

**Course Description****ETI1852C | Aerospace Test and Measurements | 4.00 credits**

This course covers the principles and applications of primarily nondestructive testing techniques used to examine materials and components of spacecraft systems. Students learn to interpret procedures, operate testing equipment, and apply safety measures while conducting visual, dye penetrant, magnetic particle, ultrasonic, and Eddy-current inspections. Emphasis is placed on accurate measurement, tool selection, and result evaluation.

Prerequisite: ETI1830C

**Course Competencies**

**Competency 1:** The student will explain nondestructive test procedures (NDT) by:

1. Differentiating between destructive and nondestructive testing methods
2. Identifying various types of nondestructive testing techniques
3. Recognizing equipment used in nondestructive testing
4. Describing the application of NDT for process capability and quality assurance
5. Explaining the advantages and disadvantages of nondestructive inspection methods
6. Outlining the limitations of different nondestructive testing techniques
7. Identifying organizations that develop standards for NDT methods and training requirements for nondestructive testing personnel

**Competency 2:** The student will apply nondestructive testing concepts by:

1. Interpreting test procedures and guidelines
2. Analyzing indicators and results from nondestructive tests
3. Selecting appropriate equipment for specific testing scenarios
4. Configuring setups for effective nondestructive testing
5. Determining the type of inspection required for different products
6. Explaining the principles of operation of nondestructive testing
7. Describing procedures for specific nondestructive testing processes
8. Utilizing proper eye and face protection, including safety glasses, goggles, and face shields
9. Using appropriate hearing protection, such as ear plugs
10. Employing proper hand and skin protection, such as gloves
11. Wearing suitable attire for the shop environment, including secure clothing, shoes, and proper handling of hair and jewelry

**Competency 3:** The student will operate nondestructive testing equipment by:

1. Conducting visual inspections effectively
2. Performing dye penetrant inspections
3. Executing magnetic particle inspections
4. Carrying out ultrasonic inspections
5. Performing Eddy-current inspections
6. Interpreting findings from various nondestructive tests
7. Evaluating and assessing test results

**Competency 4:** The student will determine correct use of measurement tools and equipment by:

1. Interpreting geometric dimensioning and tolerancing on technical drawings
2. Defining terminology used with precision measurement tools, such as micrometers and calipers
3. Utilizing precision instruments like micrometers and calipers for accurate measurements
4. Explaining the procedures for using measurement instruments
5. Choosing the appropriate measurement tools and equipment for specific tasks
6. Identifying calibration requirements for tools and equipment

**Learning Outcomes:**

- Use quantitative analytical skills to evaluate and process numerical data
- Solve problems using critical and creative thinking and scientific reasoning
- Formulate strategies to locate, evaluate, and apply information