

THREE RIVERS COMMUNITY COLLEGE
COURSE OUTLINE

Course Number/Title: MFG K237 Non-Destructive Testing I Lab

Lecture 0 hrs Laboratory 2 hrs Credit 1 hrs Contact 2 hrs

Course Description: This is an introduction to the practical application of non-destructive testing equipment and techniques. These include liquid penetrate, magnetic particle, eddy current, ultrasonics, and radiography will be performed, evaluated, and documented.

Method: Laboratory assignments

Text: Handbook of Nondestructive Evaluation; Charles J. Hellier, McGraw-Hill

Prerequisites: None Co-Requisites: MFG K236

COURSE TOPICS/CONTENT

HOURS

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| 1. VISUAL INSPECTION
Pre-inspection of surface condition and selection of enhancement equipment needed for inspection. Lighting, measuring equipment, and acceptance standards will be used in the actual inspection of samples and products and documented. | 5 |
| 2. LIQUID PENETRATE INSPECTION
Applying liquid PENETRATE to samples, i.e. precleaners, dye penetrant, removers, and developers to identify potential cracks on the surface on the samples. Methods of recording results are reviewed and demonstrated. | 4 |
| 3. MAGNETIC PARTICLE INSPECTION
Operating magnetic particle equipment i.e. permanent magnets direct contact and induced magnetism equipment, precleaning procedures, magnetizing, visual and fluorescent particle application, and demagnetization of ferromagnetic materials and products. | 4 |
| 4. EDDY CURRENT INSPECTION
Operating eddy current testing equipment i.e. frequency experiments, lift off, gain, meter and phase analysis presentations. Metal sorting, discontinuity detection, material coating, thickness measurements and conductivity/permeability measurements will be evaluated and documented. | 4 |
| 5. ULTRASONIC INSPECTION
Operating ultrasonic test equipment i.e. frequency, beam spread, penetration of sound waves, wave characterizations, pulse echo, through transmission, immersion testing, and other factors influencing ultrasonic inspection will be evaluated and documented. | 4 |
| 6. RADIOGRAPHY TESTING
Operations of an x-ray machine, safety check, selections of this correct penetrating beam, and the selections of the x-ray film to be used. | 4 |

Continuation Sheet No 2 of 2

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7.	RADIOGRAPHY INSPECTION Operation x-rays, gamma rays and fluoroscopy radiography equipment ie. exposure time, source to film distance, film selection, material considerations, etc. Discontinuity detection dimensional inspection, density and other factors will be evaluated and documented.	5
	TOTAL	30

Measurable Objectives

The student will gain hands-on experience operating NDT equipment and performing NDT techniques in the laboratory. The results of each laboratory session will be evaluated and documented by the student. A comprehensive report of one nondestructive testing technique and it's application is required as part of the student's final grade. The most commonly used NDT techniques used in industry will be the focus of this laboratory course. They are as follows:

1. Visual Inspection
2. Liquid Penetrate Inspection
3. Magnetic Particle Inspection
4. Eddy Current Inspection
5. Ultrasonic Inspection
6. Radiography Inspection

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Prepared By: Donald Blanchette

Program Coordinator: Robert Lantz

Department Chairperson: Tony Benoit