

Tentative Syllabus

CSCE 867 - 001: Computer Vision

(Spring 2023)

Course Instructor: Dr. Yan Tong
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Storey Innovation Center, Rm 2273
777-0801 (office)
Office Hours: by appointment

Course Meeting Time: Monday, Wednesday, 2:20 pm - 3:35 pm, 300 Main B111

Class Homepage: <http://www.cse.sc.edu/~tongy/csce867/csce867.html>

Academic Bulletin Description:

Scene segmentation using texture, color, motion; representation of 2-D or 3-D structures; knowledge-based vision systems.

Pre-requisites:

CSCE 763 Digital Image Processing and a good background in Calculus, Linear Algebra, Statistics, Signal Processing, programming in C++, Python, or MATLAB

Goals and Learning Outcomes:

This is a graduate-level course and will cover both classical and recent exciting progress on the theory and practice of computer vision. Topics to be covered include: image formation (computational model of camera, radiometry, and camera calibration), early vision on one image (linear filters, edge detection, and features), early vision on multiple images (stereo vision and motion estimation), mid-level vision (segmentation and object tracking), high-level vision, and special topics on applications. This course is particularly useful for those students who are interested in computer vision, vision-based pattern recognition, and robotics.

The measurable learning outcomes used to determine the degree to which this goal is being met are as follows:

- Students will achieve the necessary knowledge to solve various practical computer-vision problems
- Students will build a solid background for further computer-vision research.

Course Textbook and Readings:

- **Textbook:** *Computer Vision – A Modern Approach, 2nd Edition*, by Forsyth and Ponce, Prentice Hall, 2011
- **Reference book:** *Computer Vision: Algorithms and Applications*, by Richard Szeliski, Springer, 2011
- **Reference book:** *Introductory Techniques for 3-D Computer Vision*, by Emanuele Trucco and Alessandro Verri, 1998

All course materials comply with copyright/fair use policies.

Grading System:

All grades will be posted on Blackboard. You are strongly encouraged to check your scores in Blackboard regularly. A final letter grade will be assigned based on:

A (90-100%), B+ (86-89%), B (80-85%), C+ (76-79%), C (70-75%), D+ (66-69%), D (60-65%), and F (0-59%)

Grading Policy:

- | | |
|--------------------------------|--------------|
| • Homework assignments (4) | 5% each |
| • Programming projects (2) | 10% each |
| • Midterm exam (1) | 15% |
| • Final project & presentation | 30% in total |
| • Quizzes (10) | 15% in total |

Course Assignments:

All course deadlines are listed in Eastern Time Zone.

- **Homework assignments:** there will be four homework assignments. These assignments should be completed individually and independently (**do NOT work in groups**).
- **Programming projects:** there will be two programming projects. For each project, you will be asked to use C++, Matlab or a programming language you prefer to implement algorithms we learn in class to solve a given computer vision problem. Teamwork is allowed for the second programming project. Details will be released in the specific assignments.
- **Midterm exam:** there will be a midterm exam. The content of the exam will be notified in lecture. Most of the materials you will be tested on comes from class lectures and may or may not be included in the textbook(s). Make-up exam is not allowed except excusable absences ([Graduate Academic Regulations < University of South Carolina \(sc.edu\)](#)) with appropriate documentation and advanced notice.
- **Quizzes:** There will be 10 quizzes during the semester, which will help you to strengthen your understanding of key concepts learned in class. The quizzes may consist of True/False, Single/Multiple Choice or Short Answer questions. Each quiz may have a different weight, which will be specified individually.
- **Final project:** you are asked to do a final project, which can be either a complete research project that addresses a problem in computer vision or a survey research that reviews the prior work on a computer vision topic. You will be judged on your originality, innovativeness, and research quality. Further details on the project will be communicated often throughout the course. The project has several deliverables during the semester including
 - An abstract
 - Research work
 - An oral presentation
 - A final written report

Details and rubrics on these deliverables will be communicated throughout the course. **Missing your final project presentation will automatically result in a zero for your final project presentation grade. No late submission of final project written report is allowed.**

Late Submission Policy:

A due date will accompany all homework assignments, programming projects, quizzes, exam, and deliverables of the final project. All course deadlines are listed in Eastern Time Zone. Completing and submitting the homework assignments, programming projects, quizzes, exam, and final project deliverables by the due date is the sole

responsibility of you. Please plan accordingly and complete these course assignments in advance of their deadlines to ensure any unanticipated circumstances do not result in a missed assignment.

- Late submissions of *homework assignments* or *programming projects* will be accepted if you complete it within the week following its due date. However, **late submissions will be subject to the following penalty**: 10% will be deducted from your grade for the first day late, and an additional 5% will be deducted on each subsequent day. For these assignments (*homework assignments* or *programming projects*), you will be granted for a **ONE-TIME waiver of late submission penalty** - you will not be penalized if you submit your assignment in three days after due date. However, if you work in a group for programming project #2, you CANNOT use the waiver if any member in your group has used the waiver before. Please notify me in advance, when you use this waiver.
- Make-up exam is not allowed except excusable absences ([Graduate Academic Regulations < University of South Carolina \(sc.edu\)](#)) with appropriate documentation and advanced notice.
- Missing your final project presentation will automatically result in a zero for your final project presentation grade.
- No late submission of final project written report is allowed.

Attendance Policy:

Success in this course is dependent on your active participation throughout the course. Class attendance is required as claimed in University policy. If you are absent, you are responsible for learning material covered in class. If you have an excused absence ([Graduate Academic Regulations < University of South Carolina \(sc.edu\)](#)), you will be permitted to make up coursework or complete an equivalent assignment agreed upon with me.

To arrange excuses for absences that can be anticipated at the start of the term, you should:

- Submit a written request (email is acceptable) stating the dates of the anticipated absence no later than the end of the second week of the course.
- Explain the reason for absence. Documentations are required. Please consult the policy ([Graduate Academic Regulations < University of South Carolina \(sc.edu\)](#)) for additional information.
- Include any request for make-up work.

To arrange excuses for absences that cannot be anticipated at the start of the term, (e.g. legal proceedings or illness), you should, at the first opportunity, submit in a written request stating:

- The date of absence
- The reason for absence. Documentations are required. Please [consult the policy](#) for additional information.
- Any request for make-up work as soon as reasonably possible after you become aware of the need to be absent.

Academic Integrity:

You are expected to practice the highest possible standards of academic integrity. Any deviation from this expectation will result in a minimum academic penalty of your failing the assignment and will result in additional disciplinary measures. Violations of the University's Honor Code include, but are not limited to improper citation of sources, using another student's work, and any other form of academic misrepresentation. Violations of the University's Honor Code will be reported to the Office of Student Conduct and Academic Integrity. Below are some websites for you to visit to learn more about University policies:

[Carolinian Creed \(http://www.sc.edu/creed\)](http://www.sc.edu/creed)

[Academic Responsibility \(http://www.sc.edu/policies/staf625.pdf\)](http://www.sc.edu/policies/staf625.pdf)

[Office of Student Conduct and Academic Integrity](#)

https://www.sc.edu/about/offices_and_divisions/student_conduct_and_academic_integrity/index.php

[Information Security Policy and Standards](#)

https://sc.edu/about/offices_and_divisions/division_of_information_technology/security/policy/universitypolicy/

[Graduate Academic Regulations < University of South Carolina \(sc.edu\)](#)

Disability Services:

[Student Disability Resource Center](#) (SDRC)

https://www.sc.edu/about/offices_and_divisions/student_disability_resource_center/ empowers students to manage challenges and limitations imposed by disabilities. Students with disabilities are encouraged to contact me to discuss the logistics of any accommodations needed to fulfill course requirements (within the first week of the semester). In order to receive reasonable accommodations from me, you must be registered with the Student Disability Resource Center (1705 College Street, Close-Hipp, Suite 102, Columbia, SC 29208, 803-777-6142). Any student with a documented disability should contact the SDRC to make arrangements for appropriate accommodations.

Health and Safety:

Students are expected to comply with all university health and safety guidelines including those about COVID-19. For current COVID-19 guidelines, visit https://sc.edu/safety/coronavirus/safety_guidelines.