

#59

SAULT COLLEGE OF APPLIED ARTS & TECHNOLOGY

SAULT STE. MARIE, ONTARIO

COURSE OUTLINE

Course Title: Welding Metallurgy

Code No,: MET110-2

Program Welding and Fabricating

Semester: One

Date: 1988 06 14

Author: Dennis Socchia

New

Revision:

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APPROVED:

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Metallurgy

MET110-2

Course Name

Course Number

PHILOSOPHY/GOALS:

When the student has successfully completed this course of study, he/she should have a reasonable understanding of the material presented. The intention (therefore) is to provide students with a general overview of the many practical considerations demanded of today's tradesman.

METHODS OF ASSESSMENT (GRADING METHOD)

3 Theory Tests	90%
Attendance/Attitude	10%
Total	100%

TEXTBOOK(S):

- 1) Module MFG: "Welding Metallurgy"
- 2) Text: "Modern Welding"

OBJECTIVES:

The basic objective is to develop within the student an understanding of the concepts and procedures involved with this course of study as well as an ability to use them in the solution of problems. Theory tests are designed with this in mind.

The basic level of competency demanded is an overall course average of 55% with a maximum of **ONE** "R* Grade.

("R" grades = 54% or less)

SPECIFIC OBJECTIVES

for

METALLURGY - MET_____

1) INTRODUCTION AND ORIENTATION.....1HR

HANDOUT

The student should be given an opportunity to identify the following:

- 1) Topics covered
- 2) General objectives
- 3) Method of evaluation
- 4) Grading system with respect to A+, A, B, C, R, X.
- 5) Course policy with respect to:
 - a) attendance
 - b) attitude
 - c) due dates
 - d) rewrites
 - e) course credits
 - f) employed students
- 6) Required texts
- 7) Schedule of tests

NOTE: Course objectives and demonstrations are subject to change due to:

- a) field trips
- b) holidays
- c) equipment failure

2) METAL IDENTIFICATION AND ANALYSIS.....5 HRS

MODULE MFG - UNIT # 3

The student should be given an opportunity to:

- 1) Identify plain carbon steels, low alloy steels, stainless steels, tool steels and cast irons according to their approximate carbon content, significant alloys and physical appearance.
- 2) Explain and use the SAE/AISI classification system for the purpose of identifying and designating the above materials.
- 3) Participate in lab demonstrations and discussions for the purpose of identifying the above metals.

Samples prepared by instructor to identify:

- a) plain carbon steels
- b) low alloy steels
- c) stainless steel
- d) cast iron

3) MECHANICAL PROPERTIES.6 HRS

**MODULE MFG - UNIT #2
P 11 - 52**

The student should be given an opportunity to:

- 1) Discuss and describe the importance of mechanical properties.
- 2) Discuss and describe the following specific properties:
 - a) hardness
 - b) tensile strength
 - c) ductility
 - d) toughness
- 3) List the units of measurement for the above properties.
- 4) Write definitions for the above mechanical properties.
- 5) Participate in lab demonstrations and discussions for the purpose of understanding the above mechanical properties.

Samples prepared by instructor to demonstrate:

- a) hardness
- b) tensile strength
- c) ductility

4) HEAT TREATMENTS AND MECHANICAL PROPERTIES.8 HRS

The student should be given an opportunity to:

**Fe-FeC
HANDOUT**

- 1) List the various crystalline structures for plain carbon steels and cast irons at room temperature.
- 2) List the changes in structure when heating plain carbon steels and cast iron to/above the A₁ and A_{cm} critical temperatures.

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
		INTRODUCTION AND ORIENTATION	Handout
		- course topics	
		- general objectives	
		- methods of evaluation	
		- grading system	
		- policy regarding	
		a) attendance	
		b) attitude	
		c) due dates	
		d) rewrites	
		e) course credits	
		f) testing schedule	
		NOTE: Course objectives and demonstrations are subject to change due to:	
		a) field trips	
		b) holidays	
		c) equipment failure	
		METAL IDENTIFICATION AND ANALYSIS	
		- dealing with steels and cast irons	MODULE
		- SAE/AISI classification systems	MFG
		- lab demonstration/discussion	UNIT #3
6		MECHANICAL PROPERTIES	
		- importance of properties	MODULE
		- tensile strength	MFG
		- ductility	UNIT #2
		- hardness	p 11-52
		- lab demonstrations/discussions	
1.5		THEORY TEST #1 AND REVIEW	
		- covers topics 2 and 3	
8		HEAT TREATMENTS AND MECHANICAL PROPERTIES	
		- existing equilibrium structures for irons and steels	Fe-FeC [^]
		- changes in structure upon heating	Handout
		- heat treating operations via time-temperature curves	MODULE
		- affects of heat treating upon mechanical properties	MFG
		- lab demonstrations/discussions	UNIT #5
			p 8 - 10
1.5		THEORY TEST #2 AND REVIEW	
		- covers topic #4 only	

TOPIC NO.	PERIODS	TOPIC DESCRIPTION	REFERENCE
		HEAT AFFECTED ZONE VS MECHANICAL PROPERTIES	
		- zones in a weldment	
		- factors affecting change in in mechanical properties	MODULE MFG
		- lab demonstrations/discussions	UNIT #5 p 11 - 16
1.5		THEORY TEST #3 AND REVIEW	
		- covers topic #5 only	