



SWARNANDHRA
COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
Seetharampuram, Narasapur, Andhra Pradesh- 534280

DEPT. OF COMPUTER SCIENCE AND ENGINEERING

LESSON PLAN (2025-2026)

Course Code	Course Title	Semester	Branches	Contact Periods / Week	Academic Year	Date of Commencement of Semester
20IT7E06	COMPUTER VISION	VII	CSE	5	2025-26	09-06-2025
COURSE OUTCOMES						
1	Implement fundamental image processing techniques required for computer vision.					
2	Perform shape analysis and Implement boundary tracking techniques.					
3	Apply Hough Transform for line, circle and ellipse detections					
4	Apply 3D vision techniques and Implement motion related techniques.					
5	Develop applications using computer vision techniques.					
Unit	Out Comes / Bloom's Level	Topics No.		Text Book Reference	Cont act Hour	Delivery Method
UNIT-I : Image Processing Foundations						
I	CO1: Implement fundamental image processing techniques required for computer vision. (K1, K2)	1.1.1	Introduction	T1	1	Chalk ,talk
		1.1.2	Image Processing Foundations	T1	2	Chalk ,talk
		1.1.3	Review of image processing techniques	T1	1	Chalk ,talk
		1.1.4	classical filtering operations	T1	1	Chalk ,talk
		1.1.5	thresholding techniques	T2	1	Web Resources
		1.1.6	edge detection techniques	T2	1	Video
		1.1.7	corner and interest point detection			
		1.1.8	mathematical morphology	T1	1	Chalk,talk,
		1.1.9	texture.	T1	1	Chalk,talk,PPT
	Content beyond Syllabus (If needed)	1.1.10	Convolutional Neural Networks(CNN)	T1	1	PPT
			Class Test-I			
Total						
UNIT-II : Shapes And Regions						
II	CO2: Perform shape analysis and Implement boundary tracking techniques.	2.1.1	Shapes And Regions	T2	1	Chalk, talk
		2.1.2	Binary shape analysis	T2	1	Web Resources
		2.1.3	Block coding: Error Correction,	T2	1	Chalk, talk
		2.1.4	connectedness	T2	1	Chalk ,talk
		2.1.5	object labeling and counting	T2	1	Web Resources
		2.1.6	size filtering	T3	1	Web Resources
		2.1.7	distance functions	T3	1	Chalk ,talk, ppt
		2.1.8	skeletons and thinning	T3	1	PPT



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		2.1.9	deformable shape analysis	T3	1	Web Resources
		2.1.10	boundary tracking procedures	T3	1	Chalk ,talk
		2.1.11	active contours	T2	1	Chalk ,talk
		2.1.12	shape models and shape	T2	1	Chalk ,talk
		2.1.13	centroidal profiles	T2	1	Chalk ,talk
		2.1.14	handling occlusion	T2	1	Chalk ,talk
		2.1.15	boundary length measures	T2	1	Chalk ,talk
		2.1.15	boundary descriptors	T1	1	Chalk ,talk
		2.1.16	chain codes	T2	1	Chalk ,talk
		2.1.17	Fourier descriptors	T2	1	Chalk ,talk
		2.1.18	region descriptors	T1	1	Chalk ,talk
		2.1.19	moments	T2	1	Chalk ,talk
			Class Test -II			
	Content beyond Syllabus	2.1.20	Recurrent Neural Networks (RNNs)	T1	1	Chalk ,talk
Total					12	
UNIT-III: Hough Transform						
III	CO3: Apply Hough Transform for line, circle and ellipse detections (K3)	3.1.1	Hough Transform	T1	1	Chalk ,talk
		3.1.2	Line detection	T1	1	Chalk ,talk
		3.1.3	Hough Transform (HT) for line detection	T1	1	Web Resources
		3.1.4	foot-of-normal method	T1	1	NPTEL video
		3.1.5	line localization	T1	1	PPT
		3.1.6	line fitting	T3	1	PPT
		3.1.7	RANSAC for straight line detection	T3	1	Web Resources
		3.1.8	HT based circular object detection	T3	1	Chalk ,talk
		3.1.9	accurate center location	T1	1	Web Resources
		3.1.10	speed problem	T1	1	Chalk ,talk
		3.1.11	ellipse detection	T1	1	Chalk ,talk
		3.1.12	Case study: Human Iris location	T1	1	Chalk ,talk
		3.1.13	hole detection	T1	1	Chalk ,talk
		3.1.14	generalized Hough Transform (GHT)	T1	1	Web Resources
		3.1.15	spatial matched filtering	T1	1	NPTEL video
		3.1.16	GHT for ellipse detection	T1	1	PPT
		3.1.17	object location	T1	1	PPT
		3.1.18	GHT for feature collation	T1	1	Web Resources
		Class Test -III				
	Content beyond Syllabus (if needed)	3.3.1	Deep Generative Models	T3	1	Chalk ,talk
Total					23	



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UNIT-IV : 3D Vision and Motion						
IV	CO4: Apply 3D vision techniques and Implement motion related techniques	4.1.1	3D Vision and Motion	T1	1	PPT
		4.1.2	Methods for 3D vision	T1	1	Web Resources
		4.1.3	projection schemes	T1	1	Chalk ,talk
		4.1.4	shape from shading	T1	1	PPT
		4.1.5	photometric stereo	T1	1	Chalk ,talk
		4.1.6	shape from texture	T1	1	Web Resources
		4.1.7	shape from focus	T1	1	Web Resources
		4.1.8	active range finding	T2	1	Chalk ,talk
		4.1.9	surface representations	T2	1	Web Resources
		4.1.10	point-based representation	T1	1	Web
		4.1.11	volumetric representations	T1	1	Chalk ,talk
		4.1.12	3D object recognition	T1	1	Web Resources
		4.1.13	3D reconstruction	T1	1	Web
		4.1.14	introduction to motion	T2	1	Chalk ,talk
		4.1.15	triangulation	T2	1	Web Resources
		4.1.16	bundle adjustment	T1	1	Web
		4.1.17	translational alignment	T1	1	Chalk ,talk
		4.1.18	parametric motion	T1	1	Web Resources
		4.1.19	spline-based motion	T1	1	Web
		4.1.20	optical flow	T2	1	Chalk ,talk
		4.1.21	layered motion	T2	1	Web Resources
		4.1.22	Class Test -IV	T1	1	Web
		Content beyond Syllabus (if needed)	4.2.0	Variants and Applications of Generative Models in 3D Vision		1
Total					11	
UNIT-V: Applications						
V	CO5 Develop applications using computer vision techniques	5.1.1	Applications	T2	1	Web Resources
		5.1.2	Photo album	T2	1	Web Resources
		5.1.3	Face detection	T2	1	Chalk ,talk, ppt
		5.1.4	Face recognition	T2	1	PPT
		5.1.5	Eigen faces	T2	1	Chalk, Talk
		5.1.6	Active appearance	T2	1	Chalk, Talk
		5.1.7	3D shape models of faces	T2	1	Web Resources
		5.2.1	Surveillance	T2	1	Web Resources
		5.2.2	foreground-background separation	T2	1	Web Resources
		5.2.3	particle filters	T2	1	Chalk ,talk, ppt
		5.2.5	Chamfer matching	T2	1	PPT
		5.2.6	Tracking and occlusion	T2	1	Chalk ,talk
		5.2.7	combining views from multiple cameras	T2	1	Web Resources
		5.2.8	human gait analysis	T2	1	Web



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		5.3.1	In-vehicle vision system	T2	1	Chalk ,talk
		5.3.2	locating roadway	T2	1	Web Resources
		5.3.3	road markings	T2	1	Web
		5.3.3	identifying road signs	T2	1	Chalk ,talk
		5.3.4	locating pedestrians	T2	1	Web Resources
			Class Test -V			
	Content beyond Syllabus (if needed)	Self-supervised Learning; Reinforcement Learning in Vision		T2	1	Web Resources
Total					12	
CUMULATIVE PROPOSED PERIODS					72	

Text Books:	
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	D. L. Baggioeal, —Mastering OpenCV with Practical Computer Vision Projects , Packt Publishing, 2012.
2	E. R. Davies, —Computer & Machine Vision , Fourth Edition, Academic Press, 2012.
3	Jan Erik Solem, —Programming Computer Vision with Python: Tools and algorithms for analyzing images , O'Reilly Media, 2012
Reference Books:	
S.No.	AUTHORS, BOOK TITLE, EDITION, PUBLISHER, YEAR OF PUBLICATION
1	Mark Nixon and Alberto S. Aquado, —Feature Extraction & Image Processing for Computer Vision , Third Edition, Academic Press, 2012.
2	R. Szeliski, —Computer Vision: Algorithms and Applications , Springer 2011
3	Simon J. D. Prince, —Computer Vision: Models, Learning, and Inferencel, Cambridge University Press, 2012.
Web Details	
1	https://onlinecourses.nptel.ac.in/noc20_cs88/preview
2	https://www.geeksforgeeks.org/computer-vision/computer-vision/
3	https://docs.opencv.org/4.x/d9/df8/tutorial_root.html

	Name	Signature with Date
i. Faculty	Dr. N. Tulasi Raju	
ii. Faculty II (for common Course)	Dr. T. Kesava Rao Mr. S.S Venu Madhav Mr. V.S. Ramakrishna Mr. S. Chanti	
iii. Course Coordinator	Dr. N. Tulasi Raju	
iv. Module Coordinator	Dr. T. Kesava Rao	
v. Programme Coordinator	Dr. P. Srinivasulu	

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