Lakeland Community College COURSE SYLLABUS

WELD 1040: Introduction to Fabrication and Mechanized Welding 3 credits

Lecture
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 and laboratory work to gain knowledge and skills related to metal fabricating – including the hands-on use of basic metal fabricating machines and mechanized arc and resistance welding equipment. Students do not do any hands-on manual or semi-automatic welding in this course. Topics include safety and health concerns; print reading and sketching; welding symbols and weld gauges; measuring devices and instruments; lay-outs; metal fabricating processes; operation of metal fabricating machines and related material handling equipment; operation of resistance spot welding and mechanized or robotic semi-automatic welding equipment; and the design, building and use of jigs and fixtures. Students must provide long pants, safety glasses, work gloves, work boots with steel toes and a calculator capable of calculating square roots for this course

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

1. Interpret welding drawings and welding symbols
2. Draw simple sketches.
3. Lay out and measure piece-parts using a tape measure and other basic measuring instruments.
4. Properly perform basic metalworking and mechanized welding operations.
5. Properly operate resistance spot welding and mechanized arc-welding equipment.
6. Discuss the design, construction and benefits of using jigs and fixtures.
7. Discuss basic concepts of electricity

COURSE OUTLINE:

I Safety and Health Concerns Associated With Metal Fabricating.

- A. General safety and health issues in a metal fabricating facility
- B. Avoiding dangers associated with energized equipment and machines
- C. Lock-out tag-out procedures
- D. Confined spaces
- E. Fall protection
- F. Hand held grinders
- G. Safe use of torches and handling of compressed gas cylinders
- H. Dangers of oxygen and other gases used in metal fabricating operations
- I. Other safety and health concerns

II. Use of Tape Measures, Measuring Instruments and Basic Math

- A. Fractions, decimals, measuring distances, and metric conversions.
- B. Calculating areas, volumes and weight of welds, sheets and plates
- C. How to do lay-outs

III. Basic Electricity

- A. Basic electric components and meters
- B. Ohm's law and power
- C. Series circuits
- D. Parallel circuits
- E. Power
- F. Magnetism
- G. Introduction to transformers
- H. Three-phase power

IV. Types of Shop Equipment and Proper Operation

- A. Material handling equipment
  - 1. Fork lifts, pallet jacks and cranes
- B. Saws
  - 1. Horizontal and vertical band saws
  - 2. Abrasive and cold saws
  - 3. Reciprocating saws
- C. Plasma and oxyfuel cutting equipment
  - 1. Manual and mechanized
- D. Shears
  - 1. Mechanical and hydraulic
- E. Press and leaf brakes
  - 1. Mechanical and hydraulic
- F. Bending rolls
  - 1. Manual and powered
- G. Tube, pipe and bar benders
- H. Ironworkers
- I. Drills and drilling machines
  - 1. Hand-held
  - 2. Magnetic
  - 3. Drill presses
  - 4. Production drilling machines
- J. Hole punching machines
- K. Lathes and milling machines
- L. Grinders and grinding machines
  - 1. Hand-held
  - 2. Bench-mounted and pedestal
  - 3. Blanchard and other production grinders

V. Resistance Welding

- A. Basic principles and safety concerns
- B. Typical machines and equipment
- 1. Spot vs seam welding
- 2. Hand-held, rocker-arm and press welders
- 3. Multiple head machines
- C. Materials welded
- D. Set-up and operation
  - 1. Some typical weld schedules
- E. Typical defects and methods of assuring quality

VI. Submerged Arc Welding

A. Basic principles and safety concerns
B. Typical machines and equipment
    1. Hand-held, tractor-mounted and beam carriage
    2. Single wire vs multiple wires
A. Materials welded
B. Set-up and operation
    1. Some typical weld schedules
C. Typical defects and methods of assuring quality

VII. Orbital Pipe and Tube Welding Machines

A. Basic principles and safety concerns
B. Typical machines and equipment
    1. GTAW root and fill
    2. Modified GMAW root and GMAW-P fill
    3. Modified GMAW root w/FCAW fill
C. Materials welded
D. Set-up and operation
E. Some typical weld schedules
F. Typical defects and methods of assuring quality

VIII. Robotic Welding

A. Basic principles and safety concerns
B. Typical machines and equipment
    1. Used for arc, spot, submerged arc and laser welding operations
    2. Major parts – controller, teach pendant, base, manipulator, end effector
    3. Programming using teach pendant vs on-line or off-line programming
    4. Special considerations and equipment needed when used for arc welding
    5. Typical robotic welding cell and optional ancillary equipment
C. Set-up and operation
D. Typical defects and methods of assuring quality

IX. How to Read Shop Drawings and Prints

A. Basic types of views
B. Lines and what they represent
C. Dimensioning and tolerance stack-ups
D. Sections and other special views
E. Notes and conventions
F. Understanding welding symbols

X. Types and Shapes of Materials

A. Commonly used metals

    1. Industry designations

B. Sheet and plate

    1. Standard gauges

    2. Types of processing (HR, CR, P and Q, etc.)

C. Structural shapes

D. Pipe and pipe schedules

XI. Jigs and Fixtures

A. Purpose and benefits of using

B. Types and functions
   1. Production runs vs limited use
   2. For use in machining vs use in welding
C. Supporting and locating principles
D. Clamping and work holding principles
E. Basic construction principles

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	BASIS FOR GRADES:
83 - 90.99%	= B	Attendance (Missing 20% of classes = 0) --- 20%
75 – 82.99%	= C	Homework ---------- 10%
68 – 74.99%.....	= D	Laboratory Assignments----------15%
67.99 or below …….	= F	Quizzes ---------- 10%
Failure, non-attendance …….	= FNA	Midterm ---------- 20%
		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.

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			
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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.