Course Outline

EE 415 Digital Signal Processing (3 credit hours)

Spring 2009

Schedule	Lecture on Mon & Wed (12:30 – 13:45AM)	**Website**	http://groups.google.com/group/DSP-S-09
Instructor	Muhammad Rizwan	**Contact**	muhammad.rizwan@umt.edu.pk
Office	S3/41 (Room 1), SST, UMT	**Office Hours**	T.B.A.
Course Description	This course provides an introduction to the theory and application of DSP with a solid foundation in the basics of DSP related to both signal analysis & system analysis and design. The contents of the subject include Sampling, Quantization, Discrete time signals and systems, Z-transform, Frequency analysis of signals and systems, Discrete Fourier Transform, Implementation of Discrete Time Systems and Design of Digital Filters.		
Expected Outcomes	After completing this course students will be able to analyze, design and implement DSP Systems.		
Textbooks	• *Digital Signal Processing-Principles, Algorithms and Applications, 3rd Edition,* by John G. Proakis and Dimitris G. Manolakis, Published by Pearson Press.		
Reference Books	• *Discrete-Time Signal Processing, 2nd Edition,* by Alan V. Oppenheim, Published by Pearson Press. • *Digital Signal Processing, 3rd Edition,* Sanjit K. Mitra, Published by McGRAW HILL. • *Fudamentals of Digital Signal Processing Using Matlab, by* Robert J. Schilling and Sandra L. Harris, Published by Thomson		
Assignments	4-5 Matlab based Assignment 5-6 Numerical based Assignment	**Quizzes**	10-15 Quizzes
Midterms	A single midterm exam that will cover all material covered till the midterm.	**Final**	Comprehensive
Grading Policy	• Assignments (5%+5%) • Quizzes: 20% • Midterms: 20% • Final: 50%		

Lectures Plan

No of Lectures	Topic
3	Introduction • Signals, Systems and Signal Processing • Classification of Signals • Concept of Frequency in Continuous-Time and Discrete-Time • Analog to Digital and Digital to Analog Conversion
3	Discrete Time Signals and Systems • Discrete-Time Signals • Discrete-Time Systems • Difference Equation
4	Z-Transform • Introduction • Properties of z-transform • Inverse z-transform • Pole zero description of discrete time systems • Stability of the systems • Magnitude and Frequency Response • Magnitude & Frequency Response Estimation from Pole Zero Diagram
4	Frequency Analysis of Signals and Systems • Frequency Analysis of Continuous-Time Signals • Frequency Analysis of Discrete-Time Signals • Frequency Domain Characteristics of LTI Systems • LTI Systems as Frequency Selective Filters
5	Discrete Fourier Transform • Sampling the Fourier Transform • Properties of DFT • Computation of DFT • Decimation in time FFT • Decimation in frequency FFT algorithms • Radix-2, Radix-4 and Split Radix FFT Algorithms • Quantization effects in the computation of the DFT
5	Implementation of Discrete Time Systems • Structure for FIR Systems • Structure for IIR Systems
5	Digital Filters Design • Design of FIR Filters • Design of IIR Filters