

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



**SAULT
COLLEGE**

COURSE OUTLINE

COURSE TITLE: FABRICATION AND WELDING

CODE NO. : WLD200 **SEMESTER:** FOUR

PROGRAM: MECHANICAL ENGINEERING TECHNOLOGY AND
MECHANICAL ENGINEERING TECHNICIAN –
MANUFACTURING

AUTHOR: STEVE WITTY
INSTRUCTOR: CLIFF MOSS

DATE: January 2013 **PREVIOUS OUTLINE DATED:** January 2012

APPROVED: *“Corey Meunier”*
CHAIR **DATE**

TOTAL CREDITS: 2

PREREQUISITE(S): WLD121

HOURS/WEEK: 2

Copyright ©2013 The Sault College of Applied Arts & Technology
*Reproduction of this document by any means, in whole or in part, without prior
written permission of Sault College of Applied Arts & Technology is prohibited.*

***For additional information, please contact Corey Meunier, Chair
School of Technology & Skilled Trades
(705) 759-2554, Ext. 2610***

I. COURSE DESCRIPTION:

This course will build upon the set of skills developed by the successful completion of Welding–WLD121 by introducing students to common layout and fabrication techniques. Students will learn to read basic drawings and symbols in order to fabricate components to the specified size and shape. Weld quality will be verified by means of both guided bend tests and / or fillet fracture tests.

II. LEARNING OUTCOMES AND ELEMENTS OF THE PERFORMANCE:

Upon successful completion of this course, the student will demonstrate the ability to:

1. *Identify and Select Personal Protective Equipment for Arc Welding Operations.*Potential Elements of the Performance:

- identify proper eye, hand and face protection
- identify proper footwear and clothing
- identify and select filter lenses
- describe the effects of exposure to ultra violet and / or infra red radiation
- locate and identify shop ventilation controls
- locate and identify emergency exits
- locate and identify manifold shut-off valves for the shop gas system
- identify hazards associated with the SMAW / GMAW process
- understand emergency shop evacuation procedures

2. *Demonstrate the ability to read Shop Drawings in order to obtain the information required to fabricate a component or components to size and shape.*Potential Elements of the Performance:

- Identify and name structural steel shapes and plate to include
 - Angle Iron
 - Channel Iron
 - Standard Wide Flange
 - Plate
 - Sheet Metal
- Identify standard drawing abbreviations and details to include
 - N/S – F/S
 - ON CL
 - Major piece marks
 - Minor piece marks
 - Standard Material Designations

- Identify common welding symbols to include
 - AS – OS
 - Fillet Welds – length and size
 - Groove Welds – preparation and size
 - Field / Shop Welds
 - Intermittent and Staggered Welds – length and pitch
- Locate General Notes to required identify materials, welding process, electrodes and hole diameter

3. *Demonstrate the ability to fabricate components to size from information provided by simple shop drawings and / or sketches.*

Potential Elements of the Performance:

- Organize and create a clean work area appropriate to the size and type of fabrication project involved
- Determine the required hand and measuring tools
- Fabricate jigs, lugs and strong backs required to maintain alignment and minimize distortion
- Fabricate components to the specified tolerance in order to ensure proper fit up and installation

4. *Demonstrate the ability to perform GMAW procedures as well as identify and correct weld defects .*

Potential Elements of Performance:

- produce fillet and groove welds on both thin gauge and thick metals
- perform adjustments to voltage and wire feed speed in accordance with the demands of base metal thickness and joint design
- change / replace rolls of electrode wire
- change / replace shielding gas cylinders
- perform in-service adjustments to wire drive rolls, contact tip and nozzle
- identify the potential for weld defects and problems
- take the necessary steps to correct weld defects

5. *Demonstrate the ability to perform SMAW procedures as well as identify and correct weld defects .*

Potential Elements of the Performance:

- produce fillet and groove welds on metal of various thickness
- perform adjustments to welding amperage in accordance with the demands of base metal thickness and joint design
- identify the potential for weld defects and problems
- take the necessary steps to correct weld defects

III. TOPICS:

1. SAFETY AND SET UP
2. READ SHOP DRAWINGS AND SKETCHES
3. BASIC FABRICATION
4. SHIELDED METAL ARC WELDING
5. GAS METAL ARC WELDING
6. WELD QUALITY AND TESTING

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

CSA Approved (Impact Resistant) Safety Glasses
CSA Approved (6 inch High Cut) Safety Work Boots
CSA Approved (Gauntlet Type) Welding Gloves
Appropriate Work Wear (see Welding Shop Guidelines)
Modules: Course Pack WLD200

EVALUATION PROCESS/GRADING SYSTEM:Part 1 NOTES:

1. Re-writes are NOT allowed for any written assignment, quiz or test.
2. Repeats are NOT allowed for any shop test
3. Course attendance is mandatory. One percent (1 %) per hour will be deducted from the final course grade for apprentices with more than 4 hours of unexcused* absence.

[Any absence without a written, valid reason will be deemed unexcused.]

Valid reasons would include:

- Doctor's note
- Apprenticeship Ministry note
- Family Death or Serious Illness supported by a written note.

V. Part 2 Final Course Grades:

The final course grade will be determined by means of the following list of weighted factors:

<i>Factor</i>	<i>Value</i>
Shop Assignments	60 %
Theory Quiz & Test	40 %
Attendance	-1% per Unexcused Hour
Shop Clean-up	-1% per Incident

The following semester grades will be assigned to students in postsecondary courses:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
B	70 - 79%	2.00
C	60 - 69%	1.00
D	50 – 59%	0.00
F (Fail)	49% and below	
CR (Credit)	Credit for diploma requirements has been awarded.	
S	Satisfactory achievement in field /clinical placement or non-graded subject area.	
U	Unsatisfactory achievement in field/clinical placement or non-graded subject area.	
X	A temporary grade limited to situations with extenuating circumstances giving a student additional time to complete the requirements for a course.	
NR	Grade not reported to Registrar's office.	
W	Student has withdrawn from the course without academic penalty.	

VI. SPECIAL NOTES:

Attendance:

Sault College is committed to student success. There is a direct correlation between academic performance and class attendance; therefore, for the benefit of all its constituents, all students are encouraged to attend all of their scheduled learning and evaluation sessions. This implies arriving on time and remaining for the duration of the scheduled session.

It is the departmental policy that once the classroom door has been closed, the learning process has begun. Late arrivers will not be granted admission to the room.

VII. COURSE OUTLINE ADDENDUM:

The provisions contained in the addendum located on the portal form part of this course outline.