

Pennsylvania State University
School of Electrical and Computer Science
CMPEN/EE 454 Fundamentals of Computer Vision
Summer 2020

Instructor:

Dr. Mohamed Almekkawy

Office: w105 Westgate Building

Email: Please Contact me through “Canvas email”, I will not respond to emails sent to my PSU email.

Office hours: Thursday: 1:30 – 2:30 PM

<https://psu.zoom.us/j/99745389818?pwd=NVVvUWILcGVua0VobDV6SG4rdTFMUT09>

Meeting password: 454

Learning Assistants

- Xilun Liu:
Email: xxl343@psu.edu
Office hours: (<https://psu.zoom.us/j/99446387780>).
Monday, Wednesday, Friday: 4:30 – 6:00 PM.

Class Meetings:

Lecture slides and videos will be available online in the following folder:

<https://psu.box.com/s/tbkqpbhzubvd9jdvryqxkwuoqy8w8v7h>

Prerequisite:

We assume familiarity with calculus, basic concepts of linear algebra, basic probability, and programming experience, especially programming in MATLAB.

- CMPSC 201C or 103 or equivalent.
- MATH 230 or 231 or equivalent.

Textbook:

There is no required textbook, but you may find it useful to locate one or two for background reading.

Here are some recommended references:

- Computer Vision, Algorithms and Applications by Richard Szeliski, Springer, 2011, ISBN: 9781848829343 is a good reference text and is available for free at <http://szeliski.org/Book/>. In addition, here is the link if you want to rent or purchase the electronic copy of this book.
<https://www.vitalsource.com/educators/products/computer-vision-richard-szeliski-v9781848829350?term=9781848829350>
- Computer Vision: Models, Learning, and Inference by Simon Prince, Cambridge Univ Press, 2012. Available at <http://www.computervisionmodels.com>, it is beautifully illustrated and emphasizes the use of statistical machine learning in computer vision.
- Concise Computer Vision by Reinhard Klette, ISBN: 9781447163190: This textbook provides an accessible general introduction to the essential topics in computer vision.
- Introduction to Deep Learning by Sandro Skansi. This textbook presents a concise, accessible and engaging first introduction to deep learning

Course Goals and Objectives:

- Introduce the fundamental problems of computer vision.
- Introduce the main concepts and techniques used to solve those problems.
- Enable students to implement vision algorithms.
- Enable students to make sense of the vision literature.

Required Work

Problem Sets

Problem sets assignments are done individually and are due at the date/time specified. Problems will be assigned weekly or biweekly. Late homework will not be accepted. Some of them will be online questions that can be graded automatically by the Canvas system. When that happens, it will not be possible to get partial credit for wrong answers, so double check your answers before submitting. All homework will be submitted electronically in Canvas. This may require scanning in handwritten sketches or equations, or drawing them in some software package. Take a moment now to figure out how to do this so you won't be running around in a panic before the first deadline trying to get your answers into the computer.

Exams

There will be two online midterm exams and we do NOT have a final exam. No makeup exams will be given unless there are extra ordinary circumstances, such as a significant illness, family emergency, etc.... Please notify the instructor BEFORE a missed exam. In addition, submit written or printed documentation of the reason for your absence. Cheating on any (exam) will result in a 0 grade on that exam/quiz.

Projects

- Projects may be assigned biweekly. All projects are to be submitted on Canvas by the specified date and time, a 5% deduction for each day of late submission for a maximum of 5 days (one minute will be counted as one day). No submission will be accepted after the 5th day of the due date. Your code must be in running order, and adhere to input and output formats that will be specified.
- We are going to run your code on new input data! If it doesn't work, the grade will reflect that. The projects grade will be based on your code, a problem statement, description of solution approach, rationale for any design decisions made, description of user-defined parameter settings, pictures of results produced, and a discussion of the results, including explanation of any deficiencies observed.
- Computer projects can be done using the language of your preference (MATLAB is preferred), but we have to be able to run it on machines at PSU.

Grading:

Problem Sets: 30%
Projects: 50%
Exam 1: 10%
Exam 2: 10%

Grading Distribution:

A 100-94	B+ < 90 - 86	C+ < 77 - 73	D < 68 - 61
A- <94- 90	B < 86 - 81	C < 73 - 68	F < 61 - 0
	B- < 81-77		

Students with Disabilities

It is my policy (as well as University policy) to provide, on a flexible and individualized basis, reasonable accommodations to students who have disabilities that may affect their participation in this course. Penn State welcomes students with disabilities into the University's educational programs. Every Penn State campus has an office for students with disabilities. The Student Disability Resources Web site provides contact information for every Penn State campus. For further information, please visit the Student Disability Resources Web site.

In order to receive consideration for reasonable accommodations, you must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation. If the documentation supports your request for reasonable accommodations, your campus's disability services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. You must follow this process for every semester that you request accommodations.

Counseling & Psychological Services (CAPS) Statement

Students who experience personal issues that interfere with their academic performance, social development or satisfaction at Penn State are encouraged to seek confidential assistance from Counseling and Psychological Services (CAPS) Center (<http://studentaffairs.psu.edu/counseling/>). They can be reached at (814) 863-0395. Some of the more common concerns they can help with include anxiety, depression, difficulties in relationships (friends, roommates, or family); sexual identity; lack of motivation or difficulty relaxing, concentrating or studying; eating disorders; sexual assault and sexual abuse recovery; and uncertainties about personal values and beliefs. Crisis intervention is available from Centre County CAN HELP (<http://centrecountypa.gov/index.aspx?NID=593>) at 1-800-643-5432, 24 hours a day, seven days a week.

Academic Integrity and Honesty

I expect you to abide by the standards of academic honesty set in the student guide. The University defines academic integrity as the pursuit of scholarly activity in an open, honest and responsible manner. All students should act with personal integrity, respect other students' dignity, rights and property, and help create and maintain an environment in which all can succeed through the fruits of their efforts (refer to Senate Policy 49-20). Dishonesty of any kind will not be tolerated in this course. Dishonesty includes, but is not limited to, cheating, plagiarizing, fabricating information or citations, facilitating acts of academic dishonesty by others, having unauthorized possession of examinations, submitting work of another person or work previously used without informing the instructor, or tampering with the academic work of other students. Students who are found to be dishonest will receive academic sanctions and will be reported to the University's Office of Student Conduct for possible further disciplinary sanctions (refer to Senate Policy G-9). Check <http://www.eecs.psu.edu/students/resources/EECS-CSE-Academic-Integrity.aspx> for additional details.

Course Policies

“This course may require you to take exams using certain proctoring software that uses your computer's webcam or other technology to monitor and/or record your activity during exams. The proctoring software may be listening to you, monitoring your computer screen, viewing you and your surroundings, recording and storing any and all activity (including visual and audio recordings) during the proctoring process. By enrolling in this course, you consent to the use of the proctoring software selected by your instructor, including but not limited to any audio and/or visual monitoring which may be recorded. Please contact your instructor with any questions.”

Changes in syllabus and assignment sheets may be modified. All changes will be announced in class/online.