

MATERIALS SCIENCE

1	Course Title:	MATERIALS SCIENCE
2	Course Code:	MAK2005
3	Type of Course:	Compulsory
4	Level of Course:	First Cycle
5	Year of Study:	1
6	Semester:	2
7	ECTS Credits Allocated:	4.00
8	Theoretical (hour/week):	3.00
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. RUKİYE ERTAN
15	Course Lecturers:	-
16	Contact information of the Course Coordinator:	Rukiye Ertan e-mail: rukiye@uludag.edu.tr Tel: + 90 (224) 294 06 53 Adres: Uludağ Üniversitesi, Mühendislik Fakültesi, Otomotiv Mühendisliği Bölümü, 16059, Görükle-Bursa, Türkiye.
17	Website:	
18	Objective of the Course:	To gain knowledge and skill about structure of materials, basic phase diagrams and mechanical properties used in automotive engineering applications.
19	Contribution of the Course to Professional Development:	
20	Learning Outcomes:	
	1	To be able to define interatomic bonds of engineering materials.
	2	To be able to define crystal structure types of materials
	3	To be able to Explain Crystallographic directions and planes.
	4	To be able to list crystal imperfections.
	5	To be able to define tensile test results.
	6	To be able to show the cooling curves and two alloy basic phase diagrams.
	7	To be able to calculate the amount of phases in basic phase diagrams.
	8	To be able to define heat treatment of steels
	9	To be able to define microstructure and general properties of polymers.
	10	To be able to define composite materials.
21	Course Content:	
	Course Content:	
Week	Theoretical	Practice
1	Basic Definitions and Concepts. The Structure of Atom	

2	Atomic Bonding (Metallic, Ionic, Covalent and van der Waals Bonds.) Atomic Diameter and Coordination Number	
3	Structure and types of crystal. Bravais lattices and atomic packing factor. Crystallographic directions and planes. Crystal Defects	
4	Mechanical Tests of Materials	
5	Diffusion and industrial applications.	
6	Show the cooling curves and two alloy basic phase diagrams.	
7	The Fe-C Phase diagram.	
8	The solution of the problems of the Fe-C phase proportions.	
9	Production of cast iron and steel	
10	Heat treatment of steels.	
11	Strengthening mechanisms	
12	Non-ferrous metals and their alloys	
Activites		
14	Automotive materials Theoretical	14
Practicals/Labs		0
Self study and preperation		20
Homeworks		0
Projects		0
Field Studies		0
Midterm exams		1
Others		0
Final Exams		1
Total Work Load		
TERM LEARNING ACTIVITIES		
ECTS Credit of the Course		
Midterm Exam		1
Quiz		0
Home work-project		1
Final Exam		1
Total		3
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	0	0	5	4	1	0	0	4	2	0	2	0	0	0	0	0
ÖK2	0	0	5	4	1	0	0	4	2	0	2	0	0	0	0	0
ÖK3	0	0	5	4	1	0	0	4	2	0	2	0	0	0	0	0
ÖK4	0	0	5	4	1	0	0	4	2	0	2	0	0	0	0	0
ÖK5	0	0	5	4	1	0	0	4	2	0	2	0	0	0	0	0
ÖK6	0	0	5	4	1	0	0	4	2	0	2	0	0	0	0	0
ÖK7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
ÖK10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LO: Learning Objectives PQ: Program Qualifications																
Contribution Level:	1 very low			2 low			3 Medium			4 High			5 Very High			