Subjects

- Image Sampling and Quantization
  - Basic Concepts in Sampling and Quantization
  - Representing Digital Images
  - Aliasing and Moiré Patterns
  - Zooming and Shrinking Digital Images
- Some Basic Relationships Between Pixels
- Image Enhancement in the Spatial Domain
  - Some Basic Gray Level Transformations
  - Histogram Processing (including Histogram Equalization)
  - Enhancement Using Arithmetic/Logic Operations
  - Basics of Spatial Filtering
  - Smoothing Spatial Filters
  - Sharpening Spatial Filters
  - Bilateral Filters
- Image Scaling
- Edge Detection
- Color Image Processing
  - Color Fundamentals
  - Color Models
  - Color Transformations
- template matching
- Fourier Transforms
  - Smoothing Frequency-Domain Filters
  - Sharpening Frequency Domain Filters
  - Band Pass Filtering
  - Hybrid Images
- Geometric Transformations and Image Warping
- Noise Removal
- Image Compression
  - Introduction on Coding, Interpixel and Psychovisual Redundancies
  - Compression using Singular-Value Decomposition
  - Compression using Huffman Coding
  - Introduction on Entropy
  - Karhunen-Loeve Transform (KLT)
  - JPEG Encoder and Decoder
  - An overview on MPEG Encoder and Decoder
- Image Segmentation
  - Segmentation as Clustering or Grouping (K-Means)
  - Histogram-Based Segmentation
  - Mean-Shift
  - Oversegmentation & Superpixels
  - Simple Linear Iterative Clustering (SLIC)
  - Normalized Cuts (NCuts)
  - Texture Based
  - Interactive Graph Cuts for Optimal Boundary and Region Segmentation of Objects in N-D Images

  - Deformable Contours
  - Graph-Based Oversegmentation
- Texture (Analysis and Synthesis)
- Image Blending
  - Alpha Compositing with Feathering
  - Pyramid Blending
    . Laplacian Pyramid Blending
  - Poisson Blending
    . Membrane Interpolation
    . Discrete Poisson Solver
- Morphing
  - Align, then cross-dissolve
  - Local warp, then cross-dissolve
  - Using Delaunay Triangulation by Duality