COURSE SYLLABUS

COMPUTER VISION-COSC 4356
Monday-Wednesday 2:30-3:55 PM in COB 211

Instructor: Arun Kulkarni, Ph.D. Professor of Computer Science
Office: COB315.07
Office Hours: T-R 10:30 AM -2:00 PM, M-W 10:30 AM -12:00 PM
Email: akulkarni@uttyler.edu
Webpage: **https://www.uttyler.edu/directory/computer-science/akulkarni.php**

TEXTBOOK (Recommended): Richard Szeliski (2022) Computer Vision: Algorithms and Applications, Springer, 2nd Edition,

ADDITIONAL REFERENCES: Kulkarni, A. D. (2001). Computer Vision and Fuzzy Neural Systems. Prentice Hall PTR, Upper Saddle River, NJ.

PRE-REQUISITES: Structured Programming language, Linear algebra background

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Course Description
The course will introduce techniques in computer vision. Computer vision deals with extracting meaningful descriptions of physical objects from images or a sequence of images. Computer vision is used in many applications such as machine inspection, fingerprints recognition, military reconnaissance, robot vision, character recognition, medical image diagnosis, and data mining. The course will provide an overview of a computer vision system and describe algorithms for implementing various stages of a computer vision system. Various methods including statistical approach, deep learning, and Convolution Neural Networks (CNN) will be discussed. MATLAB toolboxes will be used for on-hand experience.

Course Objectives

1. **Explain** fundamental concepts, scope, and applications of computer vision.
2. **Acquire and represent** digital images using appropriate image acquisition models.
3. **Apply** MATLAB-based tools to perform image preprocessing and enhancement techniques.
4. **Extract and analyze** relevant features for effective visual data representation.
5. **Design and compare** supervised and unsupervised classification techniques for image analysis.
6. **Implement and evaluate** convolutional neural network (CNN) models for real-world computer vision applications.

Tentative time allotment for the course will be as follows:

Topic	Hours
Introduction	3
Computer Vision Overview	3
Image acquisition	3
MATLAB Introduction	3
Pre-processing Techniques	6
Feature Extraction	6
Supervised Classification	6
Unsupervised Classification	3
Convolution Neural Networks	6
Applications	3

EVALUATION:

90-100	A
80-89	B
70-79	C
60-69	D
0-59	F

SCHEDULE

		Evaluation
Test 1	Thursday, February 22, 2024	70 %
Test 2	Thursday, April 4, 2024	
Final Exam	Tuesday, April 30, 2024	
Assignments		20%
Assignment 1	Wednesday, Feb 12, 2026	
Assignment 2	Wednesday, Mar 4, 2026	
Assignment 3	Wednesday, Mar 26, 2026	
Assignment 4	Wednesday, Apr 23, 2026	
Attendance & Class Participation		10%

Academic Dishonesty: You are expected to do your own work. You may assist each other with general concepts, but direct assistance with a particular assignment or any attempts to gain an unfair academic advantage will not be tolerated. Cheating is considered a serious academic offense both by the department and the University. It may result in a failing grade from this course for all parties involved. The instructor reserves the right to ask you to explain any assignment that you turn in to judge if the work is yours.

Disabilities: If you have a disability, including a learning disability, for which you request an accommodation, please contact the Student Services Center located in the University Center, Room 282. The telephone number is 566-7079 (TDD 565-5579) so that the appropriate arrangements may be made.