MARYLAND APPLIED GRADUATE ENGINEERING

Course Syllabus

Theory and Applications of Digital Signal Processing

ENPM603
Fall 2021

Learning Outcomes

The course will teach analysis and design methods for discrete-time signals and systems. More specifically, the course covers the sampling theorem, the Z-transform and discrete-time system analysis, multi-rate systems, discrete-time random processes, methods for designing FIR and IIR digital filters, the DFT and FFT, and power spectrum estimation. It will also provide introduction to advanced signal processing methods and applications, such as speech processing, image and video processing, and adaptive noise cancellation. Through this study the students will improve their understanding of digital signal analysis and system design. They will also gain practical experience via various MATLAB programming exercises.

Required Resources

Course website: **elms.umd.edu**

Textbook (mandatory):

Digital Signal Processing Fundamentals and Applications
L. Tan and J. Jiang
Third Edition
Academic press
ISBN: 978-0-12-815071-9

Access to MATLAB is also required.

Dr. Emre Gunduzhan
egunduzh@umd.edu

Class Meets
Tue 4:00pm – 6:40pm
TBA

Office Hours
Mon 4:00pm – 5:00pm
Wed 5:00pm – 6:00pm

Prerequisites
ENEE 322 Signals and Systems Theory, or equivalent

Course Communication
Important reminders and course information will be via ELMS Announcements

Use ELMS Discussions for any questions or comments about course material

Feel free to e-mail for general questions and everything else

Campus Policies

It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include topics like:

- Academic integrity
- Student and instructor conduct
- Accessibility and accommodations
- Attendance and excused absences
- Grades and appeals
- Copyright and intellectual property

Please also visit the **Graduate Policies and Procedures for Review of Alleged Arbitrary and Capricious Grading** and follow up with me if you have questions.

Activities, Learning Assessments, & Expectations for Students

There are 14 lectures in the course. I expect students to attend the lectures so that they can actively participate in discussions. Each lecture will start with a review of the previous topics and I expect the students come to the class prepared to answer questions.

There will be homework assignments in the form of questions or MATLAB programming tasks approximately every two weeks throughout the semester. The homework solutions can be turned in at the class or electronically using ELMS.

There will be one midterm and one final examination, both in class.

The overall grade will be based on homeworks, midterm exam, and the final exam.

All homeworks are individual assignments. Academic dishonesty, including cheating, fabrication, plagiarism, copying solutions or code from another source (such as another student, internet, etc) will not be tolerated.

Course-Specific Policies

I expect you to make the responsible and respectful decision to refrain from using your cellphone in class. If you have critical communication to attend to, please excuse yourself and return when you are ready.

I advise you to watch youtu.be/WwPaw3Fx5Hk for a short video on adverse impacts of laptop and cellphone usage on learning – even if they are used for course-related material and note-taking.

For this course, some of your assignments will be collected via Turnitin on our course ELMS page. I have chosen to use this tool because it can help you improve your scholarly writing and help me verify the integrity of student work. For information about Turnitin, how it works, and the feedback reports you may have access to, visit Turnitin Originality Checker for Students

Grades

All assessment scores will be posted on the course ELMS page. If you would like to review any of your grades (including the exams), or have questions about how something was scored, please email me to schedule a time for us to meet.

Late work will not be accepted for course credit so please plan to have it submitted well before the scheduled deadline. I am happy to discuss any of your grades with you, and if we have made a mistake I will immediately correct it. Any formal grade disputes must be submitted in writing and within one week of receiving the grade.

Assessments	Number	Category Weight
Homeworks	6	40%
Midterm Exam	1	30%
Final Exam	1	30%

Each assessment will be scored out of a maximum of 100 points. The average of the individual homework assessment scores will form the score for the homework category. The total score will then be calculated by a weighted average of the category scores using the weights shown in the above table.

Final letter grades are assigned based on the total score earned. To be fair to everyone there are clear standards and they are applied consistently, so please understand that being close to a cutoff is not the same as making the cut (89.99 ≠ 90.00). It would be unethical to make exceptions for some and not others.

Final Grade Cutoffs										
		+	85	+	65	+	50		
A	>=95	B	78	C	60	D	45	F	< 40
-	90	-	70	-	55	-	40		

Course Schedule

August 31	Introduction to digital signal processing, signals and systems	
September 7	Sampling and quantization	HW1 due
September 14	Digital systems and their properties	
September 21	DFT and FFT	HW2 due
September 28	Spectral analysis	
October 5	Z-transform, region of convergence, inverse z-transform	
October 12	Analysis of digital systems	HW3 due
October 19, 2019	**Midterm Exam**	
October 26	IIR filter design and applications	
November 2	FIR filter design and applications	
November 9	Multirate signal processing	HW4 due
November 16	Subband decomposition	
November 23	Adaptive filters	HW5 due
November 30	Image and video processing	
December 7	Speech processing (if time permits)	HW6 due
December 21, 2019	**Final Exam**	