

Lakeland Community College COURSE SYLLABUS

WELD 1030: ARC WELDING FUNDAMENTALS 3 credits

Lecture

No Lab

Note: This course does not include any hands-on welding

Instructor: NAME OF INSTRUCTOR

Contact: Email: alternate:

Phone: cell: alternate:

Textbook Required:

Moniz, B.J. Welding Skills, 5th ed. American Technical Publishers, 2015

HELP/TUTORING:

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

COURSE DESCRIPTION:

This course provides instruction to familiarize students with what welding is, career pathways, basic welding terminology, tools and equipment used by welders, and what a welder needs to know and do in order to safely make good welds and be a highly-valued productive worker. It does not provide hands-on welding experience. Topics include: an overview of the basic arc welding processes; the eight variables that must always be controlled during arc welding; basic concepts of electricity related to welding; types of welds and weld joints; basic metallurgy; fixturing and positioning equipment; weld testing and inspection methods; understanding shop drawings and welding symbols; and welding-related safety and health issues. The economics of welding and the development of desirable “soft skills” (such as being dependable, teachable and able to work and communicate well with others) are also emphasized throughout the course. A calculator capable of calculating the square root of a number is required for this course.

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

1. Discuss basic principles of arc welding.
2. Interpret welding drawings and symbols.
3. Discuss concepts of metallurgy.
4. Discuss basic concepts of electricity in welding and related equipment.
5. Discuss the requirements of a weld.
6. Discuss the economics of welding.
7. Discuss safety in welding.
8. Discuss opportunities for welding career preparation including Lakeland’s Industrial Welding degree and industry standard welding certifications

COURSE OUTLINE:

- I. Introduction to Welding
 - A. Explanation of what welding is and career pathways
 - B. Familiarization with basic welding terminology
 - C. Types of welds, joints and positions of welding
 - D. Welding Tools and Equipment
- II. Basic Principles of Arc welding
 - A. Introduction to electricity as it relates to welding
 - B. Commonly-used arc welding processes (SMAW, GMAW, FCAW, GTAW, SAW)
 - C. Types of power sources
 - D. Welding electrodes and filler rods
 - E. The eight critical welding variables associated with arc welding

- F. Commonly-encountered problems and how to address them
- III. Requirements of welds
 - A. What the requirements are and how they are specified
 - B. Use of measuring devices to verify weld locations and size
 - C. Types of defects in welds and base metals
 - D. Testing and inspection of welds and base materials
 - E. Calculating required quantity of electrode or filler rod
 - F. Converting metric dimensions to US customary units
 - G. Understanding welding symbols
 - H. Understanding and working to code and specification requirements including Welding Procedure specifications, records, and documents.
- IV. Basic welding metallurgy and properties of metals
 - A. Commonly-welded metals
 - B. Properties of metals and methods used to change them
 - C. How welding impacts the properties of metals
 - D. How to avoid cracking of welds and base metals
- V. Economics of welding
 - A. The 5 steps to economical welding
 - B. Calculating weld weights, deposition rates, arc times, and operating factors
 - C. The importance of “doing it right the first time”
 - D. Building and using fixtures and positioners to save time
- VI. Weld safety and health
 - A. Electrical hazards
 - B. Arc radiation
 - C. Fires and burns
 - D. Safe use of torches and handling of compressed gas cylinders
 - E. dangers of oxygen and other gases used in welding and cutting
 - F. Welding on tanks and closed containers
 - G. Confined spaces
 - H. Fall protection
 - I. Using hand-held grinders

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	<u>BASIS FOR GRADES:</u>	
83 - 90.99%	= B	Attendance (Missing 20% of classes = 0) ---	20%
75 – 82.99%	= C	Homework -----	20%
68 – 74.99%	= D	Quizzes -----	10%
67.99 or below	= F	Midterm -----	25%
Failure, non-attendance	= FNA	Final Exam -----	25%
			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.

HOMEWORK: (20% of final grade):

Students will frequently be given 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.

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

Methods of Presentation:

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

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	

WELD 1030 – COURSE SCHEDULE:

Class #	Date:	Topic:	Preparation:
1		Syllabus; Ground Rules; Careers; LCC Welding Program; Look Ahead; Using Tape Measure; Basic Math; Safety in Welding	Buy Text; Down Load ANSI Z49.1 from Lincoln Electric (LE) website
2		Joint Design and Welding Terms; Requirements of a Weld; Reading Shop Drawings; Welding Symbols	WS-Chps 1,2,3 & 45; Handouts given out at end of class #1

3		Labor Day – No Class, but keep doing homework	Handouts (class#2): Tape Measure and Math, and about Shop Drwgs
4		Class--Electrical theory & circuits; Significance in Welding Applications; Intro to SMAW	Handout on electricity given out at end of class #2; WS-Chp 8
5		SMAW- Equipment, Essential Variables; Selecting Electrodes, Striking an Arc, Distortion Control	WS-Chps 9, 10, 11 & 43
6		GTAW-Equipment, Procedures & Applications	WS-Chps 16, 17 & 18
7		GMAW&FCAW- Equipment, Procedures & Applications	WS-Chps 19,20,21&22
8		Welding Economics; Prep for Midterm	Handout on Economics
9		Midterm; Pipe Welding	WS-Chp 27
10		GTAW Arc Spot; Production GMAW; Stud Welding; SAW; Automation and Robotic Welding	WS-pgs 384-390; pgs 395-399 and WS Chp 29
11		Evaluating and Testing Welds – Metallography, Discontinuities, Destructive and Nondestructive Testing	WS-Chps 33,34, 31 & 32
12		WPS, WPQR, Welder Qualification, Codes and Specifications	WS-Chps 35, 36 & 46
13		Welding Metallurgy; Welding Carbon and Alloy Steels; Hydrogen Cracking	WS-Chps 37&39
14		Welding Stainless Steels, Aluminum and Nonferrous Metals	WS-Chps 41 & 42
15		Class –Review for COMPREHENSIVE FINAL	Review Points to remember and go thru text pointing impt things
16		Class -- FINAL EXAM	Review all course mats and prior quiz, test & end of chpt questions

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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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