

Computer Vision	Code & No:	CS 460
	Credits:	3 (2+2+0)
	Pre-requisite:	CS210
	Co-requisite:	
	Level:	9 or 10

Course Description: This course provides an introduction to computer vision, including fundamentals of image formation, camera imaging geometry, feature detection and matching, stereo, motion estimation and tracking, image classification, scene understanding, and deep learning with neural networks. Implementation of various algorithms will be done in python language.

Course Aims:

1. To introduce to the theoretical and practical aspects of computing with images
2. To cover the techniques of image formation, measurement, and analysis
3. To expose to the common methods for robust image matching and alignment
4. Highlight the geometric relationships between 2D images and the 3D world
5. Giving exposure to object and scene recognition and categorization from images

Course Learning Outcomes (CLOs):

1. Be familiar with both the theoretical and practical aspects of computing with images
2. Have described the foundation of image formation, measurement, and analysis
3. Have implemented common methods for robust image matching and alignment
4. Understand the geometric relationships between 2D images and the 3D world
5. Have gained exposure to object and scene recognition and categorization from images

No.	Topics	Weeks	Teaching hours
1	Image formation and perception, image representation	1	2
2	Image geometric transformations, image registration	1	2

3	Edge detection, image segmentation	2	4
4	Linear filters, Binary image analysis, Background subtraction	2	4
5	Object recognition, template matching, classification	2	4
6	Object detection and tracking	1	2
7	Camera models, stereo vision	1	2□
8□	Supervised classification algorithms	1	2
9	Visual attributes, Dimensionality reduction	2	4□
10□	Deep learning	1	2
□	Total	14	28

Textbooks:

1. Computer Vision: Algorithms and Applications by Richard Szeliski, Springer, 2011, ISBN 978-1-84882-934-3

Essential References:

1. Computer Vision, A Modern Approach, Forsyth and Ponce, 2nd ed., 2011