

COURSE FAB2070: GAS METAL ARC WELDING 1**Level:** Intermediate**Theme:** Fabrication Processes**Prerequisite:** FAB1048 Semi-automated/Automated Welding**Description:** Students develop an understanding of the advantages and disadvantages of gas metal arc welding (GMAW) processes, and they gain experience using GMAW processes by performing flat, horizontal and vertical fillet welds and flat groove welds.**Parameters:** Access to a fabrication work centre complete with gas metal arc welding (GMAW) equipment and supplies, and to instruction from an individual with formal, specialized training in arc welding practices.**Curriculum and Assessment Standards**

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> outline the advantages and disadvantages of GMAW processes versus other forms of arc welding processes describe the characteristics of a desirable gas metal arc weld 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> a written or oral presentation that outlines four advantages of GMAW processes over other forms of arc welding processes <p><i>Assessment Tool</i> <i>Presentations/Reports: Advantages of Gas Metal Arc Welding, FAB2070-1</i></p> <p><i>Standard</i> <i>Performance rating of 2 for each applicable task</i></p>	10
	<ul style="list-style-type: none"> identification and description of five visual characteristics of a weld that meets trade standards <p><i>Assessment Tool</i> <i>Fabrication Process: Light Gauge Fillet Welds, FAB2070-2</i> <i>Illustrative Example:</i> <i>Vertical Lap Joint Fillet Weld, FAB2070-3</i></p> <p><i>Standard</i> <i>Performance rating of 3 for each applicable task</i></p>	10

COURSE FAB2070: GAS METAL ARC WELDING 1 (continued)

General Outcomes	Assessment Criteria and Conditions	Suggested Emphasis
<p><i>The student will:</i></p> <ul style="list-style-type: none"> • perform safe set-up and maintenance procedures with GMAW equipment • demonstrate safe GMAW practices to perform: <ul style="list-style-type: none"> – fillet welds on mild steel plate in the flat, horizontal and vertical positions – groove welds on mild steel plate in the flat position • demonstrate basic competencies 	<p><i>Assessment of student achievement should be based on:</i></p> <ul style="list-style-type: none"> • demonstration of safe start-up, shut-down and maintenance procedures, using GMAW equipment <p><i>Assessment Tools</i> <i>Equipment Checklist: GMAW Set-up and Maintenance Procedures, FABEQUIP-6</i></p> <p><i>Standard</i> <i>All procedures to be performed correctly</i></p> <ul style="list-style-type: none"> • demonstration of safe GMAW practices and the completion of: <ul style="list-style-type: none"> – two flat, two horizontal and two vertical fillet welds on mild steel plate, using GMAW processes – two flat groove welds on mild steel plate, using GMAW processes <p><i>Assessment Tool</i> <i>Fabrication Process: Light Gauge Fillet Welds, FAB2070-2</i> <i>Illustrative Example: Vertical Lap Joint Fillet Weld, FAB2070-3</i></p> <p><i>Standard</i> <i>Welds are to be free of visible structural defects and are to have uniform reinforcement</i> <i>Performance rating of 3 for each applicable task</i></p> <ul style="list-style-type: none"> • observations of individual effort and interpersonal interaction during the learning process. <p><i>Assessment Tool</i> <i>Basic Competencies Reference Guide and any assessment tools noted above</i></p>	<p>10</p> <p>70</p> <p>Integrated throughout</p>

COURSE FAB2070: GAS METAL ARC WELDING 1 (continued)

Concept	Specific Outcomes	Notes
<p>Orientation</p> <ul style="list-style-type: none"> • Health and Safety • GMAW Variables • Weld Quality 	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • describe safety issues related to: <ul style="list-style-type: none"> – the use of personal protective equipment – handling and storage of consumables – keeping the welding area free of hazards – insuring adequate ventilation • describe a safety plan in case of accident • identify the advantages and disadvantages of GMAW processes as compared to other arc welding processes • identify the variables that can directly affect weld quality; i.e.: <ul style="list-style-type: none"> – the welding current and voltage – modes of metal transfer; e.g.: <ul style="list-style-type: none"> • short arc • globular • spray arc – diameter and type of filler metal – type and condition of equipment – welding technique; e.g.: <ul style="list-style-type: none"> • forehand or pushing • backhand or pulling • identify possible causes of welding defects; e.g.: <ul style="list-style-type: none"> – surface porosity – subsurface porosity – lack of fusion – burn through – lack of penetration – coldlapping • identify problems common to out of position welding 	<p>Demonstrate forehand and backhand welding techniques.</p>

COURSE FAB2070: GAS METAL ARC WELDING 1 (continued)

Concept	Specific Outcomes	Notes
<p>Planning and Management</p> <ul style="list-style-type: none"> • Equipment Set-up • Preparation • Equipment Maintenance 	<p><i>The student should:</i></p> <ul style="list-style-type: none"> • apply safe work practices and procedures: <ul style="list-style-type: none"> – select and use appropriate personal protective equipment – maintain a clean and tidy work station – demonstrate safe tool/material handling and storage techniques • for a given type of weld and/or weldment, select the appropriate: <ul style="list-style-type: none"> – wire type, size and feed rate – current – shielding gas type and flow rate • prepare and clean all surfaces to be welded • properly position metal for welding • describe and demonstrate the maintenance required for wire drive systems and gun assemblies 	
<p>Implementation</p> <ul style="list-style-type: none"> • Gas Metal Arc Welding 	<ul style="list-style-type: none"> • demonstrate safe GMAW techniques and perform fillet welds in the flat, horizontal and vertical positions on mild steel plate • demonstrate safe GMAW techniques and perform groove welds in the flat position on mild steel plate 	
<p>Assessment</p> <ul style="list-style-type: none"> • Quality Control • Career Preparation 	<ul style="list-style-type: none"> • complete a visual inspection (i.e., non-destructive test) by observing and assessing: <ul style="list-style-type: none"> – overall size, shape and appearance of the beads – plate penetration – fusion – degree of undercutting and overlapping • perform a destructive test where appropriate • prepare a record of completed activities within a portfolio 	