	National Institute of Technology Meghalaya An Institute of National Importance		CURRICULUM
Programme	**Bachelor of Technology in Electronics and Communication Engineering**	Year of Regulation	**2018-19**
Department	**Electronics and Communication Engineering**	Semester	**VI**

Course Code	Course Name	Credit Structure				Marks Distribution			
		L	T	P	C	INT	MID	END	Total
EC 322	**Advanced Digital Signal Processing**	**3**	**0**	**0**	**3**	**50**	**50**	**100**	**200**

Course Objectives		Course Outcomes		
	To study the fundamentals of sampling theory and multi-rate signal processing.		CO1	Ability to understand the fundamentals of sampling theory and multi-rate signal processing.
	To study the different linear prediction and optimum linear filters.		CO2	Ability to understand the different linear prediction and optimum linear filters.
	To study different adaptive filters.		CO3	Ability to understand the different adaptive filters.
	To study the various nonparametric methods for power spectrum estimation.		CO4	Ability to analyse the various nonparametric methods for power spectrum estimation
	To study the various parametric methods for power spectrum estimation.		CO5	Ability to analyse the various parametric methods for power spectrum estimation

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs			
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	PSO4
1	CO1	**3**	**1**	**1**	**-**	**1**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**3**	**1**	**1**	**-**
2	CO2	**3**	**3**	**2**	**2**	**2**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**2**	**2**	**-**
3	CO3	**3**	**2**	**3**	**-**	**3**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**1**	**2**	**-**
4	CO4	**3**	**3**	**3**	**2**	**3**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**2**	**2**	**-**
5	CO5	**3**	**3**	**3**	**2**	**3**	**-**	**-**	**-**	**2**	**-**	**-**	**-**	**3**	**2**	**2**	**-**

SYLLABUS

No.	Content	Hours	COs
I	Introduction, Decimation by a Factor D, Interpolation by a Factor I, Sampling Rate Conversion by a Rational Factor I/D, Filter Design and Implementation for Sampling rate Conversion. Multistage Implementation of Sampling Rate Conversion, Applications of Multirate Signal Processing, Sampling Rate Conversion of Bandpass Signals.	**7**	**CO1**
II	Linear Prediction and Optimum Linear Filters Innovations Representation of a Stationary Random Process, Forward and Backward linear prediction, Solution of the Normal Equations, Properties of linear prediction-Error Filter, AR Lattice and ARMA Lattice-Ladder Filters.	**7**	**CO2**
III	Adaptive Filters Adaptive direct-form FIR Filters- LMS Algorithms, Adaptive Direct-Form Filter- RLS Algorithms, Adaptive Lattice-Ladder Filters.	**7**	**CO3**
IV	Power Spectral Estimation Estimation of Spectra from Finite Duration Observations of a Signal, Periodogram, Nonparametric Methods for Power Spectral Estimation: Bartlett, Welch, Blackman and Tukey methods, Comparison of performance of Non-Parametric Power Spectrum Estimation Methods.	**7**	**CO4**
V	Parametric Methods for Power spectrum estimation Relationship between Auto-Correlation and Model Parameters, Yule-Walker method for AR model parameter, Burg method for AR model parameter, Unconstructrained Least Squares Methods for AR model parameter, Sequential Estimation methods for AR model parameter, Moving Average(MA) and ARMA Models Minimum Variance Method.	8	**CO5**
	Total Hours	**36**	

Essential Readings

1. Proakis JG and Manolakis DG, "Digital Signal Processing Principles, Algorithms and Application", Pearson, 4rd edition, 2007
2. Openheim AV and Schafer RW, "Discrete Time Signal Processing", Pearson, 3rd edition, 2010.

Supplementary Readings

1. Gopi ES, "Algorithm collections for Digital Signal Processing Applications using Matlab", Springer, 1st edition, 2007.