

SAULT COLLEGE OF APPLIED ARTS AND TECHNOLOGY

SAULT STE. MARIE, ONTARIO



**SAULT
COLLEGE**

COURSE OUTLINE

COURSE TITLE: THERMAL CUTTING
CODE NO. : MTF106 **SEMESTER:** TWO
PROGRAM: METAL FABRICATOR TECHNICIAN / WELDING
TECHNIQUES
AUTHOR: STEVE WITTY/DAVE HOLLEY
DATE: JAN 2011 **PREVIOUS OUTLINE
DATED:** JAN 2010
APPROVED:

“Corey Meunier”
CHAIR

DATE

TOTAL CREDITS: ONE
PREREQUISITE(S): N/A
HOURS/WEEK: ONE

Copyright ©2011 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:

A trades curriculum that has been designed to provide students with a combination of theoretical knowledge and hands on skill in relation to Oxy-Fuel-Gas, Plasma Arc and Carbon Arc Gouging and cutting equipment.

1. Perform safe set-up, operation and correction of common cutting faults for the Oxy-Fuel Cutting equipment applications.

Potential Elements of the Performance:

Define safety related concepts.

- personal protection
 - clothing
 - safety glasses
 - cutting goggles
 - hearing protection
 - noise protection
 - fumes protection
 - protection against falling material
- cylinders
 - basic construction and features
 - fusible plugs
 - rupture disk
 - flashback arrestors
 - reverse flow check valves
- fire hazards
 - flammable distances of sparks / dross
 - fire prevention
 - fire blankets
 - fire extinguishers
 - oxygen hazards
- maintenance

Describe the characteristics, applications and control of gases.

- manifold systems
- arrestors
- fuel gases
 - acetylene
 - maximum safe pressure
 - safe withdrawal rates
 - cylinder handling
 - type of piping
 - propane
 - polypropylene
 - MAPP

- natural gas
- flammable ranges
- oxygen
- fire hazard
- explosion hazard
- liquid bulk storage
- cylinder handling
- preparing the work site
 - fire hazards
- cutting closed containers
 - cleaning
 - water filling
 - purging
- cutting in confined spaces

Explain the operation and handling of oxy-fuel equipment.

- secure cylinders
- gauges
- hoses
 - sizes
 - color
 - length
- torches
 - manual and machine
 - heating equipment
 - fittings
 - tips
 - installing
 - types
 - size selection
 - cleaning
 - gas pressures
 - maintenance

Set up, light and shut down equipment.

- safe set up
- correct lighting procedure
- correct shut down procedure

Perform manual oxy-fuel-gas cutting.

- square cuts
- bevel cuts
- piercing
- straight cutting

- shape cutting
- gas pressures
- speed of travel
- tip to metal distance

Correct common cutting faults.

- cut edge quality
- kerf lines
- dross (slag) adherence

2. Perform safe set-up, operation and correction of common cutting faults for the Plasma Arc Cutting equipment.

Potential Elements of the Performance:

Define safety related concepts.

- personal protection
 - electrical safety
 - grounding
 - bonding
 - radiation
 - heat
 - noise
 - fumes
 - high open circuit voltage
 - high pressure cylinders
 - compressed air pressure

Explain the features of plasma arc cutting equipment.

- power supplies
- torches
- secure cylinders
- gauges
- hoses
- fittings
- tips
- pressures
- speed of travel
- types of cuts
- material types
- material thickness
- piercing
- quality control

Cut manually using plasma arc equipment

Set-up parameters

- square cuts
- bevel cuts
- piercing

- straight cutting
- shape cutting
- shut down

Correct common cutting faults.

- cut edge quality
- kerf lines
- cutting direction based on square side of cut
- dross adherence (slag)

3. *Perform safe set-up, operation and correction of common cutting faults for the Air Carbon Arc Gouging Equipment.*

Potential Elements of the Performance:

Define safety related concepts.

- personal protection
 - electrical
 - radiation
 - fire hazards
 - flammable distances of sparks / dross
 - fire prevention
 - fire blankets
 - fire extinguishers
 - compressed air
 - noise
 - fumes
 - preparing the work site

Explain the operation and handling of equipment.

- power supplies
 - amperage
 - voltage
- torches
- electrode selection
 - diameter
 - shapes
- hoses
- fittings
- compressed air pressures
- speed of travel
- types of cuts
- depth of cut
- material types
- quality control

Gouge manually using carbon arc equipment.

- defect excavation
 - weld removal
 - back gouging to sound metal
 - weld joint preparation

Correct common cutting faults.

- cut edge quality
- post cleaning

III. TOPICS:

1. OXY-FUEL CUTTING
2. PLASMA ARC CUTTING
3. AIR CARBON ARC GOUGING

IV. REQUIRED RESOURCES/TEXTS/MATERIALS:

- Impact Resistant Safety Glasses (CSA Approved)
- High Cut (6 inch) Safety Work Boot (CSA Approved)
- Weld Gloves (CSA Approved)
- Modules: Course Pack MTF 106

V. 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 unexcused* absence.

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

Valid reasons would include:

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

Part 2 Final Course Grades:

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

Factor	Value
Shop Assignments/Tests	100 %
Attendance	-1% per Unexcused Hour
Late	-1% per Late
Shop Clean-up	-1% per Incident

The following semester grades will be assigned to students:

Grade	<u>Definition</u>	<i>Grade Point Equivalent</i>
A+	90 – 100%	4.00
A	80 – 89%	3.00
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:

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.

VII. COURSE OUTLINE ADDENDUM:

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