

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)
CO1	To describe Image Formation Models, Monocular imaging system, Orthographic & Perspective projections
CO2	To evaluate applications of 2D/3D Vision Filters, Binary Images, Features and Edge Detection
CO3	To describe Image Processing and Feature Extraction concepts
CO4	To analyze motion Estimation, Regularization theory, Optical computation, Stereo Vision

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

S. NO	Contents	Contact Hours
UNIT 1	Image Formation Models: Monocular imaging system, Orthographic & Perspective Projection, Cameras – lenses, projections, sensors, Radiometry –Measuring Light, light and surfacesRepresentation – color spaces, Camera model and Camera calibration, Binocular imaging systems, Sources, Shadows and Shading.	8
UNIT 2	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	6
UNIT 3	Image Processing and Feature Extraction: Image representations (continuous and discrete), Linear Filters, Texture, Edge detection.	6
UNIT 4	Motion Estimation: Regularization theory, Optical computation, Stereo Vision, Motion estimation, Structure from motion.	8
UNIT 5	Shape Representation and Segmentation: Deformable curves and surfaces, Snakes and active contours, Level set representations, Fourier and wavelet descriptors, Medial representations, Multi- resolution analysis.	8
UNIT6	Object recognition: Hough transforms and other simple object recognition methods, Shape correspondence and shape matching, Principal component analysis, Shape priors for recognition.	6
	TOTAL	42

REFERENCES		
S.No.	Name of Books/Authors/Publishers	Year of Publication / Reprint
1	Computer Vision: A Modern Approach by D. A. Forsyth and J. Ponce, Prentice Hall, 2003/2011	2011
2	Computer Vision by Linda Shapiro and George Stockman, Prentice-Hall, 2001	2001
3	Robot Vision, by B. K. P. Horn, McGraw-Hill., 1986	1986
4	Richard Hartley and Andrew Zisserman, Multiple View Geometry in Computer Vision, Second Edition, Cambridge University Press, March 2004	2004

B.Tech. Information Technology				
Course code: Course Title	Course Structure			Pre-Requisite
	I	T	P	Data Structures and