THE OHIO STATE UNIVERSITY

COLLEGE OF ENGINEERING

Solid-State Welding/Joining

WELDENG 7021

Credit Hours:

3.00 - 3.00

Course Levels:

Graduate (5000-8000 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: 7001, 7002, 7101, 7102, 4001, 4002, 4101, or 4102, and Grad standing; or permission of instructor.

Course Goals / Objectives:

- Understanding of solid state welding process through exploration of processes and scientific and engineering principles that govern the processes
- Understand how the physical laws affect the observed phenomenon in solid state welding processes
- Understand material compatibility and phenomenon that affect compatibility

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

Designation:

Elective