**SOUTHEAST COMMUNITY COLLEGE**
**CONSTRUCTION MANUFACTURING AND TECHNOLOGY DIVISION**
**Nondestructive Testing Technology Program**
**Revision Date: August 2025**

## I. CATALOG DESCRIPTION

| | |
|---|---|
| Course Number: | NDTT1360 |
| Course Title: | Ultrasonics I |
| Prerequisite(s): | MATH1050 or Higher and NDTT1260 |
| Catalog Description: | Applications and ultrasonic inspection techniques. Technique requirements specified in selected codes, standards, and job specifications. Examination and reporting consistency. Introduction to ultrasonic system configuration and computers. |
| Credit Hours: | 4 |
| Class Hours: | 30 |
| Lab Hours: | 90 |
| Total Contact Hours: | 120 |

## II. COURSE OBJECTIVES: *Course will*

**A.** Explore terminology and concepts, and identify the various fundamentals of ultrasonics along with application of fundamental electrical theory.

**B.** Discusses the theory and establishes sound practices in the setup and calibration of ultrasonic test systems as they apply to various inspection applications.

**C.** Introduces students to the fundamental architecture and use of both analog and digital instruments utilized for ultrasonic examinations.

**D.** Addresses the techniques and practices for performing various types of inspections which are conducted using ultrasonic test systems including but not limited to thickness gauging, straight beam, shear wave, and basic immersion testing.

## III. STUDENT LEARNING OUTCOMES AND GENERAL EDUCATION LEARNING OUTCOMES:

**A.** Student Learning Outcomes: *Student will be able to*

**1.** Interpret the principles and theory which govern modern ultrasonic testing techniques and practices for industrial applications.

**2.** Become proficient in the use of basic ultrasonic test equipment for the purposes of calibration, material thickness measurement, basic weld and/or other product form evaluations.

**3.** Demonstrate proficiencies in his/her ability to conduct independent ultrasonic examinations with recognized codes, standards, specifications, and procedures and correctly report findings.

**B.** General Education Learning Outcomes (GELOs)

**1.** GELO #3: Critical Thinking & Problem Solving
Outcome 1: Collect, identify, interpret and analyze data.

## IV. CONTENT/TOPICAL OUTLINE *(course outline may provide more detailed information)*

**A.** Introduction to ultrasonic inspection

**B.** Fundamental properties of ultrasound

**C.** Wave propagation

**D.** Characteristics of sound propagation in different media

**E.** Generation of ultrasound

**F.** Transducers

**G.** Instrumentation and circuitry
**H.** Coupling methods and test techniques
**I.** Pulse echo and through transmission test systems
**J.** Calibration blocks and reference standards
**K.** System configurations for applications
**L.** Interpretation of indications
**M.** Inspection reports and documentation

## V. INSTRUCTIONAL MATERIALS

**A.** Required Text(s): *PTP Ultrasonic Testing,* Classroom training and *Structural Welding Code D1-1,* 2020 Edition or latest edition

**B.** Supplies:

**1.** Instructor handouts
**2.** Notebook
**3.** Scientific calculator
**4.** 6" steel rule
**5.** Tape measure
**6.** Safety glasses
**7.** Small standard blade/small Phillips head screw drivers

## VI. METHODS OF PRESENTATION/INSTRUCTION

A. Methods of presentation typically include a combination of the following:

1. Lecturing
2. Small and large group discussion
3. Video presentations
4. Demonstrations
5. Handouts
6. Observations
7. Assigned lab projects

## VII. METHODS OF EVALUATION *(course outline may provide more detailed information)*

**A.** Methods of evaluation, although determined by the individual instructor, traditionally includes a combination of the following:

**1.** Homework
**2.** Quizzes
**3.** Tests
**4.** Lab grades
**5.** Attendance/class conduct

## VIII. SPECIFIC COURSE REQUIREMENTS

**A.** Attendance
**B.** Examinations/Quizzes
**C.** Homework
**D.** Lab projects
**E.** Must earn a final grade of 70% (2.0) or higher.