CS 474/674 Image Processing and Interpretation

Fall 2020 – Dr. George Bebis

Prerequisites: CS 202 with a "C" or better; STAT 352 or STAT 461. If you do not meet the prerequisite requirements for this course, you should contact me immediately. Credit hours: 3.0

Meets: MW 1:00pm – 2:15pm (WEB)

Instructor: Dr. George Bebis

- Office: 411 WPEB
- Phone: (775) 784-6463
- E-mail: bebis@cse.unr.edu
- Course Webpage: http://www.cse.unr.edu/~bebis/CS474
- Office Hours: By appointment

Required Text:


Optional Texts:


Objectives

Digital image processing is among the fastest growing computer technologies. This course will provide an introduction to the theory and applications of digital image processing. In particular, this course will introduce students to the fundamental techniques and algorithms used for processing and extracting useful information from digital images.
Course Outline (tentative)

- Introduction
- Intensity & Geometric Transformations
- Spatial Filtering & Convolution
- Fourier Transform & Frequency Domain Filtering
- Sampling and Aliasing
- Image Restoration
- Image Compression
- Short-Time Fourier Transform
- Multi-resolution Representations & Wavelets (if time permits)
- Applications (if time permits)

Student learning Outcomes

- (SLO2) Design, implement, and evaluate a computing or engineering solution to meet a given set of requirements, with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

- (SLO5) Function effectively as a member or leader of a team engaged in activities appropriate to the program’s discipline, creating a collaborative and inclusive environment, establishing goals, planning tasks, and meeting objectives.

Exams and Assignments

Grading will be based on quizzes, exams, and programming assignments. Graduate students will have to write a paper critique.

- There will be 8-9 quizzes during the semester which will be announced at least one class period in advance. The lowest quiz grade will be dropped.

- There will be 2 exams: a midterm and a final. The material covered in the exams will be drawn from the lectures and the quizzes.

- There will be 4-5 programming assignments which should be done in groups of two students.

- Graduate students will be required to write a critique on a paper to be chosen from a list of papers to be provided by the instructor after the midterm exam.
Course Policies

- Lectures will be delivered through Zoom during regular meeting times. Lectures will be recorded and will be available for you to watch anytime if for some reason you miss class.

- Quizzes, exams, and programming assignments will be submitted through Canvas. It is highly recommended that you use the GeniusScan and Canvas Student apps for scanning and submitting your work. Specific details will be discussed in class.

- Lecture slides, assignments, and other useful information will be posted on the course web page.

- Quizzes and exams will be closed books, closed notes. If you are unable to take a quiz or exam at the designated date and time, you must inform me in advance. Quizzes and exams cannot be made up unless there is an extreme emergency.

- Discussion of your work with others is allowed and encouraged. However, each student should do his/her own work. Assignments which are too similar will receive a zero.

- No late work will be accepted unless there is an extreme emergency. If you are unable to hand in your work by the deadline, you must discuss it with me before the deadline.

- No incomplete grades (INC) will be given in this course and a missed exam may be made up only if it was missed due to an extreme emergency.

- Students are expected to attend all lectures, and be on time. Students who miss a class and/or are late for a class may experience an impact on their grade by missing course activities. If you miss a lecture, you are responsible for all material covered or assigned.

- The Instructor reserves the right to add to, and/or modify any of the above policies as needed to maintain an appropriate and effective educational atmosphere. If this happens, all students will be notified in advance of implementation of the new and/or modified policy.

Academic Dishonesty

Cheating, plagiarism or otherwise obtaining grades under false pretenses constitute academic dishonesty according to the code of this university. Academic dishonesty will not be tolerated and penalties can include filing a final grade of "F"; reducing the student's final course grade one or two full grade points; awarding a failing mark on the coursework in
question; or requiring the student to retake or resubmit the coursework. For more details, see the University Academic Standards policy: UAM 6,502

Disability Services

Any student with a disability needing academic accommodations is requested to speak with me or contact the Disability Resource Center (Thompson Building, Suite 101), as soon as possible to arrange for appropriate accommodations.

Academic Success Services

Your student fees cover usage of the Math Center (784-443 or www.unr.edu/mathcenter/), Tutoring Center (784-6801 or www.unr.edu/tutoring/), and University Writing Center (784-6030 or http://www.unr.edu/writing_center/). These centers support your classroom learning; it is your responsibility to take advantage of their services. Keep in mind that seeking help outside of class is the sign a responsible and successful student.

Please note that the Math Center is focused on helping students with mathematical and statistical concepts. While mathematics is used extensively in engineering, the Math Center does not have the resources to help students with engineering courses. Engineering students are encouraged to use the Math Center for help in their math classes, and they are welcome to use its computer lab and study area any time—regardless of course. However, Math Center tutors cannot answer questions regarding engineering courses.

Audio and Video Recording

Surreptitious or covert video-taping of class or unauthorized audio recording of class is prohibited by law and by Board of Regents policy. This class may be videotaped or audio recorded only with the written permission of the instructor. In order to accommodate students with disabilities, some students may have been given permission to record class lectures and discussions. Therefore, students should understand that their comments during class may be recorded.

Safe Learning Environment

UNR is committed to providing a safe learning and work environment for all. If you believe you have experienced discrimination, sexual harassment, sexual assault, domestic/dating violence, or stalking, whether on or off campus, or need information related to immigration concerns, please contact the University’s Equal Opportunity & Title IX Office at 775-784-1547. Resources and interim measures are available to assist you. For more information, please visit: http://www.unr.edu/equalopportunity-title-ix
Grading Scheme

Quizzes: 20%
Midterm Exam: 20%
Final Exam: 20%
Prog. Assign: 40%
Critique: 10% (grad students only)

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<th>Grade</th>
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<tr>
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Important dates

9/7/2020 – Labor Day (no class)
10/21/2020 – Midterm exam
10/27/2020 – Final day to drop classes and receive a "W"
11/11/2020 – Veterans Day (no class)
12/9/2020 – Prep Day
12/14/2020 - Final exam (9:50am – 11:50am)