Course Code	Course Title
COMP 4421	**Image Processing**

Course Description

Introduction to image processing. To equip students with the fundamental knowledge of image processing. Topics include image processing and analysis in spatial and frequency domains, image restoration and compression, image segmentation, color image processing, morphological image processing, representation and description, object recognition, related application areas and some other closely related topics.
Some image processing and analysis tools may also be introduced subject to the availability of time.

List of Topics

Introduction,
Image Fundamentals,
Image Transformations and Filtering,
Image Restoration and Reconstruction,
Color Image Processing,
Image Compression,
Morphological Image Processing,
Image Segmentation,
Image Registration,
Feature Extraction and Recognition Tasks,
Applications or related topics, e.g., deep learning for medical image analysis.

Textbooks

This course suggests a list of reference books listed below. No textbook.

Digital Image Processing, by Gonzalez and Woods, 4th Ed., Pearson, 2018.
Digital Image Processing using MATLAB, by Gonzalez and Woods, Prentice Hall, 2004.
The Image Processing Handbook, by John C. Russ (On-line at UST Library).
Digital Image Processing, by Kenneth R. Castleman, Prentice Hall, 1996.
Two-dimensional Signal and Image Processing, by Jae S. Lim, Prentice Hall, 1990.
Computer Vision: A Modern Approach by Forsyth and Ponce, Prentice Hall, 2003.
Toennies, Klaus D. Guide to medical image analysis. Springer London, 2017.
Goodfellow, Ian, Yoshua Bengio, and Aaron Courville. Deep learning. MIT press, 2016.

Grading Scheme

Exam	70%
Assignments	30%
Total	100%

Course Intended Learning Outcomes

1. Identify basic image enhancement techniques in both the spatial and frequency domains.
2. Image restoration in the presence of noise and distortion.
3. Apply basic morphological image processing techniques.
4. Segment image components from an image.
5. Register images with similarity metrics and transformations.
6. Compress an image with lossless or lossy compression methods.
7. Represent and recognize an image using different feature descriptors.
8. Apply basic image processing techniques to typical applications.

Assessment Rubrics

N/A