
LAKELAND COMMUNITY COLLEGE - COURSE OUTLINE FORM*

*** WORK-IN-PROCESS VERSION, NOT YET APPROVED ***

ORIGINATION DATE: 10/23/17 **APPROVAL DATE:**
LAST MODIFICATION DATE: 11/16/17 **EFFECTIVE TERM/YEAR:** FALL/ 18
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COURSE ID: WELD2410
COURSE TITLE: Welding Economics

	LECTURE	LAB	CLINICAL	TOTAL	OBR MIN	OBR MAX
CREDITS:	2.00	0.00	0.00	2.00	0.00	0.00
CONTACT HOURS:	2.00	0.00	0.00	2.00		

PREREQUISITE:

MATH1080

COURSE DESCRIPTION:

This course provides instruction and laboratory work to gain knowledge and skills as an introduction to welding economics. The practical use of welding equipment and technologies will be used to produce a cost effective weldment. Various welding processes and technologies will be introduced. Classroom and laboratory experience includes knowledge and skill development around arc welding processes, welding variables, welding management, weld requirements, and updated welding technologies. Students must furnish a calculator capable of computing square roots (scientific or construction calculator preferred), safety glasses, gloves, protective clothing, leather work boots (preferably steel toe), and helmet for use in the laboratory.

RATIONALE FOR COURSE:

Supplemental knowledge and skills are necessary for the successful welder. This course provides an introduction to welding economics and the costs associated with welding in a practical way. This course will help provide a pathway for employment in a welding field.

OUTCOMES:

The course will

1. Reinforce essential welding safety equipment and procedures
2. Introduce students to welding economic welding processes and procedures utilized in the welding industry and related to career paths such as a welding supervisor.
3. Familiarize students with basic terminology, processes, and documents relevant to overall welding economics, cost calculations of a weld.
4. Provide instruction and welding skill for welding economics covering arc welding processes proper design, set-up, and techniques to produce a cost effective weld.

5. Develop student ability to critique the cost of welds for quality, productivity, and improvement.
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PERFORMANCE INDICATORS:

Upon completion of the course, the student should be able to

1. Identify and apply safety procedures when working with welding equipment.
 2. Classify effective welding processes for specific applications.
 3. Calculate welding economics; operator factor, travel speeds, deposition rates, and weight of weld metal.
 4. Evaluate areas to reduce costs in a typical welding environment.
 5. Explain technologies used in the welding industry to make welding operations run more efficiently and reduce overall welding costs.
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COURSE OUTLINE:

- I Safety
 - A. Protective equipment
 - B. Hazards
 - C. ANSI Z49.1
- II. Welding Fundamentals
 - A. SMAW, FCAW, GMAW, GTAW, SAW Process
 - B. Weld process comparisons
 - C. Weld process Variables
 - D. Requirements of a weld
- III. Weld Processes Improvements
 - A. Lab process comparison module
 - B. Traditional data collection methods
 - C. Calculate travel speed, deposition rates, operator factor
 - D. Welding management
- IV. Weld Process Calculations
 - A. Travel speed analysis
 - B. Weld size cost and analysis
 - C. Traditional data collection
- V. Weld Technology Improvements
 - A. Waveform control technology lab module
 - B. Analyze travel speed, deposition rates, operator factor, management
 - C. Calculate costs and analyze data
- VI. Welding Technology Improvements
 - A. Cloud based production monitoring technology
 - B. Calculate costs and analyze real data using production monitoring technology
 - C. Weld score
 - D. Weld sequencer
 - E. Hard automation
 - F. Robotic arc welding
- VII. Traditional Methods of Welding Economics

- A. Collect welding data using traditional methods
- B. Calculate travel speed, deposition rate, operator factor, management
- C. Analyze and present traditional calculated data

VIII. Advanced Methods of Welding Economics

- A. Collect welding data using technology methods
 - B. Calculate travel speed, deposition rates, operator factor, management
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Analyze and present advanced calculated data **INSTRUCTIONAL PROCEDURES**

THAT MAY BE UTILIZED:

Lectures, videos, and handouts may be used for instruction of the fundamental concepts.

GRADING PROCEDURES:

Examinations and/or quizzes

Class participation and discussion

Lab work, individual projects, papers, reports, and/or homework

COURSE EVALUATION PROCEDURES:

This course will be reviewed bi-annually by faculty and the Advisory Committee. Students will complete course evaluations each semester.

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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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LAKELAND STUDENT LEARNING OUTCOMES

LEARNS ACTIVELY	I	R	D
1. Takes responsibility for his/her own learning.			
2. Uses effective learning strategies.			
3. Reflects on effectiveness of his/her own learning strategies.			
THINKS CRITICALLY	I	R	D
4. Identifies an issue or idea.			D
5. Explores perspectives relevant to an issue or idea.			
6a. Identifies options or positions.			
6b. Critiques options or positions.			
7. Selects an option or position.			
8a. Implements a selected option or position.			
8b. Reflects on a selected option or position.			
COMMUNICATES CLEARLY	I	R	D
9a. Uses correct spoken English.			
9b. Uses correct written English.			
10. Conveys a clear purpose.			
11. Presents ideas logically.			D
12a. Comprehends the appropriate form(s) of expression.			
12b. Uses the appropriate form(s) of expression.			D
13. Engages in an exchange of ideas.			
USES INFORMATION EFFECTIVELY	I	R	D
14. Develops an effective search strategy.			
15a. Uses technology to access information.			
15b. Uses technology to manage information.			
16. Uses selection criteria to choose appropriate information.			
17. Uses information responsibly.			
INTERACTS IN DIVERSE ENVIRONMENTS	I	R	D
18a. Demonstrates knowledge of diverse ideas.			
18b. Demonstrates knowledge of diverse values.			
19. Describes ways in which issues are embedded in relevant contexts.			
20a. Collaborates with others.			
20b. Collaborates with others in a variety of situations.			
21. Acts with respect for others.			

Definitions:

Introduces (I)

Students first learn about key ideas, concepts, or skills related to the performance indicator. This usually happens at a general or very basic level, such as learning one idea or concept related to the broader outcome.

Reinforces (R)

Students are given the opportunity to synthesize key ideas of skills related to the performance indicator at increasingly proficient levels.

Demonstrates (D)

Students should demonstrate mastery of the performance indicator with the level of independence expected of a student attaining an associate's degree.