

<b>Computer Vision and Applications</b>	<b>L</b> <b>3</b>	<b>T</b> <b>0</b>	<b>P</b> <b>2</b>	Basic of Linear Algebra and Programming
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**Course Objective:** To introduce fundamentals of computer vision so that students will understand to program a computer for understanding a scene or features in an image development.

S. NO	Course Outcomes (CO)
<b>CO1</b>	To describe Image Formation Models, Monocular imaging system, Orthographic & Perspective projections.
<b>CO2</b>	To evaluate applications of 2D/3D Vision Filters, Binary Images, Features and Edge Detection
<b>CO3</b>	To describe Image Processing and Feature Extraction concepts
<b>CO4</b>	To analyze motion Estimation, Regularization theory, Optical computation, Stereo Vision

<b>CO5</b>	To investigate Shape Representation Segmentation, Deformable curves and surfaces
<b>CO6</b>	To explain about Object recognition, describe Hough transforms and other simple object recognition methods

S. NO	Contents	Contact Hours
<b>UNIT 1</b>	Intorduction to Image Processing and Computer Vision, 2D/3D Vision: Filters, Binary Images, Features, Edge Detection, Texture, Shape, Segmentation, Clustering, Model Fitting, Probabilistic, 3D Vision:Multiview geometry, Stereo, Shape from X, 3D data	<b>8</b>
<b>UNIT 2</b>	Image Processing and Feature Extraction: Image representations (continuous and discrete), Linear Filters, Texture, Edge detection.	<b>6</b>
<b>UNIT 3</b>	Motion Estimation: Regularization theory, Optical computation, Stereo Vision, Motion estimation, Structure from motion.	<b>6</b>
<b>UNIT 4</b>	Shape Representation and Segmentation: Deformable curves and surfaces, Snakes and active contours, Level set representations, Fourier and wavelet descriptors, Medial representations, Multi- resolution analysis.	<b>8</b>
<b>UNIT 5</b>	CV Applications: Object recognition: Hough transforms and other simple object recognition methods, Shape correspondence and shape matching, Principal component analysis, Shape priors for recognition	<b>8</b>
<b>UNIT6</b>	CV Applications: Pose Estimation, Converting 2D images into 3D models, Image transformation using GANs, Computer Vision for traffic monitoring tools, Medical Image analysis.	<b>6</b>
<b>TOTAL</b>		<b>42</b>

REFERENCES		
S.No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
<b>1</b>	Computer Vision: A Modern Approach by D. A. Forsyth and J. Ponce, Prentice Hall	2011
<b>2</b>	Computer Vision by Linda Shapiro and George Stockman, Prentice-Hall	2001
<b>3</b>	Robot Vision, by B. K. P. Horn, McGraw-Hill., 1986	1986
<b>4</b>	Richard Hartley and Andrew Zisserman, Multiple View Geometry in Computer Vision, Second Edition, Cambridge University Press	2004
<b>5</b>	Computer vision: principles, algorithms, applications, learning by E.R. Davies	2018

## SIXTH SEMESTER

# **B.Tech. Information Technology**

**Course code:** Course Title

**Course Structure**

**Pre-Requisite**