MSc program, Biomedical Engineering Department

Course Unit Title	Advance Image Processing
Course Unit Code	BME 505
Type of Course Unit	Elective
Level of Course Unit	MSc program
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	Assist Prof. Dr. Kamil Dimililer
Name of Lecturer (s)	Assist. Prof. Dr. Kamil Dimililer
Name of Assistant (s)	-
Mode of Delivery	Face to Face, lab works
Language of Instruction	English
Prerequisites	-
Recommended Optional Programme Components	Computer programming skills

Course description:
Introduction to medical imaging and various medical, imaging systems. Nuclear magnetic moment, nuclear spin, resonance, connector constants, spin systems, MR spectroscopic data processing. Application of MR spectroscopy on brain, muscles, tissue and etc.

Objectives of the Course:

- To give the students an opportunity to study and learn advanced concepts of Image Processing.
- To implement advanced image processing methods and algorithms to solve real-life problems.

Learning Outcomes
After completing the course the student will be able to;
Describe how digital images are represented, manipulated, encoded and processed with emphasis on algorithm design, implementation and performance evaluation at advance level.

		Assessment
1	Implement advance image processing techniques	2
2	Understand the theoretical aspects of image processing	1
3	Analyse and compare image processing methods	2
4	Summarize current researches in real life applications of Image Processing	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	5
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	4
3	Solve problems by systems analytical thinking both in subject specific and interdisciplinary concepts	4
4	Combine specialized knowledge of various component disciplines	4
5	Carry out in dependent scientific work and organize (capacity of teamwork), Conduct and lead more complex projects	4
6	To assess the social and environment-related effects of their actions	4
CL: Contribution Level (1: Very Low, 2: Low, 3: Moderate, 4: High, 5: Very High)		

Course Contents

Week	Topics	Exam
1	Introduction to Image Processing	
2	Fundamentals of Digital Imaging	
3	Image Enhancement in Spatial Domain	
4	Image Enhancement in Spatial Domain	
5	Image Enhancement in Frequency Domain	
6	Image Enhancement in Frequency Domain	
7		Midterm
8	Morphological Image Processing	
9	Morphological Image Processing	
10	Image Segmentation	
11	Image Restoration	
12	Object Recognition	
13	Review	
14	Review	
15		
16		Final

Recommended Sources

1. Gonzalez and Woods "Digital Image processing"
2. Gonzalez, Woods "Digital Image processing using Matlab"

Assessment		
Assignments	30%	Programming and Research
Midterm Exam	25%	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. Students may use calculators during the exam.
3. 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	-	-	-
Assignment	-	-	-
Project/Presentation/Report	-	-	-
E-learning activities	-	-	-
Quizzes	-	-	-
Midterm Examination	1	30	30
Final Examination	1	30	30
Self Study	14	8	112
Total Workload			236
Total Workload/25(h)			9.44
ECTS Credit of the Course			10