

## NE 110 – Introduction to Non-Destructive Testing & QA/QC

Credits: 3

Contact Hours: 3 Lecture – 0 Lab

Instructor:

### **Textbook/Materials**

Reference Only: Nondestructive Testing Classroom Training Handbooks (CT-6-2 through CT-6-6) by General Dynamics, Convair Division; published by ASNT.

### **Course Description**

The purpose of this course is to provide students a synopsis of widely used and lesser used non-destructive evaluation methods. Students also will be introduced to relevant quality assurance and quality control requirements in accordance with ASQ, ASME, and ANSI standards.

### **Prerequisites**

N/A

### **Co-requisites**

N/A

**This is a required course in Engineering Technology: Non-Destructive Testing Technology concentration.**

### **Program Educational Objectives**

- PEO1. To produce graduates who have a strong foundation of scientific and technical knowledge along with the skills required to conduct nondestructive examinations and communicate the results in support of engineering, manufacturing, construction and in-service activities.
- PEO2. To produce graduates who have the ability to pursue careers in eddy current inspection, liquid penetrant inspection, magnetic particle inspection, radiographic inspection, ultrasonic inspection, visual inspection, quality engineering, or quality control.
- PEO3. To produce graduates who continue their education in areas such as materials evaluation, engineering management, quality assurance, quality control, and engineering technology.

### **Course Outcomes**

1. List and define defects that occur in manufacturing.
2. List and define defects that occur in service.
3. Demonstrate basic knowledge about the equipment and standard techniques required to perform major non-destructive examinations/QC inspections.
4. Explain the information conveyed by the various NDT methods to aid in determining the most suitable method for a given application.
5. Explain the application of QA/QC concepts to provide quality results in the manufacturing or service industries.
6. Explain safety precautions associated with various NDT and QA/QC methods.
7. Explain the personnel requirements for certification in NDT and QA/QC.
8. Explain the reasons for equipment certification, calibration, and qualification.

**Student Outcomes**

- SO a. An ability to apply the knowledge, techniques, skills, and modern tools of the discipline to narrowly defined engineering technology activities.
- SO d. An ability to function effectively as a member of a technical team.
- SO g. An understanding of the need for and an ability to engage in self-directed continuing professional development.
- SO i. A commitment to quality, timeliness, and continuous improvement.

**Topics Covered**

- Introduction to NDT and QA/QC
  - a. Historical Background
  - b. Key Concepts and General Definitions
- Understanding Discontinuities
  - a. locations of discontinuities
  - b. causes of discontinuities
  - c. acceptable discontinuities
  - d. unacceptable discontinuities
- Overview of Visual Inspection (VT)
- Overview of Liquid Penetrant Testing (PT)
- Overview of Magnetic Particle Testing (MT)
- Review of Surface NDT Methods
- Overview of Radiographic Testing (RT)
- Overview of Ultrasonic Testing (UT)
- Overview of Eddy Current Testing (ET)
- Review of Volumetric NDT Methods
- Concepts in QA/QC; Certification Requirements
- Technical Research Papers