

COURSE DESCRIPTIONS

Faculty	Science and Information Technology				
Department	Computer Science			NQF level	7
Course Title	Image Processing	Code	508472	Prerequisite	501241
Credit Hours	3	Theory	3	Practical	0
Course Leader	Ms. Nada Aljarrah	email			
Lecturers	Ms. Nada Aljarrah	emails	n.aljarrah@jadara.edu.jo		
Lecture time	8:30 – 10:00	Classroom		Attendance	Fulltime
Semester	1	Production		Updated	2024-2025
Type of Teaching	<input type="checkbox"/> Face to Face <input checked="" type="checkbox"/> Blended <input type="checkbox"/> Online				

Short Description

This course aims to learn image processing using Matlab and science problems, introduce to image processing, operations, transforms, image types, Filter, Point processing, neighborhood processing, fourier Processing, Image restoration, image segmentation, and image Morphology.

Course Objectives

Upon completion of this course, students should be able to:

- Develop a theoretical foundation of fundamental Digital Image Processing concepts.
- Provide mathematical foundations for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression.
- Gain experience and practical techniques to write programs using MATLAB language to manipulate images digitally; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression.
- familiarize himself/herself with image/video compression standards.

Course Intended Learning Outcomes (CILOs)

A. Knowledge - Theoretical Understanding

The student upon completion of this course will be able to

a1: Have a clear understanding of the principals the Digital Image Processing terminology used to describe features of images. (K1)

B. Knowledge - Practical Application

The student upon completion of this course will be able to

a2: Have a good understanding of the mathematical foundations for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing, compression and analysis. (K5)

C. Skills - Generic Problem Solving and Analytical Skills

The student upon completion of this course will be able to

b1: Use different digital image processing algorithms, and Design, code and test digital image processing applications using MATLAB language. (S2)

D. Skills - Communication, ICT, and Numeracy			
b2: Be able to use the documentation for, and use, MATLAB library and MATLAB Digital Image Processing Toolbox (IPT), and understand the image processing algorithm and how it works. (S3)			
E. Competence: Autonomy, Responsibility, and Context			
c1. Writing programs in Matlab language for digital manipulation of images; image acquisition; preprocessing; segmentation; Fourier domain processing; and compression. (C2)			
Teaching and Learning Methods			
<input type="checkbox"/> Face to Face Lectures	<input type="checkbox"/> Brain Storming	<input type="checkbox"/> Synchronous remote	<input type="checkbox"/> Asynchronous remote
<input type="checkbox"/> Using Video	<input type="checkbox"/> Discussions	<input type="checkbox"/> Research Project	<input type="checkbox"/> Case Study
<input type="checkbox"/> Field visit	<input type="checkbox"/> Problem solving		
Assessment Methods			
<input type="checkbox"/> Formative Assessment	<input type="checkbox"/> Quiz	<input type="checkbox"/> Lab Exam	<input type="checkbox"/> Homework
<input type="checkbox"/> Project Assessment	<input type="checkbox"/> Oral Presentation	<input type="checkbox"/> Midterm	<input type="checkbox"/> Final Exam

Course Contents					
Week	Hours	CLOs	Topics	Teaching & Learning Methods	Assessment Methods
1	3	a1,a2	Introduction	Presentation & discussions	
2	3	a1,a2, b1	Image Files and File Types	Presentation & discussions	Quiz
3	3	a1,a2, b1	Image Display	Presentation & discussions	Assignment (lab)
4	3	a1, a2, b1,b2	Point Processing	Presentation & discussions	Assignment (lab)
5	3	a2, b1,	Neighborhood Processing	Presentation & discussions	Quiz
6	3	b2, c1			
7	3	a2, b1, b2, c1	Image Geometry	Presentation & discussions	Assignment (lab)
8	1:30	a1,a2, b1,b2	Midterm Exam		
9	3	a2, b1, b2, c1	The Fourier Transform	Presentation & discussions	Quiz
10	3	a2, b1,b2, c1	Image Restoration	Presentation & discussions	Assignment (lab)

11	3	a2, b2, c1	Image Segmentation	Presentation & discussions	Assignment (lab)
12	3	a2, b2, c1	Mathematical Morphology	Presentation & discussions	Assignment (lab)
13	3	a2, b2, c1	Image Topology	Presentation & discussions	Assignment (lab)
14	2	a1,a2, b1,b2, c1	Final exam		

Infrastructure	
Textbook	A computational introduction to digital image processing, Alasdair McAndrew, CRC Pres, 2016, 2 nd Ed.
References	Color Image Processing and Application, Plataniotis and Ventanopoulos. Dogotal Signal and Image Processing using MATLAB.
Required reading	
Electronic materials	Available on : http://elearning.jadara.edu.jo/CourseContent/index/10774/
Other	Any other book related to Image Processing

Assessment Method		Grade					
			a1	a2	b1	b2	c1
First (Midterm)		30	10	6	8	6	
Second (if applicable)							
Final Exam		40	10	6	8	6	10
Coursework		30					
Coursework assessment methods	Assignments	20				10	10
	Case study						
	Discussion and interaction						
	Group work activities						
	Lab tests and assignments						
	Presentations						
	Quizzes	10		3	7		
Total		100	20	15	23	22	20

Plagiarism

Plagiarism is claiming that someone else's work is your own. The department has a strict policy regarding plagiarism and, if plagiarism is indeed discovered, this policy will be applied. Note that punishments apply also to anyone assisting another to commit plagiarism (for example by knowingly allowing someone to copy your code).

Plagiarism is different from group work in which a number of individuals share ideas on how to carry out the coursework. You are strongly encouraged to work in small groups, and you will certainly not be penalized for doing so. This means that you may work together on the program. What is important is that you have a full understanding of all aspects of the completed program. In order to allow proper assessment that this is indeed the case, you must adhere strictly to the course work requirements as outlined above and detailed in the coursework problem description. These requirements are in place to encourage individual understanding, facilitate individual assessment, and deter plagiarism.