

Shri G.S Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. I Year MA 10021: Mathematics for Engineers

Total No. of Units: 5

Total No. of Lectures: 25

LECTURE PLAN

<u>S.No.</u>	<u>Topic</u>	<u>No. of Lectures</u>
UNIT 1		
1.	Contributions of Indian mathematicians	01
2.	Partial derivatives: Definition, Jacobians	01
3.	Expansion of functions by Taylor's and Maclaurin's series of two variables	01
4.	Maxima and Minima of functions of two variables	01
UNIT 2		
5.	Beta and Gamma functions	01
6.	Elementary ideas of multiple integrals	01
7.	Change of order of integration	01
8.	Change of variables in double integrals using Jacobians	01
UNIT 3		
9.	Rank of a matrix by Echelon form and Normal form , Inverse of matrices by Gauss- Jordan method	02
10.	System of linear equations, Eigen values, Eigen vectors with their properties and applications	03
11.	Cayley-Hamilton theorem : Finding inverse and power of a matrix by Cayley Hamilton Theorem	01
UNIT 4		
12.	Ordinary Differential Equations: Linear differential equations with constant coefficients	04
13.	Second order linear differential equations with variable coefficients	01
14.	Method of variation of parameters	01
15.	Application to simple problems	02
UNIT 5		
16.	Introduction to Fuzzy Sets, Classical sets vs Fuzzy sets, Crisp set characteristics	01
17.	Membership Functions, Definition and representation, Types of membership functions, Properties of membership functions	01
18.	Normality, Convexity, Support, Operations on Fuzzy Sets: Union, Intersection, and Complement, Applications of Fuzzy Sets	01

Shri G.S Institute of Technology and Science
Department of Applied Mathematics and Computational Science
B.Tech. I Year MA 10509: Mathematics for Data Science

Total No. of Units: 5

Total No. of Lectures: 25

LECTURE PLAN

<u>S.No.</u>	<u>Topic</u>	<u>No. of Lectures</u>
UNIT 1		
1.	Contribution of Indians in Development of Statistics and Data Science	02
2.	Measures of Central Tendency – Mean, Mode and Median with examples	01
3.	Measures of Dispersion - Range, Quartile, Mean Absolute Deviation with examples	01
4.	Standard Deviation with examples	01
UNIT 2		
5.	Basic introduction of Probability. Mathematical and Classical definitions of probability	01
6.	Composition of events, Addition theorem of probability with examples	01
7.	Conditional probability, Multiplication theorem of probability, Bayes' Theorem	01
8.	Probabilistic Distributions – Binomial, Poisson, and Normal Distributions	02
UNIT 3		
9.	Random Variables: Discrete random variables and Continuous random variables	01
10.	Probability Mass Function, Probability Density Function, Cumulative Distribution Function	02
11.	Mathematical Expectation or mean of random variable	01
12.	Variance of random variables with examples	01
13.	Practice question based on mean Variance of random variables	T(1)
UNIT 4		
14.	Inferential Statistics: Population and sample, parameter and statistics. Sampling: Methods of sampling (random, stratified, systematic, cluster)	01
15.	Hypothesis testing: Null and Alternative hypotheses, Type-I and Type-II errors, level of significance	01
16.	Parametric tests t-test, z-test, F-test with examples	01
17.	Correlation and: Karl Pearson and Spearman Rank Correlation coefficient	01
18.	Regression: Types of Regression Models, Simple Linear Regression	01
UNIT 5		
19.	Basic Introduction to data tools, MS-Excel, R-Programming and MATLAB for data analysis	02
20.	MS-Excel for data analysis with case studies	01
21.	R-Programming for statistical computing and case studies	01
22.	MATLAB tools for engineering applications and Case studies	01