CS 482 - Fall 2017

[**Computer Vision – 72399 – CS 482 - 001**](#)

Prerequisites: Grade of C or better in MATH 203 / Linear Algebra, STAT 344 / Probability and Statistics for Engineers and Scientists I, and CS 310 / Data Structures.

Instructor: Prof. Harry Wechsler [**wechsler@gmu.edu**](mailto:wechsler@gmu.edu)

Course Description – Course covers basic principles of visual perception and their implementation on computer systems. Topics include early visual processing, edge detection, segmentation, intrinsic images, image modeling, representation of visual knowledge, and image understanding. Students complete projects involving real images.

Course (ABET) Outcomes:

- Basic knowledge of image formation process.

- Basic knowledge of image processing techniques for color and gray level images: edge detection, corner detection, segmentation.

 - Basics of video processing, motion computation and 3D vision, and geometry.

 - Ability to implement basic vision algorithms using MATLAB and OpenCV (Open source computer vision library).

 - Ability to apply the appropriate technique to a problem, write a project report and present the results in class.

Time, Day, and Venue: TR – Tuesday and Thursday 3:00 – 4:15 pm

 – Mason Hall D023

Office Hours: T– Tuesday 2:00 – 2:45 pm and R – Thursday 4:30 – 5:15, ENGR 4448.

[**http://registrar.gmu.edu/calendars/fall-2017/**](http://registrar.gmu.edu/calendars/fall-2017/)

First day of classes: Tuesday, August 29

Columbus Day Recess: no class on Tuesday, October 10

Thanksgiving recess: no class on Thursday, November 27

Last day of classes: Thursday, December 7

http://registrar.gmu.edu/calendars/fall-2017/final-exams/

Final Exam: Thursday, December 14, 1:30 – 4:15 pm

Required Textbook: Concise Computer Vision, Reinhard Klette, Springer, 2014 (including slides):

https://www.cs.auckland.ac.nz/~rklette/TeachAuckland.html/775/

Supplementary Textbook: A Practical Introduction to Computer Vision with OpenCV, Kenneth Dawson-Howe, Wiley, 2014.

Required Software MATLAB and OpenCV. Homework and Term Project will require using MATLAB and OpenCV. You can buy a student version of MATLAB in Johnson center or use it remotely from ITE labs. OpenCV is a C/C++ open source computer vision library.

Course Outline:

1. Introduction

2. Image Data

3. Image Formation and Processing

4. Image Analysis

REVIEW for MIDTERM1: Tuesday, October 3

MIDTERM1: Thursday, October 5

5. Image Segmentation

6. Motion and Tracking

7. 3D and Stereo

REVIEW for MIDTERM2: Tuesday, November 14

MIDTERM2: Thursday, November 16

8. Feature Detection

9. Face Biometrics and Object Detection

10. Deep Learning

REVIEW for FINAL: TR – Tuesday and Thursday, December 5 and December 7.

(Cumulative) FINAL: Thursday, December 14.

Grading Composition (100 points)

- Homework – 30 %

- (Non-Cumulative) MIDTERM 1 and MIDTERM 2 – Thursday, October 5 & Thursday, November 16 – 20 %

- Term Project – November 28 and 30 – 20 %

- (Cumulative) Final – Thursday, December 14 - 30 %

Grading Scale

http://www.fcps.edu/southcountyhs/sservices/gradescale.html

Honor Code

You are expected to abide by the GMU honor code. Homework assignments and exams are individual efforts. Information on the university honor code can be found at

http://oai.gmu.edu/the-mason-honor-code/

Additional departmental CS information: **http://cs.gmu.edu/wiki/pmwiki.php/HonorCode/CSHonorCodePolicies**

Learning Disability Accommodation

If you have a documented learning disability or other condition which may affect academic performance, make sure this documentation is on file with the Office of Disability Services (ODS) and then discuss it with the professor in his office regarding accommodations.