

# IMAGE PROCESSING WITH PYTHON

**Course Code:** ECOE2

**Prerequisites:** Nil

**Credits:** 3:0:0

**Contact Hours:** 42

## UNIT – I

**Introduction:** Getting started with image processing, image processing pipeline, image input/output, image display, basic image manipulations, image formation – sampling and quantization, convolution

## UNIT – II

**Image Enhancement:** Point-wise intensity transformations, histogram processing, noise smoothing, gradient, Laplacian, sharpening, unsharp masking, edge detection

## UNIT – III

**Image Processing:** Morphological binary operations, feature detectors vs descriptors, SIFT, Haar-like features

## UNIT – IV

**Image Segmentation:** Hough transform, thresholding, edge/region based segmentation

## UNIT – V

**Machine and Deep Learning in Image Processing:** Clustering, PCA, Eigenfaces, image classification, object detection, image classification with Tensorflow, Popular deep CNNs

### Textbooks:

1. Sandipan Dey, “Hands-on Image Processing with Python”, Packt Publishing Ltd., 2018.
2. R. C. Gonzalez, R. E. Woods, “Digital Image Processing”, 4<sup>th</sup> Edition, Pearson Publishers, 2018.

### References:

1. R. C. Gonzalez, R. E. Woods, S. L. Eddins, “Digital Image Processing using MATLAB”, 3<sup>rd</sup> Edition, Gatesmark Publishing, 2020.