**Lectures:** Thurs 6:00 – 8:30 pm

Description: An important goal of artificial intelligence (AI) is to equip computers with the capability of interpreting visual inputs. Computer vision is an area in AI that deals with the construction of explicit, meaningful descriptions of physical objects from images. It includes as parts many techniques from image processing, pattern recognition, geometric modeling, and cognitive processing. This course introduces students to the fundamental concepts and techniques used in computer vision.

Pre-requisites: CS 5403 (Data Structures), proficiency in programming, and familiarity with matrix arithmetic.

Week (Approximate)	Topics (Tentative)
1	Introduction Image representation & image properties
2	Image preprocessing
3	Edge detection
4-5	Image segmentation
6	Region (2D shape) analysis
7	Image recognition
8	Exam I
9-10	Invariant features & interest points (Corners, HOG, SIFT, etc.)
11	3-D sensing and camera calibration
12	Stereo imaging
13-14	Selected topics: face recognition, deep learning
15	Exam II (during final exam week)
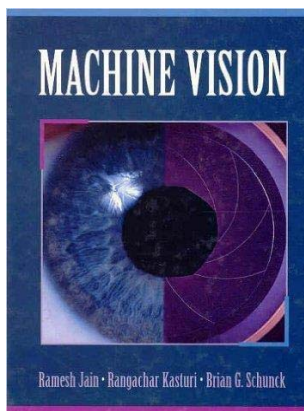
Required textbook: We will use the following book in the teaching of basic concepts in computer vision. This book is well written and easy to understand. I will provide class notes for more advanced materials and supplement them with technical papers. The book is available from Amazon.com and other sources.

- R. Jian, R. Kasturi and B. G. Schunck, *Machine Vision,* McGraw- Hill, 1995.

Supplemental books: I may also use materials from the following computer vision books in my lectures but you are not required to buy them.

- Milan Sonka, Vaclav Hlavac, and Roger Boyle, *Image Processing, Analysis, and Machine Vision*, *4th Edition*, Cengage Learning, Stamford, CT, 2015.
- Linda G. Shapiro and George C. Stockman, *Computer Vision,* Prentice Hall, 2001.

Instructor: Professor Edward K. Wong
Office: Room 10.045, 10th floor, 2 Metrotech Center
Office hours: Tues 2:15 – 3:00 pm. Thurs 3:00 – 4:30 pm. Other times: you are
                  welcome to drop by whenever I am in the office or you can make an
                  appointment ahead of time.
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Course load: There will be about 4 – 5 handwritten homework assignments, plus two computer vision projects that I will assign. You can use any programming language to do the project, but Python, C/C++, Java, or MatLab are the recommended languages. There will be two exams. The second exam will be held during the final exam week and will only cover materials after the first exam.

The preferred way to hand in homework is by submitting a hardcopy in class the day it is due. If you cannot come to class, you can put a hardcopy in my mail box, located in the ECE/CSE department office in Room 10.016 of 2 MTC, or you can submit a softcopy via NYU Classes. Homework will be accepted up to 7 days late but will be subject to 2% grade penalty (of the total points of the homework) each day it is late (weekends included). Solutions to homework are posted approximately one week after the homework is due. Late projects will also be subject to 2% grade penalty (of the total points of the project.)

Grade Distribution:

Homework	10%
Projects	30%
Exam I	30%
Exam II	30%

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https://engineering.nyu.edu/sites/default/files/2018-06/code-conduct2-2-16.pdf

Moses Center Statement of Disability: If you are a student with disability and is requesting accommodations, please contact the NYU Moses Center for Students with Disabilities (CSD) at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations. Information about the Moses Center can be found at http://www.nyu.edu/students/communities-and-groups/students-with-disabilities.