Subject Name & Code	**Digital Signal Processing – EC550**
No. of Teaching Hours: 40, **Tutorials: 12 Sessions.**	**Credits: 3:1:0 L-T-P**
CIE Marks: 50	**SEE Marks: 50**

Course outcome: At the end of the course, the student should be able to

CO1: Perceive discrete-time signals in the frequency domain and its properties, using discrete Fourier transform.

CO2: Compute DFT using FFT algorithms.

CO3: Analyse, design and realize digital filters for the given specifications.

CO4: Implement the applications of Digital Signal Processing algorithms using computer aided tool

UNIT 1:

Introduction to DFT, Frequency domain sampling and reconstruction of discrete time signals, DFT as a linear transformation, its relationship with other transforms. Direct computation of DFT, Properties of DFT. Use of DFT in linear filtering.

08 Hours

UNIT 2:

DIT and DIF algorithms for computing DFT and IDFT. Goertzel algorithm, Chirp-Z Transform.

08Hours

UNIT 3:

Introduction to IIR filters, characteristics of commonly used analog filters, frequency transformations, design of IIR filters from analog filters using IIT and BLT techniques.

08 Hours

UNIT 4:

Introduction to FIR filters, Design of FIR filters using windowing and frequency sampling techniques. Quantization of filter coefficients, Round-off and finite word length effects in digital filters.

08 Hours

UNIT 5:

Direct form-I, direct form-II, Transposed, cascade, parallel and lattice methods of realizations of FIR and IIR filters. Introduction to multirate signal processing and Digital signal processors.

08 Hours

SLE: Recent developments and applications of signal processing,

Text Books:

1. **Proakis and Manolakis,** *"Digital signal processing – principles , Algorithms and applications"*, Pearson Education, 4th Edition, 2007.
2. **Oppenheim and Schaffer**, *"Discrete time signal processing",* PHI , 2003.
3. **S.K. Mitra** ,*"Digital signal Processing",* TMH, 2004.

E-Resource:

1. IEEE Transactions on Signal Processing.
2. https://nptel.ac.in/courses/117102060.