THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Brazing and Soldering

WELDENG 7023

Credit Hours:
3.00 - 3.00

Course Levels:
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Brazing and soldering processes with emphasis on physical and metallurgical principles, materials, design and application considerations.

Prerequisites and Co-requisites:
Prereq: 7101 or 4101, and 7102 or 4102, and Grad standing; or permission of instructor.

Course Goals / Objectives:
- Describe the basic principles of brazing and soldering processes, and of microstructure, properties, quality, and reliability of brazed and soldered joints. Provide specific knowledge about brazing and soldering of metals, ceramics, and composites
- Provide basic understanding of surface energy, wetting, and capillary flow in brazing and soldering. Interaction of solid and liquid metals, solidification, diffusion, phase transformations. Formation of oxides, carbides, nitrides and intermetalics
- Provide basic knowledge about the brazing and soldering filler metals and fluxes, their composition, properties, application, compatibility to base metals, selection, and classification
- Describe the basic principles and considerations in the design and strength of brazed and soldered joints, including joint geometry and gaps, strenght calculation, thermal expansion mismatch, stress concentration, testing, and quality control
- Provide basic knowledge about the inspection and quality control of brazed and soldered joints, and about the safety considerations in brazing and soldering

Course Topics:

- Introduction, definitions, and general characterization of brazing and soldering
- Physical and metallurgical phenomena in brazing and soldering
- Wetting and capillary flow of brazing and soldering filler metals
- Brazing and soldering processes
- Brazing and soldering filler metals and fluxes
- Base materials and brazeability, brazing and soldering of metals and metallic alloys.
- Effect of preplacing of brazing and soldering filler metals on filling the joint gap and joint quality.
- Brazing and soldering of non-metallic materials.
- Design and strength of brazed and soldered joints.
- Inspection of brazed and soldered joints.
- Microstructure characterization and defects in brazed and soldered joints.
- Safety considerations in Brazing and soldering

Designation:

Elective