

Course Syllabus

Course Title: EE569 Introduction to Digital Image Processing
Units: 4
Lecture Time: 2022 Spring, Monday and Wednesday 8-9:50am
Lecture Location: Online Instruction (1st week) or OHE 122 (for the rest of the semester)
Discussion Time: Friday 10-10:50am
Discussion Location: Online Instruction (1st week) or OHE 122 (for the rest of the semester)

Instructor: Prof. C.-C. Jay Kuo
Office: Ming Hsieh Dept. of Electrical Engineering, Room EEB 404B
Office Hours: Monday and Wednesday: 10-11am (or by appointment) via zoom
Zoom Meeting Link:
<https://usc.zoom.us/j/7918142126?pwd=WUgxRHVXU05jaTNGU2dKMW11eU9RZz09>
Meeting ID: 791 814 2126
Passcode: 669321
Contact Info: E-mail: cckuo@sipi.usc.edu, Tel: (213) 740-4658

Website: <https://courses.uscdcn.net/d2l/login>
1. Check the website for latest announcements and project assignments.
2. For general questions, please utilize the discussion board on Piazza. Sign up link at <https://piazza.com/usc/spring2022/ee569> . TAs will check the forum on a daily basis.

Teaching Assistants:

- Yijing Yang (yijingya@usc.edu)
- Zhiruo Zhou (zhiruo@usc.edu)
- Yao Zhu (yaozhu@usc.edu)
- Pranav Kadam (pranavka@usc.edu)

TA Office Hours:

- Monday 3:00PM – 5:00PM (Zhiruo Zhou)
- Tuesday 9:30 – 11:00AM (Yijing Yang)
- Tuesday 4:00 – 5:00PM (Zhiruo Zhou)
- Wednesday 10:00 – 11:30AM (Yao Zhu)
- Thursday 5:00 – 6:30PM (Yao Zhu)
- Friday 2:00 – 3:30PM (Yijing Yang)
- Piazza Q&A – Pranav Kadam

Zoom link for TA Office Hours: <https://usc.zoom.us/j/96607634263>

Grader:

- Peida Han (peidahan@usc.edu)

Graders' office hours by appointment only. Once grades for each assignment are out, graders will announce their office hours to answer grading related questions.

Teaching Objectives

To equip students with fundamental knowledge of theory, algorithms and applications of modern digital image processing techniques and the programming skills for their implementation

Prerequisite/Co-Requisite: None

Recommended Preparation: EE503

Programming Language Requirement:

Use either C/C++ or Matlab to implement the algorithms in your homework. You are encouraged to use C/C++ since it is commonly used in industry. However, Matlab is also allowed. Python will be needed in the last two homework.

Midterm Exams:

1st midterm exam: March 2 (Wednesday) 8-9:50am.

2nd midterm exam: April 11 (Monday) 8-10am.

Homework and Term Project:

There will be six homework assignments. Each home assignment contains two computer programming projects. All homework assignments will be due on the midnight of the due date (11:59pm) - no late homework will be accepted.

Homework and Term Project Schedule:

Assignment #1: Assigned on January 10 (Monday); Due on January 30 (Sunday).

Assignment #2: Assigned on January 31 (Monday); Due on February 20 (Sunday).

Assignment #3: Assigned on February 21 (Monday); Due on March 10 (Thursday).

Assignment #4: Assigned on March 9 (Wednesday); Due on March 27 (Sunday).

Assignment #5: Assigned on March 28 (Monday); Due on April 14 (Thursday).

Assignment #6: Assigned on April 13 (Wednesday); Due on May 1 (Sunday).

Grading Policy:

1. Midterm Exam: 34% (17% each)
2. Homework Assignments: 66% (11% each)
 - a. Quality of written report (4% of 11%)
 - b. Quality of experimental results (6% of 11%)
 - c. Quality of codes plus semester-end oral exam (1% of 11%)
3. Online participation: 5%
 - a. Making posts on Piazza. (2% of 5%)
 - b. Answer questions on Piazza. (3% of 5%)

Textbook:

William K. Pratt: Digital Image Processing, 4th Edition, John Wiley & Sons Inc., 2007. (ISBN 9780471767770).

Coverage:

Topic #1: Image demosaicing, contrast/histogram manipulation, enhancement and filtering

Topic #2: Image denoising

Topic #3: Edge and boundary detection

Topic #4: Digital halftoning

Topic #5: Geometric image modification and image warping

Topic #6: Morphological processing, shape analysis and retrieval

Topic #7: Texture analysis and segmentation

Topic #8: Salient point detection and image matching

Topic #9: Fundamentals of convolutional neural networks

Topic #10: Successive subspace learning

Homework Coverage:

Homework Assignment #1 (Coverage: Topics #1-2)

Homework Assignment #2 (Coverage: Topics #3-4)

Homework Assignment #3 (Coverage: Topics #5-6)

Homework Assignment #4 (Coverage: Topics #7-8)

Homework Assignment #5 (Coverage: Topics #9)

Homework Assignment #6 (Coverage: Topics #10)

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/scampus-part-b/>. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <https://policy.usc.edu/research-and-scholarship-misconduct/>.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call

studenthealth.usc.edu/counseling/

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 - 24/7 on call

<http://www.suicidepreventionlifeline.org>

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-9355(WELL), press "0" after hours - 24/7 on call

<https://studenthealth.usc.edu/sexual-assault/>

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086/Title IX - (213) 821-8298

<http://equity.usc.edu/>, <http://titleix.usc.edu/>

Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298

https://usc-advocate.symplicity.com/care_report/

Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

The Office of Disability Services and Programs - (213) 740-0776

<http://dsp.usc.edu>

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Campus Support and Intervention - (213) 821-4710

<https://uscsa.usc.edu/>

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

<https://diversity.usc.edu/>

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

<http://dps.usc.edu/>, <http://emergency.usc.edu>

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-1200 – 24/7 on call

<http://dps.usc.edu>

Non-emergency assistance or information.

*The Statement on Academic Conduct and Support Systems is from the link:

<https://graduateschool.usc.edu/faculty-n-staff/academic-conduct-n-support-systems/>

(updated January 16, 2019)