



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Solid-State Welding/Joining

WELDENG 4021

Credit Hours:

3.00

Course Levels:

Undergraduate (1000-5000 level)

Course Components:

Lecture

Course Description:

The welding and joining of materials in the solid state with emphasis on physical processes and metallurgical principles.

Prerequisites and Co-requisites:

Prereq: 4002, and enrollment in the WeldEng-BS or MatScEn-BS major; or permission of instructor.

Course Goals / Objectives:

- To expand the students understanding of solid state welding process through exploration of processes and scientific and engineering principles that govern the processes, as well as, fundamental mechanisms
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Course Topics:

- Mechanisms of Solid State Welding I
 - Thermo-mechanical Processing of Metals and Alloys (Low to High Strain Rates)
 - Cold and Pressure Welding
 - Roll Bonding
 - Flash Butt Welding
 - Friction Welding
 - Friction Stir Welding
 - Ultrasonic Welding
 - Explosive (Impact) Welding
 - Magnetic Pulse (Impact) Welding
 - Deformation / Resistance Welding
 - Material Changes during Solid-State Joining and Its Impact
 - Diffusion Based Joining Processes (includes transient liquid phase bonding)
 - Meso-, Micro- and Nano-Scale Welding
 - Computational Tools for Solid-State Joining
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Designation:

Elective