FORMAN CHRISTIAN COLLEGE
(A Chartered University)
SP 2022
CSCS 365: Digital Image Processing (2+1 Credits Hrs)
Course Outline and Lesson Plan

INSTRUCTOR INFORMATION:

NAME	Dr. Sidra Minhas
EMAIL	sidraminhas@fccollege.edu.pk
OFFICE	S – 303
OFFICE HOURS	MW – 11:00 – 01:00
LAB ENGINEER	TBD

COURSE INFORMATION:

PRE-REQUISITE	COMP 200 (Data Structures and Algorithms) CSCS 202 (Computational Linear Algebra)
LAB REUIREMENTS	MATLAB latest version installed on personal laptops
INTRODUCTION	This course introduces the students to the basics of digital images, their structure and formulation. Algorithms for image manipulation and characterization in spatial domain are included. Later formal treatment of images in frequency domain, including filtering and edge detection are described. Image processing will be performed using MATLAB.
AIMS AND OBJECTIVES	To understand how digital images are represented, manipulated, encoded and processed.
TEXT BOOK	**Digital Image Processing by Rafael C. Gonzalez & Woods**
REFERENCE BOOKS	Understanding Digital Signal Processing (3rd Edition) by Richard G. Lyons, Prentice Hall; 3rd edition (2010)
ASSESSMENT CRITERIA (Tentative)	Assignments (10%), Quizzes (15%), Lab Tasks (15%), Mid Term Exam(20%), Final Project (15%) Final Exam (25%),

Week No	Topics	Book Sections	Lab	Assignments
1 – 2	• Introduction to Visual Perception • Overview of Human Vision • Image perception • Digital Image Sensing & Acquisition • Image Sampling & Quantization • Digital Image Representation • Spatial Intensity & Resolution • Introduction to Pixels • Fields that use Image Processing	2.1, 2.3, 2.4	Lab 1: Introduction to MATLAB and Basic DIP functions	
3	• Relationships between Pixels • Image arithmetic and logical operations • Masking & ROI Extraction	2.6	Lab 2: Image Arithmetic and Logical Operations	Assignment 1
4	Spatial Transformation & Filtering • Intensity Transformation	3.1, 3.2	Lab 3: Image Intensity Transformations	Assignment 1 due
5	Spatial Transformation & Filtering • Histogram Processing	3.3	Lab 4. Histogram Equalization	Assignment 2: Combining Spatial Enhancement Methods
6	Spatial Transformation & Filtering • Spatial Filtering • Correlation & Convolution • Smoothing & Sharpening	3.4	Lab 5: Spatial Transforms	
Mid Exam & Easter break				
7	Introduction to Image Processing in Frequency Domain	4.1,4.2	Lab 6: Frequency Domain Images	Assignment 2 Due
8	Fourier Transform	4.3, 4.4, 4.5		
9	Filtering in Frequency Domain High Pass, Loss Pass & Band Pass Filtering	4.7	Lab 7:	
Eid & Spring Break				
10 (Tentative)	Image Restoration & Reconstruction Noise Modeling & reduction	5	Lab 8:	Assignment 3
11	Color Image Processing	6	Lab 9	
12	Image Compression	8	Lab 10	Assignment 3 Due
13	Morphological Operations	9		

14	Review & Project Submission			
15	Final Exam			

Rules:

- All quizzes will be un-announced.
- Quizzes will cater for attendance as well.
- There will be no re-take of any quiz in any case. In the end best X quizzes will be counted.
- Late assignments will be negatively marked but must be submitted withing 1 week of the deadline.
- Extremely late assignments will be catered only after assessing a student's performance.
- Every lab will be graded.
- Missed labs will not be graded. Best X labs will be counted.
- It's the student's responsibility to catch up with missed lectures/labs.