# CSE 6367: Computer Vision

Fall 2023

## Instructor Information

### Instructor(s)

Marnim Galib

### Office Number

ERB 556

### CSE Department Telephone Number

817-272-3785

### Email Address

marnim.galib@uta.edu

### Faculty Profile [Marnim Galib](https://www.uta.edu/academics/faculty/profile?username=galibm#About%20Me)

### Office Hours

TBA

## Course Information

### Section Information

001

### Time and Place of Class Meetings

Monday, Wednesday 5:30PM – 6:50PM, ERB 130

**TA**

TBA

### Description of Course Content

Advanced techniques for interpretation, analysis, and classification of digital images. Topics include methods for segmentation, feature extraction, recognition, stereo vision, 3-D modeling, and analysis of time-varying imagery. Also taught as EE 6358. Prerequisite: CSE 5301 or CSE 5360 or EE 5356 or EE 5357, and consent of instructor.

### Student Learning Outcomes

The objective of this course is to provide the fundamental theory, applications, and techniques of computer and machine vision. This course will discuss different levels of computer vision from early image formation to the high level object recognition and scene analysis. Having successfully completed this course, students will understand the principals and techniques for extracting information from digital images and will be able to design and implement high level computer vision applications such as face recognition, stereo vision, and motion tracking.

### Textbooks and Other Course Materials

[Computer Vision: Algorithms and Applications, Richard Szeliski](https://szeliski.org/Book/)

### Technology Requirements

The instructor intends to use in-person class as much as possible. All learning activities such as classes, quizzes and exams will be online if in-person classes are not possible.

* Canvas: for video recordings of lectures, submitting programming assignments/homeworks, questions/discussion forum, releasing grades
* If the quizzes/exams are held online, we will use Respondus Monitor and Lockdown Browser to administer quizzes and exams. and webcam for quizzes and exams. Students will need a webcam, a microphone, and Internet access.
* Students can access tutorials on these tools by clicking on the “Get Started” Box on their Canvas Homepage.

## Grading Information

There are 3 categories of graded work: quizzes, assignments and a semester project. Quizzes make up 40% of the grade, assignments make up 40% of the grade, and the semester project is worth 20% of your grade.

**Quiz Policy:** These quizzes will take place in the classroom during class hours. The quizzes may be pop quizzes or announced, and I will count best n-1 quizzes out of total n quizzes.

**Assignment Policy**: There will be programming assignments. All assignments must be submitted

using Canvas. Everything is due by 11:59pm on the due date. There is a 24-hour grace period after the due date with no penalty. The purpose of the grace period is to compensate for the unforeseen events such as network or server problems. No assignment will be accepted after the grace period.

**Project Policy:** The course project will consist of the design and implementation of a computer vision system to solve a real world problem. The student is free to choose a project of their own interest. You’ll have to submit Project Proposal, Project Presentation and Project Final Report during the semester. Each report will have indivual points and counts towards the 20% grade for project.

## Academic Dishonesty

While I do encourage students to work together on understanding Coding Assignments and other programming concepts, I expect every student to do their own work and turn in their own code. Coding Assignments are checked for similarity – any student's code that is determined to be too similar to another student's code submission will be assigned a 0 for the first offense and will be referred to the Office of Student Conduct. Further, your final grade will be reduced by 10%. If you commit a second offense during the semester, you will get an F. This policy will be applied to all students involved – it does not matter if you are copying from someone else or allowing someone else to copy your work.

## Student Conduct

Students are expected to be professional and civil in their language and conduct:

* During lectures
* During office hours
* In any oral, written, or electronic communication with the instructor and TAs
* In assignment submissions

For any student violating this policy, the instructor reserves the right to impose any grading penalties that the instructor considers appropriate. Examples of violations include language that is vulgar, insulting, disrespectful or threatening, making noise or talking with other students during lectures, disrupting lectures in any way, or making it difficult for other students to follow lectures in any way.

## Course Schedule

As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course.

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| --- | --- |
| **Date** | **Topic** |
| Week 1 | Introduction to computer vision and Python, Numpy, scipy, and opencv |
| Week 2 | Image formation, image representation |
| Week 3 | Elementary image operations, linear filters |
| Week 4 | Edge and corner detection |
| Week 5 | Image Filtering |
| Week 6 | Geometric transformation and warping |
| Week 7 | Stereo vision, and epipolar geometry |
| Week 8 | Feature detection, Feature matching |
| Week 9 | Weak classifiers, AdaBoost |
| Week 10 | Segmentation |
| Week 11 | Object Recognition |
| Week 12 | Face recognition |
| Week 13 | Shape matching |
| Week 14 | Optical flow, Motion detection and tracking |

## Important Dates

August 21 First day of class

September 6 Census date

October 27 Last day to drop classes

December 5 Last day of classes

## Institutional Information

UTA students are encouraged to review the below institutional policies and informational sections and reach out to the specific office with any questions. To view this institutional information, please visit the [Institutional Information](https://resources.uta.edu/provost/course-related-info/institutional-policies.php) page (https://resources.uta.edu/provost/course-related-info/institutional-policies.php) which includes the following policies among others:

* Drop Policy
* Disability Accommodations
* Title IX Policy
* Academic Integrity
* Student Feedback Survey
* Final Exam Schedule

## Additional Information

### Attendance

At The University of Texas at Arlington, taking attendance is not required but attendance is a critical indicator of student success. Each faculty member is free to develop his or her own methods of evaluating students’ academic performance, which includes establishing course-specific policies on attendance. **As the instructor of this section, Attendance is highly encouraged, but not mandatory.**

However, while UT Arlington does not require instructors to take attendance in their courses, the U.S. Department of Education requires that the University have a mechanism in place to verify Federal Student Aid recipients’ attendance in courses. UT Arlington instructors should be prepared to report the last date of attendance as part of the final grading process. Specifically, when assigning a student a grade of F, faculty must report the last date a student attended their class based on evidence of academic engagement such as a test, participation in a class project or presentation, or an engagement online via Canvas. This date is reported to the Department of Education for federal financial aid recipients.

### Academic Success Center

The Academic Success Center (ASC) includes a variety of resources and services to help you maximize your learning and succeed as a student at the University of Texas at Arlington. ASC services include supplemental instruction, peer-led team learning, tutoring, mentoring and TRIO SSS. Academic Success Center services are provided at no additional cost to UTA students. For additional information visit: [Academic Success Center](https://www.uta.edu/student-success/course-assistance) (https://www.uta.edu/student-success/course-assistance). To request disability accommodations for tutoring, please complete this [form](https://www.uta.edu/student-success/course-assistance/tutoring/request) (https://www.uta.edu/student-success/course-assistance/tutoring/request).

▲ The [IDEAS Center](https://www.uta.edu/ideas/) (https://www.uta.edu/ideas/) (2nd Floor of Central Library) offers FREE [tutoring](https://www.uta.edu/ideas/services/tutoring/index.php) and [mentoring](https://www.uta.edu/ideas/services/mentoring/index.php) to all students with a focus on transfer students, sophomores, veterans and others undergoing a transition to UT Arlington. Students can drop in or check the schedule of available peer tutors at www.uta.edu/IDEAS, or call (817) 272-6593.

The English Writing Center (411LIBR)

▲ The Writing Center offers FREE tutoring in 15-, 30-, 45-, and 60-minute face-to-face and online sessions to all UTA students on any phase of their UTA coursework. Register and make appointments online at the [Writing Center](https://uta.mywconline.com/) (https://uta.mywconline.com). Classroom visits, workshops, and specialized services for graduate students and faculty are also available. Please see [Writing Center: OWL](http://www.uta.edu/owl) (http://www.uta.edu/owl) for detailed information on all our programs and services.

The Library’s 2nd floor [Academic Plaza](http://library.uta.edu/academic-plaza) (http://library.uta.edu/academic-plaza) offers students a central hub of support services, including IDEAS Center, University Advising Services, Transfer UTA and various college/school advising hours. Services are available during the [library’s hours](https://library.uta.edu/hours) (https://library.uta.edu/hours) of operation.

Librarian to Contact

▲ Each academic unit has access to [Librarians by Academic Subject](http://www.uta.edu/library/help/subject-librarians.php) (http://www.uta.edu/library/help/subject-librarians.php) that can assist students with research projects, tutorials on plagiarism and citation references as well as support with databases and course reserves.

## Emergency Phone Numbers

**▲** In case of an on-campus emergency, call the UT Arlington Police Department at **817-272-3003** (non-campus phone), **2-3003** (campus phone). You may also dial 911. Non-emergency number 817-272-3381