Basic Course Information

Semester:	**FALL 2015**	Instructor Name:	**Carlos Araiza**
Course Title & #:	**Welding Technology 100**	Email:	**Carlos.araiza@imperial.edu**
CRN #:	**10803**	Webpage (optional):	
Classroom:	**311-3120**	Office #:	
Class Dates:	**Aug 17- Dec 11,2015**	Office Hours:	**11:30am – 2:00pm**
Class Days:	**T. W. R.**	Office Phone #:	**760-355-6319 Secretary/Division Office 760-355-6361 Secretary/Dean's Office 760-355-6217 Division Coordinator 760-355-6361**
Class Times:	8:00am-100:10 am	Emergency Contact:	
Units:	5 units		

Course Description

The student will be exposed to complete basic study of welding technology up to include health and safety. Personal protective equipment, fire protection and electrical safety. The student practice techniques for skill development in shield metal arc welding (SMAW)., gas tungsten arc welding (GTAW), flux cored arc welding (FCAW), soldering/brazing welding (S/BW), and oxygen-acetylene (OXY-ACE) welding and cutting processes.

In addition, American Welding Society, Code pf Federal Regulations (CFRS), specifications and welding standards will be discussed during the course of this semester.

Student Learning Outcomes

The student must be able to understand and demonstrate the basic techniques in SMAW, GTAW and OXY-ACE, FCAW, S&BW process. Also, students must be able to demonstrate proper use and identification of fire extinguisher classification, first, second and third degree burns/electrical hazards, respiratory protection, AWS Standard, Health and Safety, and Fire Protection.

In addition, students must take personal responsibility for their own safety and the safety of others.

The teacher will discuss, explain in detail and demonstrate each welding technique and process. Students are encouraged to ask questions and/or seek assistance during classroom or welding presentations, or at any time during the sessions. In the event the student do not comprehend and has a legitimate questions associated with the test book, students are encourage to contact the teacher 24/7.

Students must display team building attitude, interest and goodwill at all time.

Course Objectives

Students are made aware of other organizations. The most common is the American Welding Society and its associated codes:

A. AWS D1. 1 Structural Welding Code Steel
B. AWS D1.2 Structural Welding Code Aluminum
C. AWS D1.3 Structural Welding Code Sheet Metal
D. AWS D1.4 Structural Welding Code Reinforcing Steel
E. AWS D1.5 Bridge Welding Code
F. American National Standards Institute (ANSI) Z49.1 Protective Foot Wear
G. ANSI Z89 Safety Glasses

Further, the following Code of Federal Regulations (CFRs) and National Standards will be briefly discussed during the course of this semester.

A. CFR 29-Labor Occupational Safety and Health Administration
B. CFR 40-Protection of the Environment
C. CFR 49-Transportation of Hazardous Materials

Above mentioned CFRs and/or standards are integral parts and/or associated with welding technology.

Textbooks & Other Resources or Links

Welding Technology Fundamentals
William A Bowditch, Kevin E. Bowditch and Mark A. Bowditch

In addition, teaching material, assignments and presentations will correspond to written examinations, laboratory assignments, class room presentations and Final Examination. Presentations and familiarizations are conducted by reviewing handbooks and publications published by the American Welding Society, American National Standards Institute (ANSI) the Occupational Safety and Health Administration (OSHA), OxyfuelGas Welding, Cuttings and Heating Safety, and Safety in Welding, Cutting and Allied Processes (ANSI) Z49.1

The student must be able to understand and demonstrate the basis techniques in SMAW, GTAW and OXY-ACE, FCAW, S&BW processes. Also, students must be able to demonstrate proper use and identification of fire extinguisher classification, burns/electrical hazards respiratory protection, AWS standards, health and safety, and fire protection.

In addition, students must take personal responsibility for their own safety and the safety of others.

The teacher will discuss, explain in detail and demonstrate each welding techniques and process.

Students are encourage to ask questions and/or seek assistance during classroom or welding presentations, or at any time during the sessions. In the event the student does not comprehend and has a legitimate questions associated with the text book, students are encourage to contact the teacher 24/7.

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
9. Al other equipment, materials, and supplies will be contribute to the learning process and success in the course.
10. For health and safety reasons, students are encourage to purchase their personal protective equipment (welding jacket and welding helmet).
    (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

Date or Week	Activity, Assignment, and/or Topic	Pages/ Due Dates/Tests
Week 1 August 19 - 21	Syllabus & Introduction Chapter 1-15-Science of Development	Pages 1-502
Week 2 August 28 - 30	Chapter 1-15 continued Chapter 16 -Biology of Mind	Pages 504-505
Week 3 September 4-6	Paper: Distinguishing myth from science during first 2 years of life.	Due 9-16-2015
	etc	

Tentative, subject to change without prior notice

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 4: Shielded Metal Arc Welding (SMAW)		
1 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
2 Make minor external repairs to SMAW equipment and accessories.	**Text:** Ch. 5: 131, 134–138	Job 6B-1
3 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
4 Operate SMAW equipment on carbon steel.	**Text:** Ch. 6: 161–172, 176–186	**Lab Workbook:** Jobs 6B-2 through 6B-5 All Jobs in Lessons 6C, 6D, and 6E
5 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 6D Job 6D-1 Job 6D-2 Lesson 6E Job 6E-1 Job 6E-2 Job 6E-4 Job 6E-5
6 Make groove welds in all positions on carbon steel.	**Text:** Ch. 6: 173, 180–185	**Lab Workbook:** Lesson 6C Job 6C-1 Job 6C-4 Lesson 6D Job 6D-3 Lesson 6E Job 6E-3 Job 6E-6
7 Passes SMAW welder performance qualification test (2G and 3G, uphill, limited thickness test plates) on carbon steel.	Ch. 31: 797–799	

Module 5: Gas Metal Arc Welding (GMAW-S, GMAW Spray Transfer)		
Note: Jobs in the Lab Workbook can be modified as necessary by changing the specified metal transfer method.		
1 Perform safety inspection of GMAW equipment and accessories.	**Text:** Ch. 7: 208–222, 226 Ch. 9: 275, 291	**Lab Workbook:** Lesson 9A Job 6B-1
2 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		
3 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
4 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
5 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
6 Make groove welds in all positions on carbon steel.	**Text:** Ch. 9: 268–270, 294–298	**Lab Workbook:** Job 9E-3 Job 9E-6
7 Passes GMAW-S welder performance qualification test on carbon steel.		

Spray Transfer		
8 Set up for GMAW (spray) operations on carbon steel.	**Text:** Ch. 9: 271–290	**Lab Workbook:** Lesson 7B Lesson 9C Job 9D-7
9 Operate GMAW (spray) equipment on carbon steel.	**Text:** Ch. 9: 271–272, 291–302	**Lab Workbook:** Lesson 9B Lesson 9D Job 9D-3 Job 9D-4 Job 9D-5 Job 9D-7
10 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
11 Make groove welds in the 1G position on carbon steel.	**Text:** Ch. 9: 271–272, 294–295	**Lab Workbook:** Job 9D-4
12 Passes GMAW (spray) welder performance qualification test on carbon steel.	Ch. 31: 797–799	
Module 6: Flux Cored Arc Welding (FCAW-G/GM, FCAW-S)		
Note: Jobs in the Lab Workbook can be changed from the GMAW process to the FCAW-G or FCAW method.		
1 Perform safety inspections of FCAW equipment and accessories.	**Text:** Ch. 9: 275, 291	**Lab Workbook:** Job 6B-1 Lesson 9A
2 Make minor external repairs to FCAW equipment and accessories.	**Text:** Ch. 6: 214 Ch. 7: 220 Ch. 9: 278–281, 289–290	Job 6B-1 Lesson 7B
Gas Shielded		
3 Set up for FCAW-G/GM operations on carbon steel.	**Text:** Ch. 9: 273–290	**Lab Workbook:** Lesson 7B Lesson 9C All welding jobs in Lessons 9D and 9E require the setting of variables.
4 Operate FCAW-G/GM equipment on carbon steel.	**Text:** Ch. 9: 291–298	**Lab Workbook:** Lessons 9D and 9E Jobs 9D-2 through 9D-6 All Jobs in Lesson 9E

5 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
6 Make groove welds in all positions on carbon steel.	**Text:** Ch. 9: 294–298	**Lab Workbook:** Lessons 9D and 9E Job 9D-4 Job 9D-7 Job 9E-3 Job 9E-6
7 Passes FCAW-G/GM welder performance qualification test on carbon steel.	Ch. 31: 797–799	
Self-Shielded		
8 Set up for FCAW-S operations on carbon steel.	**Text:** Ch. 9: 273–281, 289–290	**Lab Workbook:** Lesson 7B Lesson 9C Job 9D-1
9 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
10 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
11 Make groove welds in all positions on carbon steel.	**Text:** Ch. 9: 294–298	**Lab Workbook:** Job 9D-4 Job 9D-7 Job 9E-3 Job 9E-6
12 Passes FCAW-S welder performance qualification test on carbon steel.	Ch. 31: 797–799	

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.