

Lakeland Community College COURSE SYLLABUS

WELD 2370 Advanced Pipe Welding 3 credits

Lecture

Lab

Instructor: NAME OF INSTRUCTOR

Contact: Email: alternate:

Phone: cell: alternate:

Textbook Required:

HELP/TUTORING:

Available at the Learning Center Office, Rm A1044 Phone 525-7019

COURSE DESCRIPTION:

This course introduces students to advanced American Society of Mechanical Engineers (ASME), American Petroleum Industry (API), and American Welding Society (AWS) pipe welding standards in the vertical and overhead positions using the SMAW process on steel pipe. Students will choose one of these three standards to develop their welding skills and to prepare them for Certification of Qualification to the respective code. At the conclusion of this course, students take a 6G pass/fail welder qualification test using the Shielded Metal Arc Welding (SMAW) process. Laboratory sessions will provide hands-on time to develop skills to produce quality weldments on pipe. The course covers functions and specific uses of manual welding equipment, various SMAW welding techniques, prepping and fitting of pipe coupons, and welding certification requirements. The student must furnish: long pants; welding helmet (shade #10 or above); safety glasses; work gloves; welding jacket; leather work boots, preferably steel toe; 8" crescent wrench; soapstone and holder; tape measure; combination square; chipping hammer; wire brush; tool bag; center punch; and 12 oz. ball peen hammer. 4 1/2" grinder is optional.

RATIONALE FOR COURSE:

This course is designed to introduce students how to prep, fit, tack, and SMAW weld pipe to the ASME or API standards in the vertical and overhead pipe position.

COURSE OBJECTIVES, at the conclusion of this course, the student should be able to:

1. Describe the various safety hazards involved in arc welding in the vertical and overhead positions.
2. Describe the safety equipment to be worn or utilized and their function and purpose in welding.
3. Identify the different welding positions: 1G, 2G, 5G, 6G, and 6GR.
4. Describe the difference between schedule 40 and schedule 80 pipe wall thickness.
5. Weld 6" schedule 40 & 80 pipe to ASME or API standard in the 5G and 6G position.
6. Properly set the machine controls for the transformer, rectifier, and motor generator power sources for the specific welding task.
7. Produce an acceptable vertical up or vertical down root pass depending on the code the welder has chosen while welding using E6010 electrodes in the 5G and 6G positions.
8. Produce an acceptable vertical up or vertical down fill and cap weld using E6010 or 7018 electrodes determined by the respective code in the 5G and 6G positions.
9. Produce an acceptable vertical up or vertical down 6" schedule 40 & 80 test pipe and bend specimens.
10. Describe the qualification tests as used by API and ASME, and demonstrate the proper welding and fit up technique.
11. Identify the difference between API, ASME and AWS codes.

12. Demonstrate proficiency in the SMAW process in the 6G position according to the appropriate ASME Section IX or API 1104 code as taken from the pipe prepared and tested by Instructor.

COURSE OUTLINE

- . Difference Between Pipe Welding Codes
 - A. ASME
 - 1. American Society of Mechanical Engineering
 - a. Most of the time done in the up-hill position
 - b. Power plants in house piping
 - i. High pressure
 - ii. High volume
 - B. API
 - 1. American Petroleum Institute
 - a. Most of the time done in the down-hill position
 - b. Oil and gas industry Cross country pipeline
 - i. Low pressure
 - ii. High volume
 - C. AWS
 - 1. American Welding Society
 - a. Structural
- . Review and Reinforce Understanding Safety Related To Pipe Welding
 - A. E205 safety hand out
 - B. ANSI Z49.1
 - C. MSDS Sheets
 - D. Safety Glasses and other PPE
 - E. Warning
 - F. Safety Label
 - G. Body positions
 - 1. Start uncomfortable move to comfortable
 - 2. Head positioning and movement to insure continues good view of weld puddle
- . Advanced Pipe Welding Positions
 - A. 5G Fixed pipe parallel with ground weld in vertical position (Bell hole)
 - B. 6G Fixed pipe at a 45 degree angle weld in a compound angle (Arkansas Bell hole)
 - C. 6GR fixed pipe at 45 degree angle with a restrictor plate around the pipe weld at a compound angle
- . Review and Reinforce Understanding Of Fit Up Requirements
 - A. ASME and AWS
 - B. API
 - C. Tacking
 - D. Grinding of tacks
- . Root Pass (Stringer Bead) Technique
 - A. Drag technique
 - B. Stitch technique
- . Wagon Track
 - A. Slag trapped alongside of the root pass
- . Grinding Of The Root Pass
 - A. Grind down the high spot on the root pass to expose the wagon tracks
- . Hot Pass ASME 5G and 6G
 - A. Burn out the wagon track DC+ ten amps greater than that of the root pass
 - B. 10 minutes to put in the hot pass after the root pass is put in

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- . Fill Passes (Could Be Multiple Passes) ASME 5G and 6G
 - A. 7018
 - 1. Slight drag or weave
 - B. 6010
 - 1. Shuffle or whip

 - . API Hot Pass 5G and 6G
 - A. Shuffle step
 - 1. burn out wagon tacks
 - 2. Rod angle 10 to 15 degree drag angle

 - . Fill and Stripper Pass 5G and 6G
 - A. Shuffle step
 - 1. Stripper pass is the fill pass on the pipe between 2 O'clock and 5 O'clock and between 7 O'clock and 10 O'clock this is where the weld might become thin because of the travel speed was picked up because of gravity and fluidity of the puddle.

 - . API Cap Pass 5G and 6G
 - A. Stinger
 - B. Weave
 - 1. Europe full stove means Vertical down welding full joint
 - 2. Dolly Mix means Vertical up root vertical down fill and cap

 - . Review and Reinforce the Understanding of the Six Things That Control the Key Hole
 - A. Land
 - B. Gap
 - C. Amperage
 - D. Travel speed
 - E. Rod angle
 - F. Pressure

 - . Welder Qualification Test
 - A. Hands-on skills test of student's ability to make acceptable SMAW weld
 - 1. Can take either 6G Certification of Qualification Test in respective code
 - 2. Pass/fail test
 - 3. Industry Recognized Certification of Qualification is awarded to students passing independent 3rd party test of welds using a qualified or pre-qualified Welding Procedure Specification
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FEDERAL CREDIT COMPLIANCE STATEMENT:

It is expected that students will spend two to three hours, minimally, outside of the classroom/laboratory performing course related work such as reading, research, homework assignments, practice, studio work, and other academic work for every hour of instruction spent in the classroom/laboratory.

STUDENTS WITH DOCUMENTED DISABILITIES:

Lakeland Community College is committed to providing all students equal access to learning opportunities. The Student Accommodation Center works with students with documented disabilities to provide and/or arrange reasonable accommodations. If you have a disability (e.g. learning, attention, psychiatric, vision, hearing, physical, or systemic) and feel it may create a barrier to your education, contact the Student Accommodation Center at 440-525-7020 or stop by the office, Room A-1042.

SUBSTANCE ABUSE NOTICE:

The Lakeland Community College Welding Program is committed to a safe learning environment in the classroom and the laboratory. Students are expected to report to lecture and lab classes properly prepared and unimpaired by alcohol and/or drugs. If the instructor believes a student is under the influence of alcohol and/or drugs, the instructor will ask the student to leave the classroom to ensure the health and safety of all students. Any student asked to leave the classroom faces potential Student Conduct Code charges.

ACADEMIC INTEGRITY:

Honesty, as the basic component of trust is essential to both individual and institutional integrity. With this premise in mind, Lakeland Community College has set forth certain behaviors as being forms of academic misconduct, and thus potentially diminishing Lakeland’s integrity, reputation for academic quality, and ability to function as an academic community. The institution’s faculty and administration, therefore, regard academic misconduct as a serious offense. Established as violations of academic misconduct at Lakeland Community College are cheating, plagiarism, fabrication of material included in academic work, denying others access to information or material, enabling academic misconduct, and deception in order to gain academic advantage. Policies dealing with violations of academic misconduct may be obtained by visiting <http://www.lakelandcc.edu/web/about/student-development> or from the Student Development Office.

GRADING:

The final grade for this three-credit hour course will be calculated based on scores achieved on attendance, homework, quizzes, a midterm exam and a final exam. The instructor has the option of grading on a curve if the average grade is less than 80%.

91 – 100%	= A
83 - 90.99%	= B
75 – 82.99%	= C
68 – 74.99%.....	= D
67.99 or below	= F
Failure, non-attendance	= FNA

BASIS FOR GRADES:

Attendance (Missing 20% of classes = 0) ---	20%	
Homework -----	10%	
Laboratory Assignments-----	15%	
Quizzes -----	10%	
Midterm -----	20%	
<u>Final Exam -----</u>	<u>25%</u>	
Total ---		100%

ATTENDANCE (20% of final grade):

Attendance is a very important part of this course since the Instructor will at times be presenting and explaining information in the lecture sessions that will not be in the text book but may be included in quizzes and exams. Furthermore, employers expect employees to show up on time for every scheduled work day and this attendance requirement is intended to help students develop this ability.

ON THE FIRST DAY OF CLASS: You should make arrangements with two or more classmates so if you are late or have to be absent you can get any missed assignments from them. As you are expected to attend every class it is not the instructor’s responsibility or obligation to re-teach material to students who are absent.

IF YOU ARE LATE OR ABSENT: A student can be late for class one time; thereafter, arriving late will count as being absent for half a class. This course consists of 16 classes, so each class missed will reduce student’s final course score by 6.25% and missing three classes will result in 20% of students final course score being zero.

LABORATORY WORK/HOMEWORK: (25% of final grade):

Students will frequently be given laboratory work or homework assignments, such as answering end-of-chapter questions or completing an alternate assignment handed out in class, such as measuring lines or distances, creating a 3-view drawing, putting weld symbols on a drawing, etc. Homework turned in late will only get half credit. Students will, however, be given an opportunity to make up lost points by (a) participating in voluntary plant tours or (b) researching the facility offering the tour and then writing a cover letter with a resume applying for employment at that facility and submitting it to the class Instructor or (c) attending an American Welding Society meeting or event.

QUIZZES: (10% of final grade):

Quizzes will not necessarily be announced in advance; therefore, it is important for students to arrive on time for every class. Students who arrive late to class will not be given additional time to complete a quiz. In this course the lowest quiz score will be dropped when the student's course grade is being calculated. Students will not be allowed to make up a missed quiz. The Instructor has the discretion to include pop-quizzes as part of their teaching method and students should be prepared for this to be done in this course.

EXAMS: (Midterm – 25% of final grade; Final – 25%):

Exams will commence and terminate at the pre-announced time. It is the student's responsibility to arrive on time and complete the exam within the stated time. No additional time will be given. If a student is ill on the scheduled Midterm or Final Exam dates, he/she must phone the Instructor at least one hour before the exam is to begin. If you reach voice mail or an answering machine leave a message, clearly stating and spelling your first and last names and provide your telephone number including area code. In this message, state when you plan to take the missed exam in the Lakeland Learning Center testing room (A-1040). **NOTE: The exam must be taken within 48 hours of its scheduled administration time to avoid penalty unless an alternate time is arranged with the Instructor before the 48 hour deadline has passed.** Students must provide a picture ID for the Testing Center monitor. The student is responsible for determining Testing Center hours.

COURSE POLICY:

The policies and procedures for this course shall be consistent with the college policies and procedures explained in the current Student Handbook and Calendar.

Cell phones are to be turned off or silenced in class and lab, and photographing or video recording of class sessions and/or materials presented is not allowed without the Instructor's permission. Cell phones cannot be used during quizzes or exams, and the Instructor reserves the right to collect and hold them while quizzes or tests are being taken. Non-compliance with this policy may result in a student being expelled from class.

Adds, drops, and withdrawals are per standard policies of Lakeland Community College. A student's failure to attend the class does not constitute a withdrawal and will ultimately lead to a failing grade. Those who wish to withdraw from class should contact the Counseling Center to initiate the withdrawal procedure.

For cancellations due to bad weather, call the Lakeland Emergency Closing Hotline at (440) 525-7242, or check Lakeland's web page, local radio or TV stations.

Methods of Presentation:

Text book reading assignments
Lecture
Audio/Visual Media
Demonstration
On-line presentation
Individualized instruction

The policies, requirements and other information contained in this syllabus are subject to change at the discretion of the Instructor

LAKELAND COMMUNITY COLLEGE'S MISSION STATEMENT:

"To provide quality learning opportunities to meet the social and economic needs of the community."

Lakeland Community College Learning Outcomes
Learns Actively
Thinks Critically
Communicates Clearly
Uses Information Effectively
Interacts in Diverse Environment
Essential skills for personal and professional growth

COURSE SCHEDULE:

Class #	Date:	Topic:	Preparation/Comments:
1			
2			
3			
4			
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The course and services are available without regard to a participant’s race, color, religion, ancestry, age, handicap, sex, marital status or national origin. The number for TDD/TYY or relay services is 440-525-7006.

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