

Course Code	Course Name	Course Type	Cd	L	T	P	Marks		
							Sessional	Final Exam	Total
COM-601	Artificial Intelligence with Computer Vision	PCC	4	3	1	0	50	100	150

Course Outcomes:

At the end of the course the student will be able to:

CO1	Design and implement intelligent solutions to classification, regression and clustering problems.
CO2	Design and implement distinguishing features in pattern and object recognition tasks.
CO3	Understand how images are represented numerically and to Implement image processing techniques like Colour and geometric transforms.
CO4	Design to programmatically track a single point over time and understand motion models that define Object Movement over time.
CO5	Implement a method for tracking a set of unique features over time to match features from one image Frame to another.

Detailed Syllabus**Section A**

UNIT 1: Introduction to Artificial Intelligence: Basic of AI, history of AI, various techniques of Artificial Intelligence (Machine learning, NLP, Automation & Robotics and Computer vision, Types of AI, Applications of Artificial Intelligence, two ways of Artificial Intelligence work i.e., symbolic and Data Based.

(8 hrs)

UNIT 2: Foundation of Machine learning: Terminology used in ML, ML Process (Building the Model), Supervised ML, Unsupervised ML and Reinforcement ML and its Algorithms, types of problems solved using ML (Regression, Classification, Clustering), Exploratory Data Analysis on Real world Problem i.e., possibility of Rain including the variable dependency.

(8 hrs)

UNIT 3: Image Processing, Computer Vision and Computer Graphics: Computer Vision - Low-level, Mid-level, High-level, Overview of Diverse Computer Vision Applications, Light-Models, Image Acquisition, and Backgrounds: Adaptive Background Subtraction; Camera Geometry, Calibration, and Stereo Interest Operators and Feature Extraction.

(8 hrs)**Section B**

UNIT 4: Tracking: Feature Tracking (Selecting features, Nose Tracking); Direct Method (Image-Based Tracking): Head Tracking, Face feature tracking; Model-based Tracking: (Hand tracking, Body tracking, Fingertip Tracking), Kalman Filtering, Particle Filtering and Mean shift tracking.

(8 hrs)

UNIT 5: Recognition: Space-Time Methods: Discriminant Analysis, Bayesian Network Classifiers; Temporal Methods; Model-Based Methods (Markov-Dynamic Networks); Hidden Markov Models.

(8 hrs)**Text Books**

S. No.	Name of the Books	Author	Publisher	Edition (Pub. Yr.)
1	Artificial Intelligence: A Modern Approach	Stuart Russell and Peter Norvig	Pearson	4 th (2020)
2	Computer Vision - A modern Approach	D. Forsyth and J. Ponce	McGraw-Hill	2 nd (2018)