Course Type	Course Code	Name of the Course	L	Т	Р	Credits
DE	NCSD503	Computer Vision	3	0	0	3

## **Course Objective**

The students will get fundamental concepts of computer vision with an overview of the current methodologies and techniques. Fundamental processing tasks like segmentation, feature extraction, image classification, and object detection will be covered. By the end of this course,

## Learning Outcomes

Students will be able to apply the basic principles and tools used in computer vision to solve practical problems in scientific and commercial applications.

Unit No.	Topics to be Covered	Lecture Hours	Learning Outcome
1	Introduction, applications, challenges	2	The students will be introduced in this field
2	Image representation, preprocessing in spatial and transform domains, Human vision and color perception	6	Students will learn about fundamental operations on images with an orientation of human vision system
3	Feature analysis: local and global, feature detection, matching, texture, shape analysis	6	Students will learn to work on features for extraction of visual information
4	Image segmentation, object detection, semantic segmentation	5	Students will learn about segmentation techniques
5	Image alignment and stitching	2	Students will learn about image matching and alignment techniques
6	Motion estimation, activity recognition, structure from motion, depth estimation	5	Students will ;earn about motion estimation and other aspects essential for machine vision
7	Classification concepts	4	Students will learn about this important parts of machine vision
8	Processing for Three-dimensional world, invariants and perspective, image transformations and camera calibration and motion	4	The students will learn about camera models
9	real time vision systems, face detection and recognition, surveillance vision systems,	4	Students will learn about the real time processing as required in practical applications
10	machine learning and deep learning concepts in vision	4	Students will learn about machine learning based computer vision techniques
	Total	42	

## **Text Books:**

- 1. Computer Vision: Algorithms and Applications, 2nd ed. Richard Szeliski, Springer
- 2. Computer Vision: Principles, Algorithm, Applications, Learning by E.R. Devise Academic Press
- 3. Computer Vision: Modes, Learning, and Inference by Simon Prince, CRC Press.

## **Reference Books:**

1. Computer Vision: A Modern Approach, Forsyth and Ponce, Pearson