EECE 5510 – Digital Signal Processing

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Course Description:

Introduction to the theory and practice of discrete-time signals and systems. Concepts covered include Fourier Transforms, Z-transforms, linear time invariant system analysis in the time and frequency domains, sampling theory and Discrete Fourier Transforms. Application of these concepts includes digital filter design techniques and the use of Fast Fourier Transforms for efficient frequency domain analysis. Labs and design projects related to specific signal processing applications are used to illustrate the material, including topics such as audio and image processing.

Course Learning Outcomes:

We will explore fundamental digital signal processing concepts using simple examples in MATLAB, C/C++ and CUDA to demonstrate key concepts of the course. Example source code will be shared from the class GitHub repository, and students will have access to the necessary hardware and software for implementation.

Additional expected learning outcomes for graduate students are to analyze and think critically to apply knowledge, skills, and values appropriate to Digital Signal Processing. In addition, graduate students should master new and various methods and technologies at an advanced level.

Location & Schedule:

Class meets on Tuesdays & Thursdays: 5:00pm-6:15pm
In person – EHALL 323 – or live stream available via Microsoft Teams.

Grading:

Homework and Projects: 60%
Mid-term exam: 20%
Final exam: 20%

Recommended Texts:

Alan V. Oppenheim, Ronald W. Schafer, *Discrete-Time Signal Processing,* 3rd edition, 2010.
ISBN-13: 978-0131988422
ISBN-10: 0131988425

Dick Blandford, John Parr, *Introduction to Digital Signal Processing,* 1st edition, 2013.
ISBN-13: 978-0131394063
ISBN-10: 0131394061

Other Notes:

Students are required to comply with all policies outlined in the Graduate Bulletin, including the Marquette University Honor Code and Honor Policy. Class notes and lecture recordings will be shared on D2L. Assignments will be given at least 2 weeks prior to the due date.

Office Hours:

By appointment; using Microsoft Teams or in-person Haggerty Hall – Room 235

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