Permutations , Product of permutations, Group property of permutations, Cyclic permutation , Transposition , Even and Odd permutations, Proposition regarding permutations , Alternating Groups , Dihedral groups.
Discussion on some physical examples e.g. the motion group of a cube.

MODULE-III – GROUP THEORY II (12L)

Order of an element of a group , Properties of the order of an element of a group , Subgroups , some basic theorems on subgroups, Cyclic group , Cosets , Lagrange's theorem, Fermat's Little Theorem(statement only).
Normal subgroup, some basic theorems on Normal subgroup, Quotient group , some applications in algebraic coding theory e.g. Block codes , Linear codes , Coset decoding etc.

MODULE-IV- MORPHISMS, RING AND FIELD (12L)

Homomorphism and Isomorphism of groups, some basic theorems.
Rings , some elementary properties of a ring, Ring with unity , Characteristic of a ring, Ring with zero divisors, Subring , Integral domain, Field , Division Ring or Skew Field.(Emphasis should be given on examples and elementary properties.)

References:

1. Higher Algebra, S.K.Mapa, Sarat Book Distributors
2. Advanced Higher Algebra, J.G. Chakravorty and P.R. Ghosh, U.N. Dhur and Sons
3. A First course in Abstract Algebra, J.B.Fraleigh, Narosa
4. Algebra, M.Artin, Pearson
5. Discrete Mathematics and its Applications, Kenneth H Rosen, McGraw Hill
6. Discrete Mathematics For Computer Scientists And Mathematicians

   Joe R. Mott , Abraham Kandel and Theodore P. Baker, Prentice-Hall Of India
7. A Friendly Introduction to Number Theory, Joseph H Silverman, Pearson
8. Topics in Algebra, I.N.Herstein, Wiley India
9. Advanced Algebra, Samuel Barnard and James Mark Child, Macmillian

Subject Name: Probability and Numerical Methods					
Paper Code: MATH 2202					
Contact Hours per week	**L**	**T**	**P**	**Total**	**Credit Points**
	3	**1**	**0**	**4**	**4**

MODULE-I – NUMERICAL METHODS (16L)

SOLUTION OF NON-LINEAR ALGEBRAIC EQUATIONS AND TRANSCENDENTAL EQUATIONS:

Bisection Method, Newton-Raphson Method, Regula-Falsi Method.

SOLUTION OF LINEAR SYSTEM OF EQUATIONS:

Gauss elimination method, Gauss-Seidel Method, LU Factorization Method.

INTERPOLATION AND INTEGRATION:

Newton's Forward and Backward Interpolation Method, Lagrange's Interpolation, Trapezoidal and Simpson's 1/3rd Rule.

SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS:

Euler's and Modified Euler's Method , Runge-Kutta Method of 4th order.

MODULE-II – FUNDAMENTALS OF PROBABILITY (5L)

Prerequisites- Set Theory.

Random experiment, Sample space , Events .

Definition of Probability ,

Addition law of probability, Multiplication law and Conditional Probability.

Bayes' Theorem (Statement only)

MODULE-III – PROBABILITY DISTRIBUTIONS AND STATISTICS (15L)

Random Variables – Discrete and Continuous, Probability Mass Function, Probability Density and Cumulative Distribution Functions, Mathematical Expectation and Variance.

Special Distributions: Binomial, Poisson, Uniform, Exponential and Normal.

Measures of Central Tendency and Dispersion – Mean, Median, Mode and Standard Deviation for grouped and ungrouped frequency distribution.

Simple Correlation and Regression.

MODULE –IV- MARKOV CHAINS AND JOINT PROBABILITY DISTRIBUTION (12L)

Definition of Discrete Time Markov Chain. Examples Including Random Walk, Ehrenfest Chain and Birth-Death Chain, Transition Matrix, Chapman-Kolmogorov Equation and its application.

Joint distribution using joint probability mass/density function. Finding marginal pmf/pdf from joint. Multiplicative property of joint pmf/pdf in case of independent random variables.

References:

1. Miller & Freund's Probability and Statistics for Engineers, R.A.Johnson, Prentice Hall of India

2. Numerical Mathematical Analysis, J.B.Scarborough, Oxford and IBH Publishing Co. Pvt. Ltd.

3. Numerical Methods (Problems and Solution), Jain, Iyengar , & Jain, New Age International Publishers

4. Fundamentals of Mathematical Statistics, S.C. Gupta and V.K. Kapoor, Sultan Chand & Sons

5. A First course in Probability, Sheldon Ross, Pearson

6. Introduction to Stochastic Processes, Paul G. Hoel, Sidney C. Port & Charles J. Stone University Bookstall, New Delhi (Houghton Pliffin Company, 1972)

7. Introduction to Probability Models, Sheldon Ross, Elsevier India

Subject Name: Design & Analysis of Algorithms					
Paper Code: CSEN 2201					
Contact Hours per week	**L**	**T**	**P**	**Total**	**Credit Points**
	3	**1**	**0**	**4**	**4**

Module I

1. Algorithm Analysis (7 Lectures)

Time and space complexity. Asymptotic Notations and their significance.