

**CENTRAL UNIVERSITY OF KERALA
DEPARTMENT OF COMPUTER SCIENCE
M.Sc. COMPUTER SCIENCE**

CORE COURSE					
COURSE CODE	COURSE TITLE	CONTACT HRS/WEEK			CREDITS
		LEC	LAB	TUT	
CSC5104	Digital Signal Processing	2	2	1	4

Lec = Lecture, Tut = Tutorial, Lab = Practical

This is a participatory, experimental learning and **skill development course**.

Course Objective:

The objective of the course is to provide theoretical and practical aspects of digital signal processing.

By completing this course, students will obtain the following course/learning outcomes:

1. Knowledge to be gained:
 - (i) Develop methods for signal transformation.
 - (ii) To address digital signal processing in wide application areas including speech processing, remote sensing etc.
2. Skill to be gained:
 - (iii) Skills in representation of digital signal processing concepts using AI related toolbox/packages in Python and MATLAB
3. Competency to be gained:
 - (iv) Computational modelling of digital signal processing in any real world problems

Prerequisites: Basic knowledge in mathematics.

Grading:

Lab implementation	– 12%
Participatory based group Project	– 8%
Assignment/Quiz/presentation	– 8%
Class Test	– 12%
Final Exam	– 60%

CSC5104 – Digital Signal Processing

Module 1

Signals and Signal Processing- Characterization and Classification of Signals, Typical Signal Processing Operations, Typical Signal Processing Applications, Advantages of Digital Signal Processing, Sampling and reconstruction of Signals.

Module 2

Time Domain Representation of Signals and Systems- Discrete Time Signals, Operations on sequences, Discrete time Systems, Linear Time Invariant Discrete Time Systems.

Module 3

z-Transform, Properties of the z-Transform, Rational z-Transform, Inversion of the z-Transform, Pole – Zero Analysis.

Module 4

Frequency Analysis of Signals- Frequency Analysis of Continuous Time Signals, Frequency Analysis of Discrete Time Signals, Frequency domain and Time Domain Signal Properties.

Module 5

Case study in any one of the following: Discrete Fourier Transform, Discrete Cosine Transform, Analog-to-Digital and Digital-to-Analog Converters.

References:

1. John J Proakis & Dimitris G Manolakis, *Digital Signal Processing: Principles, Algorithms and Applications*, Pearson, 2007.
2. Michael J. Roberts, *Signals and systems*, McGraw-Hill Higher Education, 2004