ABDULLAH GÜL UNIVERSITY
GRADUATE SCHOOL OF ENGINEERING & SCIENCE
MATERIALS SCIENCE AND MECHANICAL ENGINEERING PROGRAM
COURSE DESCRIPTION AND SYLLABUS

Course Title	Code	Semester	T+L Hours	Credit	ECTS
Introduction to Biomaterials	AMN 510	FALL-SPRING	3	3	10

Prerequisite Courses	None

Type	Elective
Language	English
Coordinator	Erkin Aydın
Instructor	Erkin Aydın
Adjunt	none
Aim	Introduce the biomaterials field to students; teach mechanical, chemical, and biological properties of various biomaterials classes, and strategies of selection of them according to the application site within the body
Learning Outcomes	To define and classify biomaterials To provide properties of general biomaterials classes To teach criteria for choosing the right biomaterials according to the site of application in the body To teach the concept of biocompatibility To familiarize students with the real life applications of concepts learned in the class
Course Content	Biomaterials definition and classes; polymeric, metallic, ceramics, and composite biomaterials; mechanical, chemical, and biological properties of various biomaterials classes; surface properties of biomaterials; immune reaction of body against biomaterials; biocompatibility; several application examples/

WEEKLY TOPICS AND PRELIMINARY STUDY

Week	Topic	Preliminary Study
1	Introduction, sturucture of solids	Course book Chapter 1 and 2; Examples from literature
2	Characterization of materials	Course book Chapter 3 and 4; Examples from literature
3	Metallic implants	Course book Chapter 5; Examples from literature
4	Polymeric materials	Course book Chapter 7; Examples from literature
5	Ceramics and composite implants	Course book Chapter 6 and 8; Examples from literature
6	Structural properties of materials and their effects on biomaterials properties	Course book Chapter 9; Examples from literature
7	Tissue reaction against implants	Course book Chapter 10; Examples from literature
8	Soft tissue replacement	Course book Chapter 11 and 12; Examples from literature
9	Midterm exam	Text book and course notes
10	Hard tissue replacement I and II	Examples from literature
11	Hard tissue replacement I	Course book Chapter 13; Examples from literature
12	Hard tissue replacement II	Course book Chapter 14; Examples from literature
13	Tissue engineering materials and regenerative medicine	Course book Chapter 16; Examples from literature
14	Student presentations	Examples from literature
15	Student presentations	Examples from literature

16	Final	Text book and course notes

SOURCES	
Lecture Notes	Lecture notes and slides
Other Sources	Text book: Biomaterials, An introduction. Joon Park, RS Lakes, Third edition, 2007.

COURSE MATERIALS SHARING	
Documents	Lectures notes are shared on the internet
Homeworks	Students will be given one homework each week
Exams	Midterm and Final

EVALUATION SYSTEM		
SEMESTER STUDY	**NUMBER**	**CONTRIBUTION**
Midterm exam	1	25%
Student presentations	1	25%
Homework	1	20%
SUB-TOTAL		70%
Contribution of Semester Study		70%
Contribution of Final Exam	1	30%
TOTAL		100 %

Course Category	
Sciences and Mathematics	50%
Engineering	50%
Social Sciences	0%

RELATIONSHIPS BETWEEN LEARNING OUTCOMES AND PROGRAM QUALIFICATIONS							
No	Program Qualifications	Contribution Level					
		1	2	3	4	5	
1	Accessing knowledge, evaluating and interpreting information by doing scientific research in the field of Materials Science and Mechanical Engineering				x		
2	Ability to use science and engineering knowledge for development of new methods in Materials Science and Mechanical Engineering			x			
3	To be able to understand and analyze materials by using basic knowledge on Materials Science and Mechanical Engineering				x		
4	Design and implement analytical, modeling and experimental research			x			
5	Solve and interpret the problems encountered in experimental research						
6	Considering scientific and ethical values during the collection and interpretation of data				x		
7	Integrating knowledge of different disciplines with the help of scientific methods, and completion and implementation of scientific knowledge using data		x				
8	To gain leadership ability and responsibility in disciplinary and interdisciplinary team works		x				
9	To be able to contribute to the solution of social, scientific and ethical problems encountered in the field of Materials Science and Mechanical Engineering		x				
10	To be able to define, interpret and create new information about the interactions between various discipline of Materials Science and Mechanical Engineering			x			

*Increasing from 1 to 5.

ECTS / WORK LOAD TABLE			
Activities	Number	Duration (Hours)	Total Work Load
Course Length (includes exam weeks: 16x total course hours)	16 weeks	3	48
Out-of-class Study Time (Pre-study, practice)	16 weeks	7	112

Internet search, library work, literature search	16 weeks	3	48
Presentation	10 weeks	3	30
Homework	3 weeks	11	33
Midterm	1	15	15
Final Exam	1	15	15
Total Work Load			301
Total Work Load / 30			301/30
Course ECTS Credit			10