

WELDENG 7024 (Approved): High Energy Density Welding Processes

Course Description

Theory and practice of laser, electron beam, and other high energy density welding processes.

Prior Course Number: 704

Transcript Abbreviation: HED Weld Proc

Grading Plan: Letter Grade

Course Deliveries: Greater or equal to 50% at a distance

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 4001 or 7001 or permission of instructor.

Exclusions: Not open to students with credit for 704 or 4024.

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 4024. Lecture content will be the same as 4024, but graduate students will be required to conduct detailed review of research papers and provide brief class presentations.

Course Goals

Understand how the physical laws affect the design and operation of electron beam and laser material processes and processing systems.

Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Electron beam welding systems	6.0							
Electron beam welding processes	2.0							
Lasers and systems	14.0							
Optics	2.0							
Laser beam welding process	2.0							
laser cutting and drilling processes	2.0							

Grades

Aspect	Percent
MT 1	25%
MT 2	25%
HW	15%
Final exam	35%

Representative Textbooks and Other Course Materials

Title	Author
<i>Lecture Notes High Energy Density Welding Processes and Systems</i>	Albright, C.E., Farson, D.F.
<i>Laser Material Processing</i>	Steen, W.M.

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.
*	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
***	1	an ability to select and design welding materials, processes and inspection techniques based on application, fabrication and service conditions

Course Contribution		Program Outcome
***	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

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