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:	2	
6	Semester:	3	
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:	None	
12	Language:	Turkish	
13	Mode of Delivery:	Face to face	
14	Course Coordinator:	Prof. Dr. ALİ BAYRAM	
15	Course Lecturers:	Prof.Dr.Ali BAYRAM / Doç.Dr. Hakan AYDIN / Öğr.Gör.Dr. Kurtuluş YİĞİT	
16	Contact information of the Course Coordinator:	bayram@uludag.edu.tr hakanay@uludag.edu.tr kyigit@uludag.edu.tr	
17	Website:		
18	Objective of the Course:	To gain professional knowledge and skills about the structure, basic type phase diagrams and mechanical properties of materials used in Mechanical Engineering applications.	
19	Contribution of the Course to Professional Development:	1. The student knows the inter-atomic bonding structures of engineering materials. 2. The student knows what kind of crystal structure the materials used in engineering applications have. 3. Student will be able to establish a relationship between the presence of crystal faults and mechanical and metallurgical phenomena. 4. The student learns that technological applications such as phase transformations, cementation, nitriding, boring, plating, welding and soldering occur by diffusion. 5. The student determines which phases can be found in a particular composition and temperature with the help of the equilibrium diagram of any binary alloy system and can calculate the percentages of these phases. 6. The student has theoretical knowledge about mechanical examination of materials such as tensile strength and hardness measurement and can calculate ductility, section narrowing, yield and tensile strength by using tensile test results.	
20	Learning Outcomes:		
		1	Recognizes the atomic structure and inter-atomic bonds and relates the physical and mechanical properties of the material.
		2	Knows the crystal structures formed by atoms, crystal defects and atomic diffusion.
		3	Learns the experiments applied to determine the mechanical properties of materials.
		4	Learn phase diagrams and learn about alloy
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21	Course Content:

Course Content:

Week	Theoretical	Practice
1	Introduction to the lesson structure of the atom	
2	Atomic bonds	
3	Atomic bonds	
4	Crystal structure	
5	Crystal structure	
6	Theoretical problem solutions for the crystal structure	
7	Diffusion MIDTERM	
8	Tensile test	
9	Fatigue test	
10	Hardness, Notch-impact tests	
11	Creep test, problem solutions for tensile tests.	

Activites	Number	Duration (hour)	Total Work Load (hour)
Theoretical	14	3.00	42.00
Practicals/Labs	0	0.00	0.00
Self study and preperation	14	3.00	42.00
Homeworks	8	4.00	32.00
Projects	0	0.00	0.00
Field Studies	0	0.00	0.00
Midterm exams	1	9.00	9.00
Others	0	0.00	0.00
Final Exams	1	2.00	2.00
Total Work Load			127.00
Total work load/ 30 hr			4.23
ECTS Credit of the Course			4.00

Jr. John Wiley & Sons, Inc.2007.
F. Shackelford, Prentice Hall International Inc.1996.,
Arifa 2004.

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Quiz	0	0.00
Final Exam	1	60.00
Total	2	100.00
Contribution of Term (Year) Learning Activities to Success Grade		40.00
Contribution of Final Exam to Success Grade		60.00
Total		100.00
Measurement and Evaluation Techniques Used in the Course		In order to ensure that Mechanical Engineering students participate actively in the course, students are asked questions during the course. Incomprehensible matters are explained again. 1 midterm exam and 1 final exam are held during the semester.

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	5	4	4	4	1	1	1	1	1	1	1	0	0	0	0	0
ÖK2	5	4	3	4	1	1	1	1	1	1	1	0	0	0	0	0
ÖK3	5	3	4	3	1	1	1	1	1	1	1	0	0	0	0	0
ÖK4	5	3	1	1	1	1	1	1	1	1	1	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**				