

## Faculty of Computers and Information Technology

### Image Processing

**Information :**

**Course Code :** ITC 432

**Level :** Undergraduate

**Course Hours :** 3.00- Hours

**Department :** Department of Computer Science

**Instructor Information :**

Title	Name	Office hours
Professor	NEVEEN IBRAHIM MOHAMED GHALI	1
Assistant Lecturer	MAHMOUD MAGDY MOHAMED ABDO	

**Area Of Study :**

The objective of this course is to introduce the students to the fundamental techniques and algorithms used for acquiring, processing and extracting useful information from digital images. Particular emphasis will be placed on covering methods used for image sampling and quantization, image transforms, image enhancement and restoration, image encoding, image analysis and pattern recognition.

**Description :**

Digital image fundamentals; Image enhancement in the spatial domain: grey level transformation; Histogram processing; Spatial filters; Image enhancement in frequency domain: 2-D Fourier transform; Other transforms; Smoothing filters; Sharpening filters; Image restoration; Noise model; Estimating the degradation function; Wiener filter; Geometric transformations; Image segmentation: detection of discontinuities; edge linking and boundary detection; Thresholding; Region based segmentation ; Morphological image processing : operation concepts ; some basic algorithms.

Digitizing images; Color image processing; Image compression; Wavelet and multi-resolution processing; Representation and description; Chain codes; Signatures; boundary descriptors; regional descriptors; Image classification; statistical based classification; Verification of image classification . 3D Imaging . Application Field.

**Course outcomes :**

**a.Knowledge and Understanding: :**

1 -	o Understand the fundamental techniques and algorithms used for acquiring, processing and extracting useful information from digital images.
2 -	o Understand and use the methods used for image sampling and quantization, image transforms, image enhancement and restoration, image encoding, image analysis and pattern recognition.
3 -	o Understand and use the methods to solve real-world problems in several areas including medical, remote sensing and surveillance
4 -	o Understand and use the tools of digital image processing (DIP) to solve any new problem.

**b.Intellectual Skills: :**

1 -	o Analyze various approaches to process scheduling. Thread scheduling
2 -	o Examine the major trends in the distributed computing including networking of computer systems, client/server computing, and clusters, and to describe some of the key design areas in the development of distributed operating systems.

### **Course Topic And Contents :**

<b>Topic</b>	<b>No. of hours</b>	<b>Lecture</b>	<b>Tutorial / Practical</b>
Introduction	3	2	2
Digital Image Fundamentals.	3	2	2
Digital Image Fundamentals	3	2	2
Digital Image Fundamentals	3	2	2
Image Enhancement (Point Processing)	3	2	2
Mid Term-1	2	1	2
Image Enhancement (Histogram Processing)	3	2	2
Image Enhancement (Spatial Filtering 1)	3	2	2
Image Enhancement (Spatial Filtering 2)	3	2	2
Image Enhancement in Frequency domain	3	2	2
Image Enhancement in Frequency domain	3	2	2
Mid Term -2	2	1	2
Image restoration	3	2	2
Image restoration	3	2	2
Revision	3	2	2
Final Exam	3	2	2

### **Teaching And Learning Methodologies :**

Lectures  
Exercises  
Projects  
Web-Site searches

### **Course Assessment :**

<b>Methods of assessment</b>	<b>Relative weight %</b>	<b>Week No</b>	<b>Assess What</b>
Final Exam	40.00	16	
Mid Term Exam II	15.00	12	
MidTerm Exam I	15.00	6	
Project	20.00	14	