

**ABDULLAH GUL UNIVERSITY  
GRADUATE SCHOOL OF ENGINEERING & SCIENCE  
BIOENGINEERING DEPARTMENT  
COURSE DESCRIPTION AND SYLLABUS**

Course Name	CODE	SEMESTER	T+L Hour	CREDIT	ECST
Biomaterials	BENG 518	FALL- SPRING	3 + 0	3	7,5

**Prerequisite Courses**

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<b>Course Type</b>	Elective
<b>Course Language</b>	English
<b>Course Coordinator</b>	Prof. Sevil D. İšoğlu
<b>Lecturers</b>	.Prof. Sevil D. İšoğlu, Asst. Prof. İsmail Alper İšoğlu
<b>Course Assistants</b>	-
<b>Course Objectives</b>	Teaching students about definitions of biomaterials and investigation of different application fields of biomaterials including medicine.
<b>Learning Outcomes</b>	Students, <ul style="list-style-type: none"> <li>• understand the fundamental principles of biomaterials</li> <li>• learn material types and selection criteria</li> <li>• gain general concepts about materials science</li> <li>• get knowledge about applications</li> <li>• learns way of interdisciplinary work</li> <li>• follow up-to-date topics</li> </ul>
<b>Course Content</b>	Introduction, Definition of Biomaterials, Examples, Structure of Matter, Chemical Bonds, Surface Properties of Biomaterials, Metallic Materials, Ceramic Materials, Polymeric Materials, Composite Materials, Proteins: Structure-Function Relationship, Biocompatibility, Tissue Response, Soft Tissue Applications, Hard Tissue Applications and Other Applications

**WEEKLY SUBJECTS AND RELATED PRELIMINARY PAGES**

Week	Subjects	Preliminary
1	Introduction, Definition of Biomaterials, Examples	Related sections of the recommended books and articles
2	Structure of solids and properties	Related sections of the recommended books and articles
3	Material characterization, mechanical, thermal and optical properties	Related sections of the recommended books and articles
4	Material characterization, surface properties	Related sections of the recommended books and articles
5	Metals	Related sections of the recommended books and articles
6	Midterm I	
7	Ceramics	Related sections of the recommended books and articles
8	Polymers	Related sections of the recommended books and articles
9	Biopolymers, biodegradation	Related sections of the recommended books and articles
10	Composites	Related sections of the recommended books and articles
11	Tissue Response	

12	Biocompatibility tests	Related sections of the recommended books and articles
13	Applications: Soft and hard tissue implants, cardiovascular implants	Related sections of the recommended books and articles
14	Applications: Tissue engineering, artificial organs	Related sections of the recommended books and articles
15	Presentations	
16	Final	

#### RESOURCES

<b>Course Notes</b>	(a) Biomaterials- An Introduction, Joon B. Park, Roderick S. Lakes (b) Biomaterials Science- An Introduction to Materials and Medicine, Buddy D. Ratner, Allan S. Hoffman, Frederick J. Schoen, Jack, E. Lemons
<b>Other Resources</b>	Related articles

#### MATERIAL SHARING

<b>Documents</b>	
<b>Homework</b>	Presentation at the end of semester
<b>Exams</b>	Midterm and final

#### RATING SYSTEM

SEMESTER WORKS	SAYISI	KATKI PAYI
Midterm	1	35
Quiz	-	-
Presentation	1	25
Final		40
<b>TOTAL</b>		100
<b>Success Rate of Semester</b>		55
<b>Success Rate of Final</b>		45
<b>TOTAL</b>		100

#### Course Category

Basic Sciences and Mathematics	%50
Engineering Sciences	%50
Social Sciences	

#### THE RELATIONSHIP BETWEEN THE LEARNING OUTCOMES AND PROGRAM COMPETENCE

		Contribution Level				
No Program Outcomes		1	2	3	4	5
1	Understanding of Life Sciences, Mathematics and Engineering at the post-graduate level, and being able to implement of this knowledge into bioengineering problems				x	
2	Having the ability of developing a new scientific method or a technological product or process, and, designing experiments, implementing, collecting data and evaluating regarding these issues				x	
3	Choosing technical equipment used in the applications related to bioengineering, having sufficient knowledge in adopting and using new technological equipment				x	
4	Having the ability of reaching the information, using resources, contributing to the literature by transferring the process and results of scientific studies as written or verbally in the national and international environments				x	
5	Having the ability of working as an individual or a team, in the teams composed of discipline or different disciplines, gaining awareness of leadership and taking responsibility				x	
6	Having advanced level of foreign language knowledge to manage efficient verbal, written and visual communication in the major field					X
7	Having the understanding of ethics in science and the responsibility in profession with the awareness of lifelong learning, being beneficial to society and sensitiveness to global issues		X			

8	Being aware of the social impacts of the solutions and applications of the challenges regarding Bioengineering		X	
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\*From 1 to 5, it increasingly goes.

<b>ECTS / WORK-LOAD TABLE</b>			
Activities	Activities	Duration (Hour)	Total (Work-Load)
Course Duration (Including exam week: 16x total course hour)	16	3	48
Out of Class Exercise Time (Pre-study, reinforcement)	16	7	112
Searching on Internet, library study	16	3	48
Presentation	5	3	15
Homework	16	3	48
Midterms	1	15	15
Final	1	15	15
<b>Total Work-Load</b>			301
<b>Total Work-Load / 30</b>			301/30
<b>Course ECTS Credit</b>			7,5