



## Industrial Technology (IndT) 404

### Special Topics: Introduction to Non-Destructive Testing

3 Credit Hours 16 Weeks

Spring Semester 2021 Year

Prerequisite(s): IndT 350 or permission

#### **Instructor Information**

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*Instructor:* Dr. Alex Vakanski

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*Office Hours:* Open door policy, or by prior appointment

E-mail is the preferred medium of communication for any changes to the class schedule. All e-mail notifications will be sent to the student's University of Idaho account only. Course information can be found on BbLearn in the Courses section.

#### **Course Description (Catalog)**

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The course introduces students to methods, techniques, and equipment for non-destructive testing. The basic concepts and principles of visual, liquid penetrant, magnetic particles, ultrasonic, radiographic, eddy current, and thermal testing are covered.

#### **Course Scope**

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Methods and techniques for non-destructive testing, with a focus on ultrasonic, radiographic, liquid penetrant, magnetic particle, and eddy current testing.

#### **Course Objectives**

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After the completion of the course, the students should demonstrate the ability to:

1. Describe different methods for non-destructive testing, the equipment used, the testing function, and applications.
2. Identify suitable inspection processes and equipment, and follow procedures for conducting non-destructive testing.
3. Collect evaluation data, analyze results, and prepare reports on non-destructive testing.
4. Define general safety considerations in performing non-destructive testing and interpret testing standards.

## Course Materials

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Required Textbook: Paul E. Mix  
“*Introduction to Nondestructive Testing: A Training Guide*”  
2<sup>nd</sup> edition, 712 pages, Wiley, 2005  
ISBN-10: 0471420298  
ISBN-13: 978-0471420293

## Optional Reference Materials

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1. Charles J. Hellier, “Handbook of Nondestructive Evaluation,” First edition, McGraw-Hill, 2003, ISBN: 0-07-028121-1.
2. “Programmed Instruction Book: Introduction to NDT (PI-4-1)” General Dynamics / Convair Division, 1983.
3. “Programmed Instruction Book: Liquid Penetrant Testing (PI-4-2)” General Dynamics / Convair Division, 1988.
4. “Programmed Instruction Book: Magnetic Particle Testing (PI-4-3)” General Dynamics / Convair Division, 1988.
5. “Programmed Instruction Book: Ultrasonic Testing (PI-4-4)” General Dynamics / Convair Division, 1988.
6. “Programmed Instruction Book: Eddy Current Testing (PI-4-5)” General Dynamics / Convair Division, 1988.
7. “Programmed Instruction Book: Radiographic Testing (PI-4-6)” General Dynamics / Convair Division, 1988.

## Evaluation Procedures

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The course is delivered in a web-based format. Course materials, related to lecture notes, presentations, assignments, videos, and supplementary materials, are posted on BbLearn on a regular basis. The students are responsible to actively participate in the course by regularly logging in on BbLearn, reading the posted materials, and completing the assignments in a timely manner. BbLearn is the main medium for communication between the students in the course and the instructors.

Examination: There is one mid-semester examination, and one final examination. The dates of each examination are indicated in the Course Outline below. Failure to take the exams on the due dates, without prior approval, will result in zero marks. Prior approval could be granted only under acceptable circumstances.

Assignments and quizzes: There are four homework assignments and two quizzes. The due dates for the homework assignments and the dates of the quizzes are indicated in the Course Outline below.

Grading scheme:

Homework Assignments (4×10)	40 points
Quizzes (2×10)	20 points
Midterm Exam	20 points

Final Exam	20 points
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Total Points	100 points

Final Grades:	Above 90	A
	80 – 89	B
	70 – 79	C
	60 – 69	D
	Below 60	F

**IndT 404 Student Honor Code**

I have read the honor code below and agree with its provisions. My continued enrollment in this course constitutes full acceptance of this code.

I will not:

- provide or receive information from another person during an exam,
- plagiarize information from books, journals, or the internet,
- copy another person's solutions and submit them as my own.

**Course Outline**

Date	Topics	Course Objectives	Readings	Assignments
Jan. 19	<b>Introduction to NDT</b>	1	Chapters 1, 14	
Jan. 26	<b>Properties of Materials, Processes, Discontinuities</b>	1	Lecture Notes	
Feb. 2	<b>Visual Testing</b>	1, 2	Chapter 13	Homework 1
Feb. 9	<b>Liquid Penetrant Testing, Penetrant Materials</b>	1, 2, 3	Chapter 6	
Feb. 16	<b>Liquid Penetrant Testing, Test Methods</b>	1, 2	Chapter 6	Quiz 1
Feb. 23	<b>Magnetic Particle Testing, General Principles</b>	1, 2	Chapter 7	Homework 2
Mar. 2	<b>Magnetic Particle Testing, Test Methods</b>	1, 2	Chapter 7	
Mar. 9	<b>Midterm Exam</b>			Midterm
Mar. 23	<b>Ultrasonic Testing, General Principles</b>	1, 2, 3	Chapter 11	
Mar. 30	<b>Ultrasonic Testing, Test Methods</b>	1, 2	Chapter 11	
Apr. 6	<b>Radiographic Testing, General Principles</b>	1, 2, 3	Chapter 9	Homework 3
Apr. 13	<b>Radiographic Testing, Test Methods</b>	1, 2, 4	Chapter 9	

Apr. 20	<b>Eddy Current Testing</b>	1, 2	Chapter 3	Quiz 2
Apr. 27	<b>Thermal and Infrared Testing</b>	1, 2	Chapter 10	
May 4	<b>Exam Preparation</b>	1, 4		Homework 4
May 11	<b>Final Exam</b>			Final

## Policies

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### WRITING EXPECTATIONS

All written submissions should be submitted in a font and page set-up that is readable and neat. It is recommended that students try to adhere to a consistent format, which is described below.

- Typewritten in double-spaced format with a readable style and font and submitted inside the electronic classroom (unless classroom access is not possible and other arrangements have been approved by the professor).
- Arial 11 or 12-point font or Times New Roman styles.
- Page margins Top, Bottom, Left Side, and Right Side = 1 inch, with reasonable accommodation being made for special situations and online submission variances.

### CITATION AND REFERENCE STYLE

Assignments completed in a narrative essay or composition format must follow APA or MLA style guidelines.

### LATE ASSIGNMENTS

For each week that an assignment is late 10 % marks may be deducted, unless the student contacts the instructor ahead of time about an extenuating situation.

### DISABILITY ACCOMMODATIONS

This institution complies with the [Americans with Disabilities Act, Section 504 of the Rehabilitation Act](#), and the [World Wide Web Consortium's \(W3C\) Universal Access Guidelines](#). Reasonable accommodations are available for students who have a documented disability. Please notify your instructor(s) during the first week of class regarding accommodation(s) needed for the course. All accommodations must be approved through the ISU Counseling Testing and Career Services Office in Idaho Falls. For assistance, please call 282-7750 or stop by their office in the Student Union Building Room 223.

### CELL PHONE/TEXTING POLICY

Cell phone/texting in the classroom is not permitted. If you have a family or work reason to call or text on your cell phone please excuse yourself from the classroom and use your mobile device

in the hall. At times it might be necessary to use a mobile device as a web browser in the classroom in conjunction with an in-class discussion or exercise. The instructor will allow this use on a case by case basis.

## NETIQUETTE

Online universities promote the advancement of knowledge through positive and constructive debate--both inside and outside the classroom. Discussions on the Internet, however, can occasionally degenerate into needless insults and “flaming.” Such activity and the loss of good manners are not acceptable in a university setting--basic academic rules of good behavior and proper “Netiquette” must persist. Remember that you are in a place for the fun and excitement of learning that does not include descent to personal attacks, or student attempts to stifle the discussion of others.

- Technology Limitations: While you should feel free to explore the full-range of creative composition in your formal papers, keep e-mail layouts simple. The Educator classroom may not fully support MIME or HTML encoded messages, which means that boldface, italics, underlining, and a variety of color-coding or other visual effects will not translate in your e-mail messages.
- Humor Note: Despite the best of intentions, jokes, and especially satire can easily get lost or taken seriously. If you feel the need for humor, you may wish to add “emoticons” to help alert your readers: ;-), : ), ☺

## ACADEMIC INTEGRITY

The University of Idaho expects that students will engage in academic activity with high standards of honesty and integrity. These values are central to the educational process and are also cornerstone values for citizenship and professional conduct after you leave the University.

The University of Idaho has specific academic honesty expectations described in the Student Code of Conduct. These are minimum standards that are generally applied across the University.

For more information see: <http://www.uidaho.edu/DOS/academicintegrity>

## NONDISCRIMINATION POLICY

The University of Idaho has a policy of nondiscrimination on the basis of race, color, religion, national origin, sex, age, disability or status as a Vietnam era veteran. This policy applies to all programs, services, and facilities, and includes, but is not limited to, applications, admissions, access to programs and services, and employment. Such discrimination is prohibited by titles VI and VII of the Civil Rights Act of 1964, title IX of the Education Amendments of 1972, sections 503 and 504 of the Rehabilitation Act of 1973, the Vietnam Era Veterans' Readjustment Assistance Act of 1974, the Age Discrimination Act of 1975, the Age Discrimination in Employment Act Amendments of 1978, the Americans With Disabilities Act of 1990, the Civil Rights Act of 1991, the Rehabilitation Act Reauthorization of 1992 and other state and federal laws and regulations. Sexual harassment violates state and federal law and policies of the Board of Regents, and is expressly prohibited, as stated in Faculty Staff Handbook (FSH) 3220. The University of Idaho

also prohibits discrimination on the basis of sexual orientation, as stated in FSH 3215. The entire FSH can be accessed online at <http://www.webs.uidaho.edu/fsh>. Questions or concerns about the content and application of these laws, regulations or University policy may be directed to the Human Rights Compliance Officer (208-885-4213); Complaints about discrimination or harassment should be brought to the attention of the Human Rights Compliance Office (208-885-4212). Retaliation for bringing forward a complaint is prohibited by FSH 3810.

### **LIBRARY RESOURCES**

As a UI student, you not only have access to valuable print and electronic resources from the university's library, but you also have the access to personalized assistance from the librarians. If you have assignments or research questions and aren't sure how to make the most of library resources from off campus, feel free to contact the College of Education liaison librarian with questions. Help may be obtained via phone; 208-885-2503. As always, you may also call the main reference desk anytime Monday to Thursday 9am to 9pm, Friday 9am to 5pm, and Sunday 1pm to 9pm, 208-885-6584, or visit <http://www.lib.uidaho.edu> for email or IM assistance.

### **DISCLAIMER STATEMENT**

Course content may vary from the outline to meet the needs of this particular group.