



THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Ultrasonic Nondestructive Testing

WELDENG 4303

Credit Hours:

3.00 - 3.00

Course Levels:

Undergraduate (1000-5000 level)

Course Components:

Lecture

Course Description:

Principles of ultrasonic wave generation, interaction of ultrasonic waves with material structures with emphasis on characterization of material properties, and quantitative ultrasonic evaluation of material discontinuities.

Prerequisites and Co-requisites:

Prereq: 4103, and enrollment as WeldEng-BS major; or permission of instructor.

Course Goals / Objectives:

- Achieve basic understanding of main concepts and aims of ultrasonic NDT
 - Learn theoretical principles of ultrasonic methods and their capabilities and limitations
 - Learn ultrasonic wave interaction with interfaces between materials and ultrasonic spectroscopic methods
 - Learn applications of ultrasonics for material characterization
 - Obtain some basic laboratory experience with ultrasonic testing
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Course Topics:

- Introduction to course.
 - Vibrations and ultrasonic waves.
 - Physical principles and interaction with interface between materials.
 - Oblique incidence of ultrasonic wave on liquid solid interface.
 - Ultrasonic transducers. Radiation field of ultrasonic transducer.
 - Measurements of velocity and attenuation. Ultrasonic laboratory.
 - Ultrasonic spectroscopy. Sepectroscopic evaluation of adhesive joints laboratory.
 - Ultrasonic evaluation of joints.
 - Homework siposia presentations and practical examples.
 - Modeling of ultrasonic systems as a linear system.
 - Ultrasonic scattering. Ultrasonic laboratory.
 - Ultrasonic scattering in polycrystalline materials.
 - Reflection from defects.
 - Ultrasonic NDT and damage tolerance concept.
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Designation:

Elective