NONDESTRUCTIVE EVALUATION METHODS

1	Course Title:	NONDESTRUCTIVE EVALUATION METHODS	
2	Course Code:	MAK4419	
3	Type of Course:	Optional	
4	Level of Course:	First Cycle	
5	Year of Study:	4	
6	Semester:	7	
7	ECTS Credits Allocated:	3.00	
8	Theoretical (hour/week):	2.00	
9	Practice (hour/week):	0.00	
10	Laboratory (hour/week):	0	
11	Prerequisites:		
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Doç. Dr. Hakan AYDIN	
15	Course Lecturers:		
16	Contact information of the Course Coordinator:	e-mail: hakanay@uludag.edu.tr Tel: + 90 (224) 294 06 52 Adres: Uludağ Üniversitesi, Mühendislik-Mimarlık Fakültesi, Makine Mühendisliği Bölümü, 16059, Görükle-Bursa, Türkiye.	
17	Website:		
18	Objective of the Course:	In this course ,structure of the damages and defects in metals and alloys that can be used in the determination of non-destructive material testing methods is intended to introduce.	
19	Contribution of the Course to Professional Development:		
20	Learning Outcomes:		
		1	To be able to classify nondestructive testing methods.
		2	To be able to distinguish defects in materials.
		3	To be able to comprehend defects while occurring in production stages such as welding, casting and plastic deformation.
		4	To be able to determine the field of application of ultrasonic testing methods and evaluate the results.
		5	To be able to determine the field of application of radiographic testing methods and evaluate the results.
		6	To be able to determine the field of application of magnetic particle testing methods and evaluate the results.
		7	To be able to determine the field of application of magnetic particle testing methods and evaluate the results.
		8	To be able to determine the field of application of penetrating fluid testing method and evaluate the results.
		9	To be able to determine the field of application of pressurized gas or pressurized liquid testing method and evaluate the results.
		10	To be able to compare all nondestructive testing techniques relative to each other and decide which technique can be used.
21	Course Content:		
	Course Content:		

Week	Theoretical	Practice
1	Course presentation and content. General information about the non-destructive testing of materials.	
2	Usage purposes of non-destructive testing methods and classification of methods.	
3	Material defects which can be detected by non destructive testing.	
4	Damage and structural defects while in material processing such as casting and welding. Heat treatment defects.	
5	Damage and structural defects while in material processing such as forging and rolling.	
6	Ultrasonic testing methods and basic principles.	
7	Determine the field of application of ultrasonic testing methods and to evaluate the results.	
8	Midterm Exam	
9	Radiographic testing methods and basic principles.	
10	Radiographic testing method application areas. Radiographic examination techniques weaknesses and advantages.	
11	Radiographic examination method for example; internal stress measurement.	
12	Magnetic particle testing methods with the basic principles of the method and application areas.	
13	Testing methods of the basic principles and applications with Eddy current.	
14	The basic principles of fluid penetrating examination methods and applications Pressurized gas or pressurized liquid testing method.	

22	Textbooks, References and/or Other Materials:	1. Non-destructive Testing, R.Halmshaw, Butterworth-Heinemann, 1991. 2. An Introduction to Nondestructive Testing, Matthew J.Golis, ASNT, 1991 3. Non-Destructive Testing: Ultrasonic – Level I , Ekinci Ş., ÇNAEM TR – 282, Eylül 1990. 4. Turkish Nondestructive Testing Standards TS EN 462, 571, 583, 584, 1330, TS EN ISO 9934, 13018. 5. Material Information and Testing, Anık, Selahaddin, Birsen Publishing House İstanbul, 2000. 6. Material Information and Testing, Demirci, A. Halim, Alfa-2004. 7. Plastics Materials and Processing, Strong A.B., Prentice-Hall Inc. 2000. 8. Werkstoffprüfung mit Ultraschall, Krautkramer J. und Krautkramer H. Springer – Verlag, Berlin 1985. 9. Material Information, Güngör, Yasin, Beta Publising House, İstanbul,2001.
23	Assesment	

TERM LEARNING ACTIVITIES	**NUMBER**	**WEIGHT**
Midterm Exam	1	40.00
Quiz	0	0.00
Home work-project	1	10.00
Final Exam	1	50.00

Total	3	100.00
Contribution of Term (Year) Learning Activities to Success Grade		50.00
Contribution of Final Exam to Success Grade		50.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		

24 ECTS / WORK LOAD TABLE

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	2.00	28.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	5	2.00	10.00
Homeworks	1	15.00	15.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	12.00	12.00
Others	1	10.00	10.00
Final Exams	1	15.00	15.00
Total Work Load			90.00
Total work load/ 30 hr			3.00
ECTS Credit of the Course			3.00

25 CONTRIBUTION OF LEARNING OUTCOMES TO PROGRAMME QUALIFICATIONS

	PQ1	PQ2	PQ3	PQ4	PQ5	PQ6	PQ7	PQ8	PQ9	PQ10	PQ11	PQ12	PQ13	PQ14	PQ15	PQ16
ÖK1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK2	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0
ÖK3	0	0	0	0	0	0	0	0	0	0	3	3	0	0	0	0
ÖK4	2	0	2	0	3	0	0	0	0	0	3	4	0	3	0	0
ÖK5	3	0	2	0	3	0	0	0	0	0	3	4	0	3	0	0
ÖK6	0	0	2	0	3	0	0	0	0	0	3	4	0	3	0	0
ÖK7	0	0	2	0	3	0	0	0	0	0	3	4	0	3	0	0
ÖK8	0	0	2	0	3	0	0	0	0	0	3	4	0	3	0	0
ÖK9	0	0	2	0	3	0	0	0	0	0	3	4	0	3	0	0
ÖK10	0	0	0	0	0	0	0	0	0	0	0	4	0	0	0	0

LO: Learning Objectives PQ: Program Qualifications

Contribution Level:	1 very low	2 low	3 Medium	4 High	5 Very High