Digital Image Processing and Pattern Recognition

E1528

Lecture 1

Introduction

INSTRUCTOR

DR / AYMAN SOLIMAN

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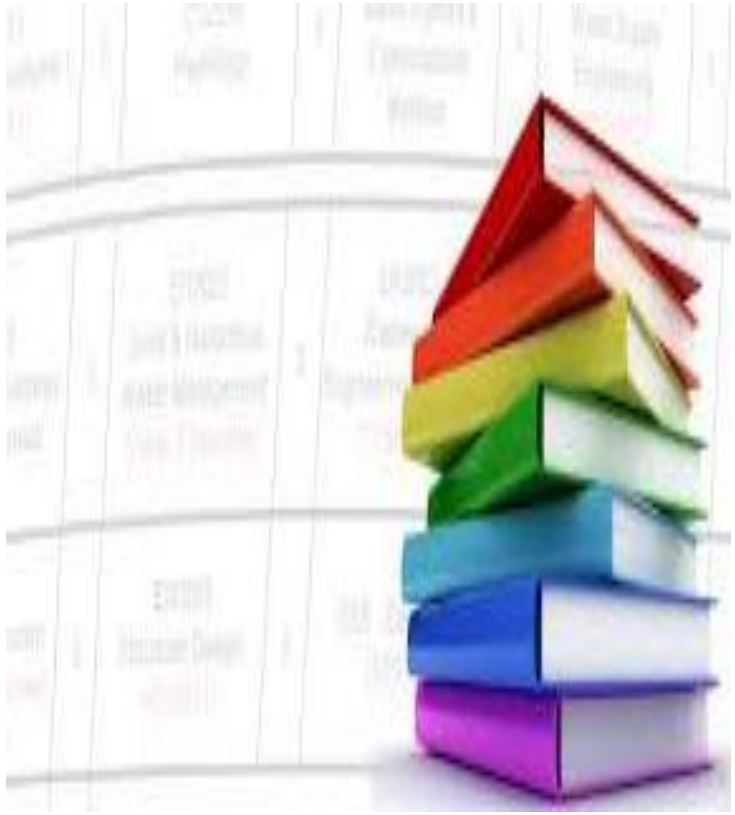
1) Course Contents.

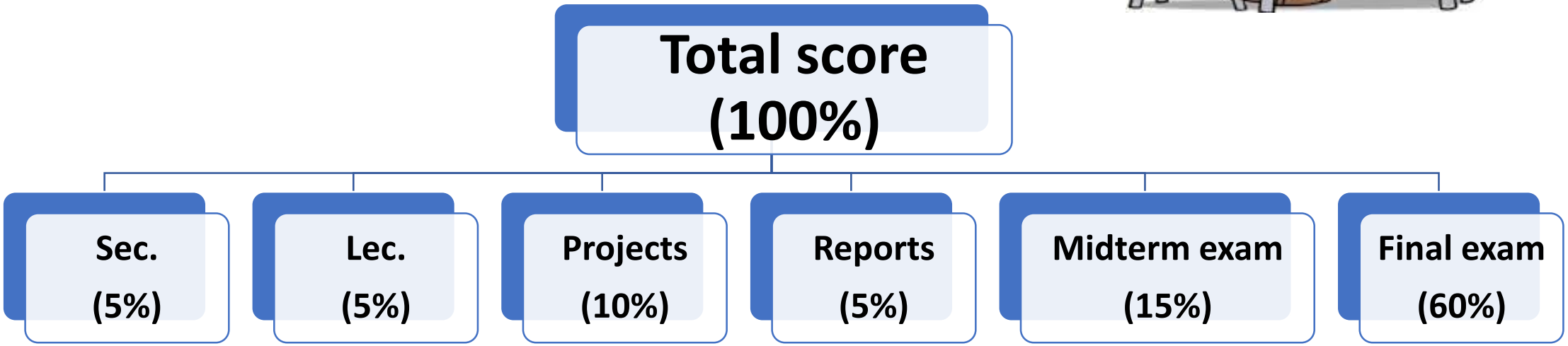
- Introduction
- Fundamental steps in Digital Image Processing,
- Image sampling and quantization,
- Histogram Processing,
- DSP and Digital Filter Design,
- Two-dimensional Fourier transform,
- Image degradation models and Restoration, Periodic noise reduction in frequency domain,

1) Course Contents (cont.)

- Color transformation, Color Enhancement,
- Wavelet and Multi-resolution image Processing,
- Image Compression Models,
- Signal Compression,
- Morphological Image Processing,
- Image Segmentation, Medical Imaging Systems,



2) Grading System & distribution.



3) Course Information.

Lecture: **Tuesday (09:00 - 11:25 AM)**

Office Hours: **Tuesday** 14:10 ～ 15:30 PM
Thursday 9:00 ～ 13:00 PM

References:

- **Digital Image Processing Using MATLAB, Rafael C. Gonzalez, Richard E. Woods, Steven L. Eddins, 2018.**
- **Digital Image Processing and Pattern Recognition second edition**
- **Practical image and video processing using MATLAB® by Oge Marques**

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TAs:

Eng. Enas Mohamed

4) Course Policy.

- Be **on time** and cell phones should be silent or off during the lecture.
- Any forms of **cheating or plagiarism** will result in a **Zero grade** for the required task, report or exam (No discussion nor excuses).
- Students are expected to **respect** Instructors, TAs, and their colleagues.
- Your grades is based on **merit only** nothing else.

5) Objectives

- Give the students a general understanding of the fundamentals of digital image processing.
- Introduce the student to analytical tools which are currently used in digital image processing as applied to image information for human viewing.
- Develop the student's ability to apply these tools in the laboratory in image restoration, enhancement and compression

6) Introduction

the students should:

- Know the basic components of an image processing system.
- Understand the basics of the human visual system as they relate to image processing; including spatial frequency resolution and brightness adaption.
- Understand how images are represented; including optical images, analog images, and digital images.
- Understand image types such as binary images, gray-scale images, color and multi-spectral images.
- Know the key concepts in image file formats.
- Understand the model for an image analysis process.

6) Introduction

the students should:

- Understand why preprocessing is performed and know about image geometry, convolution masks, image algebra and basic spatial filters.
- Understand image quantization in both the spatial and brightness domains.
- Understand how discrete transforms work; including concepts of basis images, orthogonality, orthonormality, separability and reversibility.
- Know about the 2-D Fourier, discrete cosine and wavelet transforms.
- Know why log remapping is necessary for viewing spectral image data.
- Understand lowpass, high pass, bandpass, notch filters; including ideal and non-ideal filters.

Thank you