
Course Prefix/No.:	WLD 214
Course Title:	Non-Destructive Testing
Lecture Hours/Week:	2.0
Lab Hours/Week:	0.0
Credit Hours/Semester:	2.0

[Distance Learning Attendance/VA Statement](#)
[Textbook Information](#)

COURSE DESCRIPTION

This course covers non-destructive testing processes used in the evaluation of welds.

COURSE COMPETENCIES

Upon successful completion of this course, the student should be able to:

Module 1 – Liquid Penetrant Testing

- Explain the fundamentals to liquid penetrant testing of a weld.
- Discuss the procedures for liquid penetrant processing.
- Discuss the different liquid penetrant testing methods.
- Identify and discuss liquid penetrant testing equipment.
- Perform a selection of the proper liquid penetrant testing method.
- Interpret and evaluate the quality of a weld based upon testing indicators.
- Describe liquid penetrant process control.
- List the necessary test procedures and standards.
- Discuss safety and health risks and proper disposal of used penetrant.

Module 2 – Magnetic Particle Testing

- Discuss the principles of magnetic particle testing on a weld.
- Explain the effects of discontinuities on material.
- Define magnetization.
- Explain the principles of demagnetization.
- List the needed equipment.
- Define discontinuities.
- Explain flux fields.
- Discuss the properties of the magnetic particles and the methods of electric current.
- Explain the process and need for demagnetization.
- List the equipment needed to perform magnetic particle testing on a weld.
- Discuss different types of discontinuities.
- List the evaluation techniques that may be used in magnetic particle testing.
- Maintain quality control.

Module 3 – Ultrasonic Testing

- Discuss the principles of ultrasonics.
- Discuss the principles of using ultrasonic testing on a weld.
- Discuss the basic principles of acoustics.
- List the equipment needed for ultrasonic testing.
- Discuss transducer operation and theory.
- List basic ultrasonic testing methods.
- Explain the importance of equipment calibration
- Be able to perform an evaluation of base metal product forms.
- Discuss ultrasonic testing applications.
- Explain transducer characteristics.
- List evaluation standards.

Module 4 – Electromagnetic Testing

- Discuss the principles of using electromagnetic testing.
- Discuss eddy-current theory
- Discuss eddy-current instrumentation.
- Read out mechanisms.
- Discuss eddy-current sensing elements.
- Discuss the theory of flux leakage.
- Discuss flux leakage sensing elements.
- Define and explain coil impedance.
- Identify eddy-current test systems and analyze the results.
- Select the proper test frequency.
- Define coupling.
- List electromagnetic test applications.
- Discuss the factors affecting flux leakage fields.
- Make a selection of the proper magnetization method.
- List flux leakage applications.
- Explain remote field testing.
- Explain alternating current field measurement.
- List the electromagnetic testing standards and procedures.

Module 5 – Radiographic Testing

- Discuss radiographic principles.
- Discuss the principles of using radiographic testing on a weld.
- List the needed equipment.
- Discuss the properties and handling of radiographic film.
- List safety concerns associated with radiographic testing.
- Discuss specialized radiographic imaging.
- List special radiographic techniques.

MINIMAL STANDARDS

Assignments and attendance must be completed as designated in “Evaluation Strategies/Grading.” Criteria for minimal acceptable performance will be provided by the instructor.

REQUIREMENTS

Attendance Policy

The college attendance policy stated in the college handbook will be honored. The instructor will provide specific requirements for the course.

Academic Honesty

Students are expected to adhere to the college policy regarding student conduct as stated in the college handbook.

Assignments

Students are expected to complete all assignments and any supplementary exercises designated by the instructor.

EVALUATION STRATEGIES/GRADING

Successful completion of the course requires the completion of each module with an average of 70 points. Grades will be calculated from work attitude, all tests/projects, homework assignments, and laboratory assignments.

Grading Scale:

A = 90.0 – 100
B = 80.0 – 89.9
C = 70.0 – 79.9
D = 60.0 – 69.9
F = 00.0 – 59.9

Evaluation Method:

Tests/Projects	75.0% for each Module
Work Attitude	25.0% for each Module

Each module counts	20.0% of final grade.
--------------------	-----------------------

Work Attitude is defined as:

- Participation
- Cooperation
- Appearance
- Effort
- Safety
- Responsibility
- Professionalism
- Attendance
- Self Motivation
- Works Independently

METHODS OF INSTRUCTION

This course may be offered in traditional classroom format or as a self-paced, CD-based, hybrid delivery format.

Lectures, reading assignments, projects, discussions, video presentations, multimedia presentations, and web content are the major teaching methods used in this course.

ENTRY LEVEL SKILLS

The student must be able to read and design basic relay ladder diagrams. The student must also have basic computer skills.

PREREQUISITES: RDG 031 or equivalent and MAT 031 or equivalent

CO-REQUISITES: None

Disabilities Statement: Any student who feels s/he may need an accommodation based on the impact of a disability should contact the Special Resources Offices (SR) at 803-327-8007 in the 300 area of Student Services. The SRO coordinates reasonable accommodations for students with documented disabilities.

Effective: 2011SP