Course Unit Title	Biomedical Imaging
Course Unit Code	BME303
Type of Course Unit	Compulsory
Level of Course Unit	3rd year BSc program
National Credits	4
Number of ECTS Credits Allocated	6
Theoretical (hour/week)	4
Practice (hour/week)	-
Laboratory (hour/week)	-
Year of Study	3
Semester when the course unit is delivered	3
Course Coordinator	Ali Işın
Name of Lecturer (s)	Ali Işın
Name of Assistant (s)	-
Mode of Delivery	Face to Face
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	-

Course description:

This course is designed for biomedical engineering undergraduate students. The purpose of this course is to provide biomedical imaging equipment background on technical aspects. Biomedical diagnostic imaging systems including x-ray devices, fluoroscopes, CT's, MRI devices and nuclear imaging devices are introduced in detail. Students are provided with overviews of the major physical techniques that engineers have used to explore in biomedical engineering level.

Objectives of the Course:

- The main objective of this emphasis is to prepare students for a career in biomedical imaging. A solid foundation, practical knowledge, and skills are established in optics, imaging modalities, and image and signal processing.

Learning Outcomes

At the end of the course the student should be able to		Assessment
1	Develop a thorough understanding on basics of biomedical diagnostic imaging devices.	1, 2,3
2	Develop a thorough understanding on principles of different imaging techniques.	1, 2, 3
3	Develop a thorough understanding on principles of medical imaging electronics and instrumentation.	1, 2
4	Develop a thorough understanding on clinical applications of medical imaging modalities.	1, 2

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	Analyze, design and conduct experiments, as well as to analyze and interpret	4

	data.	
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.	3
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.	2
9	Recognize of the need for, and an ability to engage in life-long learning.	2
10	Exhibit a knowledge of contemporary issues.	1
11	Use the techniques, skills and modern engineering tools necessary for engineering practice to develop marketable products for the global market.	3

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

Course Contents

Week	Chapter	Topics	Assessment
1	1	Introduction to medical imaging	
2	1	X-ray principles	
3	1	Conventional X-ray devices	Projects Assigned
4	1	Fluoroscopy and Angiography	
5	2	CT Equipment I	
6	2	CT Equipment II	
7		Other X-ray based imaging devices	
8	3		Midterm Exam
9	3	Principles of MRI	
10	3	MRI Device	
11	3	Ultrasound Imaging Devices	
12	4	Nuclear Imaging Principles	Projects Due
13	4	PET and PET-CT	
14	5	Recent Developments in Medical Imaging & Revision Week	
15			Final Exam.

Recommended Sources
Textbook:

Supplementary Course Material

- Lecture notes

Assessment

Attendance	5%	

Assignment	15%	
Midterm Exam	30%	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

- Attendance to the course is mandatory.
- Late assignments will not be accepted unless an agreement is reached with the lecturer.
- Students may use calculators during the exam.
- 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	3	48
Labs and Tutorials	3	2	6
Assignment	-	-	-
Project/Presentation/Report	2	2	4
E-learning activities	-	-	-
Quizzes	-	-	-
Midterm Examination	1	15	15
Final Examination	1	20	20
Self Study	14	5	70
Total Workload			163
Total Workload/30(h)			5.63
ECTS Credit of the Course			6