ECE 4670/6670 Introduction to Digital Signal Processing

Section 1 (3 credit hrs)

Fall 2023

General Information:

Instructor: Dr. Yongqiang Wang (yongqiw@clemson.edu),

Meeting time: 8:00 am - 9:45 am Tuesdays and Thursdays at Riggs 226 (08/23/2023 - 12/15/2023)

Office hours: Online (https://clemson.zoom.us/j/9209214331) by appointment

Course webpage: https://www.clemson.edu/canvas/

Text: Our main reference will be: Digital Signal Processing Using MATLAB - 4th edition

Course Description & Objectives:

This course is developed as an introduction to digital signal processing. Students are expected to learn basic principles and implementation of digital signal processing techniques. Methods suitable for digital signal processing are introduced and their applications are explored. Prerequisite: ECE 3300.

Optional Reference Texts (From which you will find great insight):

1) *Lyons, Richard G. Understanding Digital Signal Processing. Prentice Hall.*

Course Topics (Subject to change, may not cover all items below):

1) Digital sequence
2) Discrete systems
3) IIR filters
4) FIR filters
5) Z-transform
6) DFT
7) Applications in optimization and machine learning

Grading:

Students can choose between the two options below:

1) Non-project option:

1. Homework: 3×10%
2. Mind-term: 30%
3. Final: 40%

2) Project option (project must be approved by the instructor by Sept. 14, 2023):

1) Homework: 3× 10%
2) Weekly progress reports: 15%
3) Presentation: 20%
4) Paper-format Reports (4-6 pages, IEEE conference paper format): 35%

Homework should be prepared with MS Word or Latex, and submitted in PDF format to yongqiw@clemson.edu. As emails might be lost in transmission, please view your submission as successfully received only if you receive a confirmation email from the instructor.

With the approval of the instructor, if the report is submitted for publication in a high-quality journal, grade "A" will be given.

Requirements on Project and Presentation:

Projects must be research projects contributing new theory and/or applications to digital signal processing. The results should be a research publication suitable for a high-quality conference or workshop.

1) Project topic one: signal processing in machine learning (reference will be provided)
2) Project topic two: signal processing in distributed optimization (reference will be provided)
3) Project topic three: signal processing in game theory (reference will be provided)
4) Project topic four: student proposed topic with instructor's approval

For all projects, the requirements are:

1) A meeting with the instructor to discuss and approve your project proposal by Sept. 14, 2023 (preferably sooner);
2) Weekly progress reports are required to be sent to the instructor by the end of every week;
3) A project presentation (25 minutes) in class between Nov. 30-Dec.7, 2023;
4) A project report in IEEE conference paper style. Due Dec. 8, 2022 at 11:59 pm, via email (confirmations will be given if successfully submitted).

With the approval of the instructor, if the report is submitted for publication in a high-quality journal, grade "A" will be given.

Policies:

Students may leave after 10 minutes if the instructor or guest lecturer does not arrive in that time. Attendance while not required is highly recommended. Students who regularly attend class and participate will receive special consideration if course average is borderline. Students are responsible for getting lecture notes, and handouts for missed classes from fellow students or from the class website when applicable. Any exam that was scheduled at the time of a class cancellation due to inclement weather will be given at the next class meeting unless contacted by the instructor.

Any assignments due at the time of a class cancellation due to inclement weather will be due at the next class meeting unless contacted by the instructor. Any extension or postponement of assignments or exams must be granted by the instructor via email or Canvas within 24 hours of the weather related cancellation.

It is recommended that students check their email daily for important announcements, assignments, and other class related information. It is preferred that you use your clemson.edu account and not forward to another account (e.g. hotmail, yahoo, etc.) as there is the potential for lost information with these systems.

Scantron is available through the department but will not be used in the class.

Academic Integrity:

If someone else's work (code, slides, research publications, etc.) is used to produce any work you do for this course, you must (1) indicate how this work was used, and (2) acknowledge this work in a bibliography section. For presentations, you must create your own slides.

This course follows Clemson University procedures. Students suspected of violating academic integrity will be reported. The official statement of Clemson University on Academic Integrity:

"*As members of the Clemson University community, we have inherited Thomas Green Clemson's vision of this institution as a 'high seminary of learning.' Fundamental to this vision is a mutual commitment to truthfulness, honor, and responsibility, without which we cannot earn the trust and respect of others. Furthermore, we recognize that academic dishonesty detracts from the value of a Clemson degree. Therefore, we shall not tolerate lying, cheating, or stealing in any form. In instances where academic standards may have been compromised, Clemson University has a responsibility to respond appropriately to charges of violations of academic integrity.*"

More details of the graduate academic integrity policy are available at:

http://gradspace.editme.com/AcademicGrievancePolicyandProcedures#intergritypolicy

Disability Services:

Clemson University values the diversity of our student body as a strength and a critical component of our dynamic community. Students with disabilities or temporary injuries/conditions may require accommodations due to barriers in the structure of facilities, course design, technology used for curricular purposes, or other campus resources. Students who experience a barrier to full access to this class should let the professor know, and make an appointment to meet with a staff member in Student Accessibility Services as soon as possible. You can make an appointment by calling 864-656-6848, by emailing studentaccess@lists.clemson.edu, or by visiting Suite 239 in the Academic Success Center building. Appointments are strongly encouraged – drop-ins will be seen if possible, but there could be a significant wait due to scheduled appointments. Students who receive Academic Access Letters are strongly encouraged to request, obtain and present these to their professors as early in the semester as possible so that accommodations can be made in a timely manner. It is the student's responsibility to follow this process each semester. You can access further information here: https://www.clemson.edu/academics/studentaccess/index.html .

Title IX Statement:

The Clemson University Title IX (Sexual Harassment) statement: Clemson University is committed to a policy of equal opportunity for all persons and does not discriminate on the basis of race, color, religion, sex, sexual orientation, gender, pregnancy, national origin, age, disability, veteran's status, genetic information or protected activity (e.g., opposition to prohibited discrimination or participation in any complaint process, etc.) in employment, educational programs and activities, admissions and financial aid. This includes a prohibition against sexual harassment and sexual violence as mandated by Title IX of the Education Amendments of 1972. The policy is located at http://www.clemson.edu/campus-life/campus-services/access/non-discrimination-policy.html. Alesia Smith is the Clemson University Title IX Coordinator, and the Executive Director of Equity Compliance. Her office is located at 110 Holtzendorff Hall, 864.656.3181 (voice) or 864.656.0899 (TDD).

Modification Statement:

The instructor reserves the right to modify any aspect of the syllabus at any time during the semester for reasons including but not limited to COVID related situations.

Copyright Statement: