COURSE PROFILE

Course Number : EE 354	**Course Title : Digital Signal Processing**
Required / Elective : Required	**Pre-requisite :** EE353
Course Description: Linear time invariant systems, stability and causality. Discrete Time Fourier Transform. Z-Transform. Sampling and quantization schemes. Sampling Theorem. A/D, D/A conversion. Transform analysis of LTI systems. Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) systems, and their realizations. Digital filter design techniques. Discrete Fourier Transform (DFT) and its computation: Fast Fourier transform techniques. Computer applications.	**Textbook / Required Material :** A.V. Oppenheim, R.W. Schafer, Discrete Time Signal Processing 2nd Ed., Prentice Hall Signal Processing Series.
Course Structure / Schedule : (3+0+0) 3 / 6 ECTS	
Extended Description : Discrete time signals, discrete time systems and their properties, LTI systems and their properties, LCCDEs, frequency domain representation of LTI systems, discrete time Fourier Transform, Frourier Transform theorems and properties, Z-transform region of convergence, inverse Z-transform, properties of the Z-transform, sampling and its frequency domain representation, reconsruction, discrete time processing of continuous time signals, changing the sampling rate, transform analysis of LTI systems, ideal frequency selective filters, phase distortion and goup delay, systems characterized by LCCDEs, frequency response for rational system functions, relationship between magnitude and phase, all-pass systems, minimum phase systems, linear systems with generalized linear phase, block diagram representation of LTI systems, signal flow graph representation, basic structures for LTI systems, design of discrete time filters from continuous time filters, design of FIR filters by windowing, Kaiser window method, discrete Fourier series and properties, Discrete Fourier Transform (DFT) and properties, linear convolution using DFT, computation of DFT:Fast Fourier Transform.	
Design content : Filter Design (Theoretical and using Matlab.)	**Computer usage:** Mandatory computer assignments to review and develop some of the concepts taught in class.
Course Outcomes: [relevant program outcomes in brackets]: On successful completion of this course, students should be able to: 1) Represent discrete time signals analytically, visualize them in time and frequency domains and perform basic operationson them. [2], [6], [11] 2) Recognize the relationship between the continuous time signals and their discrete time counterparts, identify the practical aspects of sampling. [2], [6] 3)Represent and analyze discrete time systems both in time- and transform domains. [2], [6], [11] 4)Analyze and design digital filters analytically and using MATLAB. [2], [6], [11], [7] 5)Recognize the practical aspects of discrete time signal processing. [6], [11], [7]	

Level of Contribution of Course to Program Outcomes:

Strong:[2],[6]
Average:[7],[11]

Recommended reading: Digital Signal Processing - A Practical Approach : E C Ifeachor & B W Jervis, Addison-Wesley.

Teaching Methods:

Pre-readings, lecture, individual exercises.

Assessment Methods:

Exams,Homeworks and Computer assignments, class surveys.

Student Workload:

. Preparatory reading	66 hrs
Lectures,workshop, discussions	42 hrs
Homeworks, Computer assignments	35 hrs
Midterm exams	4 hrs
Final Exam	3 hrs
TOTAL …… 150 hrs … to match 25 x 6 ECTS	

Prepared by : Mengüç Öner	Revision Date : 02.02.2010