

Course Unit Title	Biomechanics	
Course Unit Code	BME320	
Type of Course Unit	Compulsory	
Level of Course Unit	Bachelor of Science	
National Credits	3	
Number of ECTS Credits Allocated	5	
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	Assist. Prof. Dr. Rasime Kalkan	
Name of Lecturer (s)	Abdulkader Helwan	
Name of Assistant (s)	Chid Wilson	
Mode of Delivery	Face to Face.	
Language of Instruction	English	
Prerequisites	BME102	
Recommended Optional Programme Components		
Course description:		
<p>This course is an undergraduate level biomechanics course, which emphasizes as a basis for understanding biomechanics and their applications. The course focuses on an important role of biomechanics in diverse areas of growth, development, tissue remodelling and homeostasis. Topics include cellular biomechanics, hemodynamics, the circulatory system, the interstitium, ocular biomechanics, the respiratory system, muscles and movement and skeletal biomechanics. This course covers the fundamental concepts of biomechanics (biology, fluid mechanics, thermodynamics, anatomy or physiology) behind the design of real biomedical problems with biomechanical concepts.</p>		
Objectives of the Course:		
<ul style="list-style-type: none"> • The major objective of this course is to provide students with knowledge of the structure and function of biological systems by means of the methods of mechanics. • Students will learn skills to apply engineering principles to understand how living systems function at all scales of organization and to translate this understanding to the design of devices and procedures that will improve diagnostic and therapeutic methods in health care. 		
Learning Outcomes		
At the end of the course the student should be able to		Assessment
1	Describe biomechanics and how they are used in different biomedical problems.	1, 2, 3,4,5
2	How physical forces interact with living systems?	1, 2, 3,4,5
3	Why does biomechanics matter?	1, 2, 3,4,5
4	How biomechanics plays an important role in diverse areas of growth, development, tissue remodelling and homeostasis?	1,2,3,4,5
5	Critically review biomechanical research studies and new technology.	
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.	4
4	Function on multidisciplinary teams.	5
5	Control in design work, by using simulation, modelling and tests and integration in a problem solving oriented way.	4
6	Display an understanding of professional and ethical responsibility.	3
7	Communicate effectively aware of the non-technical effects of engineering.	1
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 to Biomechanics	
2		Cellular Biomechanics-I	
3		Cellular Biomechanics-II	
4		Hemodynamic	Assignment 1
5		The Circulatory System/Ocular Biomechanics-I/Revision	
6		The Circulatory system/Ocular Biomechanics-II	Assignment 2
7		The Respiratory System-I	
8		The respiratory System-II/Revision	Midterm Exam
9			
10		Muscles and movement-I	
11		Muscles and Movement-II	
12		Skeletal Biomechanics-I/Project Presentations	Assignment 3
13		Skeletal Biomechanics-II	
14		Terrestrial Locomotion	
15		Review for Exam	
16		FINAL	Final Exam.

Recommended Sources

Textbook:

Introductory BIOMECHANICS, 3rd Edition. C. Ross Ethier and Craig A. Simmons, Cambridge University Press, 2008. ISBN 978-0-521-84112-2. Required text.

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)			5.4
ECTS Credit of the Course			5