

2000-2001

MSc Phys, MSc (Tech) Electron, MSc. Andhra
Science, MSc Spec. Chem

2000-2001

ANDHRA UNIVERSITY

M.Sc. ELECTRONICS

II SEMESTER

3/10/20

SSP-S201

P 201. "MATHEMATICAL METHODS OF PHYSICS - II.

UNIT - I.

1. Tensor Analysis:

10 Hrs.

Introduction, Transformation of Coordinates, Contravariant, Covariant and Mixed tensors, Addition and multiplication of tensors, contraction and Quotient law The line element, fundamental tensors, covariant differentiation, covariant derivatives of vectors and tensors, Christoffel Symbols, Transformation laws of Christoffel Symbols.

BARRY SPAIN : Chapter 1, 2 and 3.

2. GROUP THEORY:

15 Hrs.

Definition, Subgroups, Conjugate subgroups, Isomorphism, Representation of groups, Character, Direct product, Cyclic group, Symmetric Group, Unitary group, Two-and Three dimensional Rotational groups, Dihedral group, Crystallographic point groups, generators, SU(2), SU(3) and homogeneous Lorentz groups, Applications of group Theory.

MARGENAU and MURPHY ----- Chapter 15.

ARFKEN

----- Chapter 4 Sections 7 to 12.

UNIT - II.

3. INTEGRAL EQUATIONS:

10 Hrs.

Introduction, Integral Transforms, generating functions, Neumann's Series, Separable Kernels, Green's functions - one dimension, Green's functions - two - and three - dimensions.

ARFKEN : Chapter 16, Sections 1,2,3,5 and 6.

4. NUMERICAL METHODS:

15 Hrs.

Finite Differences, Numerical Interpolation - Newton's and Lagrange's formula.

Numerical integration - Trapezoidal and Simpson's rules.

Roots of equations: Newton - Raphson method, Iterative method, bisection method. Gaussian elimination method for solving linear equations. Solutions of ordinary differential equations -

Taylor's, Euler's, Adam's and Runge - Kutta methods. Numerical Solution of Partial

differential equations -Wave equation, Laplace equation and heat conduction equation.

S.S.SASTRY - Chapter 2,3,5,7 & 8.

TEXT BOOKS: 1. "Tensor Calculus " by Barry Spain, Radha Publishing House, Calcutta.

2. "The Mathematics of Physics and Chemistry" by MARGENAU AND MURPHY, Affiliated East-West Press, New Delhi.

3. "Mathematical Methods for Physicists" by G.ARFKEN. Academic Press New York.

4. "Introductory Methods of Numerical Analysis " by S.S.SASTRY. Prentice Hall of India, New Delhi.

Reference Books: 1. Tensors and Matrices in Physics by A.W.Joshi, Wiley Eastern Ltd., New Delhi.

2. Group Theory for Physicists by A.W.Joshi, Wiley Eastern Ltd., New Delhi.

3. "Numerical Methods " by V.N.Vedamurthy and N.Ch.S.N.Iyengar.

4. "Numerical Methods for Scientific and Engineering Computation" by Jain, Iyengar and Jain, Wiley Eastern Ltd., New Delhi.

5. "Mathematical Physics " by E.BUTKOV, Addison-Wesley Publishing Company, Reading, MASS