

## SchSkill Trd, Appr & Renew Tech

### Basic Welding

2019-2020 Academic Year

Program	Year	Semester
START-Trades Fundamentals Certificate	1	2

<b>Course Code:</b> TFBW 1304	<b>Course Equiv. Code(s):</b> MPAW 2400
<b>Course Hours:</b> 42	<b>Course GPA Weighting:</b> 3
<b>Prerequisite:</b> N/A	
<b>Corequisite:</b> N/A	
<b>Laptop Course:</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
<b>Delivery Mode(s):</b> In class <input checked="" type="checkbox"/> Online <input type="checkbox"/> Hybrid <input type="checkbox"/> Correspondence <input type="checkbox"/>	
<b>Authorized by (Dean or Director):</b> Rebecca Milburn	<b>Date:</b> June 2019

Prepared by		
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## Course Description:

This course includes a 1 hour theory and a 2 hour practical class. The theory portion develops the student's knowledge of the Oxy Fuel, SMAW and GMAW welding processes. The student will learn about equipment and components, welding procedures, quality and safety. In the 2 hour practical, the student will learn to apply the principles from the theory class. They will practice welding using the Oxy Fuel, SMAW and GMAW welding processes.

## Subject Eligibility for Prior Learning Assessment & Recognition (PLAR):

Prior Learning Assessment and Recognition (PLAR) is a process a student can use to gain college credit(s) for learning and skills acquired through previous life and work experiences. Candidates who successfully meet the course learning outcomes of a specific course may be granted credit based on the successful assessment of their prior learning. The type of assessment method (s) used will be determined by subject matter experts. Grades received for the PLAR challenge will be included in the calculation of a student's grade point average.

The PLAR application process is outlined in <http://www.durhamcollege.ca/plar>. Full-time and part-time students must adhere to all deadline dates. Please email: [PLAR@durhamcollege.ca](mailto:PLAR@durhamcollege.ca) for details.

### PLAR Eligibility

Yes  No

### PLAR Assessment (if eligible):

- Assignment
- Exam
- Portfolio
- Other

Skills Demonstration

## Course Learning Outcomes

Course Learning Outcomes contribute to the achievement of Program Learning Outcomes for courses that lead to a credential (e.g. diploma). A complete list of Vocational/Program Learning Outcomes and Essential Employability Skill Outcomes are located in each Program Guide.

### Course Specific Learning Outcomes (CLO)

Student receiving a credit for this course will have reliably demonstrated their ability to:

- CLO1 Define the fundamentals, components and equipment of the oxy-fuel welding process.
- CLO2 Describe and practice the safe use of all welding processes and equipment.
- CLO3 Perform fusion welding and cutting of mild steel.
- CLO4 Define the fundamentals, equipment and components of the Gas Metal Arc Welding(GMAW) process.
- CLO5 Perform the welds required using the Gas Metal Arc Welding (GMAW) process with relevant materials used in the automotive industry.
- CLO6 Define the fundamentals, equipment and the components of the Shielded Metal Arc Welding(SMAW) process with relevant materials used in the automotive industry.
- CLO7 Perform the welds required using the Shielded Metal Arc Welding(SMAW).

### Essential Employability Skill Outcomes (ESSO)

This course will contribute to the achievement of the following Essential Employability Skills:

- EES 1. Communicate clearly, concisely and correctly in the written, spoken, and visual form that fulfills the purpose and meets the needs of the audience.
- EES 2. Respond to written, spoken, or visual messages in a manner that ensures effective communication.
- EES 3. Execute mathematical operations accurately.
- EES 4. Apply a systematic approach to solve problems.
- EES 5. Use a variety of thinking skills to anticipate and solve problems.
- EES 6. Locate, select, organize, and document information using appropriate technology and information systems.
- EES 7. Analyze, evaluate, and apply relevant information from a variety of sources.
- EES 8. Show respect for the diverse opinions, values, belief systems, and contribution of others.
- EES 9. Interact with others in groups or teams in ways that contribute to effective working relationships and the achievement of goals.
- EES 10. Manage the use of time and other resources to complete projects.
- EES 11. Take responsibility for one's own actions, decisions, and consequences.

## Evaluation Criteria:

The Course Learning Outcomes and Essential Employability Skills Outcomes are evaluated by the following evaluation criterion.

Evaluation Description	Course Learning Outcomes	EESOs	Weighting
Oxy Acetylene Theory Test	CLO1, CLO2, CLO3	EES2, EES10, EES11	15
Oxy Acetylene Practical Assignment	CLO1, CLO2, CLO3	EES2, EES5, EES9, EES10, EES11	15
GMAW Theory Test	CLO2, CLO4	EES1, EES2, EES5, EES10, EES11	15
GMAW Practical Assignment	CLO2, CLO5	EES2, EES5, EES9, EES10, EES11	15
SMAW Theory Test	CLO2, CLO6, CLO7	EES1, EES2, EES10, EES11	10
SMAW Weld Assignment	CLO2, CLO7	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	15
In Process	CLO1, CLO2, CLO3, CLO4, CLO5, CLO6, CLO7	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	15
<b>Total</b>			<b>100%</b>

### Notes:

1. The opportunity to attempt a missed test is at the discretion of the course professor. If a student is permitted to attempt a missed test, rescheduling is to be arranged by the student at the test centre within one week of the missed test.
2. Test dates are tentative and will be confirmed by the professor.
3. Part of the content and evaluation of this course is to be completed online and it is the responsibility of the student to become familiar with the use of DC Connect in order to complete the course successfully.
4. Assignments, labs, tests and in process activities may not be redone. Extra assignments will not be created for students to increase their grades during or after the course is complete. Missed assignments and tests receive a mark of zero.
5. In the event of unexpected absence, students must contact the professor before the class starts. The student must provide appropriate documentation to validate the absence and secure permission for the assignment to be submitted at a later time and/or date.

## Required Text(s) and Supplies:

1. PPE Required:  
Welding Gloves, Safety Glasses, CSA Approved Work Boots, Long Pants (Denim)

## Recommended Resources (purchase is optional):

N/A

# Policies and Expectations for the Learning Environment:

## General Policies and Expectations:

General College policies related to	General policies related to
+ Acceptable Use of Information Technology	+ attendance
+ Academic Policies	+ absence related to tests or assignment due dates
+ Academic Honesty	+ excused absences
+ Student Code of Conduct	+ writing tests and assignments
+ Students' Rights and Responsibilities can be found on-line at <a href="http://www.durhamcollege.ca/academicpolicies">http://www.durhamcollege.ca/academicpolicies</a>	+ classroom management can be found in the Program Guide (full time programs only) in MyCampus <a href="http://www.durhamcollege.ca/mycampus/">http://www.durhamcollege.ca/mycampus/</a>

## Course Specific Policies and Expectations:

## General Course Outline Notes:

1. Students should use the course outline as a learning tool to guide their achievement of the learning outcomes for this course. Specific questions should be directed to their individual professor.
2. The college considers the electronic communication methods (i.e. DC Mail or DC Connect) as the primary channel of communication. Students should check the sources regularly for current course information.
3. Professors are responsible for following this outline and facilitating the learning as detailed in this outline.
4. Course outlines should be retained for future needs (i.e. university credits, transfer of credits etc.)
5. A full description of the Academic Appeals Process can be found at <http://durhamcollege.ca/gradeappeal>.
6. Faculty are committed to ensuring accessible learning for all students. Students who would like assistance with academic access and accommodations in accordance with the Ontario Human Rights Code should register with the Access and Support Centre (ASC). ASC is located in room SW116, Oshawa Campus and in room 180 at the Whitby Campus. Contact ASC at 905-721-3123 for more information.
7. Durham College is committed to the fundamental values of preserving academic integrity. Durham College and faculty members reserve the right to use electronic means to detect and help prevent plagiarism. Students agree that by taking this course all assignments could be subject to submission either by themselves or by the faculty member for a review of textual similarity to Turnitin.com. Further information about Turnitin can be found on the Turnitin.com Web site.

# Learning Plan

The Learning Plan is a planning guideline. Actual delivery of content may vary with circumstances.

Students will be notified in writing of changes that involve the addition or deletion of learning outcomes or evaluations, prior to changes being implemented, as specified in the Course Outline Policy and Procedure at Durham College.

Wk.	Hours:	1	Delivery:	In Class
1	<b>Course Learning Outcomes</b>			
	CLO1, CLO2			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES9, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES9, EES10, EES11
	<b>Intended Learning Objectives</b>			
	Program Orientation Times, dates of program. Classroom and workshop timetable. Evaluation methods and procedures. Safety standards and procedures in welding. Personal safety. Workshop safety. Emergency procedures. Fire drill. Fire extinguishers and blankets. Protective clothing. Welding goggles and filter lenses. Fumes and ventilation. Oxygen. Safety precautions and standards. Cylinders. Rupture disc. Pressure regulators. Acetylene. Safety precautions and standards. Cylinders. Fusible plugs. Generators. Pressure regulators. Other industrial gasses.			
	<b>Intended Learning Activities</b>			
	Power point presentations Guided discussions Demonstrations			
	<b>Resources and References</b>			
	N/A			
	<b>Evaluation</b>			

<b>Wk.</b>	<b>Hours:</b> 2	<b>Delivery:</b> Shop
1	<b>Course Learning Outcomes</b> CLO2, CLO3	
	<b>Essential Employability Skills</b>	
	<b>Taught:</b> EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	<b>Practiced:</b> EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11
	<b>Intended Learning Objectives</b> Setting up Oxy Acetylene Equipment and shutting it down properly. Setting the flame, knowing the difference between carburizing, neutral and oxidizing flames. -Carrying a molten pool without filler wire. - Corner joint w/o filler wire. - Butt joint w/o filler wire.	
	<b>Intended Learning Activities</b> Demonstrations Discussions	
	<b>Resources and References</b> N/A	
<b>Evaluation</b> In Process - On Going	<b>Weighting</b> 15	

Wk.	Hours: 1	Delivery: In Class
2	<b>Course Learning Outcomes</b> CLO1, CLO2	
	<b>Essential Employability Skills</b> <b>Taught:</b> EES1, EES2, EES9, EES10, EES11 <b>Practiced:</b> EES1, EES2, EES9, EES10, EES11	
	<b>Intended Learning Objectives</b> Handling oxygen and acetylene cylinders safely. Maintaining Set-up and operating the oxy fuel equipment safely. Pressure Regulator Operation and maintenance. Two stage regulators. Diaphragms Gauges. Working pressure. Cylinder pressure. Line Resistance. Fuel gasses. Acetylene. Methylacetylene-propadiene (MPS). MAPP. Propane and Natural gas. Hydrogen. Oxy fuel flames.	
	<b>Intended Learning Activities</b> Power point presentations Guided discussions Demonstrations	
	<b>Resources and References</b> N/A	
	<b>Evaluation</b>	



<b>Wk.</b>	<b>Hours:</b> 2	<b>Delivery:</b> Shop
2	<b>Course Learning Outcomes</b> CLO2, CLO3	
	<b>Essential Employability Skills</b>	
	<b>Taught:</b> EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	<b>Practiced:</b> EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11
	<b>Intended Learning Objectives</b> <ul style="list-style-type: none"> <li>- Corner joint with out filler wire.</li> <li>- Butt joint w/o filler wire.</li> <li>- Lap joint in the Horizontal position with filler wire.</li> </ul>	
	<b>Intended Learning Activities</b> Demonstrations Discussions	
	<b>Resources and References</b> N/A	
<b>Evaluation</b>		

Wk.	Hours: 1	Delivery: In Class
3	<b>Course Learning Outcomes</b> CLO1, CLO2	
	<b>Essential Employability Skills</b>  <b>Taught:</b> EES1, EES2, EES9, EES10, EES11 <b>Practiced:</b> EES1, EES2, EES9, EES10, EES11	
	<b>Intended Learning Objectives</b> Welding and cutting torches care and use: <ul style="list-style-type: none"> <li>- Types of torches</li> <li>- Service</li> <li>- Mixing the gasses</li> <li>- Welding and heating tips</li> <li>- Welding tip cleaners.</li> <li>- Flashback arresters</li> <li>- Reverse flow check valves</li> <li>- Hoses and fittings</li> <li>- Flashbacks and backfires</li> <li>- Types of flames</li> <li>- Leak detection</li> <li>- Turning on and testing a torch</li> <li>- Turning off the welding torch</li> <li>- Dismantling and storage of the equipment</li> <li>- Manifold systems and operations</li> </ul>	
	<b>Intended Learning Activities</b> Power point presentations Guided discussions Demonstrations	
	<b>Resources and References</b> N/A	
	<b>Evaluation</b>	

Wk.	Hours: 2	Delivery: Shop
3	<b>Course Learning Outcomes</b> CLO2, CLO3	
	<b>Essential Employability Skills</b> <b>Taught:</b> EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11 <b>Practiced:</b> EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	
	<b>Intended Learning Objectives</b> Cube Project	
	<b>Intended Learning Activities</b> Demonstrations Discussions	
	<b>Resources and References</b> N/A	
	<b>Evaluation</b>	

Wk.	Hours: 1	Delivery: In Class
4	<b>Course Learning Outcomes</b> CLO1, CLO2	
	<b>Essential Employability Skills</b> <b>Taught:</b> EES1, EES2, EES9, EES10, EES11 <b>Practiced:</b> EES1, EES2, EES9, EES10, EES11	
	<b>Intended Learning Objectives</b> Identify and describe the basic safe set up and operation of the Oxy fuel cutting process including: <ul style="list-style-type: none"> <li>-Eye protection</li> <li>-Types of cutting torches</li> <li>-Cutting tips</li> <li>-Hand cutting</li> <li>-Selecting the correct tips and pressures -Chemistry and physics of the cut</li> <li>-Preheat</li> <li>-Speed</li> <li>-Safe set up of the oxy acetylene cutting equipment -Pressure</li> <li>-Slag</li> <li>-Plate cutting</li> <li>-Methods of improving cuts</li> <li>-Distortion and Warpage control</li> <li>-Pipe cutting Techniques</li> <li>-Edge preparations.</li> </ul>	
	<b>Intended Learning Activities</b> Power point presentations Guided discussions Demonstrations	
	<b>Resources and References</b> N/A	
	<b>Evaluation</b>	

<b>Wk.</b>	<b>Hours:</b>	<b>Delivery:</b>
	2	Shop
4	<b>Course Learning Outcomes</b> CLO2, CLO3	
	<b>Essential Employability Skills</b>	
	<b>Taught:</b>	<b>Practiced:</b>
	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11
	<b>Intended Learning Objectives</b> Safe assembly of the Oxy fuel cutting equipment. Cube Project Cut a straight line, a bevelled line and cut a circle out of mild steel plate.	
	<b>Intended Learning Activities</b> Demonstrations Discussions	
<b>Resources and References</b> N/A		
<b>Evaluation</b>		
<b>Wk.</b>	<b>Hours:</b>	<b>Delivery:</b>
	1	In Class
5	<b>Course Learning Outcomes</b> CLO1, CLO2	
	<b>Essential Employability Skills</b>	
	<b>Taught:</b>	<b>Practiced:</b>
	EES1, EES2, EES10, EES11	EES1, EES2, EES10, EES11
	<b>Intended Learning Objectives</b> Final oxy acetylene test.	
	<b>Intended Learning Activities</b> Power point presentations Guided discussions Demonstrations	
<b>Resources and References</b> N/A		
<b>Evaluation</b> Final Oxy Acetylene Test.		<b>Weighting</b> 15

<b>Wk.</b>	<b>Hours:</b>	<b>Delivery:</b>
	2	Shop
5	<b>Course Learning Outcomes</b> CLO2, CLO3	
	<b>Essential Employability Skills</b>	
	<b>Taught:</b>	<b>Practiced:</b>
	EES1, EES2, EES3, EES4, EES5, EES10, EES11	EES1, EES2, EES3, EES4, EES5, EES10, EES11
	<b>Intended Learning Objectives</b> Corner, butt, and lap joint as per blueprint. Carrying out all safety standards control distortion final welds free of all defects.	
	<b>Intended Learning Activities</b> Demonstrations Discussions	
<b>Resources and References</b> N/A		
<b>Evaluation</b> Oxy Acetylene Practical Test		<b>Weighting</b> 15
<b>Wk.</b>	<b>Hours:</b>	<b>Delivery:</b>
	1	In Class
6	<b>Course Learning Outcomes</b> CLO2, CLO4	
	<b>Essential Employability Skills</b>	
	<b>Taught:</b>	<b>Practiced:</b>
	EES1, EES2, EES9, EES10, EES11	EES1, EES2, EES9, EES10, EES11
	<b>Intended Learning Objectives</b> Define the fundamentals of the GMAW process.  Modes of metal transfer: - Short Circuit - Globular - Spray	
	<b>Intended Learning Activities</b> Power point presentations Guided discussions Demonstrations	
<b>Resources and References</b> N/A		
<b>Evaluation</b>		

Wk.	Hours: 2	Delivery: Shop
6	<b>Course Learning Outcomes</b> CLO2, CLO5	
	<b>Essential Employability Skills</b> <b>Taught:</b> EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11 <b>Practiced:</b> EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	
	<b>Intended Learning Objectives</b> Safe set up and operation of the arc welding equipment. Clean and inspect welding helmets. Filter lens selection. Ventilation system.  -Beads and weave technique in the flat position. -Corner welds in the flat position.	
	<b>Intended Learning Activities</b> Demonstrations Discussions	
	<b>Resources and References</b> N/A	
	<b>Evaluation</b>	

Wk.	Hours: 1	Delivery: In Class
7	<b>Course Learning Outcomes</b> CLO4	
	<b>Essential Employability Skills</b> <b>Taught:</b> EES1, EES2, EES9, EES10, EES11 <b>Practiced:</b> EES1, EES2, EES9, EES10, EES11	
	<b>Intended Learning Objectives</b> Explain the function of the components in the GMAW process. <ul style="list-style-type: none"> <li>- Welding Machine(power source)</li> <li>- Cable Assembly</li> <li>- Shielding Gas</li> <li>- Wire Feeder</li> <li>- Spool gun</li> <li>- Drive Roll Assembly</li> <li>- Liners</li> <li>- Gas Diffuser</li> <li>- Contact Tip</li> <li>- Nozzles</li> </ul>	
	<b>Intended Learning Activities</b> Power point presentations Guided discussions Demonstrations	
	<b>Resources and References</b> N/A	
	<b>Evaluation</b>	



<b>Wk.</b>	<b>Hours:</b>	<b>Delivery:</b>
	2	Shop
7	<b>Course Learning Outcomes</b> CLO2, CLO5	
	<b>Essential Employability Skills</b>	
	<b>Taught:</b>	<b>Practiced:</b>
	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11
	<b>Intended Learning Objectives</b>	
	Safe set up and operation of the arc welding equipment. Clean and inspect welding helmets.  -Fillet welds in the horizontal position.	
<b>Intended Learning Activities</b>		
Demonstrations Discussions		
<b>Resources and References</b>		
N/A		
<b>Evaluation</b>		
<b>Wk.</b>	<b>Hours:</b>	<b>Delivery:</b>
	1	In Class
8	<b>Course Learning Outcomes</b> CLO4	
	<b>Essential Employability Skills</b>	
	<b>Taught:</b>	<b>Practiced:</b>
	EES1, EES2, EES9, EES10, EES11	EES1, EES2, EES9, EES10, EES11
	<b>Intended Learning Objectives</b>	
	Describe the procedure variables for GMAW and their affect on quality and productivity. - Setting speed and feed rates, - Filler wire types, - Analysis of weld positions and techniques.	
<b>Intended Learning Activities</b>		
Power point presentations Guided discussions Demonstrations		
<b>Resources and References</b>		
N/A		
<b>Evaluation</b>		

<b>Wk.</b>	<b>Hours:</b>	<b>Delivery:</b>
	2	Shop
8	<b>Course Learning Outcomes</b> CLO2, CLO5	
	<b>Essential Employability Skills</b>	
	<b>Taught:</b>	<b>Practiced:</b>
	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11
	<b>Intended Learning Objectives</b>	
	Safe set up and operation of the arc welding equipment. Clean and inspect welding helmets.  - Multi-pass fillet welds in the flat position. - Multi-pass fillet welds in the horizontal position. - GMAW welding sheet metal.	
<b>Intended Learning Activities</b>		
Demonstrations Discussions		
<b>Resources and References</b>		
N/A		
<b>Evaluation</b>		
<b>Wk.</b>	<b>Hours:</b>	<b>Delivery:</b>
	1	In Class
9	<b>Course Learning Outcomes</b> CLO2, CLO4	
	<b>Essential Employability Skills</b>	
	<b>Taught:</b>	<b>Practiced:</b>
	EES1, EES2, EES9, EES10, EES11	EES1, EES2, EES9, EES10, EES11
	<b>Intended Learning Objectives</b>	
	Describe the set up and use of GMAW process for welding sheet metal. Understanding the machine and the methods.	
<b>Intended Learning Activities</b>		
Power point presentations Guided discussions Demonstrations		
<b>Resources and References</b>		
N/A		
<b>Evaluation</b>		

<b>Wk.</b>	<b>Hours:</b>	<b>2</b>	<b>Delivery:</b>	<b>Shop</b>
9	<b>Course Learning Outcomes</b> CLO2, CLO5			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11
	<b>Intended Learning Objectives</b> Welding sheet metal			
	<b>Intended Learning Activities</b> Demonstrations Discussions			
	<b>Resources and References</b> N/A			
<b>Evaluation</b>				
<b>Wk.</b>	<b>Hours:</b>	<b>1</b>	<b>Delivery:</b>	<b>In Class</b>
10	<b>Course Learning Outcomes</b> CLO2, CLO4			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES10, EES11
	<b>Intended Learning Objectives</b> Gas Metal Arc Welding Theory Test			
	<b>Intended Learning Activities</b> Power point presentations Guided discussions Demonstrations			
	<b>Resources and References</b> N/A			
<b>Evaluation</b> Gas Metal Arc Welding Theory Test			<b>Weighting</b> 15	

<b>Wk.</b>	<b>Hours:</b>	<b>2</b>	<b>Delivery:</b>	<b>Shop</b>
10	<b>Course Learning Outcomes</b> CLO2, CLO5			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES3, EES4, EES5, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES3, EES4, EES5, EES10, EES11
	<b>Intended Learning Objectives</b> Practical test			
	<b>Intended Learning Activities</b> Demonstrations Discussions			
	<b>Resources and References</b> Text -Construction Health and Safety Manual -DC Connect			
<b>Evaluation</b>		Gas Metal Arc Welding Practical Assignment		<b>Weighting</b> 15
<b>Wk.</b>	<b>Hours:</b>	<b>1</b>	<b>Delivery:</b>	<b>In Class</b>
11	<b>Course Learning Outcomes</b> CLO2, CLO6			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES9, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES9, EES10, EES11
	<b>Intended Learning Objectives</b> Define the fundamentals of the shielded Metal Arc Welding Process. - Development of arc welding. - Fusion - Arc characteristics, - Arc length. - Effect on voltage. - Travel speed - Weld contamination protection.			
	<b>Intended Learning Activities</b> Power point presentations Guided discussions Demonstrations			
	<b>Resources and References</b> N/A			
<b>Evaluation</b>				

Wk.	Hours: 2	Delivery: Shop
11	<b>Course Learning Outcomes</b> CLO2, CLO7	
	<b>Essential Employability Skills</b> <b>Taught:</b> EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11 <b>Practiced:</b> EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	
	<b>Intended Learning Objectives</b> Safe set up and operation of the arc welding equipment. Clean and inspect welding helmets. Filter lens selection. Ventilation system. Chipping hammer wire brush.  -Bead and weave techniques using E4914 electrodes.	
	<b>Intended Learning Activities</b> Demonstrations Discussions	
	<b>Resources and References</b> N/A	
	<b>Evaluation</b> Fillet Weld - Flat	

<b>Wk.</b>	<b>Hours:</b>	<b>1</b>	<b>Delivery:</b>	<b>In Class</b>
12	<b>Course Learning Outcomes</b> CLO2, CLO6			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES9, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES9, EES10, EES11
	<b>Intended Learning Objectives</b>			
	Describe the equipment requirements of the shielded Metal Arc Welding Process.			
	Describe the equipment set up and process. <ul style="list-style-type: none"> <li>- Power sources.</li> <li>- Power source control</li> <li>- Arc force</li> <li>- Electrodes</li> <li>- Electrode holders</li> <li>- Welding cables</li> </ul>			
<b>Intended Learning Activities</b>				
Power point presentations Guided discussions Demonstrations				
<b>Resources and References</b>				
N/A				
<b>Evaluation</b>				
<b>Wk.</b>	<b>Hours:</b>	<b>2</b>	<b>Delivery:</b>	<b>Shop</b>
12	<b>Course Learning Outcomes</b> CLO2, CLO7			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11
	<b>Intended Learning Objectives</b>			
	<ul style="list-style-type: none"> <li>- Flat welding techniques using E4914 electrodes</li> <li>- Open corner multi pass exercise.</li> </ul>			
	<b>Intended Learning Activities</b>			
Demonstrations Discussions				
<b>Resources and References</b>				
N/A				
<b>Evaluation</b>				

<b>Wk.</b>	<b>Hours:</b>	<b>1</b>	<b>Delivery:</b>	<b>In Class</b>
13	<b>Course Learning Outcomes</b> CLO2, CLO6			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES9, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES9, EES10, EES11
	<b>Intended Learning Objectives</b> Review			
	<b>Intended Learning Activities</b> Power point presentations Guided discussions Demonstrations			
	<b>Resources and References</b> N/A			
<b>Evaluation</b>				
<b>Wk.</b>	<b>Hours:</b>	<b>2</b>	<b>Delivery:</b>	<b>Shop</b>
13	<b>Course Learning Outcomes</b> CLO2, CLO7			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES3, EES4, EES5, EES9, EES10, EES11
	<b>Intended Learning Objectives</b> - Horizontal welding techniques using E4918 electrodes-multi pass exercise.			
	<b>Intended Learning Activities</b> Demonstrations Discussions			
	<b>Resources and References</b> N/A			
<b>Evaluation</b>				

<b>Wk.</b>	<b>Hours:</b>	<b>1</b>	<b>Delivery:</b>	<b>In Class</b>
14	<b>Course Learning Outcomes</b> CLO2, CLO6			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES10, EES11
	<b>Intended Learning Objectives</b> SMAW Theory Test			
	<b>Intended Learning Activities</b> Power point presentations Guided discussions Demonstrations			
	<b>Resources and References</b> N/A			
<b>Evaluation</b> SMAW Theory Test		<b>Weighting</b> 10		
<b>Wk.</b>	<b>Hours:</b>	<b>2</b>	<b>Delivery:</b>	<b>Shop</b>
14	<b>Course Learning Outcomes</b> CLO2, CLO7			
	<b>Essential Employability Skills</b>			
	<b>Taught:</b>	EES1, EES2, EES3, EES4, EES5, EES10, EES11	<b>Practiced:</b>	EES1, EES2, EES3, EES4, EES5, EES10, EES11
	<b>Intended Learning Objectives</b> SMAW Practical Assignment			
	<b>Intended Learning Activities</b> Demonstrations Discussions			
	<b>Resources and References</b> N/A			
<b>Evaluation</b> SMAW Practical Assignment		<b>Weighting</b> 15		