

WELDENG 7002 (Approved): Physical Principles of Welding Processes II

Course Description

Study of the application of physical principles in engineering of non-arc welding processes and equipment.

Prior Course Number: 600, 601

Transcript Abbreviation: Phy Prn Wld Pro II

Grading Plan: Letter Grade

Course Deliveries: Classroom

Course Levels: Graduate

Student Ranks: Masters, Doctoral

Course Offerings: Autumn

Flex Scheduled Course: Never

Course Frequency: Every Year

Course Length: 14 Week

Credits: 3.0

Repeatable: No

Time Distribution: 3.0 hr Lec

Expected out-of-class hours per week: 6.0

Graded Component: Lecture

Credit by Examination: No

Admission Condition: No

Off Campus: Never

Campus Locations: Columbus

Prerequisites and Co-requisites: Prereq: Graduate standing and 7001 or 4001 or permission of instructor.

Exclusions: Not open to students with credit for 600 or 601 or 4002.

Cross-Listings:

The course is required for this unit's degrees, majors, and/or minors: No

The course is a GEC: No

The course is an elective (for this or other units) or is a service course for other units: Yes

Subject/CIP Code: 14.9999

Subsidy Level: Doctoral Course

Programs

Abbreviation	Description
WELDENG	Welding Engineering

General Information

This is a graduate level course that will be taught at the same time as 4002. Lecture content will be the same as 4002, but graduate students will be required to conduct detailed review of research papers related to resistance welding provide brief class presentations.

Course Goals

Understanding of major Resistance Welding processes, weld parameters, equipment, and applications.

Understanding of the fundamentals and theory of Resistance Welding.

Understanding of the fundamentals and theory of Solid-State Welding.
Ability to describe and understand the major Solid-State Welding processes, weld parameters, equipment, and industrial applications.
Understanding of the fundamentals and theory of High Energy Density welding processes.
Ability to describe and understand Laser and Electron Beam welding processes, weld parameters, equipment, and industrial applications.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Fundamentals of Resistance Welding processes	10.0							
Equipment, parameters, and applications for Resistance Welding processes	6.0							
Fundamentals of Solid-State Welding processes	8.0							
Equipment, parameters, and application of Solid-State Welding processes	4.0							
Fundamentals of Laser and Electron Beam Welding processes	8.0							
Equipment, parameters, and application of Laser and Electron Beam Welding processes.	6.0							

Grades

Aspect	Percent
MT 1	20%
mt 2	20%
HW, labs	20%
Final exam	40%

Representative Textbooks and Other Course Materials

Title	Author
<i>Class notes</i>	Dickinson, Farson, Phillips

ABET-EAC Criterion 3 Outcomes

Course Contribution	College Outcome
***	a An ability to apply knowledge of mathematics, science, and engineering.
***	b An ability to design and conduct experiments, as well as to analyze and interpret data.
***	c An ability to design a system, component, or process to meet desired needs.
	d An ability to function on multi-disciplinary teams.
***	e An ability to identify, formulate, and solve engineering problems.
	f An understanding of professional and ethical responsibility.
	g An ability to communicate effectively.
	h The broad education necessary to understand the impact of engineering solutions in a global and societal context.
	i A recognition of the need for, and an ability to engage in life-long learning.
	j A knowledge of contemporary issues.

Course Contribution		College Outcome
**	k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

WELDENG ABET-EAC Criterion 9 Program Criteria Outcomes

Course Contribution		Program Outcome
***	l	an ability to select and design welding materials, processes and inspection techniques based on application, fabrication and service conditions
***	m	an ability to develop welding procedures that specify materials, processes and inspection requirements
	n	an ability to design welded structures and components to meet application requirements

Prepared by: Dave Farson