

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



Sault College

COURSE OUTLINE

COURSE TITLE: Fabrication and Welding

CODE NO. : WLD200 **SEMESTER:** 3rd

PROGRAM: Mechanical Techniques Program

AUTHOR: Dennis Clement-Socchia

DATE: June 2006 **PREVIOUS OUTLINE DATED:** Jan 2004

APPROVED:

DEAN

DATE

TOTAL CREDITS: 2

PREREQUISITE(S): Welding WLD 121 (or its equivalent)

HOURS/WEEK: 2

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*For additional information, please contact Colin, Kirkwood, Dean
School of Technology, Skilled Trades & Natural Resources*

(705) 759-2554, Ext.2688

- COURSE DESCRIPTION:** This course will build upon the set of skills developed by the successful completion of Welding–WLD121. More specifically, it will introduce students to common layout and fabrication techniques as well as the use of welding procedures designed to control distortion. Working from shop sketches, students will learn to read basic drawings and symbols in order to fabricate components to their specified size and shape. Weld quality will be verified by means of both guided bend tests and / or fillet fracture tests.
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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
 - GOSL
 - Ga
 - N/S – F/S
 - ON CL
 - Pitch
 - 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 (8 inch High Cut) Safety Work Boots
 CSA Approved (Gauntlet Type) Welding Gloves
 Appropriate Work Wear (see Welding Shop Guidelines)

Modules: Distortion # 120201e
 Gas Metal Arc Welding # 120103a
 GMAW Filler Metals Gases and Safety # 120103b
 Welding Symbols # 120204g

V. EVALUATION PROCESS/GRADING SYSTEM:

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

<i>Factor</i>	<i>Weight</i>
General Shop Welds	40%
Fabrication Projects	30%
Theory Test / Quiz	<u>30%</u>
Total	100%

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%	
B	70 - 79%	3.00
C	60 - 69%	2.00
D	50 – 59%	1.00
F (Fail)	49% and below	0.00
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:

Special Needs:

If you are a student with special needs (e.g. physical limitations, visual impairments, hearing impairments, or learning disabilities), you are encouraged to discuss required accommodations with your professor and/or the Special Needs office. Visit Room E1101 or call Extension 493 so that support services can be arranged for you.

Retention of Course Outlines:

It is the responsibility of the student to retain all course outlines for possible future use in acquiring advanced standing at other postsecondary institutions.

Plagiarism:

Students should refer to the definition of “academic dishonesty” in *Student Rights and Responsibilities*. Students who engage in “academic dishonesty” will receive an automatic failure for that submission and/or such other penalty, up to and including expulsion from the course/program, as may be decided by the professor/dean. In order to protect students from inadvertent plagiarism, to protect the copyright of the material referenced, and to credit the author of the material, it is the policy of the department to employ a documentation format for referencing source material.

Course Outline Amendments:

The professor reserves the right to change the information contained in this course outline depending on the needs of the learner and the availability of resources.

Substitute course information is available in the Registrar's office.

Weld Tests

Where circumstances are deemed acceptable by the course Instructor, Students will be allowed a maximum of one retry in the event of a failure to each of the guided bend or fracture tests.

VII. PRIOR LEARNING ASSESSMENT:

Students who wish to apply for advanced credit in the course should consult the professor. Credit for prior learning will be given upon successful completion of a challenge exam or portfolio.

VIII. DIRECT CREDIT TRANSFERS:

Students who wish to apply for direct credit transfer (advanced standing) should obtain a direct credit transfer form from the Dean's secretary. Students will be required to provide a transcript and course outline related to the course in question.