories.	**Text:** Ch. 13: 406–407 Ch. 14: 429–430	**Lab Workbook:** Job 14-4
2 Make minor external repairs to mechanized OFC equipment and accessories.	**Text:** Ch. 13: 400–403, 406–407	
3 Set up for mechanized OFC operations on carbon steel.	**Text:** Ch. 14: 427–428	**Lab Workbook:** Job 14-4
4 Operate mechanized OFC equipment on carbon steel.	**Text:** Ch. 13: 406–407 Ch. 14: 427–428	**Lab Workbook:** Job 14-4 Job 14-5
5 Perform straight, square edge cutting operations in the flat position on carbon steel.	**Text:** Ch. 13: 406–407	**Lab Workbook:** Job 14-5
6 Perform straight, bevel edge cutting operations in the flat position on carbon steel.	**Text:** Ch. 13: 406–407	**Lab Workbook:** Job 14-5

Unit 3: Manual Plasma Arc Cutting (PAC)		
1 Perform safety inspections of manual PAC equipment and accessories.	**Text:** Ch. 10: 311–312	**Lab Workbook:** Job 6B-1
2 Make minor external repairs to manual PAC cutting equipment and accessories.	**Text:** Ch. 10: 316	Job 6B-1
3 Set up for manual PAC operations on carbon steel, austenitic stainless steel, and aluminum.	**Text:** Ch. 10: 310–312	**Lab Workbook:** Job 10-1
4 Operate manual PAC equipment on carbon steel, austenitic stainless steel, and aluminum.	**Text:** Ch. 10: 312–316	**Lab Workbook:** Job 10-1 Job 10-2
5 Perform straight, square edge cutting operations in the flat position on carbon steel, austenitic stainless steel, and aluminum.	**Text:** Ch. 10: 312–316	**Lab Workbook:** Job 10-1
6 Perform shape, square edge cutting operations in the flat position on carbon steel, austenitic stainless steel, and aluminum.	**Text:** Ch. 10: 316	**Lab Workbook:** Job 10-2
Unit 4: Manual Air Carbon Arc Cutting (CAC-A)		
1 Perform safety inspections of manual CAC-A equipment and accessories.	**Text:** Ch. 23: 624–626, 644–645	**Lab Workbook:** Lesson 23A Job 23B-1
2 Make minor external repairs to manual CAC-A equipment and accessories.	**Text:** Ch. 11: 280–281	
3 Set up manual CAC-A scarfing and gouging operations on carbon steel.	**Text:** Ch. 23: 624–626	**Lab Workbook:** Job 23B-3
4 Operate manual CAC-A equipment on carbon steel.	**Text:** Ch. 23: 626–628	**Lab Workbook:** Job 23B-2
5 Perform scarfing and gouging operations to remove base and weld metal in the flat and horizontal positions on carbon steel.	**Text:** Ch. 23: 626–628	**Lab Workbook:** Job 23B-3

Module 9: Welding Inspection and Testing		
1 Examine cut surfaces and edges of prepared base metal parts.	**Text:** Ch. 6: 173–176 Ch. 30: 772–773, 783	**Lab Workbook:** Job 10-1 Job 10-2 Job 14-1 Job 23B-2 Job 30-3
2 Examine tacks, root passes, intermediate layers, and completed welds.	**Text:** Ch. 6: 173–176 Ch. 12: 391–392 Ch. 14: Fig. 14-19 Ch. 30: 771–791	**Lab Workbook:** All weld performance Jobs in the lab workbook require a visual inspection.