Course Code	CSE 344/544, ECE 344/544		
Course Name	Computer Vision		
Credits	4		
Course Offered to	UG/PG		
	This is an introductory course on Computer Vision offered to undergraduate a enable students to understand and develop applications using existing tools.		
Course Description	vision problems. Groups of two or three will do a course project and show a d		ming assignments targeted towards solving real-world computer
	Pre-requisit		
Pre-requisite (Mandatory)	Pre-requisite (Desirable) Pre-requisite (other)		
Linear Algebra	Image Analysis (CSE), Digital Signal Processing (ECE)	i ro rodaisiis(siiisi)	
zinear rugebra	3 7 (* 7 3 3 3 3 C * 7	J	
Post Conditions*(For suggestions on verbs please refer the second sheet)			
CO1	CO2	cos	CO4
Apply techniques for feature extraction and	1002	Look up relevant literature and identify	Evaluate and compare quantitative
representation, tracking, segmentation,	Apply ideas from single and multi-view geometry in applications requiring	potential solutions for a given computer	performance of vision algorithms by
object detection and recognition.	depth/3D estimation.	vision problem and implement them using	using appropriate metrics.
object detection and recognition.			using appropriate metrics.
Weekly Lecture Plan			
Week Number	Lecture Topic Introduction to Computer Vision	COs Met	Assignment/Labs/Tutorial
1	·		4
	Camera geometry and camera calibration	CO2, CO3	」
2	Camera geometry and camera calibration	CO2, CO3	(HW-1)
	Review of Digital Image Processing		
3	Edge Detection and Hough Transforms	CO1, CO3	(Quiz 1)
	Image Segmentation	CO1, CO3	(HW-2)
4	Feature Point Detection - Harris, SIFT, HOG, LBP, STIP	CO1, CO3	Project Proposal
	Feature Detection and Description - Bag Of Words, VLAD	CO1, CO3	
5	Object Recognition - SVMs	CO3, CO4	(Quiz 2)
	Detection - Viola Jones Object detector	CO3, CO4	(HW-3)
6	Convolutional Neural Networks and Applications	CO3, CO4	1
	Convolutional Neural Networks and Applications	CO3, CO4	1
7	Optical Flow/ Mid-sem Review	CO1	(Quiz-3)
	Overflow		1
В	Mid-sem Exam		†
9	KLT based object tracking	CO1, CO3	†
	Linear Algebra review		Mid-sem project report
	Projective Geometry - Basics and 2D transformations (Euclidean, Similarity,		Tima sem project report
10	Affine and Projective)	CO2, CO3	Quiz-4, HW-4
11	Epipolar Geometry - Fundamental and Essential Matrix	CO2, CO3	1 1
	Least Squares and Robust Estimation (RANSAC)	CO2, CO3	(Quiz-5)
12	Stereo reconstruction, SfM and Bundle Adjustment	CO2, CO3	(HW-5)
· -	Homography and panorama creation.	CO2, CO3	1(1111 3)
13	Recent Progress in Computer Vision, Review and Overflow	002,003	(Quiz-6)
•	Assessment	Plan	(Quiz 0)
Type of Evaluation % Contribution in Grade			
Assignment	20		
Project	•		
	30		
Quiz	10		
Mid-sem	15		
End-sem	25		
*Please insert more row for other type of Evaluation			
	Resource Mat	terial	
Type Title			
		<u> </u>	
Reference	Richard Szeliski's draft "Computer Vision: Algorithms and Applications"		

Richard Hartley and Andrew Zisserman, Wultiple View Geometry", Cambridge University Press, 2004
David Forsyth, Jean Ponce, \Computer Vision: A Modern Approach", Pearson Education, second edition.

Simon J. D. Prince, \Computer Vision: Models, Learning, and Inference", 1st Edition, Cambridge University Press, 2012 Notes and references posted on course page

Reference