Course Name						
INTRODUCTION TO NON DESTRUCTIVE TESTING OF MATERIALS						
Code	**Semester**	**Local Credits**	**ECTS Credits**	**Course Implementation, Hours/Week**		
				Theoretical	**Tutorial**	**Laboratory**
MET 483E	7	2	4	2	-	-

Department/Program	Metallurgical and Materials Engineering		
Course Type	Elective	**Course Language**	English
Course Prerequisites	None		

Course Category by Content, %	**Basic Sciences**	**Engineering Science**	**Engineering Design**	**General Education**
		40	60	

Course Description	Non Destructive testing methods have a significant importance in production and service operations as far as the quality assurance of products are concern. This course will provide a wide range of information on nondestructive testing methods and their applications. The Scope of NDT, The Need and the Definition of NDT, Comparison of Destructive and Non Destructive Testing Techniques, NDT methods, Liquit Penetrant Testing, , Magnetic Particle Testing Ultrasonic testing, Radiographic Testing, , Eddy Current Testing , Other NDT tests and their applications.
Course Objectives	The student who completes this course will have the knowledge on: • Basic concepts in Non Destructive Testing (NDT). • NDT Applications in different engineering fields • Liquid Penetrant, Magnetic Particle, Eddy Current, Ultrasonic and Radiography Tests Principles. • Applications and limitations of Liquid Penetrant, Magnetic Particle, Eddy Current, Ultrasonic and Radiography Tests • Flaw Determination by using NDT • Developments in flaw determination in Casting, Rolling, Pipe production, welding using NDT • Data Evaluation in NDT • the relations of Failure Analysis and Materials Properties and integrate these knowledge with NDT applications. • Standards on NDT • Liquid Penetrant, Magnetic Particle, Eddy Current, Ultrasonic and Radiography Tests Hardwares
Course Learning Outcomes	This course will give our student I. the confidence and knowledge on the relationships between quality assurance and non destructive testing . II. liquid penetrant test techniques and their applications III. magnetic particle test techniques and their applications IV. ultrasonic test techniques and their applications V. radyography tests techniques and their applications VI. Eddy Current tests techniques and their applications VII. Added to this, they will be able to evaluate NDT results in light of standards and their materials knowledge
Textbook	Handout on Nondestructive Testing
Other References	Paul E. Mix, P.E., E.E., Introduction to Nondestructive Testing: A Training Guide, 2nd Edition ISBN: 978-0-471-42029-3, July 2005 Wiley Ravi Prakash Nondestructive Testing Techniques. New Academic Science Ltd May 2009 **ISBN 13:** 9781906574062 **ISBN 10:** 1906574065
Homework & Projects	
Laboratory Work	
Computer Use	
Other Activities	

Assessment Criteria	**Activities**	**Quantity**	**Effects on Grading, %**
	Midterm Exams	**1**	**20**
	Quizzes		
	Homework	**2**	**20**
	Projects	**1**	**20**
	Term Paper/Project		
	Laboratory Work		
	Other Activities		
	Final Exam	**1**	**40**

COURSE PLAN

Weeks	Topics	Course Outcomes
1	The definition of non destructive testing, destructive and non destuctive tests and their comparison	**I-VI**
2	Principles of Liquid penetrant test, applications and limitations.	**II-VI**
3	Application procedure of liquid penetrant test, introduction of liqiud penetrant test hardwares.	**II-VI**
4	Magnetic particle test principles , applications and limitations.	**III-VI**
5	Magnetization methods, application procedure of magnetic particle test, introduction magnetic particle test hardwares.	**III-VI**
6	Midterm	**I-II-III-VI**
7	Radyography test principles, applications and limitations.	**V-VI**
8	Application procedure of radyography test, introduction of radyography test hardwares	**V-VI**
9	Ultrasonic test principles, applications and limitations	**IV-VI**
10	Application procedure of ultrasonic test, introduction of ultrasonic test hardwares	**IV-VI**
11	Eddy Current test principles, applications and limitations	**VII**
12	Other NDT tests and their applications.	**I-II-III-IV-V-VI**
13	Student projects` presentations, discussions and evaluations	**I-II-III-IV-V-VI**
14	Student projects` presentations, discussions and evaluations	**I-II-III-IV-V-VI**

Relationship between the Course and METALLURGICAL AND MATERIALS ENGINEERING **Curriculum**

	Program Outcomes	Level of Contribution		
		1	**2**	**3**
1	Ability to apply the knowledge of mathematics, science and engineering principles to solve problems in metallurgical and materials engineering (ABET:a)		X	
2	Ability to characterize materials using standard and/or self designed experimental methods and to evaluate the results (ABET:b)			**X**
3	Ability to design a system or a process, taking into consideration of the desired specifications, quality, ethics and environment. (ABET:c)			X
4	Ability to communicate both orally and in the written form and to take part in, and provide leadership of the teams in the elucidation of engineering problems; (ABET:d, g)			
5	Ability to define, formulate and solve engineering problems in the development, production, processing, protection and usage of engineering materials. (ABET:e)			X
6	An understanding of professional and ethical responsibilities(ABET:f)		X	
7	An understanding of current/contemporary issues and impact of engineering solutions in broad cultural, national and global levels;. (ABET:h, j)	X		
8	A comprehension of the nature of engineering progress closely linked with the development of new materials and production processes. An ability to engage in life-long learning and a recognition of its necessity (ABET:i)		X	
9	Ability to use essential tools and techniques of modern engineering in the development, production, processing, protecting of the existing and new engineering materials. (ABET:k)		X	

1: Little, 2. Partial, 3. Full

Course relationships with major elements of the field and material classes

		Level of Contribution		
		1	**2**	**3**
MAJOR ELEMENT OF THE FIELDS	STRUCTURE		X	
	PROPERTIES		X	
	DESIGN EXPERIMENT/ANALYSE DATA			X
	PROCESSING			X
	COST/PERFORMANCE			X
	QUALITY/ENVIRONMENT			X
	DESIGN PROCESS OR PRODUCT			X
MATERIAL CLASSES	METAL			X
	CERAMICS		X	
	POLYMERS	X		
	COMPOSITES	X		

1: Little, 2. Partial, 3. Full

Prepared by	**Date**	**Signature**
Prof. Dr. Yılmaz TAPTIK	March, 2013	