

Identification	Subject	Non-destructive Testing Methods (ME 453), 6 ECTS	
	Department	Mechanical Engineering	
	Program	Undergraduate	
	Term	Fall 2026	
	Instructor	Pusta Jalalova	
	Email:	puste.jalalova@khazar.org	
	Classroom/hours		
Prerequisites	Materials Science		
Language	English		
Compulsory/Elective	Elective		
Textbooks and course materials	Non-Destructive Testing is a discipline that relies heavily on real case studies, field reports, and risk assessment practices from the Oil & Gas sector. For this reason, no single textbook can adequately capture the practical, industry-specific knowledge this course aims to deliver. Instead, the instructor has systematized course materials built around real case studies, drawing on firsthand experience and documentation gathered through direct work in the Oil & Gas industry. These materials will be provided to students throughout the semester and will form the primary basis of instruction.		
Course description	This course offers a comprehensive introduction to Non-Destructive Testing (NDT) techniques with a specific focus on applications within the Oil & Gas industry. NDT is a critical aspect of quality control, maintenance, and safety assurance, allowing engineers to assess the integrity of materials and components without causing any damage. The course covers various NDT techniques, including Visual Testing (VT), Ultrasonic Testing (UT), Radiographic Testing (RT), Magnetic Particle Testing (MT), etc. - with a focus on their application in the Oil & Gas industry.		
Course objectives	The primary objective of this course is to provide students with a solid foundation in the principles of Non-Destructive Testing, particularly as they apply to the Oil & Gas industry. The course is designed to: - Provide students with the technical knowledge required to understand and implement various NDT methods. -Develop student's ability to critically assess the suitability of different NDT techniques for specific applications, considering factors such as material properties, defect types, and operational conditions. -Teach students to effectively communicate NDT findings in written reports.		
Learning Outcomes	Upon successful completion of this course, students will be able to: - Understand and explain the fundamental principles of Non-Destructive Testing, including the physical concepts underlying each technique. -Select appropriate NDT methods for various applications in the Oil & Gas industry, considering the specific requirements of different materials and operational environments. -Communicate NDT results effectively in technical reports to support engineering projects and maintenance operations.		
Teaching methods	Case analysis		x
	Group discussion		x
	Lecture		x
	Simulation		x
Evaluation Criteria	Methods	Date/deadlines	Percentage (%)
	Midterm Exam		30
	Quizzes	During the semester	20
	Assignment	During the semester	5
	Activity	At each lesson	5
	Final Exam		40
	Total		100

Class Policy	▪ Use of Generative AI (GAI) Generative AI tools (e.g., ChatGPT, Copilot, Claude, Gemini) are permitted only for limited, supportive tasks. Permitted Uses: Brainstorming and structuring ideas or assignment outlines. Editing grammar, style, and language clarity of your own draft. Clarifying course concepts and reviewing background materials. Formatting and preparing presentation materials. Prohibited Uses: Core Content & Analysis: GAI must NOT be used to generate primary technical content, conduct data analysis, perform calculations, or formulate conclusions. All submitted work must reflect your own original analysis and understanding Exams & Quizzes: GAI use is strictly prohibited during all quizzes, midterm exams, and final exams. Disclosure & Academic Integrity: Mandatory Disclosure: Any permitted use of GAI must be explicitly disclosed at the end of the assignment (stating the tool used and its specific purpose). Violations: Undisclosed use, unauthorized use, or presenting GAI-generated content as your own constitutes an academic integrity violation and may result in a warning, mandatory resubmission, or a grade penalty/zero. ▪ Ethics Copy of other students' work is highly discouraged. All assignments must be handled by the student himself. This is a university policy, and violators will be reprimanded accordingly. ▪ Preparation for class The structure of this course demands your individual effort outside the classroom for extra practice of many problems within the textbook. After each session, every student needs to put sufficient time to practice and finish the assignments by the predetermined date. • Withdrawal (pass/fail) This course strictly follows grading policy of the School of Engineering. Thus, a student is normally expected to achieve a mark of at least 60% to pass. In case of failure, he/she will be required to repeat the course the following term or year. ▪ Cheating/plagiarism Cheating or other plagiarism in handling the assignments, Mid-term and Final Examinations will lead to course failure. In this case, the student will automatically get zero (0), without any considerations. ▪ Professional behavior guidelines The students shall behave in the way to create favorable academic and professional environment during the class hours. Unauthorized discussions and unethical behavior are strictly discouraged.
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	▪ Class Activity: Students will be asked questions at the beginning of each class based on the previous lesson. Active participation and correct responses will be evaluated, and up to 5 points will be awarded at the end of the semester. ▪ Quiz There will be 4 quizzes (each for 5 points) for checking understanding of content during semester. We are not going to give make-up for a missing quiz due to any reason other than a medical report. ▪ Assignment At the end of the semester, students will complete an individual assignment on an NDT-related topic and present their work to the class. The assignment and presentation will be worth 5 points.
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Tentative Schedule

Week	Date/Day (tentative)	Topics	Textbook/Assignments
1	-	Introduction to Non-Destructive Testing (NDT)	Lesson 1.pptx
2	-	Visual Testing (VT)	Lesson 2.pptx
3	-	Ultrasonic Testing (UT)	Lesson 3.pptx
4	-	Magnetic Particle Testing (MT) Chap 4	Lesson 4.pptx
5	-	Liquid Penetrant Testing (PT)	Lesson 5.pptx
6	-	Radiographic Testing (RT)	Lesson 6.pptx
7	-	Course Review and Preparation for Midterm Exam	
8	-	Midterm exam Eddy Current Testing (ET) -1	Lesson 7.pptx
9	-	Eddy Current Testing (ET) -2	Lesson 7.pptx
10	-	Advanced NDT: PAUT and TOFD	Lesson 8.pptx
11	-	Data Interpretation and Reporting in NDT	Lesson 9.pptx
12	-	Risk Based Inspection (RBI)/ Inspection Planning and Execution	Lesson 10.pptx
13	-	Emerging Trends	Lesson 11.pptx
14	-	Case Studies (Oil & Gas)	Lesson 12.pptx
15	-	Review and Preparation for Final Exam	
16		Final exam	

This syllabus is a guide for the course and any modifications to it will be announced in advance.