

ECSE 4961/6650, Fall, 2023

Computer Vision

Instructor: Dr. Qiang Ji

Email: jiq@rpi.edu

Phone: 518-276-6440

Office: JEC 7004

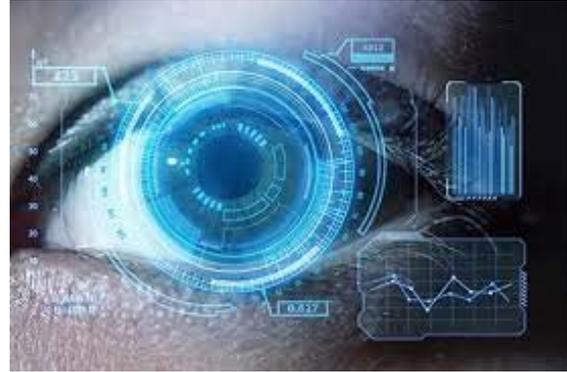
Semester and Year: Fall, 2023

Credit Hours: 3

Meeting Hours & Place: 12:30-1:50 pm,
Tuesdays and Fridays

Office Hours: Fridays 2:00pm - 3:00pm pm or by Appointment

TA: Hongji Guo, guoh11@rpi.edu , **TA office hours:** TBD



Lecture notes: http://www.ecse.rpi.edu/~qji/CV/ecse6650_lecture_notes.html

Catalog Description:

This course covers core computer vision theories/models that deal with acquiring, processing and analyzing images in order to reconstruct and understand the 3D scene. It will focus on the mathematical models that map a 3D scene to its 2D images, theories that reconstruct and interpret the 3D scene from their images, and methods for image feature extraction. Topics to be covered include image formation and representation, camera models, projective geometry, camera calibration, pose estimation, 3D reconstruction, image motion analysis, structure from motion, target tracking, feature extraction, and object recognition. Besides traditional computer vision models, this course will also introduce the latest deep learning models for object detection, tracking, recognition, and 3D reconstruction.

Prerequisites: MATH 2010 (B or higher) or equivalent, and CSCI 1200 and programming skill in Python, C++ or MATLAB.\$

Textbook: No formal textbook but detailed lecture notes will be provided

Optional Texts:

- Introductory Techniques for 3D Computer Vision Approach, E. Trucco & A. Verri.
- Computer Vision: Algorithms and Applications, 2nd edition, Richard Szeliski, 2022.
- Three-Dimensional Computer Vision-a geometric viewpoint, Oliver Faugeras, The MIT Press, 1993.
- Probabilistic Graphical Models for Computer Vision, Qiang Ji, Academic Press, 2019.

Assessment Measures:

- Assignments: 20%
- Class Projects: 40%
- Midterm Exam: 25%
- Final Project: 15%