Course Syllabus
WLDG 1421 - Welding Fundamentals
Revision Date: August 21, 2013

Catalog Description: An introduction to the fundamentals of equipment used in oxy-fuel and arc welding, including welding and cutting safety, basic oxy-fuel welding and cutting, basic arc welding processes and basic metallurgy.

Lecture hours = 3, Lab hours = 2

Prerequisites: WLDG 1307

Semester Credit Hours: 4
Lecture Hours per Week: 3
Lab Hours per Week: 2
Contact Hours per Semester: 80

State Approval Code: 4805080000

Instructional Goals and Purposes: The purpose of this course is to teach students to demonstrate safety procedures associated with oxy-fuel and arc process; perform basic welds using oxy-fuel and arc welding equipment; and identify ferrous and nonferrous metals.

Learning Outcomes:
1. Describe the process of shielded metal arc welding (SMAW).
2. Read a welding machine duty cycle chart and explain its significance.
3. Discuss the problems that can occur as a result of poor work lead clamping.
4. List the various terms used to describe shielded metal arc welding (SMAW).
5. Demonstrate a proper fillet weld in all positions.
6. Describe the effects of travel speed and arc length.
7. Explain the polarity as it relates to welding processes.
8. Describe what equipment is needed for shielded metal arc welding (SMAW).

Specific Course Objectives (includes SCANS):
After studying all materials and resources presented in the course, the student will be able to:

1. Describe the process of shielded metal arc welding (SMAW). (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1bv, 1bvi, 1ci, 1cii, 1civi, 1cv, 1cv, 2ai, 2aai, 2aaii, 2aaiii, 2aaiiv, 2aav, 2bii, 2biii, 2biv, 2bvi, 2cii, 2cii, 2civ, 2di, 2dii, 2diii, 2eii, 2eiiii)
2. Read a welding machine duty cycle chart and explain its significance. (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1bv, 1bvi, 1ci, 1cii, 1civi, 1cv, 1cv, 2ai, 2aai, 2aaii, 2aaiii, 2aaiiv, 2aav, 2bii, 2biii, 2biv, 2bvi, 2cii, 2cii, 2civ, 2di, 2dii, 2diii, 2eii, 2eiiii)
3. Discuss the problems that can occur as a result of poor work lead clamping. (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1bv, 1bvi, 1ci, 1cii, 1civi, 1cv, 1cv, 2ai, 2aai, 2aaii, 2aaiii, 2aaiiv, 2aav, 2bii, 2biii, 2biv, 2bvi, 2cii, 2cii, 2civ, 2di, 2dii, 2diii, 2eii, 2eiiii)
4. List the various terms used to describe shielded metal arc welding (SMAW). (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1bvi, 1ci, 1cii, 1civi, 1cv, 1cv, 2ai, 2aai, 2aaii, 2aaiii, 2aaiiv, 2aav, 2bii, 2biii, 2biv, 2bvi, 2cii, 2cii, 2civ, 2di, 2dii, 2diii, 2eii, 2eiiii)
5. **Demonstrate a proper fillet weld in all positions.** (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1bv, 1bvi, 1ci, 1cii, 1ciii, 1civ, 1cv, 2ai, 2aii, 2aiii, 2aiv, 2avi, 2bii, 2biii, 2biv, 2cii, 2ciii, 2civ, 2di, 2dii, 2ei, 2eii, 2eiii)

6. **Describe the effects of travel speed and arc length.** (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1bv, 1bvi, 1ci, 1cii, 1ciii, 1civ, 1cv, 2ai, 2aii, 2aiii, 2aiv, 2avi, 2bii, 2biii, 2biv, 2cii, 2ciii, 2civ, 2di, 2dii, 2ei, 2eii, 2eiii)

7. **Explain the polarity as it relates to welding processes.** (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1bv, 1bvi, 1ci, 1cii, 1ciii, 1civ, 1cv, 2ai, 2aii, 2aiii, 2aiv, 2avi, 2bii, 2biii, 2biv, 2cii, 2ciii, 2civ, 2di, 2dii, 2ei, 2eii, 2eiii)

8. **Describe what equipment is needed for shielded metal arc welding (SMAW).** (1ai, 1aii, 1aiii, 1aiv, 1av, 1bi, 1bii, 1biii, 1bv, 1bvi, 1ci, 1cii, 1ciii, 1civ, 1cv, 2ai, 2aii, 2aiii, 2aiv, 2avi, 2bii, 2biii, 2biv, 2cii, 2ciii, 2civ, 2di, 2dii, 2ei, 2eii, 2eiii)

**Course Content:**
Students in all sections of this course will be required to do the following:

1. Complete chapter assignments in textbook and workbook as assigned by the instructor
2. Perform Welds and cuts as assigned by instructor

**Methods of Instruction/Course Format/Delivery:**
Lecture, discussion and videos related to course content. Students will also perform welds and cuts as assigned by the instructor

**Assessment:**
The following items will be assigned during the semester and used to calculate the student’s final grade:

- **Assignments**
  Workbook Assignments

- **Lab Work**
  Welds as assigned by instructor

- **Attendance**
  Class and Laboratory

- **Exams**
  Mid Term and Final - written and/or skills

**Course Grade:**
The grading scale for this course is as follows:

- Assignments – 10%
- Lab work – 60%
- Attendance – 20%
- Exams – 10%

**Texts, Materials, and Supplies:**
- Pen and pencil
- Notebook
- Welding hood
- Welding gloves
- Safety glasses
- Boots
- Welding shirt
- Pliers
Other:

- For current texts and materials, use the following link to access bookstore listings: [http://www.panolacollegestore.com](http://www.panolacollegestore.com).
- For testing services, use the following link: [http://www.panola.edu/elearning/testing.html](http://www.panola.edu/elearning/testing.html).
- If any student in this class has special classroom or testing needs because of a physical learning or emotional condition, please contact the ADA Student Coordinator in Support Services located in the Administration Building or go to [http://www.panola.edu/student-success/disability-support-services/](http://www.panola.edu/student-success/disability-support-services/) for more information.
- Withdrawing from a course is the student’s responsibility. Students who do not attend class and who do not withdraw will receive the grade earned for the course.
SCANS CRITERIA

1) Foundation skills are defined in three areas: basic skills, thinking skills, and personal qualities.

   a) Basic Skills: A worker must read, write, perform arithmetic and mathematical operations, listen, and speak effectively. These skills include:
      i) Reading: locate, understand, and interpret written information in prose and in documents such as manuals, graphs, and schedules.
      ii) Writing: communicate thoughts, ideas, information, and messages in writing, and create documents such as letters, directions, manuals, reports, graphs, and flow charts.
      iii) Arithmetic and Mathematical Operations: perform basic computations and approach practical problems by choosing appropriately from a variety of mathematical techniques.
      iv) Listening: receive, attend to, interpret, and respond to verbal messages and other cues.
      v) Speaking: Organize ideas and communicate orally.

   b) Thinking Skills: A worker must think creatively, make decisions, solve problems, visualize, know how to learn, and reason effectively. These skills include:
      i) Creative Thinking: generate new ideas.
      ii) Decision Making: specify goals and constraints, generate alternatives, consider risks, and evaluate and choose the best alternative.
      iii) Problem Solving: recognize problems and devise and implement plan of action.
      iv) Visualize (“ Seeing Things in the Mind’s Eye”): organize and process symbols, pictures, graphs, objects, and other information.
      v) Knowing How to Learn: use efficient learning techniques to acquire and apply new knowledge and skills.
      vi) Reasoning: discover a rule or principle underlying the relationship between two or more objects and apply it when solving a problem.

   c) Personal Qualities: A worker must display responsibility, self-esteem, sociability, self-management, integrity, and honesty.
      i) Responsibility: exert a high level of effort and persevere toward goal attainment.
      ii) Self-Esteem: believe in one’s own self-worth and maintain a positive view of oneself.
      iii) Sociability: demonstrate understanding, friendliness, adaptability, empathy, and politeness in group settings.
      iv) Self-Management: assess oneself accurately, set personal goals, monitor progress, and exhibit self-control.
      v) Integrity and Honesty: choose ethical courses of action.

2) Workplace competencies are defined in five areas: resources, interpersonal skills, information, systems, and technology.

   a) Resources: A worker must identify, organize, plan, and allocate resources effectively.
      i) Time: select goal-relevant activities, rank them, allocate time, and prepare and follow schedules.
      ii) Money: Use or prepare budgets, make forecasts, keep records, and make adjustments to meet objectives.
      iii) Material and Facilities: Acquire, store, allocate, and use materials or space efficiently. Examples: construct a decision time line chart; use computer software to plan a project; prepare a budget; conduct a cost/benefits analysis; design an RFP process; write a job description; develop a staffing plan.

   b) Interpersonal Skills: A worker must work with others effectively.
      i) Participate as a Member of a Team: contribute to group effort.
      ii) Teach Others New Skills.
      iii) Serve Clients/Customers: work to satisfy customer’s expectations.
iv) Exercise Leadership: communicate ideas to justify position, persuade and convince others, responsibly challenge existing procedures and policies.

v) Negotiate: work toward agreements involving exchange of resources, resolve divergent interests.

vi) Work with Diversity: work well with men and women from diverse backgrounds. Examples: collaborate with a group member to solve a problem; work through a group conflict situation, train a colleague; deal with a dissatisfied customer in person; select and use appropriate leadership styles; use effective delegation techniques; conduct an individual or team negotiation; demonstrate an understanding of how people from different cultural backgrounds might behave in various situations.

c) **Information**: A worker must be able to acquire and use information.
   i) Acquire and Evaluate Information.
   ii) Organize and Maintain Information.
   iii) Interpret and Communicate Information.
   iv) Use Computers to Process Information.

   Examples: research and collect data from various sources; develop a form to collect data; develop an inventory record-keeping system; produce a report using graphics; make an oral presentation using various media; use on-line computer data bases to research a report; use a computer spreadsheet to develop a budget.

d) **Systems**: A worker must understand complex interrelationships.
   i) Understand Systems: know how social, organizational, and technological systems work and operate effectively with them.
   ii) Monitor and Correct Performance: distinguish trends, predict impacts on system operations, diagnose deviations in systems' performance and correct malfunctions.
   iii) Improve or Design Systems: suggest modifications to existing systems and develop new or alternative systems to improve performance.

   Examples: draw and interpret an organizational chart; develop a monitoring process; choose a situation needing improvement, break it down, examine it, propose an improvement, and implement it.

e) **Technology**: A worker must be able to work with a variety of technologies.
   i) Select Technology: choose procedures, tools or equipment including computers and related technologies.
   ii) Apply Technologies to Task: understand overall intent and proper procedures for setup and operation of equipment.
   iii) Maintain and Troubleshoot Equipment: Prevent, identify, or solve problems with equipment, including computers and other technologies.

   Examples: read equipment descriptions and technical specifications to select equipment to meet needs; set up and assemble appropriate equipment from instructions; read and follow directions for troubleshooting and repairing equipment.