



## CONTENTS

### THEORY CONTENT

- ▶ Basics of Image Processing : What is image processing, Image types, Image Capturing
- ▶ Image Pre-processing Techniques: Smoothing, Background subtraction, Contrast Enhancement, Point Operators, Neighborhood Operators, Image Pyramids, Median filter, Morphological Operations, Geometric Primitives and transformation, Segmentation, ROI selection
- ▶ Feature Detection: Points, Patches, Edges, Lines, HOG, Haar-like, Line detection using Hough transform
- ▶ Feature extraction: Thresholding, Blob detection, Template matching, Edgelets, Edge linking, FLANN.
- ▶ Object Classifiers: Neural Network, Fuzzy Logic, SVM, K-means
- ▶ Motion Estimation and Tracking Spline based motion, Layered Motion, Optical Flow, Kalman filter
- ▶ Computer Vision Case Studies, Applications and Hardware Platforms - Blackfin Processor BF609, BF 548; TI - TDA2x TDA3x, NVIDIA – TK1/TX1

### LABORATORY CONTENT

- ▶ Introduction to Python and OpenCV
- ▶ OpenCV Core Functionalities & Libraries
- ▶ Basic implementations with OpenCV like loading, displaying and saving an image
- ▶ Drawing lines, rectangles and circles
- ▶ Image Transformations – Translation, Rotation, Flipping, Resizing, Cropping
- ▶ Image Processing I – Image Arithmetic, Bitwise Operations, Masking, Splitting and Merging, Color Spaces
- ▶ Image Processing II – Contrast Enhancement, Linear and Non-linear Filtering, Smoothing and Blurring
- ▶ Gradients and Edge Detection
- ▶ Contours
- ▶ Object Detection / Classification
- ▶ Object Tracking

- ▶ Use of Hardware Platform BF609 and BF548, Raspberry Pi for Computer Vision
- ▶ Project 1
- ▶ Project 2

### ADMISSION PROCESS

Please Visit our website [www.vitvll.in](http://www.vitvll.in) for online application form and payment.

- ▶ Fees: Rs. 7,000/-  
(Rupees Seven Thousand Only) **Service tax extra**

### ELIGIBILITY CRITERIA

Target audience/ student

- ▶ Third year and final year students from Computer, Electronics, E&TC, IT and Instrumentation Engineering / Diploma.
- ▶ M.Tech. and Ph.D. students,
- ▶ Engineering Faculty / Diploma Faculty

### COURSE SCHEDULE

Last Date of Admission : 7th January 2017  
Course Duration : 60 Hrs  
Course Dates : 7th Jan – 12th Mar 2017

### BATCH SCHEDULE

Total number of theory hours :24  
Total number of Lab hours :36  
Total number of hours/week :07

### VENUE

Department of Electronics Engineering,  
Vishwakarma Institute of Technology, Pune

### DAYS AND TIMING OF THE COURSE

Saturday: 2 p.m.-5 p.m. & Sunday: 11 a.m. -3 p.m.

### OBJECTIVE OF COURSE

"To develop and enhance expertise in Vision Computing to benefit the students/faculty/researchers and industry professionals to solve real-world problems."

### HOW THE COURSE IS USEFUL

- ▶ Student will be competent / expert to work in the core Computer Vision and Image Processing related Projects and Industries.

### Vishwakarma Learning Labs

### Vishwakarma Institute of Technology, Pune

(An Autonomous Institute Affiliated to Savitribai Phule Pune University)

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