



**Course:** Digital Signal Processing and Filtering – 0943701 (3 Cr. – Core Course)

**Catalog Data:** Review of discrete time signals and systems. Z-transform. Discrete and fast Fourier transform. FIR and IIR filter design. Multirate digital signal processing. Introduction to digital signal processing system design. Applications of digital signal processing.

**Prerequisites by Course:** None

**Prerequisites by topic:** Students are assumed to have a sufficient knowledge in the following topics:

- Continuous and discrete signal and systems analysis techniques.
- Fourier transform.
- Frequency domain analysis of signals & systems.

**Textbook:** Discrete Time Signal Processing, by Oppenheim and Schaffer, Prentice Hall,

**References:**

- Digital Signal processing, by John Proakis and Dimitris G. Monalakis.
- Digital Signal Processing, A computer based approach, third edition, by Sanjit K. Mitra.

**Schedule & Duration:** 16 Weeks, 2 lectures per week, 75 minutes each (including exams).

**Minimum Student Material:** Text book, class handouts and calculator

**Minimum College Facilities:** Classroom with whiteboard.

**Course Objectives:**  
The following are the main objectives of this course:

1. Introduce a detailed functional structure of digital signal processing systems.
2. Study of discrete time signals and systems.
3. Manipulate DT signals and systems using transform methods.
4. Develop the capabilities of students to represent signals and systems.
5. Analysis and design of some digital filters (IIR) and FIR.
6. Applications.

**Course Topics:**

Topic	Description	Contact Hours
T.1.	Review of discrete and continuous time signals + LTI.	4
T.2.	Sampling Continuous Time Signals + practical considerations	8
T.3.	Z-transform	4
T.4.	Transform Analysis of LTI	8
T.5.	FIR and IRR Discrete Filter Design	10
T.6.	DFT + FFT	6
T.7.	DSP application:	8

**Attendance:** attendance is mandatory according to the university rules.

**Assessments:** Exams and Quizzes.

**Grading policy:**

Course Work	10 %
Project	20%
Mid Exam	30 %
Final Exam	40 %
<hr/>	
Total	100%