MSc Program, Biomedical Engineering Department

Course Unit Title	Advance Biomechanical Cardiovascular Systems
Course Unit Code	BME560
Type of Course Unit	Elective
Level of Course Unit	Master of Science
National Credits	3
Number of ECTS Credits Allocated	10
Theoretical (hour/week)	4
Practice (hour/week)	-
Laboratory (hour/week)	-
Year of Study	-
Semester when the course unit is delivered	-
Course Coordinator	Assoc. Prof. Dr. Cenk Conkbayır
Name of Lecturer (s)	Assoc. Prof. Dr. Cenk Conkbayır
Name of Assistant (s)	-
Mode of Delivery	Face to Face.
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	-

Course description:

Introduction and basic concepts of biomechanics, Dynamics of mechanics, Materials properties of Hard and soft tissues, and mechanical properties, Biomechanical behaviors, Materials for prosthesis and mechanical properties, Applications and behaviors of human body, Biomechanical systems and examples.

Objectives of the Course:

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Develop a thorough understanding on cardiac mechanics and ecg systems	1,2,3
2	Develop a thorough understanding ability between the cardiology and biomedical engineering; using and developing the technology about diagnostic and treatment devices for cardiovascular diseases.	1,2,3
3	Develop a thorough understanding on the anatomy, physiology and electrophysiology of the heart and understanding the mechanism of cardiac mechanics and ECG systems.	1,2,3
4	Develop a thorough understanding of applications and behaviors of heart biomechanical systems and examples	1,2,3
5	Develop a thorough understanding materials for cardiac prosthesis and mechanical properties	1,2,3
6	Develop a thorough understanding the connections between biomedical engineering and cardiology	1,2,3

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

Course's Contribution to Program		
		CL
1	Apply the rules of scientific research and ethics	3
2	Discuss complex biomedical engineering issues as well as own research results comprehensively and in the context of current international research and present these in writing and orally	2
3	Solve problems by systems analytical thinking both in subject specific and interdisciplinary concepts	2
4	Combine specialized knowledge of various component disciplines	2
5	Carry out in dependent scientific work and organize (capacity of teamwork), Conduct and lead more complex projects	2
6	To assess the social and environment-related effects of their actions	2
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Chapter	Topics	Assessment
1	1	Cardiac mechanics	
2	2	Cardiovascular system	
3	3	Cardiovascular physiology	
4	4	Modeling Cardiac Mechanics	
5	5	Applications in biomedical engineer for cardiology	
6	6	Biomechanics for cardiovascular diseases	
7	7	ECG	
8	8	ECG system portable	
9	9	Patient monitoring	
10	10	ECG Interpretation	
11	11	Mobile Wireless ECG system	
12	12	Artificial heart	
13	13	Pacemaker and leadless pacemaker	
14	14	Cardiac stem cells	

Recommended Sources

Textbook:

1. Topol. Textbook of cardiology
2. Braunwald. Textbook of cardiology
3. Seeley's principles of anatomy & physiology

Assessment		
Project	%10	
Midterm Exam	%40	Written Exam
Final Exam	%50	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	12	3	36
Assignment	2	3	6
Project/Presentation/Report	-	-	-
E-learning activities	-	-	-
Quizzes	-	-	-
Midterm Examination	1	3	3
Final Examination	1	3	3
Self Study	10	10	100
Total Workload			212
Total Workload/25(h)			9.45
ECTS Credit of the Course			10