Course Unit Title	Biomaterials
Course Unit Code	BME202
Type of Course Unit	Compulsory
Level of Course Unit	2nd year of BSc
National Credits	4
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	3
Practice (hour/week)	-
Laboratory (hour/week)	2
Year of Study	1
Semester when the course unit is delivered	2
Course Coordinator	Assoc. Prof. Dr. Terin Adalı
Name of Lecturer (s)	Assoc. Prof. Dr. Terin Adalı
Name of Assistant (s)	Niyazi Şentürk
Mode of Delivery	Face to Face.
Language of Instruction	English
Prerequisites	BME102
Recommended Optional Programme Components	

Course description:
Introduction to biomaterials, Biocompatibility, The structure of solids, Imperfections in crystals, super cooled and network solids, Composite material structure, Characterization of materials, Mechanical thermal properties, Phase diagrams, Strengthening by Heat Treatments, Surface properties and adhesion, Electrical, optical, X-Ray Absorption, Acoustic and ultrasonic characterization of materials, metallic implant, Ceramic implant, Polymeric implant and composite materials. The course emphasizes the fundamental properties of biomaterials.

Objectives of the Course:

- The aim of this course is to introduce students the fundamentals of material sciences as applied to medicine.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Develop a thorough understanding on biomaterials and biocompatibility.	1, 2, 3,4,5
2	Develop a thorough understanding ability to characterize biomaterials in terms of physical chemical properties,	1, 2, 3,4,5
3	Develop a thorough understanding on the characterization of biomaterials on their electrical, optical, X-Ray adsorption, acoustic and Ultrasonic properties.	1, 2, 3,4,5
4	Develop skills to understand how to biometals, biocomposites, biopolymers and bioceramics in biomedical applications.	1,2,3,4,5

Assessment Methods: 1. Written Exam, 2. Assignment, 3. Project/Report, 4. Presentation, 5. Lab. Work

Course's Contribution to Program

		CL

1	Apply knowledge of mathematics, natural science with relevant to life science and multidisciplinary context of engineering science.	4
2	Analyse, design and conduct experiments, as well as to analyse and interpret data.	5
3	Design a system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability and sustainability.	5
4	Function on multidisciplinary teams.	4
5	Control in design work, by using simulation, modelling and tests and integration in a problem solving oriented way.	5
6	Display an understanding of professional and ethical responsibility.	5
7	Communicate effectively aware of the non-technical effects of engineering.	2
8	Search technical literature and other information sources.	3
9	Recognize of the need for, and an ability to engage in life-long learning.	2
10	Exhibit a knowledge of contemporary issues.	3
11	Use the techniques, skills and modern engineering tools necessary for engineering practice to develop marketable products for the global market.	4

CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)

Course Contents

Week	Chapter	Topics	Assessment
1		Introduction, definition, performance of biomaterials.	
2		The structure of solids, Atomic, crystal, and imperfection in crystal structure.	
3		Polymers, Super cooled and Network solids, Composite material structure.	
4		Characterization, mechanical, chemical, thermal properties	Assignment 1
5		Characterization,	
6		Stereochemistry Chiral molecules	Assignment 2
7		Substitution and elimination reactions of Alkyl Halides	
8		MIDTERM	Midterm Exam
9		Alkanes and alkanes (Addition rxn.)	
10		Tools for structure determination	
11		Alcohols and ethers	
12		Oxidation reduction and organometallic compounds	Assignment 3
13		Aromatic compounds	
14		Aldehydes and Ketones	
15		Carboxylic acids and their derivatives	
16		FINAL	Final Exam.

Recommended Sources

Textbook:
Joon Park, R. S. Lakes, An Introduction Biomaterials, Springer 2007, ISBN: 978-0-387-37879-4.

Donald Voet/Judith G. Voet, Charlotte W. Pratt, Principles of Biochemistry, Third Edition, ISBN 13: 978-0470-23396-2, 2008, Wiley Publication

Lab Manual

Supplementary Course Material

- Related Research Papers

Assessment

Attendance	5%	Less than 25% class attendance results in NA grade
Assignment	5%	
Midterm Exam	30%	Written Exam
Quiz	15%	Written Exam
Final Exam	45%	Written Exam
Total	100%	

Assessment Criteria

Final grades are determined according to the Near East University Academic Regulations for Undergraduate Studies

Course Policies

1. Attendance to the course is mandatory.
2. Late assignments will not be accepted unless an agreement is reached with the lecturer.
3. Students may use calculators during the exam.
4. Cheating and plagiarism will not be tolerated. Cheating will be penalized according to the Near East University General Student Discipline Regulations

ECTS allocated based on Student Workload

Activities	Number	Duration (hour)	Total Workload(hour)
Course duration in class (including Exam weeks)	16	4	64
Labs and Tutorials	20	1	20
Assignment	2	4	8
Project/Presentation/Report	-	-	-
E-learning activities	-	-	-
Quizzes	-	-	-
Midterm Examination	1	2	2
Final Examination	1	2	2
Self-Study	15	4	60
Total Workload			162
Total Workload/30(h)			5.5

ECTS Credit of the Course	6