COMSATS University Islamabad
Department of Computer Science
Course Description Form (CDF)

Course Information	
Course Code: **CSC455**	Course Title: **Computer Vision**
Credit Hours: **3(3,0)**	Lecture Hours/Week: **3**
Lab Hours/Week: **0**	Pre-Requisites: **None**

Catalogue Description:

The topics covers includes: Overview of Computer Vision; Multiple Views & Motion; Feature Detection & Matching; Recognition; Geometry for 3D Vision; Motion Analysis; and Deep Networks.

Unit wise Major Topics:

Unit	Topic	No. of teaching hours
1.	Computer Vision: Overview, Vision Paradigms, Camera Geometry, Camera Calibration, Camera Projection, Projective Geometry, Lighting, and Image formation.	4.5
2	Multiple Views & Motion: Stereo Vision, Epipolar Geometry, Dense Stereo Correspondence, and Stereo Disparity Matching.	6
3	Feature Detection & Matching: Interest Points & Corners, Local Image Features, Model Fitting, Hough Transform, and RANSAC.	7.5
4.	Recognition: Bag of Features, Large-scale Instance Recognition, Large-scale Scene Recognition & Advanced Feature Encoding, and Detection with Sliding Windows.	9
5.	Geometry for 3D Vision: Radiometry, Surface Reflectance, Shape from Shading, Motion, and Texture, 3D Vision Model, and 2D View Representation of a 3D Scene.	6
6.	Motion Analysis: Differential Motion & Optical Flow Analysis, and Kalman Filter.	6
7.	Deep Networks Architectures: ResNets, R-CNNs, FCNs, and UNets.	6
Total Contact Hours		**45**

Mapping of CLOs and SOs

Sr.#	Unit #	Course Learning Outcomes	Blooms Taxonomy Learning Level	SO
CLO-1	1-2	Identify basic concepts, terminology, theories, models and methods in the field of computer vision.	*Understanding*	1
CLO-2	3-4	Apply computer vision techniques for solving practical problems.	*Applying*	2,4
CLO-3	5	Contrast the geometric relationships between 2D images and the 3D world.	*Understanding*	2
CLO-4	6	Analyze various motion analysis techniques.	*Analyzing*	2
CLO-5	7	Develop computer vision applications using deep	Creating	2-5

| | | | neural networks. | | |

CLO Assessment Mechanism

Assessment Tools	CLO-1	CLO-2	CLO-3	CLO-4	CLO-5
Quizzes	Quiz 1	Quiz 2	Quiz 3	Quiz 4	-
Assignments		Assignment 1	Assignment 2	Assignment 3	Assignment 4
Mid Term Exam	Mid Term Exam	Mid Term Exam	-	-	-
Final Term Exam	Final Terms Exam				

Text and Reference Books

Textbook:
1. Computer Vision: Algorithms and Applications, Richard Szeliski, Springer, 2021.

Reference Book:
1. Computer Vision Using Deep Learning: Neural Network Architectures with Python and Keras, Verdhan, Vaibhav, Apress, 2021.