

# WELDENG 7407 (Approved): Adhesive Bonding and Mechanical Joining of Plastics

## Course Description

Fundamentals of adhesive bonding science and technology and methods for mechanical joining of plastics including fasteners, snap-fits, press-fits, swaging, and staking.

**Prior Course Number:** 707

**Transcript Abbreviation:** Adh Bond Plastics

**Grading Plan:** Letter Grade

**Course Deliveries:** Classroom

**Course Levels:** Graduate

**Student Ranks:** Masters, Doctoral

**Course Offerings:** Spring

**Flex Scheduled Course:** Never

**Course Frequency:** Every Year

**Course Length:** 14 Week

**Credits:** 2.0

**Repeatable:** No

**Time Distribution:** 2.0 hr Lec

**Expected out-of-class hours per week:** 4.0

**Graded Component:** Lecture

**Credit by Examination:** No

**Admission Condition:** No

**Off Campus:** Never

**Campus Locations:** Columbus

**Prerequisites and Co-requisites:** Prereq: Graduate Standing and 620 or 4201 or 7201 or permission of instructor.

**Exclusions:** Not open to students with credit for 707 or 4407.

**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 4407. Lecture content will be the same as 4407, but graduate students will be required to submit a term project that may include a detailed design, a computer simulation or detailed review of research papers.

## Course Goals

---

Understand structure and properties of polymeric adhesives.
Ability to understand theories of adhesion.
Understand and be able to develop procedures for adhesive bonding.
Ability to analyze and design mechanical joints using fasteners.
Ability to analyze and design mechanical joints using snap and press fits.

## Course Topics

Topic	Lec	Rec	Lab	Cli	IS	Sem	FE	Wor
Introduction to structure and properties of polymeric adhesives.	4.0							
Theories of adhesion.	4.0							
Adhesive bonding procedures and rapid curing methods.	4.0							
Design and testing of adhesive joints.	2.0							
Analysis and design of snap-fits.	5.0							
Analysis and design of press-fits.	3.0							
Analysis and design of bolted joints.	3.0							
Staking and swaging.	3.0							

## Grades

Aspect	Percent
Homework and quizzes	20%
Mid-Term	25%
Final exam	30%
Term project	25%

## Representative Textbooks and Other Course Materials

Title	Author
<i>Adhesion and Adhesive Technology: an Introduction, 2nd Edition</i>	A.v. Pocius
<i>First Snap-Fit Handbook - Creating and Managing Attachments of Plastic Parts, 2nd Edition</i>	P.R. Bonenberger

## 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.

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

### **WELDENG ABET-EAC Criterion 9 Program Criteria Outcomes**

<b>Course Contribution</b>		<b>Program Outcome</b>
***	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:** Avraham Benatar