Butler Community College
Career and Technical Education Division

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New Fall 2010
Implemented Fall 2011

COURSE OUTLINE
Oxy-Fuel Gas Welding

Course Description
WE 130. Oxy-Fuel Gas Welding.1 hour credit. Prerequisite: A score at a pre-determined level on a placement instrument. This course will enable the student to recognize and apply proper fundamentals of Oxy-Fuel welding. The student will learn about and practice with oxyacetylene welding equipment as well as practice with brazing and soldering. Safety practices are emphasized.

Course Relevance
The principles learned in this course will allow the student to understand proper fundamental skills and process analysis in preparation for a position in a career of welding. This course will enable the student to develop a base skill to further the proficiency skills.

Required Materials
Althouse, A.D. (2004). *Modern welding.* Tinley Park, IL: Goodheart-Wilcox Company, Inc.

Learning Outcomes
The intention is for the student to be able to:
1 Demonstrate safety in the Oxy-Fuel welding process.
2 Demonstrate basic Oxy-Fuel welding, brazing, and soldering skills.
3 Explain fundamental theories of Oxy-Fuel welding, brazing, and soldering.

Learning PACT Skills that will be developed and documented in this course
Through involvement in this course, the student will develop ability in the following PACT skill area(s):

Technology Skills
1. Discipline-specific technology
   - Through the use of current industry standards and technology, the student will be able to perform specific welding functions with a high level of proficiency.

Major Summative Assessment Task(s)
These learning outcome(s) and the Learning PACT skill(s) will be demonstrated by:
1. Recognizing and using the correct techniques and equipment to perform specific welding, brazing and soldering profiles.
2. Identifying problems and correcting them using industry accepted welding principles.

Course Content
I. Skills or Competencies – Actions that are essential to achieve the course outcomes:
   A. Perform butt joint gas weld in the flat position

B. Perform butt joint braze weld in the flat position
C. Perform lap joint solder weld in the flat position
D. Demonstrate the basic set up of an Oxy-Fuel gas welding station

II. Themes – Key recurring concepts that run throughout this course:
A. Safety
B. Quality

III. Issues – Key areas of conflict that must be understood in order to achieve the intended outcome:
A. The force of gravity in relation to molten metal and various welding positions
B. The impact of critical welding fundamentals in relation to proper weld profiles
C. The impact of critical brazing fundamentals in relation to proper brazing profiles
D. The impact of critical soldering fundamentals in relation to proper soldering profiles

IV. Concepts – Key concepts that must be understood to address the issues:
A. Heat selection
B. Proper joint preparation
C. Process analysis
D. Terminology

Learning Units

I. Safety in the welding shop
A. Accidents
B. General shop safety
C. Safety in the welding environment
D. Oxy-Fuel Gas Welding and cutting safety
E. Arc Welding and cutting safety
F. Resistance welding safety
G. Safety around welding robots
H. Special welding process safety

II. Oxy-Fuel Gas Welding equipment and supplies
A. Complete Oxy-Fuel gas welding outfit
B. Oxygen supply
C. Acetylene supply
D. Pressure regulator principles
E. Welding hose
F. Oxyacetylene torch types
G. Air-acetylene torch
H. Welding goggles and protective clothing
I. Torch lighters and economizers
J. Oxy-Fuel Gas Welding supplies

III. Oxy-Fuel Gas Welding
A. Definition of welding
B. Soldering and brazing
C. Different types of welding and cutting

D. Oxy-Fuel Gas Welding
E. The Oxy-Fuel gas welding outfit
F. Torch positions and movements
G. Running a continuous weld pool
H. Butt joint welding
I. Lap joint welding
J. Outside corner joint welding
K. Inside corner and T-joint welding
L. Welding positions
M. Appearance of a good weld

IV. Soldering
A. Soldering principles
B. Solder alloys
C. Soldering fluxes
D. Soldering procedures
E. Soldering iron method
F. Torch soldering method
G. Dip soldering method
H. Wave soldering
I. Oven and infrared soldering
J. Resistance and Induction soldering
K. Stainless steel soldering
L. Soldering aluminum alloys
M. Soldering die castings
N. Testing and inspecting soldered joints

V. Brazing and braze welding
A. Brazing and braze welding principles
B. Joint designs for brazing and braze welding
C. Cleaning base metals prior to brazing or braze welding
D. Brazing and braze welding fluxes
E. Brazing filler metal alloys
F. Brazing and braze welding processes
G. Heat-resistant brazed joints

Learning Activities
Learning activities will include classroom lecture and hands-on exercises in both booth and shop.

Grade Determination
The student will be graded on completion of competency assessment tasks and learning activities and written examination.