ECE 66100 – Computer Vision

Type of Course
Core course for the Computer Engineering option of the MSE program

Catalog Description
This course deals with how an autonomous or a semi-autonomous system can be endowed with visual perception. The issues discussed include: vision psychophysics, image representation, edge detection, region-based segmentation, camera modeling, stereo vision, pose calculations, object recognition, optical flows, visual tracking, color vision, and beginning concepts of computational geometry. Students are expected to implement vision algorithms through programming assignments.

Credits
3

Contact Hours
3

Prerequisite Courses
MA 35100

Corequisite Courses
None

Prerequisites by Topics
This course will assume a reasonable knowledge of linear algebra.

Textbook
Lecture notes

Course Objectives
This course provides an introduction to the fundamental concepts and standard algorithms in image processing and computer vision.

Lecture Topics
1. Introduction
2. Image representation
3. Edge detection
4. Hough transformation
5. Region-based segmentation
6. Camera modeling and calibration

7. Stereo vision
8. Geometrical moments
9. Visual tracking
10. Color vision

Course Outcomes

Computer Usage

A student who successfully fulfills the course requirements will have demonstrated:

1. An understanding of digital image representation.
2. An ability to implement convolution and cross-correlation in filtering operations.
3. An ability to apply various image processing techniques to applications.
4. An understanding of camera modeling and calibration.
5. An understanding of stereo vision.
6. An ability to implement basic compression methods to compress and decompress images.

Laboratory Experience

None

Design Experience

High

Coordinator

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Date

9/8/2025