Bangladesh Army University of Science and Technology (BAUST)

Department of Computer Science and Engineering

Course Outline

Semester: Winter, 2018

Course Outline

CSE 4203: Digital Signal Processing

Course Code : CSE-4203

Course Title : Digital Signal Processing

Program : B.Sc. Engineering in CSE

Stage : Level-4, Term-II

Duration : Three hours per week for a Term (14 weeks)

Prerequisites : None

Credit : 3.0

Course Teacher

Abu Saleh Musa Miah
Lecturer
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Prerequisites

- CSE-1187- Mathmatics
- CSE-3216- Linear Algebra

Course Contents

Introduction to speech, image & data processing; Discrete time signals, sequences; Linear Constant Coefficient difference equation; Sampling continuous time signals; Two dimensional sequences and systems; Z-transform, Inverse Z-transform, H-transform; Frequency domain representation, discrete time systems and signals; Fourier series and Fourier Transform; Parseval's theorem; Equivalent noise definition of bandwidth; Convolution, Correlation and method of numerical integration; Computation of the DFT: Goertzel FFT, Chirp Z-transform algorithms.

Reference Books

1 Digital Signal Processing - John G. Proakis&DimitrisManolakis
2. Understanding Digital Signal Processing Richard G. Lyons
3. Digital Signal Processing-A practical approach - Emmanuel C. Ifeachor Barrie W. Jervis
4. Signals and Systems - Rodger Ziemer& William Tranter, D

Grading

Theory Course		**Sessional Course**	
Class Participation / Observation	5%	Class Attendance	10%
Class Attendance	5%	Class Performance	10%
HW/ Assignment/ Quizzes/**Class tests**	20%	Report	10%
Final Examination (3 hours)	70%	Quiz	20%
Total	**100%**	Viva	20%
		Lab Test	30%
		Total	**100%**

Quizzes and Assignments

There will be about 3 quizzes and 2 assignments. Students are expected to take all quizzes and complete all homework assignments on time.

Every assignment must have the following information at the top of the first page of the assignment.

ID#: Assignment#:
Name: Date Assigned: Due Date:

Attendance Requirements

Class Attendance is mandatory and it will carry 10% of the total grade.

Unfair Means and Classroom Etiquette

Students found to be adopting unfair means of any kind will be severely dealt with. If any student is found copying or cheating in a quiz, exam or assignment, all students involved will receive zero regardless of who is the receiver and who is the provider.

Tentative Lesson Plan

Week	**Lectures**	**Topics**
Week 1	Lecturer 1	Course Outline, Introduction to DSP,
	Lecturer 2	Overview and importance of DSP and DSP related fields.
	Lecturer 3	Introduction to Speech, Image and data Processing.
Week 2	Lecturer 4	Discrete time signals, sequence and there Notation..
	Lecturer 5	Signal, Amplitude, Magnitude, Power, Signal Processing Operational Symbols.
	Lecturer 6	Classification Discrete Time Signal.
Week 3	Lecturer 7	Discrete Linear and Non Linear System, Time Invariant Systems.
	Lecturer 8	Linear Constant Coefficient difference equation
Week 4	Lecturer 9	Sampling continuous time signals
	Lecturer 10	Quantization of Continuous Amplitude signals.
CT-1	Lecturer 11	Z-transform,
Week 5	Lecturer 12	Inverse Z-transform
	Lecturer 13	H-transform;
	Lecturer 14	Frequency domain representation
Week 6	Lecturer 15	**Review class for Lectures up to 14**
	Lecturer 16	Fourier series for continuous time periodic signal
	Lecturer 17	Fourier Transform for continuous time Aperiodic signal
Week 7	Lecturer 18	Fourier series for Discrete time periodic signal
	Lecturer 19	Fourier Transform for Discrete time Aperiodic signal
CT-2	Lecturer 20	Relationship of the Fourier transform to the Z Transform.
Week 8	Lecturer 21	Frequency domain classification of signals: the concept of bandwidth.
	Lecturer 22	Symmetric Properties of the Fourier Transform.
	Lecturer 23	Fourier Transform Theorems and Properties.
Week 9	Lecturer 24	Convolution
	Lecturer 25	Correlation
	Lecturer 26	method of numerical integration
Week 10	Lecturer 27	Discrete Fourier Transform.
	Lecture 28	Understanding DFT equation
	Lecture 29	DFT Example
Week 11	Lecture 30	**Review class for Lectures up to 30**
CT-3	Lecture 31	DFT summery, Linearity, Magnitudes, Frequency Axis
	Lecture 32	DFT Shifting Theorem,Example-2,Inverse DFT.
Week 12	Lecture 33	DFT Leakage,

	Lecture 34	Windows,
	Lecture 35	Classification of Windowing.
Week 13	Lecture 36	Fast Fourier Transform, Relationship of the FFT and DFT.
	Lecture 37	Radix-2 FFT Algorithm
	Lecture 38	Radix-4 FFT Algorithm.
Week 14	Lecture 39	Filter, Design Fir Filter, Design IIR Filter.
	Lecture 40	Discrete Wavelet Transform(DWT)
CT-4	Lecture 41	Empirical Mode Decomposition (EMD)
	Lecture 42	**Review class for all topics**

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Abu Saleh Musa Miah

$$w = \pi \ (or\ \omega = -\pi)\ or,\ equivalently,\ f = \tfrac{1}{2}\ (or\ f = -\tfrac{1}{5})$$