Purdue University
School of Electrical Engineering
EE637: Digital Image Processing I
Class Information
Spring 2023

Credits: 3
Area: Communications and Signal Processing
Prerequisites: EE 301 and EE 302 (or equivalent preparation)
Lecturer: Prof. Charles A. Bouman
Office: MSEE 320
Phone: (765) 494-0340
E-mail: bouman@purdue.edu
Course Web Page: https://engineering.purdue.edu/∼bouman/ee637
Teaching Assistants:
(primary) Surojit Ganguli; E-mail: sganguli@purdue.edu
(helper) Wenrui Li; E-mail: li3120@purdue.edu
(helper) Maliha Hossain; E-mail: mhossain@purdue.edu
(helper) Madhuri Nagare; E-mail: smajee@purdue.edu
TA Office Hours:
TBD 9:30-11:30 AM (NY time) Tuesday and 5:00-7:00 PM (NY time) Thursday.
Lab/Homework submission:
Homeworks will be submitted through Brightspace
Please make sure to convert all documents to pdf before submission.
The submitted pdf document should include all requested code.

Course Text:

The course will be taught from notes posted on the class web site.

Supplimentary References

Digital Picture Processing, A. Rosenfeld and A. Kak, volumes 1 and 2, Academic Press, 1982.

Signals and Systems, A. V. Oppenheim, A. S. Willsky with S. H. Nawab, Prentice-Hall, Inc., New Jersey, ISBN 0-13-814757-4, 1997.

Fundamentals of Digital Image Processing, A. K. Jain, Prentice-Hall, 1989.

The C Programming Language: Second Edition, B. W. Kernighan and D. M. Ritchie, ISBN 0-13-110370-9, Prentice-Hall, Englewood Cliffs, NJ, 1988.
Statical Inference, S. D. Silvey, ISBN 0-412-13820-4, Chapman & Hall, New York, NY, 1075.

Course Description:
Introduction to digital image processing techniques for enhancement, compression, restoration, reconstruction, and analysis. Lecture and laboratory experiments covering a wide range

of topics including 2-D signals and systems, image analysis, image segmentation; achromatic vision, color image processing, color imaging systems, image sharpening, interpolation, decimation, linear and nonlinear filtering, printing and display of images; image compression, image restoration, and tomography.

Course Objectives:

The objectives of this course are to:

- Cover the basic analytical methods which are widely used in image processing. These include topics such as deterministic and stochastic modeling of images; linear and nonlinear filtering; and image transformations for coding and restoration.
- Cover issues and technologies which are specific to images and image processing systems. We will introduce a wide range of current technologies that are having impact in the image processing field. We will also study the related areas such as human visual modeling, and display/printing device characteristics.
- Develop experience with using computers to process images. Student will learn to program in C, python, and matlab, and use the git version control system.

Grading Policies:

There will be regularly assigned course laboratory which will require the preparation of laboratory reports. Homeworks and laboratories must be performed **independently** by each student. Violation of this rule will be considered a form of cheating.

There will be two midterm exams and a single final exam. Final grades will use the following weighting.

Computer laboratories	15%
Midterm	25%
Midterm	25%
Final exam	35%

Exam Policies:

****This policy is subject to change based on evolving conditions****

Exams will be given synchronously at a prescheduled time that accommodates both on and off-campus students. The exams will be distributed and collected using Gradescope, and we will use Zoom to proctor the exam usage. Students should have the following capabilities in order to take the exam:

- Students must have access to a Gradescope account;
- Students must be able to generate answers in pdf format typically by scanning written exam answers and uploading the scans to Gradescope as raster images in jpeg, png, or tiff format.
- Students must have access to a computer with Zoom and a functioning webcam that they should leave during the full exam time.

Academic Honesty Policies:

The ECE faculty expect every member of the Purdue community to practice honorable and ethical behavior both inside and outside the classroom. Any actions that might unfairly improve a student's score on homework, quizzes, labs, or examinations will be considered cheating and will not be tolerated. Examples of cheating include (but are not limited to):

- Sharing results or other information during an examination.
- Bringing forbidden material or devices to an examination.
- Working on an exam before or after the official time allowed.
- Requesting a re-grade of answers or work that has been altered.
- Submitting a homework or laboratory report that is not your own work, or engaging in forbidden homework or laboratory report collaboration.
- Possession of another person's laboratory solutions or report from the current or previous years.
- Reference to, or use of another person's laboratory solutions or report from the current or previous years.
- Allowing another person to copy your laboratory solutions or work.
- Representing as your own work anything that is the result of the work of someone else.

All homeworks and laboratories must be performed **independently** by each student. Violation of this rule will be considered a form of cheating.

At the professor's discretion, cheating on an assignment, or examination will result in a failing grade for the entire course, or a reduced grade, or a zero score for the particular assignment, or exam. All occurrences of academic dishonesty will be reported to the Assistant Dean of Students and copied to the ECE Assistant Head for Education. If there is any question as to whether a given action might be construed as cheating, please see the professor or the TA before you engage in any such action.

Emergency Preparedness: In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. In the event of an emergency, students can get information from the following sources:

1. The course web page
2. By emailing the course instructor or teaching assistant

In an emergency, students are also welcome to contact Prof. Bouman by phone at his office or home.