EC716 Spring 2025: Advanced DSP
Information Sheet/Syllabus

INSTRUCTOR: Prof Hamid Nawab

CLASS MEETS: Mondays and Wednesdays 10:10AM-11:55AM in PHO 201

PRE-REQUISITE: EC516 or any first course in DSP.

COURSE OBJECTIVE: The main objective of this course is for students to be able to comprehend and to be able to apply (to specific applications) various advanced topics in DSP which are not typically dealt with in an introductory treatment of DSP. These advanced topics are useful for developing an in-depth understanding of DSP applications that involve processing, analysis/understanding, transmission, or reception of signals such as speech, images, video, biosignals, etc.

COURSE LEARNING OUTCOMES:
Upon successful completion of this course you should be able to:

1) *Understand* the theory behind Advanced DSP concepts.
2) *Apply* Advanced DSP concepts to solve a specific application problem.
3) *Design* Advanced DSP algorithms
4) *Implement* DSP algorithms in software.
5) *Collaborate* with others on a DSP team project
6) *Communicate* your personal contributions to a DSP team project

TOPICS FOR THIS SEMESTER:

1) Time-Dependent Fourier Transforms
2) Parametric Signal Modeling
3) Cepstral Analysis
4) Wavelet Transforms
5) Hilbert Transforms
6) Discrete Cosine/Sine Transforms
7) Multidimensional Signal Processing
8) Magnitude and Phase in Fourier Domains

COURSE STRUCTURE:
Mondays:

10:10 – 11:00 Lecture
11:05 – 11:55 Analysis Discussion
Project Report from Previous Week Due at 10:10

Wednesdays:

10:10 – 11:00 Lecture
11:05 – 11:55 Project Discussion
Analysis Report from Previous Week Due at 10:10

COURSE DELIVERABLES:
Mondays (Starting Feb 3): 1-Page Project Report
Wednesdays (Starting Feb 3): Analysis Report

COURSE GRADING:
Each Report (Project or Analysis) will be scored as follows:

Excellent:	5.0
V. Good:	4.0
Good:	3.0
Fair	2.0
Poor	1.0
Unsubmitted	0.0

Project Score = Sum of 10 highest *Project Report Scores*

Analysis Score = Sum of 10 highest *Analysis Report Scores*

Course Score = *Project Score* + *Analysis Score*

Course Letter Grade Table:

A	if Course Score ≥ 95
A-	if $90 \leq$ Course Score < 95
B+	if $85 \leq$ Course Score < 90
B	if $80 \leq$ Course Score < 85
B-	if $75 \leq$ Course Score < 80
C+	if $70 \leq$ Course Score < 75
C	if $65 \leq$ Course Score < 70
C-	if $60 \leq$ Course Score < 65
D	if $55 \leq$ Course Score < 60
F	if Course Score < 55

LINK TO ONE-NOTE LECTURE NOTES:

https://bushare-my.sharepoint.com/:o:/g/personal/hamid_bu_edu/EplY234ZPaZFjJKs-Zg_kn4BCROhwyapKXXmv_vYgenKKg?e=e7EFJm