

Course Code	Course Title	L	T	P	C
1151EC101	MATHEMATICS FOR ELECTRONICS AND COMMUNICATION ENGINEERS	2	2	0	3

a) Course Category

Program core

b) Preamble

With rapid advancement in different branches of knowledge, a student of electronics and communication engineering has to possess analytical skills for finding solutions to several real life problems. This course provides an overview of various mathematical techniques for solving different kinds of problems that occur in Engineering.

c) Prerequisite

Nil

d) Related Courses

Transforms and Partial Differential Equations

e) Course Outcomes

Upon the successful completion of the course, students will be able to:

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Solve application problems of systems of linear equations	K3
CO2	Calculate simple Probability measures for discrete and continuous cases of random sample spaces e.g., uniform distributions over sample spaces.	K3
CO3	Examine the random experiments specified by two random variables and study the Distribution of their distributions	K3
CO4	Determine covariance and spectral density of stationary random processes	K3
CO5	Derive numerical methods for various mathematical Operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.	K3

f) Correlation of COs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	H	H	-	H	H	-	-	-	-	-	-	H	L	-
CO2	H	H	-	H	H	-	-	-	-	-	-	H	L	-
CO3	H	H	-	H	H	-	-	-	-	-	-	H	L	-
CO4	H	H	-	H	H	-	-	-	-	-	-	H	L	-
CO5	H	H	-	H	H	-	-	-	-	-	-	H	L	-

g) Course Content

UNIT I LINEAR ALGEBRA 12

Vector Spaces and Subspaces -Definition and Examples, Linear Dependence and Independence Basis, Linear Transformation, Rank of a matrix, Homogeneous linear equations.

UNIT II RANDOM VARIABLES 12

Random Variables, Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Uniform, Gaussian, Raleigh, Rician probability distributions.

UNIT III TWO – DIMENSIONAL RANDOM VARIABLES 12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and linear regression.

UNIT IV RANDOM PROCESSES 12

Random Processes-Classification – Stationary process – Markov process – Poisson process.

UNIT V NUMERICAL METHODS 12

Solution of an equation by Newton –Raphson method. Solution of system of linear equations Gaussian elimination and Gauss-Jordon methods. Gauss –Jacobi and Gauss-Siedel methods. Interpolation- Newton’s forward and backward difference formulas-Lagrange method.

Total 60 Hrs

h) Learning Resources

Text Books

1. Kenneth M Hoffman, Ray Kunze, Linear Algebra, Prentice Hall, New Jersey, 1971.
2. Peebles JR. P.Z., Probability Random Variables and Random Signal Principles, Tata McGraw-Hill Publishers, Fourth Edition, New Delhi, 2002.
3. ShankerRao,G., Numerical Analysis, New Age International, New Delhi, 2006.

Reference Books

1. G. Strang, Linear Algebra and its Applications, Cenage Learning, Singapore, 2006.
2. T.K Moon and W.C Stirling, Mathematical Methods and Algorithms for Signal Processing, Pearson Education, New Jersey, 2000.
3. Oliver C. Ibe, Fundamentals of Applied Probability and Random Processes, Elsevier, First Indian Reprint, New Delhi, 2007.
4. H. Stark and J.W. Woods, Probability and Random Processes with Applications to Signal Processing, Pearson Education (Asia), 3rd Edition, New Delhi, 2002.
5. Chapra, S. C and Canale, R. P. Numerical Methods for Engineers, 5th Edition, Tata McGrawHill, New Delhi, 2007.

Online Resources

1. ocw.mit.edu/courses/mathematics/18-06-linear-algebra-spring-2010/
2. <http://nptel.ac.in/courses/117105085>
3. <http://ocw.mit.edu/courses/mathematics/18-335j-introduction-to-numerical-methods-fall-2004/>