Image Processing and Computer Vision
EEE 6512 Sections 1EF2, 2FED, CAMP
Class Periods: Mon., Weds., and Fri., Period 3, 9:35 AM – 10:25 AM
Location: Zoom Meeting
Academic Term: Fall 2020

Instructor:
Name: Dr. Damon L. Woodard
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Office Phone Number: 352-273-2130
Office Hours: Mon., Wed., Fri., 9:00 AM EST – 10:30 AM EST or by appointment via Zoom
Office Via Zoom: https://ufl.zoom.us/j/97082325312?pwd=V1o1N0ptZXNpV044WFVVMlBsMzU4Zz09
Meeting ID: 970 8232 5312
Passcode: 274629

Teaching Assistant/Peer Mentor/Supervised Teaching Student:
Please contact through the Canvas website

Name: Olivia Paradis
Email: paradiso@ufl.edu
Office Hours: Thurs. 4:00 PM – 5:00 PM, Fri. 6:00 PM – 8:00 PM EST, or by appointment via Zoom
Office via Zoom: https://ufl.zoom.us/j/4435237667?pwd=RVM2dkpURlJVb3NxM2tVejNNWlBOZz09
Meeting ID: 443 523 7667
Passcode: fics

Course Description
Pictorial data representation; feature encoding; spatial filtering; image enhancement; image segmentation; cluster seeking; two-dimensional z-transforms; scene analysis; picture description language; object recognition; pictorial database; interactive graphics; picture understanding machine.

Course Pre-Requisites / Co-Requisites
• EEE-5502 Foundations of Signal Processing
• Undergraduate-level probability and statistics course
• Undergraduate-level linear algebra course
• Exposure to MATLAB programming

Course Objectives
This course introduces students to the fundamental principles and methods used for image processing and computer vision. The goal of this course is to understand how to efficiently represent, process, and analyze image signals. The objective of the course is to provide students with the scientific foundations needed to implement and apply techniques used to address image analysis related problems. Topics to be covered include: image acquisition and display using digital devices, properties of human visual perception, sampling and quantization, image enhancement, two-dimensional Fourier transforms, linear and nonlinear filtering, morphological operations, noise removal, image deblurring, edge detection, geometric transformations, segmentation, and object recognition (classification). The course objective will be met by the completion of multiple homework assignments which require the implementation and application of image processing / computer vision methods discussed during lecture. Also, the students' understanding of the main concepts will be assessed using multiple exams.

Materials and Supply Fees
None

Required Textbooks and Software
Title: Image Processing and Analysis
Author: Stan Birchfield
Publication date, edition, and publisher: 2017, First Edition, CL Engineering
ISBN number: 978-1285179520

Software: Mathematical solver software such as MATLAB (available at UF ECE terminal server available by remote login)

Recommended Materials
None

Course Schedule
Week 1:   Course Overview, Introduction, Fundamentals of Imaging
Week 2:   Fundamentals of Imaging Cont., Image Transformations / **Homework #1 Due**
Week 3:   Image Transformations Cont.
Week 4:   Binary Image Processing /**Homework #2 Due**
Week 5:   Spatial Domain Filtering / **Exam #1**
Week 6:   Frequency Domain Processing / **Homework #3 Due**
Week 7:   Frequency Domain Processing cont.
Week 8:   Edges and Features / **Homework # 4 Due**
Week 9:   Color/ **Exam #2**
Week 10:   Segmentation Pt. 1 / **Homework #5 Due**
Week 11:   Segmentation cont.
Week 12:   Model Fitting/ **Homework #6 Due**
Week 13:   Model Fitting Cont.
Week 14:   Classification Pt. 1 / **Exam #3**
Week 15:   Classification Cont.
Week 16:   Finals Week / **Exam #4**

Online Course Recording
Our class sessions may be audio visually recorded for students in the class to refer back and for enrolled students who are unable to attend live. Students who participate with their camera engaged or utilize a profile image are agreeing to have their video or image recorded. If you are unwilling to consent to have your profile or video image recorded, be sure to keep your camera off and do not use a profile image. Likewise, students who un-mute during class and participate orally are agreeing to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will need to keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. The chat will not be recorded or shared. As in all courses, unauthorized recording and unauthorized sharing of recorded materials is prohibited.

Attendance Policy, Class Expectations, and Make-Up Policy
Pre-recorded lectures will be provided via CANVAS. The lecture period will be used by the instructor to provide office hours. I prefer that students keep their camera on during the lecture/office hour period so that I can see you as I would during normal face-to-face classes. Studies show that if we can see each other's faces then we will have more engagement, more student success, and more faculty success. However, this is not a requirement. I understand if on certain days you can't have your camera on due to internet bandwidth limitations, other family members, health issues, or any other reasons.

Excused absences must be in compliance with university policies in the Graduate Catalog (http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#attendance) and require appropriate documentation.

Makeup exams are contingent on appropriate justifications and legal documents (UF Dean of Students, certified physician, military active duty, judge for jury duty, etc.)

Evaluation of Grades

Assignment	Percentage of Final Grade
Homework Sets (6)	50%
Exams (4)	50%
TOTAL	100%

Students will be allowed to drop the lowest homework assignment and exam grade for the final course grade calculation. Homework assignments may be turned in up to three days after the due date but will receive a 10% per day point deduction.

Grading Policy

Percent	Grade	Grade Points
94 - 100	A	4.00
90 – 93	A-	3.67
88 – 89	B+	3.33
82 – 87	B	3.00
80 – 81	B-	2.67
78 – 79	C+	2.33
72 – 77	C	2.00
70 – 71	C-	1.67
62 – 69	D	1.00
0 – 61	E	0.00

More information on UF grading policy may be found at:
http://gradcatalog.ufl.edu/content.php?catoid=10&navoid=2020#grades

Students Requiring Accommodations
Students with disabilities who experience learning barriers and would like to request academic accommodations should connect with the disability Resource Center by visiting https://disability.ufl.edu/students/get-started/. It is important for students to share their accommodation letter with their instructor and discuss their access needs, as early as possible in the semester.

Course Evaluation
Students are expected to provide professional and respectful feedback on the quality of instruction in this course by completing course evaluations online via GatorEvals. Guidance on how to give feedback in a professional and respectful manner is available at https://gatorevals.aa.ufl.edu/students/. Students will be notified when the evaluation period opens, and can complete evaluations through the email they receive from GatorEvals, in their Canvas course menu under GatorEvals, or via https://ufl.bluera.com/ufl/. Summaries of course evaluation results are available to students at https://gatorevals.aa.ufl.edu/public-results/.

University Honesty Policy
UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (https://sccr.dso.ufl.edu/policies/student-honor-code-student-conduct-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any

condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

Commitment to a Safe and Inclusive Learning Environment
The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination. It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.

If you feel like your performance in class is being impacted by discrimination or harassment of any kind, please contact your instructor or any of the following:
• Your academic advisor or Graduate Program Coordinator
• Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
• Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
• Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@eng.ufl.edu

Software Use
All faculty, staff, and students of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

Student Privacy
There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: https://registrar.ufl.edu/ferpa.html

Campus Resources:

Health and Wellness

U Matter, We Care:
Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

Academic Resources

E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml.

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall*, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus*:* https://care.dso.ufl.edu.

On-Line Students Complaints*:* http://www.distance.ufl.edu/student-complaint-process.