**SWEDISH COLLEGE OF ENGINEERING & TECHNOLOGY**

**RAHIM YAR KHAN**

**B.Sc. Electrical/Electronic Engineering**

**Session: 2010-14 Term: 6th**

**Department of Electrical Engineering**

**Course Title: Digital Signal Processing (ES-321)**

**Course Supervisor: Engr. M Asif Munir**

**Credit Hours: 3+1**

**Text Book:** John G. Proakis *et al.* “Digital Signal Processing- Principles, Algorithms and Applications” 4th Edition

**Sessional Marks Evaluation Procedure:**

* Conduction of Quizzes on Weekly basis
* Conduction of Assignment and Viva-voce on Monthly basis

**Week-Wise Course Break-up**

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| **Week** | **Course Description** |
| **Week 1** | **Chapter: 01) Introduction** 1.1 Introduction: Signal, systems and Processing 1.1.1 Basic Elements of a Digital Signal Processing system 1.1.2 Advantages of Digital over Analog Signal Processing1.2 Classification of Signals 1.2.1 Multichannel and Multidimensional Signals  1.2.2 Continuous Time Versus Discrete Signals  1.2.3 Continuous-Valued Versus Discrete-Valued Signals  1.2.4 Deterministic Versus Random Signals  1.3 The Concept Frequency in Continuous-Time and Discrete-Time Signals 1.3.1 Continuous-Time Sinusoidal Signals  1.3.2 Discrete-Time Sinusoidal SignalsHarmonically Related Complex Exponentials**(Examples + Related End Problems of Medium Level Complexity)** |
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| **Week 2** | 1.4 Analog to Digital and Digital to Analog Conversion 1.4.1 Sampling of Analog Signals 1.4.2 Sampling Theorem 1.4.3 Quantization of Continuous-Amplitude Signals 1.4.4 Quantization of Sinusoidal Signals 1.4.5 Coding of Quantized Samples 1.4.6 Digital to Analog Conversion 1.4.7 Analysis of Digital Signals and Systems Versus**(Examples + Related End Problems of Medium Level Complexity)** |
| **Week 3** |  **Chapter:2) Discrete Time Signals and systems** 2.1 Discrete-Time Signals 2.1.1 Some Elementary Discrete Time signals  2.1.2 Classification of Discrete Time Signals  2.2.3 Simple Manipulations of Discrete-Time Signals 2.2 Discrete-Time Systems  2.2.1 Input-Output Description of Systems 2.2.2 Block Diagram representation of Discrete-Time Systems **(Examples + Related End Problems of Medium Level Complexity)** |
| **Week 4** | 2.2.3 Classification of Discrete Time Systems 2.2.4 Interconnections of Discrete-Time Systems2.3 Analysis of Discrete-Time Linear Time Invariant systems 2.3.1 Techniques for Analysis of Linear Systems 2.3.2 Resolution of a Discrete Time Signal into Impulses 2.3.3 Response of LTI Systems to Arbitrary Inputs: The Convolution Sum 2.3.4 Properties of Convolution and The Interconnection of LTI Systems **(Examples + Related End Problems of Medium Level Complexity)** |
| **Week 5** |  2.3.5 Causal Linear Time Invariant Systems 2.3.6 Stability of Linear Time Invariant System 2.3.7 Systems with Finite Duration And Infinite Duration Impulse Response2.4 Discrete-Time Systems Described by Difference Equations 2.4.1 Recursive and Non-recursive Discrete-Time Systems 2.4.2 Linear time Invariant Systems Characterized by Constant Coefficient Difference Equations  2.4.3 solution of Linear Constant Coefficient Difference Equations  **(Examples + Related End Problems of Medium Level Complexity)** |
| **Week 6** |  2.4.4 The Impulse Response of a Linear Time Invariant Recursive System 2.5 Implementation of Discrete Time Systems 2.5.1 Structure for Realization of LTI Systems 2.5.2 Recursive and Non-recursive Realization of FIR Systems Systems2.6 Correlation of Discrete Time Signals 2.6.1 Cross correlation and Autocorrelation Sequences 2.6.2 Properties of the Cross-correlation and Autocorrelation Sequences  **(Examples + Related End Problems of Medium Level Complexity)** |
| **Week 7-8** |  2.6.3 Correlation of Periodic Sequences 2.6.4 Input-Output Correlation Sequences**(Examples + Related End Problems of Medium Level Complexity)****Chapter:3) Z-Transform and Its Applications to The Analysis to LTI Systems**3.1 The Z-Transform 3.1.1 The Direct Z Transform 3.1.2 The Inverse Z Transform3.2 Properties of Z-transform3.6 The One-Sided Z Transform3.6.1 Definition and Properties3.6.2 Solution of Difference Equations3.6.3 Response of Pole-Zero Systems with Nonzero Initial Conditions**(Examples + Related End Problems of Medium Level Complexity)****Review of Syllabus** |
| **MIDTERM EXAM**  |