Basic Course Information

Semester:	**Fall 2020**	Instructor Name:	**Carlos Araiza**
Course Title & #:	**Weld 230 SHIELDED METAL ARC ON PIPE**	Email:	**Carlos.araiza@imperial.edu**
CRN #:	**31184**	Webpage (optional):	
Classroom:	**3100-3111**	Office #:	**3121**
Class Dates:	**Aug 17-Dec 12**	Office Hours:	**11:00am – 1:00pm**
Class Days:	**T;R**	Office Phone #:	**Secretary/Division Office 760-355-6361 Secretary/Dean's Office 760-355-6217 Division Coordinator 760-355-6361**
Class Times:	4:45pm-8:00pm	Emergency Contact:	
Units:	3 units		

Course Description

Emphasis is on skill development for SHIELDED METAL ARC WELDING on carbon steel pipe open root with use of E6010 and E7018 electrodes. Proper use of filler metal and welding joint designs are emphasized throughout the course. Proper use of filler metal and welding joints designs are emphasized throughout the course. GMAW, FCAW, processes are used to prepare the coupons. Recommended; WELD 100 and WELD 125.

Student Learning Outcomes

Required language

Explain a set of three exising hazards in the SMAW pipe welding environment and identify applicable standards. Describe and demonstrate preparation of pipe sample for a BEND TEST METHOD of DT to determine accept/reject status for SMAW pipe samples.

1. Describe four major hazards related to GTAW on pipe and potential abatement of these hazards as they pertain to shop safety. (ILO1, ILO2, ILO3)
2. Explain and safely demonstrate multiple beading and application in GTAW for welding on pipe and tube. (ILO1, ILO2, ILO3)
3. Select the proper wilding filler materials for welding on various alloys as specified on the given WPS. (ILO1, ILO2, ILO3)
4. Identify, recognize, and safely apply the essential variables associated with pipe and tube welding using the open root technique per the given WPS. (ILO1, ILO2, ILO3)

5. Reference the appropriate Welding Codes (AWS, API, and/or ASME) to determine the acceptance criteria for the welding of 6 inch schedule 80 carbon steel pipe in the 5G positon and safety complete one join per given WPS. (ILO1, ILO2, ILO3, ILO4)

Course Objectives

Upon satisfactory completion of the course, students will be able to:

1. Demonstrate and utilize safety protocols through the course.
2. Initiate the set-up of welding equipment while demonstrating safety protocols.
3. Study and comprehend the theory behind Gas Tungsten Arc Welding on pipe.
4. Demonstrate the ability to cut and prepare pipe ends for welding.
5. Demonstrate the ability to weld pipe to x-ray quality.

Textbooks & Other Resources or Links

Required: Yes
Welding level 2 from NCCER National Center for Construction Education and Research ISBN: 13 978-0-13 609970

Additional resources:
Modern Welding 11th edition. G-W Publisher. Technical Guide. Available in the book store.

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 LAB WILL BE FACE TO FACE INSTRUCTION FOR THE FIRST SIX WEEKS OF THE SEMESTER DUE TO COVID-19 RESTRICTIONS AND AFTER THE 6TH WEEK IT WILL TRANSITION TO FULLY ONLINE VIA CANVAS AND CONFERZOOM IN A SYNCHRONOUS FORMAT.

Methods of Instruction for Learning:

1. Demonstration
2. Discussion
3. Group activity
4. Individual assistance
5. Lab activity
6. Lecture
7. Simulation/case study
8. Audio visual computer assisted instruction

Two hours off independent work done out of class per each hour of lecture or class work, or 3 hours lab, practicum, or the equivalent per unit is expected.

Equipment and Supplies

- Personal protective Equipment (PPE)
  1. Welding helmet
  2. Welding and cutting face shield
  3. Welding Cap
  4. Welding Gloves
  5. Leather Work Boots
  6. Ear plugs/protection
  7. Leather jacket or sleeve

Course Grading Based on Course Objectives

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

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Module 2: Safety and Health of Welders		
Demonstrates proper use and inspection of personal protection	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	Lessons 1A, 1B, 1C, 1D, 5B, 6A, 8A, 9A, 11B, 17A, 23A

equipment (PPE).	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	
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, 4298-430 Ch. 16: 478-479 Ch. 22: 621 Ch. 32: 825-826, 829-830	Lessons 1A, 1B, 1C,1D, 6A, 8A, 9A, 11B, 17A, 23A
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	Job 6B-1 Lesson 9A
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
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	
Demonstrates proper use of precautionary labeling and MSDS information	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	Lessons 1C, 6A and 7B all welding cutting jobs

	Ch. 23: 624-626	
Module 3: Drawings and Welding Symbol Interpretation		
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
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 lesson 12C, 12D and 12E Job 12F-1 Job 16A-1 Job 20-1 Job21-1
Fabricate parts from a drawing or sketch.	Text: Ch. 2: 35-36 Ch. 3: 45-55	Lab workbook: Lesson 2 All jobs use drawing and AWS weld symbols.
Module 4: Shielded Metal Arc Welding (SMAW)		
Perform safety inspections of SMAW equipment and accessories.	Text: Ch. 1: 31-33 Ch. 5: 131,134 Ch. 6: 159-160	Lab workbook: Lesson 1C Lesson 6A Job 6B-1
Make minor external repairs to SMAW equipment and accessories.	Text: Ch. 5: 131, 134-138	Job 6B-1
Set up for (SMAW) operations on carbon steel.	Text: Ch. 6: 158-159, 161-165 Ch. 20: 561	Lab workbook: Job 6B-1 All jobs in lessons 6C, 6D and 6E

Operate SMAW equipment on carbon steel	Text: Ch. 6: 161-172, 176-186	Lab workbook: Jobs 6B-2 through 6B-5 All jobs in lesson 6C, 6D and 6E
Make fillet welds in all positions on carbon steel	Text: Ch. 6: 173-174, 177-180	Lab workbook: Lesson 6C Job 6C-2 Job 6C-3 Lesson 6E Job 6E-1 Job 6E-2 Job 6E-4 Job 6E-5
Make groove welds in all positions on carbon steel	Text: Cha. 6: 173, 180-185	Lab workbook: Lesson 6C Job 6C-1 Job 6C-4 Job 6D-3 Lesson 6E Job 6E-3 Job 6E-6
Passes SMAW welder performance qualification test (2G and 3G, uphill, limited thickness test plates) on carbon steel.	Cha. 31: 797-799	
Module 5: Gas Metal Arc Welding 9GMAW-S, GMAW Spray Transfer		
Note: all jobs in the lab workbook can be modified as necessary by changing the specified metal transfer method.		

Perform safety inspection of GMAW equipment and accessories.	Text: Ch. 7: 208-22, 226 Ch. 9: 275, 291	Lab workbook Lesson 9A Job 6B-1
Make minor external repairs to GMAW equipment and accessories.	Text: Ch. 6: 214 Ch. 7: 220 Ch. 9: 278-280, 289-290	Lab workbook: Lesson 7B
	Short circuiting transfer	
Set up for GMAW-S operations on carbon steel.	Text: Ch. 9: 268-270, 274-290	Lab workbook: Lesson 7B Lesson 9C Job 9D-1
Operate GMAW-S equipment on carbon steel	Text: Ch. 9: 268-270, 291-292	Lab workbook: Lesson 9B Lesson 9D Job 9D-6 Lesson 9E All jobs in lesson 9E
Make fillet welds in all positions on carbon steel	Text: Ch.9: 268-270, 293-298	Lab workbook: Job 9D-2 Job 9D-6 Job 9E-1 Job 9E-2 Job 9E-4 Job 9E-5
Make groove welds in all positions on carbon steel.	Text: Ch. 9: 268-270, 294-298	Lab workbook: Job 9E-3 Job 9E-6
Passes GMAW-S welder performance qualifications test on carbon steel.		
	Spray Transfer	
Set up for GMAW (spray) operations on carbon steel.	Text: Ch. 9: 271-290	Lab workbook: Lesson 7B Lesson 9C Job 9D-7
Operate GMAW (spray)	Text: Ch. 9: 271-272, 291-302	Lab workbook: Lesson 9B Lesson 9D

equipment on carbon steel		Job 9D-3 Bob 9D-4 Job 9D-5 Job 9D-7
Make fillet welds in 1F and 2F on carbon steel.	Text: Ch. 9: 271-272, 293-296	Lab workbook: Job 9D-3 Job-9D-5
Make groove welds in the 1G position on carbon steel	Text: Ch. 9: 271-272, 294-295	Lab workbook: Job 9D-4
Passes GMAE (spray) welder performance qualifications test on carbon steel.	Ch. 31: 797-799	
Module 6: Flux Cored Arc Welding (FCAW-G/GM, FCAW-S)		
Note: all jobs on the lab workbook can be changed from the GMAW process to the FCAW-G or FCAW method.		
Perform safety inspections of FCAW equipment and accessories.	Text: Ch. 9: 275, 291	Lab workbook: Job 6B-1 Lesson 9A
Make minor repairs to FCAW equipment and accessories.	Text: Ch. 6 214 Ch. 7: 220 Cp. 9: 278- 281, 289-290	
	Gas Shielded	
Set up for KCAW-G/GM	Text: Ch. 9: 273-290	Lab workbook: Lesson 7B

operations on carbon steel		Lesson 9C All jobs on lesson 9D and 9E require the setting of variables.
Operate FCAW-G/GM equipment on carbon steel.	Text: Ch. 9: 291-298	Lab workbook: Lesson 7B Lesson 9C All welding jobs on lesson 9D and 9E require the setting of variables.
Operate FCAW-G/GM equipment on carbon steel.	Text: Ch. 9: 292-298	Lab workbook: Lessons 9D and 9E Jobs 9D-2 through 9D-6 All jobs in lesson 9E
Make fillet welds in all positions on carbon steel	Text: Ch. 9: 293-298	Lab workbook: Lessons 9D and 9E Job 9D-2 Job 9D-3 Job 9D-5 Job 9D-6 Job 9E-1 Job 9E-2 Job 9E-4
Make groove welds in all positions on carbon steel	Text: Ch. 9: 294-298	Lab workbook: Lessons 9D and 9E Job 9D-4 Job9D-7 Job 9E- 3 Job 9E-6
Passes FCAW-G/GM welder performance qualification test on carbon steel.	Ch. 31: 797-799	
	Self- Shielded	
Set up for FCAW_S operations on carbon steel.	Test: Ch. 9: 273-281, 289-290	Lab workbook: Lesson 7B Lesson 9C Job 9D-1
Operate FCAW-S equipment on carbon steel.	Text: Ch. 9: 291-292	Lab workbook: Lessons 9D and 9E All jobs in lessons 9D and 9E.
Make fillet welds in all	Text: Ch. 9: 293-298	Lab workbook: Lessons 9D and 9E

positions on carbon steel.		Job 9D-2 Job 9D-3 Job 9D-5 Job 9D-6 Job 9E-1 Job 9E-2 Job 9E-4
Make groove welds in all positions on carbon steel.	Text: Ch. 9: 294-298	Lab workbook: Job9D-4 Job 9D-7 Job 9E-3 Job 9E-6
Passes FCAW-S welder performance qualification test on carbon steel.	Text: Ch. 31: 797-799	
Module 7: tungsten Arc Welding (GTAW)		
Perform safety inspections of GTAW equipment and accessories.	Text: Ch. 7: 192-205 Ch. 8: 236, 238	Lab workbook: Lesson 8A
Make minor external repairs to GTAW equipment and accessories	Text: Ch. 7: 192-206	Lab workbook: Job 6B-1
Carbon Steel		
Set up for GTA 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.
Operate GTAW equipment on carbon steel.	Ch. 8: 245, 252-262	Lab workbook: Lesson 8C All jobs on lesson 8C
Make fillet welds in all	Text: Ch. 8: 254-261	Lab workbook: Job 8C-1

positions on carbon steel.		Job 8C-2 Job 8C-4 Job 8C-5 Job 8C-7 Job 8C-8 Job 8C-10 Job 8C-11
Make groove welds in all positions on carbon steel.	Text: Ch. 8: 254, 256-261	
Authentic Stainless Steel		
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
Operate GTAW equipment on austenitic stainless steel.	Text: Ch. 20: 568	Lab workbook: Job 8C-13 Lesson 20 Job 20-3`
Make fillet welds in the 1F, 2F, and 3F on austenitic stainless steel.	Text: Ch. 20. 568	Lab workbook: Lesson 20 Job 20-3
Make groove welds in the 1G and 2G positions on austenitic stainless steel.	Text: Ch. 20: 568	Lab workbook: Job 8C-13
Passes GTAW welder performance qualification test on austenitic stainless steel.	Ch. 31: 797-799	Aluminum
Set up for GTA 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
Operate GTAW equipment on aluminum	Text: Ch. 8: 245, 252-262 Ch. 21: 579-582	Lab workbook: Lesson 21 Job 21-1
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
Make groove welds in the 1G position on aluminum	Text: Ch. 21: 579-582	Lab workbook: Lesson 21 Job 21-1
Passes GTAW welder performance qualification test on aluminum.	Text: Ch. 31: 797-799	
Module 8: Thermal Cutting Processes Unit 1: Manual Oxyfuel Gas Cuttiong (OFC)		
Perform safety in sections of manual OFC equipment and accessories.	TEXT: CH. 1: 32-33 CH. 11: 328, 333-334	LAB WORKBOOK: LESSON 1b LESSON 11b
MAKE MINOR EXTERNAL REPAIRS TO MANNUAL OFC EQUIPMENT AND ACCESSORIES.	Text: Ch. 11: 342-344, 347-349, 352-354 Ch. 13: 400-402 Fig. 13-12 to 13-14	
Set up fpr 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
Operate manual OFC equipment on carbon steel.	Text: Ch. 14: 417-426	Lab workbook: Job 14-1 Job 14-2

		Job 14-3
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
Perform shape, square edge cutting operations in the flat position on carbon steel.	Text: Ch. 13: 405 Ch. 14: 422-423	Lab workbook: Job 14-2
Perform straight, bevel edge sutting operation in the flat position on carbon steel.	Text: Ch. 14: 422-423	Lab workbook: Job 14-1
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 Ox fuel Gas Cutting (OFC) (e.g. track burner)		