The University of Texas at Tyler
Department of Electrical Engineering

EENG 4350.041: Special Topics in EE

Digital Signal Processing

Syllabus

Catalog Description:

Introduction to modern digital processing. Basic building blocks, the basic math (Z-Transforms, Fourier Transforms, Fast Fourier Transforms), deterministic processing, FIR and IIR filters, polyphase filtering, introduction to statistical filtering, basic power spectral density.

Prerequisites: EENG 4311 Signals and Systems

Credits: (3 hours lecture, 0 hours laboratory per week)

Text(s): Oppenheim, Schafer. Discrete-Time Signal Processing, 2e. Prentice Hall, 1999.

Additional Material: MATLAB, Class Notes

Course Coordinator: Ali Ghorshi, PhD

Topics Covered: (paragraph of topics separated by semicolons)

Discrete-Time signals and systems; Z transform; Sampling of Continuous time systems; Transform analysis of linear time-invariant systems; Filter design techniques; the DFT and FFT algorithms; Fourier analysis of signals using the DFT; DSP applications.

Evaluation Methods: (only items in dark print apply):

1. Examinations / Quizzes
2. Homework
3. Report
4. Computer Programming
5. Project
6. Presentation
7. Course Participation
8. Peer Review

Course Objectives[1]: By the end of this course students will be able to:

1. Explain the fundamentals of digital signal processing including sampling, frequency analysis, and filtering. [1, 2]
2. Describe the applications of DSP. [1, 2]
3. Implement and evaluate basic DSP applications using MATLAB. [2, 3, 4]
4. Determine the performance of DSP algorithms implemented using computer hardware. [1, 2, 4]
5. Design digital signal processing structures to provide solutions to practical engineering problems. [1, 2, 3, 4]

[1] *Numbers in brackets refer to method(s) used to evaluate the course objective.*

Relationship to Student Outcomes [2]: This course supports the following Electrical Engineering Student Outcomes, which state that our students will possess:

1. an ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics. [1, 2]
2. an ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors. [5]
3. an ability to communicate effectively with a range of audiences.
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.
5. an ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.
6. an ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions. [3]
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies. [4]

[2] *Numbers in brackets refer to course objective(s) that address the Program Outcome.*

Contribution to Meeting Professional Component: (in semester hours)

Mathematics and Basic Sciences:		hours
Engineering Sciences and Design:	3	hours
General Education Component:		hours

Prepared By:	Mark Humphries, Adjunct Professor	Date:	13 January 2008
Modified By:	Hector A. Ochoa, Assistant Professor		3 June 2009
	Ali Ghorshi, PhD		13 January 2019
			6 January 2020