FIRST SEMESTER

Course No: 09EC6311 Credits: 3-1-0: 4 Year:

2015 Course Title: MATHEMATICS FOR COMMUNICATION

ENGINEERING

Pre-requisites: Nil

Objective:

This course is intended to provide the necessary Mathematical foundation needed for the subjects to be dealt with in the program. After the completion of the course, the student should have a thorough understanding of Linear Algebra, Random Processes and their applications.

Syllabus:

Linear Algebra: Vector space, Linear Transformations, Matrix representation of linear transformations, Random Variables, distributions, Elements of stochastic process, Markov Chains, Continuous time Markov Chains, second order stochastic processes, Spectral Density, linear prediction and filtering.

Course Outcome:

The student will have a thorough understanding of Linear Algebra, Random Processes and their applications.

References:

1. Kenneth Hoffman and Ray Kunze, Linear Algebra, 2nd Edition, PHI.
2. Erwin Kreyszig, Introductory Functional Analysis with Applications, John Wiley & Sons.
3. Irwin Miller and Marylees Miller, John E. Freund's Mathematical Statistics, 6th Edition, PHI.
4. S. Karlin & H.M Taylor, A First Course in Stochastic Processes, 2nd edition, Academic Press, New York.
5. S. M. Ross, Introduction to Probability Models, Harcourt Asia Pvt. Ltd. and Academic Press.
6. J. Medhi, Stochastic Processes, New Age International, New Delhi.
7. A Papoulis, Probability, Random Variables and Stochastic Processes, 3rd Edition, McGraw Hill.
8. John B Thomas, An Introduction to Applied Probability and Random Processes, John Wiley & Sons.

Internal continuous assessment: 40 marks

COURSE PLAN

Course No:**09EC6311** Title: **MATHEMATICS FOR COMMUNICATION ENGINEERING** (L-T-P): 3-1-0 Credits :4		
Module	Contact hours	% marks in end semester exam
Module I: Linear Algebra: Vector spaces, subspaces, Linear dependence, Basis and Dimension, Inner product spaces, Gram-Schmidt Orthogonalization Procedure, Linear transformations, Kernels and Images , Matrix representation of linear transformation, Change of basis, Eigen values and Eigen vectors of linear operator, Quadratic form.	14	25
Module II: Operations on random variables: Random Variables, Distributions and Density functions, Moments and Moment generating function, Multivariate distributions,	7	12
FIRST INTERNAL TEST		
Independent Random Variables, Marginal and Conditional distributions, Conditional Expectation, Transformation of Random Variables , Elements of stochastic processes, Classification of general stochastic processes.	7	13
Module III: Random Processes: Markov Chains- Definition, Examples, Transition Probability Matrices of a Markov Chain, Classification of states and chains, Basic limit theorem, Limiting distribution of Markov chains. Continuous Time Markov Chains: General pure Birth processes and Poisson processes, Birth and death processes, Finite state continuous time Markov chains	14	25
SECOND INTERNAL TEST		
Module IV: Second Order Processes: Second Order Stochastic Processes, Linear operations and second order calculus, Stationary processes, Wide sense Stationary processes, Spectral density function, Low pass and band pass processes, White noise and white noise integrals, Linear Predictions and Filtering.	14	25
END SEMESTER EXAMINATION		