MATERIALS SCIENCE

1	Course Title:	MATERIALS SCIENCE	
2	Course Code:	CEV2016	
3	Type of Course:	Compulsory	
4	Level of Course:	First Cycle	
5	Year of Study:	2	
6	Semester:	4	
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:	Öğr.Gör.Dr. KURTULUŞ YİĞİT	
15	Course Lecturers:	Prof.Dr.Ali BAYRAM / Öğr.Gör.Dr. Kurtuluş YİĞİT	
16	Contact information of the Course Coordinator:	B.U.Ü. Müh.Fak.Makine Mühendisliği Bölümü 0224-2941956 0224-2940649 bayram@uludag.edu.tr kyigit@uludag.edu.tr	
17	Website:		
18	Objective of the Course:	To teach environmental engineering students the general atomic and macro scale properties of materials. To teach how to test the mechanical and corrosive properties of the materials used in their professional life. In line with this information, to make it easy to choose metal-based, composite and polymer materials required in his professional studies.	
19	Contribution of the Course to Professional Development:	Environmental Engineering students generally learn about the atomic and macro scale properties of materials. Learn how to test the mechanical and corrosive properties of materials they will use in their professional life. In line with this information, they can easily choose metal-based, composite and polymer materials required in their professional work.	
20	Learning Outcomes:		
		1	To be able to define interatomic bonds of engineering materials. To be able to define crystal structure types of materials
		2	To be able to Explain Crystallographic directions and planes.
		3	To be able to list crystal imperfections.
		4	To be able to define tensile test results.
		5	To be able to show the cooling curves and two alloy basic phase diagrams.
		6	To be able to calculate the amount of phases in basic phase diagrams.
		7	To be able to define heat treatment of steels
		8	To be able to define microstructure and general properties of polymers.
		9	To be able to define composite materials.

	10	To be able to describe the corrosive properties of metals.

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.	
4	Polymorphism. Crystallographic directions and planes. Directional and planar densities. Example problems about crystal structures. Crystal Defects	
5	Diffusion and industrial applications. Material Tests, Hardness Test	
6	Tensile Test, Fatigue Test	
7	Notch Bar Impact test Structure and Alloys	
8	Show the cooling curves and two alloy basic phase diagrams	
9	Composition of phase diagrams. Examples	
10	Heat treatment and preparation	
11	Polymers	
12	Composite Materials	
13	Corrosion in metals is introduced	
14		
15		
16		

Activites		Number	Duration (hour)	Total Work Load (hour)
Theoretical		14	3.00	42.00
Practicals/Labs		0	0.00	0.00
Seminars and presentation		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

22	Textbooks, References and/or Other Materials:	1. Materials Science and Engineering William D. Callister Jr., John Wiley & Sons, Inc., 2007. 2. Introduction to Materials Science for Engineers James F. Shackelford, Prentice Hall
23	Assesment	

TERM LEARNING ACTIVITIES	NUMBER	WEIGHT
Midterm Exam	1	30.00
Quiz	0	0.00
Home work-project	1	10.00
Final Exam	1	60.00
Total	3	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	During the course, students are asked questions to ensure that Environmental Engineering students participate actively in the course. Incomprehensible matters are explained again.

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	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ÖK2	5	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ÖK3	5	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ÖK4	5	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ÖK5	5	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ÖK6	5	3	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ÖK7	5	3	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ÖK8	5	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ÖK9	5	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0
ÖK10	5	1	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**