# Final Exam Syllabus

# Pattern Recognition and Image Processing

## Chapter 1:

1.1: What is digital image processing

1.4: Fundamentals Steps of Digital image processing

1.5: Components of an image processing system

## Chapter 2:

2.1: Elements of Visual Perception

2.3: Image Sensing and Acquisition

2.4: Image Sampling and Quantization

2.4: Neighbors of pixel, Adjacency, Distance, Connectivity, Regions, and Boundaries

## Chapter 3:

3.1: Background

3.2: Some Basic Intensity Transformation Function

3.3: Histogram Processing, Histogram Equalization

3.4: Fundamentals of spatial Filtering

3.5: Smoothing Spatial Filtering

3.6: Sharping Spatial Filtering

## Chapter 4:

Frequency Domain Filters

- Ideal Lowpass Filter
- Butterworth Lowpass Filter
- Guassian Lowpass Filter
- Ideal Highpass Filter
- Butterworth Highpass Filter
- Guassian Highpass Filter

## Chapter 8:

Some Basic Compression Methods

- Huffman Coding (Math)
- Arithmetic Coding (Math)

## Chapter 9:

Morphology Image Processing

- Erosion and Dilation
- The Hit or Miss Transformation

## Chapter 10:

Image Segmentation

- Edge Detection
- Line Detection

## Pattern Recognition

- What is pattern?
- Pattern Recognition
- Phases in pattern Recognition
- Activities for defining a pattern recognition (Pattern Recognition Cycle)
- Neural Network (with math)
- Support Vector Machine (with math)
- Clustering
    1. K-means Clustering (with math)
    2. Hierarchical Clustering (with math)