

# Course Syllabus

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## CSE 5524: Computer Vision for Human-Computer Interaction


**Autumn 2023, TR 12:45PM - 2:05PM**

**Location:** Baker Systems 198

**Instructor:** Mr. Joseph Barker, [barker.348@osu.edu](mailto:barker.348@osu.edu) (<mailto:barker.348@osu.edu>) (Please include "5524" in your email subject line)

**Preferred Method of Contact:** E-mail


### Office Hours:


- Tue 11:30am - 12:15pm
- Wed 5:15pm\* - 6pm
- Thu 2:15pm\* - 3pm
- Fri 12:15pm - 1pm
  - Zoom: <https://osu.zoom.us/j/93064618962?pwd=RWkzcFBwQmovc3hRdXM1TnlzVHdHQT09>  (<https://osu.zoom.us/j/93064618962?pwd=RWkzcFBwQmovc3hRdXM1TnlzVHdHQT09>)
  - Office hours will generally be held over Zoom, but odds are very high I will be in my office (Caldwell 415) during these times if you wish to meet in person. Feel free to send me an e-mail beforehand if you'd like to make sure I'm present when you stop by.
  - \* **Note**, Wed and Thu office hours are set to start fairly soon after my last class ends. If there are a lot of questions after class, there may be a slight delay in office hours starting.

**Grader: Aswathnarayan (Ash) Radhakrishnan**

<mailto:radhakrishnan.39@buckeyemail.osu.edu> **Grader Preferred Method of Contact:** Email to [radhakrishnan.39@osu.edu](mailto:radhakrishnan.39@osu.edu) (<mailto:radhakrishnan.39@osu.edu>) (Please include "5524" in your email subject line)

### Grader Office Hours:

- Grader Office hours will be held via Zoom: <https://osu.zoom.us/j/94288955586?pwd=OGpDR1JiaEpVbVcrUEFtMS9keXVVZz09&from=addon>  (<https://osu.zoom.us/j/94288955586?pwd=OGpDR1JiaEpVbVcrUEFtMS9keXVVZz09&from=addon>)
- Please e-mail me beforehand if you'll be attending my Office hours so I can plan to extend them if needed.
- Tue 11 AM - 11.30 AM
- Wed 11 AM - 11.30 AM

The below is a summary of the course syllabus, see [this link for the complete syllabus](https://syllabi.engineering.osu.edu/syllabi/cse_5524)  ([https://syllabi.engineering.osu.edu/syllabi/cse\\_5524](https://syllabi.engineering.osu.edu/syllabi/cse_5524)). (Even if not listed below, you are still responsible for knowing the contents of the complete syllabus.)

## Course Description

Computer vision algorithms for use in human-computer interactive systems; image formation, image features, segmentation, shape analysis, object tracking, motion calculation, and applications.

## Credits

3 semester credits.

## General Information

- Offered Autumn Semester (and Spring Semester, when possible).
- There are programming projects and prior programming experience is assumed. Programming projects are completed in either Matlab or Python.

## Objectives

- Master fundamental computer vision algorithms.
- Be competent with computer vision application design and evaluation.
- Be familiar with Matlab programming environment.
- Be exposed to original research and applications in computer vision.

## Tentative schedule:

Week	Day	Date	Topic	HW Assigned
1	Tues	8/22	Introduction	-
	Thurs	8/24	Image Formation	HW1
2	Tues	8/29	Noise Removal	-
-	Thurs	8/31	Edge Detection	HW2
3	Tues	9/5	Image Pyramids	-
-	Thurs	9/7	Region Extraction	HW3
4	Tues	9/12	2-D Shape	-
-	Thurs	9/14	PCA	HW4
5	Tues	9/19	Motion	-
-	Thurs	9/21	Motion (con't)	HW5

6	Tues	9/26	KLT Tracking, Covariance Tracking	-
-	Thurs	9/28	Mean-Shift Tracking ^^^^ LAST DAY FOR QUIZ 1 MATERIAL ^^^^^	HW6
7	Tues	10/3	Image Segmentation and Template Matching	HW7 (due 10/19)
-	Thurs	10/5	Quiz review day	-
8	Tues	10/10	<b>QUIZ 1</b>	-
-	Thurs	10/12	<b>(No class, Autumn Break)</b>	-
9	Tues	10/17	Interest Points	-
-	Thurs	10/19	Interest Points (con't)	HW8
10	Tues	10/24	Classic Interactive Applications <b>[DISCUSS PROJECT IDEAS]</b>	-
-	Thurs	10/26	Camera Models and Calibration	HW9
11	Tues	10/31	Image Registration	-
-	Thurs	11/2	Stereo Vision	HW10
12	Tues	11/7	Classification Intro <b>[PROJECT PROPOSALS DUE BY THIS DATE!]</b>	-
-	Thurs	11/9	Neural Nets	[work on project]
13	Tues	11/14	Neural Nets	[work on project]
-	Thurs	11/16	Quiz review day	[work on project]
14	Tues	11/21	<b>QUIZ 2</b>	[work on project]
-	Thurs	11/23	<b>(No class, Thanksgiving Break)</b>	-
15	Tues	11/28	Project Presentations	ALL PROJECT SLIDES ARE DUE!
-	Thurs	11/30	Project Presentations	ALL PROJECT REPORTS ARE DUE!

16	Tues	12/5	(No class)	-
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## Grading Plan

This is the *approximate* weighting of the different components of this course:

- Homeworks: 40%
- Quiz: 15% + 15%
- Project: 25%
- Participation: 5%

A passing ( $\geq 60\%$ ) combined quiz score (quiz 1 & 2) is required to pass the course.

**Homeworks:** There will be generally weekly homework assignments, including programming. Homeworks are due at the beginning of class (12:45pm) on Thursday of the following week.

*Late homeworks will not be accepted.*

**Quiz:** There will be two quizzes, one mid-semester and one at the end of the semester.

Quizzes will be in-person, on paper. The quizzes will be closed-book, but one single-sided, 8.5x11 inch cheat sheet will be allowed.

**Participation:** You are expected to be present and active in class. This means taking part in class (asking questions, etc) and/or taking part in online discussions.

Note that participation *is not* attendance. Attending class is a basic expectation of your enrollment in the course. Participation is a measure and reward of your efforts to go above and beyond merely sitting through class. The participation score will never lower your score below what you would receive from other graded elements (homework, exams, etc), but conversely I am fairly strict in the points I do award. *Do not* assume you will receive full credit on participation, most students do not.

**Grading questions:** Questions regarding grading should be made in a timely manner, both for students' benefit and to aid graders. Generally, questions should be asked no later than 1 week after an assignment/exam has been returned. Under no circumstances will grade changes be entertained at the end of the semester for assignments from significantly earlier in the semester.

## Announcements / Communication

I make normal announcements via the Carmen website (carmen.osu.edu). Announcements of urgent matters will be mailed to your name.##@osu.edu address. If you do not regularly read that account, make sure you forward it to somewhere you do check often.

We will have Carmen discussion boards for the topics being discussed each week. I will also monitor these

discussions and answer as appropriate, but students should feel free to use the forums to have group discussions as well!

### **Statement on academic misconduct:**

It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct <http://studentlife.osu.edu/csc/> (<http://studentlife.osu.edu/csc/>).

In particular, you should note that you are not allowed to, among other things, (a) knowingly provide or receive information during exams, (b) knowingly provide or receive assistance on homeworks unless I say it's OK, (c) submit plagiarized (copied but unacknowledged) work for credit, and (d) use of automated systems (such as ChatGPT) to complete (partially or fully) assignments. If I suspect that any violation occurs, *I am required* to report the violation to the Council on Academic Misconduct. COAM will determine guilt or innocence and appropriate penalties if any.

### **Health and safety:**

The university strives to make all learning experiences as accessible as possible. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's [request process](https://slds.osu.edu/covid-19-info/covid-related-accommodation-requests/) [↗\(https://slds.osu.edu/covid-19-info/covid-related-accommodation-requests/\)](https://slds.osu.edu/covid-19-info/covid-related-accommodation-requests/), managed by Student Life Disability Services. If you anticipate or experience academic barriers based on your disability (including mental health, chronic, or temporary medical conditions), please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with Student Life Disability Services. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: [slds@osu.edu](mailto:slds@osu.edu) (<mailto:slds@osu.edu>); 614-292-3307; [slds.osu.edu](https://slds.osu.edu/) [↗\(https://slds.osu.edu/\)](https://slds.osu.edu/); 098 Baker Hall, 113 W. 12th Avenue.

Additionally, do note that in the interests of public health it is University policy that individual with communicable diseases (meaning transmissible by air) should avoid campus until they are past the infectious period. In order that this not impact students' learning, a Zoom session simultaneous with lecture can be run upon request. (Recordings of live lectures *will not* be made, under any circumstances.)

### **Religious Accommodations:**

It is Ohio State's policy to reasonably accommodate the sincerely held religious beliefs and practices of all students. The policy permits a student to be absent for up to three days each academic semester for reasons








of faith or religious or spiritual belief.

Students planning to use religious beliefs or practices accommodations for course requirements must inform the instructor in writing no later than 14 days after the course begins. The instructor is then responsible for scheduling an alternative time and date for the course requirement, which may be before or after the original time and date of the course requirement. These alternative accommodations will remain confidential. It is the student's responsibility to ensure that all course assignments are completed.

### Weather or other short-term closing:

Should in-person classes be canceled, a pre-recorded video will be posted in-lieu of an in-person lecture. If a more interactive activity was planned (e.g., review days, presentations), then we will meet virtually via CarmenZoom during our regularly scheduled time. An exam on such a day will be re-scheduled to the next class day. Regardless, I will share any details/updates via CarmenCanvas and your BuckeyeMail e-mail.

## Course Summary:

Date	Details	Due
Thu Aug 31, 2023	 <b>Homework 1 Submission</b> ( <a href="https://osu.instructure.com/courses/151279/assignments/3640163">https://osu.instructure.com/courses/151279/assignments/3640163</a> )	due by 12:45pm
Thu Sep 7, 2023	 <b>Homework 2 Submission</b> ( <a href="https://osu.instructure.com/courses/151279/assignments/3640165">https://osu.instructure.com/courses/151279/assignments/3640165</a> )	due by 12:45pm
Thu Sep 14, 2023	 <b>Homework 3 Submission</b> ( <a href="https://osu.instructure.com/courses/151279/assignments/3640167">https://osu.instructure.com/courses/151279/assignments/3640167</a> )	due by 12:45pm
Thu Sep 21, 2023	 <b>Homework 4 Submission</b> ( <a href="https://osu.instructure.com/courses/151279/assignments/3640168">https://osu.instructure.com/courses/151279/assignments/3640168</a> )	due by 12:45pm
Thu Sep 28, 2023	 <b>Homework 5 Submission</b> ( <a href="https://osu.instructure.com/courses/151279/assignments/3640169">https://osu.instructure.com/courses/151279/assignments/3640169</a> )	due by 12:45pm
Thu Oct 5, 2023	 <b>Homework 6 Submission</b> ( <a href="https://osu.instructure.com/courses/151279/assignments/3640170">https://osu.instructure.com/courses/151279/assignments/3640170</a> )	due by 11:59pm
Mon Oct 30, 2023	 <b>Homework 8 Submission</b> ( <a href="https://osu.instructure.com/courses/151279/assignments/3640172">https://osu.instructure.com/courses/151279/assignments/3640172</a> )	due by 11:59pm

Thu Nov 2, 2023



Homework 9 Submission

<https://osu.instructure.com/courses/151279/assignments/3640174>

due by 12:45pm

Tue Nov 7, 2023



Project Idea Submission

<https://osu.instructure.com/courses/151279/assignments/3640162>

due by 5pm

Thu Nov 9, 2023



Homework 10 Submission

<https://osu.instructure.com/courses/151279/assignments/3640164>

due by 12:45pm

Mon Nov 27, 2023



Presentation Slides

<https://osu.instructure.com/courses/151279/assignments/3640175>

due by 11:59pm

Fri Dec 1, 2023



Project Report

<https://osu.instructure.com/courses/151279/assignments/3640176>

due by 5pm



Quiz 1

<https://osu.instructure.com/courses/151279/assignments/3640177>

Quiz 2

<https://osu.instructure.com/courses/151279/assignments/3640178>