FRACTURE IN ENGINEERING MAT.

1	Course Title:	FRACTURE IN ENGINEERING MAT.
2	Course Code:	MAK4016
3	Type of Course:	Optional
4	Level of Course:	First Cycle
5	Year of Study:	4
6	Semester:	8
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:	None
12	Language:	Turkish
13	Mode of Delivery:	Face to face
14	Course Coordinator:	Prof. Dr. AGAH UĞUZ
15	Course Lecturers:	Yok
16	Contact information of the Course Coordinator:	uguz@uludag.edu.tr 0224-2941966 Uludağ Üniv. Mühendislik-Mim. Fak. Görükle Bursa
17	Website:	
18	Objective of the Course:	To introduce the mechanisms, causes and engineering approaches to fracture type damage of especially metallic engineering materials
19	Contribution of the Course to Professional Development:	
20	Learning Outcomes:	
	1	Have basic knowledge about fracture mechanics.
	2	Have information about the fracture behaviour of materials to be used in engineering.
	3	Have knowledge on problem solving methods in practice.
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21	Course Content:	
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Week	Theoretical	Practice
1	Introduction and the content of the course. Reference publications. Materials; metallic materials, polymeric materials, ceramic materials and composite materials. Damage in materials. Fracture types in materials.	
2	Theoretical fracture strength. The evaluation of fracture mechanics.	

3	Linear Elastic Fracture Mechanics (LEFM). The relationship between stress and strain. Elastic stress-strain relationships. Principal planes and principal stresses. Stress at one point.	
4	Two dimensional Mohr's stress circle. Fracture toughness. Energy balance.	
5	The relationship between G and K. Problems related with the previous topics.	
6	Midterm exam + Course review	
7	Crack tip plastic zone. Plastic zone size and shape through specimen thickness.	
8	Problems about plastic zone size calculations. Elastic-Plastic Fracture Mechanics (EPFM).	
9	Crack opening displacement. Problems about J integral and crack tip opening displacement.	
10	Introduction to scanning and transmission electron microscopes, operating principles	
11	Linear Elastic Fracture Mechanics test	
12	Repeating courses and midterm exam	
13	The importance of microstructure in fracture mechanics. Term-work submission	
14	Safe design and crack inspection methods. Residual strength	
15	Textbooks, References and/or Other	Kırılma Mekaniğine Giriş, Agah Uğuz, Uludağ Üniversitesi
16	Assessment	

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	7	1.00	7.00
Homeworks	1	12.00	12.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	2	7.00	14.00
Others	5	2.00	10.00
Final Exams	1	15.00	15.00
Total Work Load			86.00
Total work load/30 hr			2.87
ECTS Credit of the Course			3.00

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Midterm Exam	2	40.00
Quiz	0	0.00
Home work-project	1	10.00
Final Exam	1	50.00
Total	4	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

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	4	4	3	4	2	4	3	2	2	5	4	3	4	3	0	0
ÖK2	4	4	3	4	2	4	3	2	2	5	4	3	4	3	0	0
ÖK3	4	4	3	4	2	4	3	2	2	5	4	3	4	3	0	0

LO: Learning Objectives PQ: Program Qualifications

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