



HASAN KALYONCU UNIVERSITY
Faculty of Engineering
Course Description Form

COURSE: Materials Science					
CODE: CE241		SEMESTER: FALL			
LANGUAGE: ENGLISH		TYPE: COMPULSORY			
PRE-REQUISITES: - CO-REQUISITES: -		THEORY	PRACTICAL	CREDIT	ECTS
WEEKLY HOURS: 3		3	0	3	4

CONTENT OF THE COURSE:

Introduction to materials science and classification of atomic structures of the materials. Atomic bonding and arrangement. molecular structure. Crystal structures and imperfections. Solid-state diffusion. Phase diagrams and solidification. Metals, ceramics, polymers. Composites. Corrosion and degradation of materials. Mechanical properties of materials; stress and strain, behaviour under tension and compression, toughness, fatigue, creep.

OBJECTIVE OF THE COURSE:

To enable students to have the required knowledge about the internal structure of engineering materials and to understand the evolution of internal structures according to types of materials.

WEEKLY SCHEDULE AND PRE-STUDY PAGES

Week	Topics
1	Chapter 1: Introduction to structure of materials
2	Chapter 2: Internal structures of materials, atomic structure
3	Chapter 2: Atomic bonding and arrangement, molecular structure
4	Chapter 3: Crystal structures and defects
5	Chapter 3: Amorphous structures, defects and imperfections in solids
6	Chapter 4: Structure of solids
7	Chapter 4: Structure of solids
8	Midterm Week
9	Chapter 5: Introduction to mechanical properties of materials
10	Chapter 5: Mechanical properties of materials, stress and strain
11	Chapter 5: Mechanical properties of materials, toughness
12	Chapter 5: Mechanical properties of materials, elastic deformation
13	Chapter 5: Mechanical properties of materials, fatigue
14	Chapter 5: Mechanical properties of materials, creep

TEXTBOOK: Lecture Notes

REFERENCE BOOKS

- ERDOĞAN T.Y., Materials of Construction, METU Press Publishing Company, Ankara, Turkey
- ONARAN, K., Malzeme Bilimi, Bilim Teknik Yayınevi, ISBN:975 540-017-6

EVALUATION SYSTEM:		
IN-TERM STUDIES	QUANTITY	PERCENTAGE (%)
Midterm Exam	1	40
Homework	2	10
Laboratory works	0	0
Quiz	0	0
Final Exam	1	50
TOTAL	4	100
CONTRIBUTION OF INTERM STUDIES TO OVERALL GRADE	3	50
CONTRIBUTION OF FINAL EXAMINATION TO OVERALL GRADE	1	50
TOTAL	4	100

COURSE CATEGORY:	PERCENTAGE (%)
Mathematics and Basic Sciences	30
Engineering	40
Engineering Design	30
Social Sciences	0

TABLE OF ECTS / WORKLOAD:			
Activities	QUANTITY	Duration (Hour)	Total Workload
Course Duration	13	3	39
Hours for off-the-classroom study (Pre-study, practice)	14	4	56
Laboratory works	0	0	0
Mid-term	1	2	2
Final examination	1	2	2
Homework	2	4	8
Quiz	0	0	0
Total Work Load			107
Total Work Load / 30			3,6
ECTS Credit of the Course			4

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
LO1	3	0	0	0	2	0	0	0	0	0	0
LO2	3	0	0	0	2	0	0	0	0	0	0
LO3	3	0	0	0	3	0	0	0	0	0	0
LO4	3	0	0	0	3	0	0	0	0	0	0

LO5	3	0	0	0	3	0	0	0	0	0
PO: Program Outcomes LO: Learning Outcomes Values: 0: None 1: Low 2: Medium 3: High										

INSTRUCTOR(S):	Assoc.Prof.Dr.Amjad Khabaz
FORM PREPARATION DATE:	22.05.2019

LEARNING OUTCOMES OF THE COURSE:	PROGRAM OUTCOMES:
<p>LO1: Knows internal structure of material properties and interprets changes</p> <p>LO2: Evaluates changes of mechanical properties depend on change of internal structure</p> <p>LO3: Evaluates behavior of materials under the loads.</p> <p>LO4: Interprets stress-strain behaviour and diagram of materials.</p> <p>LO5: Evaluates physical properties of materials.</p>	<p>PO1: Adequate knowledge in mathematics, science and engineering subjects pertaining to the relevant discipline; ability to use theoretical and applied knowledge in these areas in complex engineering problems.</p> <p>PO2: Ability to identify, formulate, and solve complex engineering problems; ability to select and apply proper analysis and modeling methods for this purpose.</p> <p>PO3: Ability to design a complex system, process, device or product under realistic constraints and conditions, in such a way as to meet the desired result; ability to apply modern design methods for this purpose.</p> <p>PO4: Ability to devise, select, and use modern techniques and tools needed for analyzing and solving complex problems encountered in engineering practice; ability to employ information technologies effectively.</p> <p>PO5: Ability to design and conduct experiments, gather data, analyze and interpret results for investigating complex engineering problems or discipline specific research questions.</p> <p>PO6: Ability to work efficiently in intra-disciplinary and multi-disciplinary teams; ability to work individually.</p> <p>PO7: Ability to communicate effectively in Turkish, both orally and in writing; knowledge of a minimum of one foreign language; ability to write effective reports and comprehend written reports, prepare design and production reports, make effective presentations, and give and receive clear and intelligible instructions.</p> <p>PO8: Recognition of the need for lifelong learning; ability to access information, to follow developments in science and technology, and to continue to educate him/herself.</p> <p>PO9: Consciousness to behave according to ethical principles and professional and ethical responsibility; knowledge on standards used in engineering practice.</p> <p>PO10: Knowledge about business life practices such as project management, risk management, and change management; awareness in entrepreneurship, innovation; knowledge about sustainable development.</p> <p>PO11: Knowledge about the global and social effects of engineering practices on health, environment, and safety, and contemporary issues of the century reflected into the field of engineering; awareness of the legal consequences of engineering solutions.</p>