



CS 590, Computer Vision

Summer 2022

Monday-Tuesday- Thursday 5:00-7:20

Instructor

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Course Description

This course is an introduction to various algorithms and methods in computer vision. Computer vision is a field of artificial intelligence that trains computers to interpret and understand the visual world. Different topics will be covered such as Image enhancement, Filtering, Transforms, Feature extraction, edge detection, optical flow,

Course Learning Outcomes

Upon successful completion of this course, the student will be able to:

1. Learn the main concepts and major characteristics of Computer Vision. (6)
2. Learn about image formation. (6)
3. Learn about image filters, local image features, texture. (1, 2, 6)
4. Learn different methods in segmentation, classifying images, Hough transform. (1, 2, 6)
5. Work on different projects to understand different computer vision algorithms. (2, 5, 6)

Textbook

1. *Computer Vision A Modern Approach* by Forsyth, Pearson (2012).
2. *Digital Image Processing* by Gonzalez, Pearson (2018).

Grading

- Research and presentation 40%
- Exam 30%
- Homework 30%

TOTAL 100%

The grade scale for assignments and the class is as follows:

Grading Scale:

A	90% - 100%
B	80% - 89.99%
C	70% - 79.99%
D	60% - 69.99%
F	0% - 59.99%

Policies

1. Homework must be done individually.

Due Date: Can receive full credit, will receive feedback

One day late: Can receive only a maximum of 85%, may receive no feedback.

Two days late: Can receive only a maximum of 70%, will receive no feedback.
More late: No submissions accepted

- 2. Students are expected to attend all classes. In the event that a student misses a class, he/she is responsible for all material covered in the class, including all assignments and announcements.
- 3. Late arrival to the classroom disturbs everyone. Please do not be late, but if you are unavoidably delayed, join the class quietly and with minimal disturbance.
- 4. No food or drinking is permitted in the classroom except bottled water.

Email Policy

I answer emails within 24 hours of receiving them (usually much faster). If you do not receive a response in that time, please email me again or ask in class/in my office.

There *are* exceptions: I may not answer non-emergency emails after 8:00 PM.

Grading Disputes

From the time an assignment is returned to you with a grade, you have one week to contact the professor. *After one week, your dispute will not be considered.*

Note to Students with Disabilities

If you have a disability and need assistance, special arrangements can be made to accommodate most needs. Contact the Office for Services for Students with Disabilities (SSD) as soon as possible to work out the details. They are located in Walb Student Union room 113, and the telephone number is 481-6658. Once the Director has provided you with a letter attesting to your needs for modification, bring the letter to me. For more information, please visit the web site for SSD at <http://www.pfw.edu/ssd/>.

Academic Honesty/Cheating/Plagiarism

Work should be done by yourself. That does not mean students should not discuss work, though. I expect that students will help each other troubleshoot and solve problems together in this course.

Student Success Hints

Waiting until the last minute causes large amounts of stress that can easily be avoided by getting a start on assignments as soon as they are released. Read the description when the assignment is released. Work on it in bit-sized chunks during the time you have available. And always submit something – something is better than nothing!

Course Withdrawal Policy

For the withdrawal policy, please refer to Student Success and Transitions. Should you have any concerns about your grade in the course, please feel free to ask me ahead of time.

Tentative Class Schedule

Week	Topics
1-1	Introduction to Computer Vision
1-2	Image Processing
1-3	Linear Filters
2-1	Local Image Features
2-2	Texture
2-3	Hough Transform – Optical Flow
3-1	No Class

3-2	Grouping and model fitting methods
3-3	Tracking
4-1	Lerning to classify
4-2	Classifying images
4-3	Students Presentation
5-1	Students Presentation
5-2	Students Presentation
5-3	Students Presentation
6-1	Exam

ABET Program Outcomes

(These are among the criteria that ABET, our accrediting agency, uses in accrediting degree programs in computing.)

The following are the department outcomes (i.e., objectives) for graduates of the computer science program. The course objectives section describes the role of this course in helping you achieve some of these outcomes.

1. Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions.
2. Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program’s discipline.
3. Communicate effectively in a variety of professional contexts.
4. Recognize professional responsibilities and make informed judgments in computing practice based on legal and ethical principles.
5. Function effectively as a member or leader of a team engaged in activities appropriate to the program’s discipline.
6. Apply computer science theory and software development fundamentals to produce computing-based solutions. [CS]