Degree Applicable

Glendale Community College
April, 2003

COURSE OUTLINE

Welding 122

## I. Catalog Statement

Welding 122 is second in a series of occupational welding courses designed to prepare the student for employment in the welding industry. It covers fundamental of blueprint reading interpreting shop drawings and sketches, advanced metallic arc and oxyacetylene welding and provides an introduction to tungsten inert gas and metal inert gas arc welding.

Units – 3.0
Lecture 1 hour, laboratory 6 hours

Prerequisite: Eligibility for English 120 or ESL 165 and Welding 121 or equivalent.

Note: This course may be taken 3 times; a maximum of 9 units may be earned.

## II. Course Entry Expectations

Skill Level Ranges: Reading 3; Writing 3; Listening/Speaking 3; Math 3.

Prior to enrolling in the course, students should be able to:

1. perform manipulative skills in oxy-fuel welding, cutting, brazing, and shielded metal arc welding, and plasma arc cutting;
2. demonstrate a working knowledge of oxy-fuel, welding and cutting equipment, shielded metal arc welding equipment, plasma arc cutting equipment and their theories;
3. critique and evaluate weldments after properly performing a series of destructive tests on the samples;
4. demonstrate proper safety precautions in the use of oil oxy-fuel and shielded metal arc welding equipment;
5. write and compile a general welding notebook to be used as a reference guide for related classes;
6. show a general knowledge of basic metallurgy, welding terms and megtal identification.

## III. Course Exit Standards

1. communicate in written form the alphabet of American Welding Society welding symbols as used on blueprints pertaining to welders,
2. demonstrate proficiency in advanced oxy-fuel and shielded metal arc welding of heavy steel plate in all positions,
3. analyze a welding blueprint to determine the factors necessary to achieve a sound weldment,
4. critique and evaluate weldments after proper destructive testing procedures have been implemented,
5. critically think through the process of material acquisition, design, cast, layout, and fabrication of a specified weldment.

## IV. Course Outline

A. Welding Symbols — 16 hours
   1. Location of element in symbols
   2. Examples of welding symbols
   3. Dimensioning (alphabet of lines)
   4. Basic blueprint reading

B. Basic Measurement Procedures — 6 hours
   1. Shop math
   2. Pipe joint layout

C. Metallurgy — 4 hours
   1. Effects of carbon in iron
   2. Effects of alloys

D. Hardfacing — 4 hours
   1. Definition and applications
   2. Methods: metallic arc, oxy-acetylene
   3. Hardness of deposit

E. Surface Hardening — 6 hours
   1. Definition and applications
   2. Methods of quenching steel
   3. Hardening operations
   4. Equipment used

F. Oxy-Acetylene Welding — 20 hours
   1. Overhead welding
   2. Pipe welding
      a. Roll position
      b. Stationary position
   3. Braze welding
      a. vee groove

b. cast iron
c. aluminum

4. Silver Brazing
   a. copper
   b. stainless steel
5. Hard facing
6. Fusion welding cast iron

G. Metallic Arc Welding — 36 hours

1. Using electrodes E6010, E7018
2. Vertical position welding
   a. stringer beads and wash pass
   b. butt, tee, lap joints
   c. vee grooves
   d. cutting coupons and testing welds
3. Horizontal Position
4. Pipe Welding
   a. pipe to plate fillet
   b. vee groove and square groove welding on pipe
5. Cast iron welding
   a. machineable welds
   b. Non-machineable welds

H. Introduction to T.I.G. Process — 20 hours

1. Machines and processes
2. Setting up, securing
3. Welding beads in flat position On mild steel, aluminum

## V. Methods of Presentation

The following instructional methodologies may be used in the course:

1. Lecture;
2. Demonstration;
3. Videotapes;
4. Guest speakers

## VI. Assignments and Methods of Evaluation

1. Final project.
2. Regular quizzes.
3. Examination at the end of each instructional mode.
4. Final examination.

## VII. Textbook

Stichcomb, Craig, Welding Blueprints and Symbols.
Prentice hall Publishers 1998.
10th Grade Textbook Reading Level. ISBN 0-13-436296-9.