

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

Course Name	CODE	SEMESTER	T+L Hour	CREDIT	ECST
Artificial Organs	BENG520	FALL-SPRING	3+0	3	10

<b>Prerequisite Courses</b>	
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<b>Course Type</b>	Elective
<b>Course Language</b>	English
<b>Course Coordinator</b>	Associate Professor Sevil D. İšoğlu
<b>Lecturers</b>	Associate Professor Sevil D. İšoğlu, Assistant Professor Alper İšoğlu
<b>Course Assistants</b>	-
<b>Course Objectives</b>	Course objectives are to teach the general principles of artificial organ formation, to exemplify the functioning of organs in the body and to transfer of sample applications
<b>Learning Outcomes</b>	The student, <ol style="list-style-type: none"> <li>1. learns the definition of artificial organ</li> <li>2. learns principles of body mass transfer and fluid mechanics in the body</li> <li>3. has knowledge about the basic component of the body</li> <li>4. has knowledge about chemical reactions in the body.</li> <li>5. learns the effects of artificial organs on community health.</li> <li>6. has knowledge about applications such as artificial heart, kidney, lung.</li> </ol>
<b>Course Content</b>	The course includes general components of the body at the organ level, engineering events at the body and artificial organ design with biomimetic approach.

<b>WEEKLY SUBJECTS AND RELATED PRELIMINARY PAGES</b>		
Week	Subjects	Preliminary
1	Definition of artificial organ	Relevant Sections of Recommended Books, Scientific Publications
2	The general principles of mass transfer, how does mass transfer in the body occur?	Relevant Sections of Recommended Books, Scientific Publications
3	The general principles of fluid mechanics, how does fluid mechanics in the body occur?	Relevant Sections of Recommended Books, Scientific Publications
4	The general components of the body, organ system	Relevant Sections of Recommended Books, Scientific Publications
5	Use of biomaterials in artificial organ	Relevant Sections of Recommended Books, Scientific Publications
6	Organ design with biomimetic	Relevant Sections of Recommended Books, Scientific Publications
7	Artificial organs and the effect of artificial organs on community health, negative and positive effects	Relevant Sections of Recommended Books, Scientific Publications
8	Midterm	Relevant Sections of Recommended Books, Scientific Publications
9	Artificial organ types	Relevant Sections of Recommended Books, Scientific Publications
10	Artificial kidney, hemodialysis	Relevant Sections of Recommended Books, Scientific Publications

11	Artificial lung, oxygenators	Relevant Sections of Recommended Books, Scientific Publications
12	Artificial heart	Relevant Sections of Recommended Books, Scientific Publications
13	Liver substitutes	Relevant Sections of Recommended Books, Scientific Publications
14	Presentations	Relevant Sections of Recommended Books, Scientific Publications
15	Final Exam	
16		

<b>RESOURCES</b>	
<b>Course Notes</b>	(a) Artificial Organs, N.S. Hakim, 2009, Springer.
<b>Other Resources</b>	Scientific articles related to the subject and videos

<b>MATERIAL SHARING</b>	
<b>Documents</b>	-
<b>Homework</b>	There will be no homework. At the end of the semester, a scientific presentation will be made related to a selected topic.
<b>Exams</b>	Midterm, final exam

<b>RATING SYSTEM</b>		
<b>SEMESTER WORKS</b>	<b>NUMBER</b>	<b>CONTRIBUTION</b>
Midterm	1	35
Presentation	1	25
Final		40
<b>TOTAL</b>		100
<b>Success Rate of Semester</b>		60
<b>Success Rate of Final</b>		40
<b>TOTAL</b>		100

<b>Course Category</b>	
Basic Sciences and Mathematics	%50
Engineering Sciences	%50
Social Sciences	

<b>THE RELATIONSHIP BETWEEN THE LEARNING OUTCOMES AND PROGRAM COMPETENCE</b>					
No	Program Outcomes	Contribution Level			
		1	2	3	4
1	Understanding of Life Sciences, Mathematics and Engineering at the post-graduate level, and being able to implement of this knowledge into bioengineering problems				*
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				*
3	Choosing technical equipment used in the applications related to bioengineering, having sufficient knowledge in adopting and using new technological equipment				*
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				*
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			*	
6	Having advanced level of foreign language knowledge to manage efficient verbal, written and visual communication in the major field				*
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				*

8	Being aware of the social impacts of the solutions and applications of the challenges regarding Bioengineering				*
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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
Reading			
Searching on Internet, library study	16	5	80
Material Designing, practice			
Preparation of report			
Preparation of presentation	1	18	18
Presentation	1	3	3
Homework			
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>			10