**SECOND SEMESTER**

**MTS 2 C02: MATHEMATICS-2**

**4 hours/week 3 Credits 75 Marks [Int:15+Ext:60]**

**Text (1) Calculus I (2/e): Jerrold Marsden & Alan Weinstein Springer-Verlag New York Inc (1985) ISBN 0-387-90974-5**

**Text (2) Calculus II (2/e): Jerrold Marsden & Alan Weinstein Springer-Verlag New York Inc (1985) ISBN 0-387-90975-3**

**Text (3) Advanced Engineering Mathematics(6/e): Dennis G Zill Jones & Bartlett Learning, LLC (2018) ISBN: 978-1-284-10590-2**

**Module- I** Text (1) & (2) 14 hrs 5.1: Polar coordinates and Trigonometry – Cartesian and polar coordinates (Only representation of points in polar coordinates, relationship between Cartesian and polar coordinates, converting from one system to another and regions represented by inequalities in polar system are required) 5.3 : Inverse functions-inverse function test, inverse function rule 5.6: Graphing in polar coordinates- Checking symmetry of graphs given in polar equation, drawings, tangents to graph in polar coordinates 8.3: Hyperbolic functions- hyperbolic sine, cosine, tan etc., derivatives, anti differentiation formulas 8.4: Inverse hyperbolic functions- inverse hyperbolic functions (their derivatives and anti derivatives) 10.3: Arc length and surface area- Length of curves, Area of surface of revolution about x and y axes

**Module- II** Text (2) 17 hrs 11.3: Improper integrals- integrals over unbounded intervals, comparison test, integrals of unbounded functions 11.4: Limit of sequences and Newton’s method ε-N definition, limit of powers, comparison test, Newton’s method 11.5: Numerical Integration- Riemann Sum, Trapezoidal Rule, Simpson’s Rule 82 Page 84 of 100 12.1: The sum of an infinite series- convergence of series, properties of limit of sequences (statements only), geometric series, algebraic rules for series, the i th term test 12.2: The comparison test and alternating series- comparison test, ratio comparison test, alternating series, alternating series test, absolute and conditional convergence

**Module- III** Text (3) 19 hrs 7.6: Vector spaces – definition, examples , subspaces, basis, dimension, span 7.7: Gram-Schmidt Orthogonalization Process- orthonormal bases for ℝn , construction of orthonomal basis of ℝn 8.2: Systems of Linear Algebraic Equations- General form, solving systems, augmented matrix, Elementary row operations, Elimination Methods- Gaussian elimination, Gauss– Jordan elimination, row echelon form, reduced row echelon form, inconsistent system, networks, homogeneous system, over and underdetermined system 8.3: Rank of a Matrix- definition, row space, rank by row reduction, rank and linear system, consistency of linear system 8.4: Determinants- definition, cofactor (quick introduction) 8.5: Properties of determinant- properties, evaluation of determinant by row reducing to triangular form

**Module- IV** Text (3) 14 hrs 8.6: Inverse of a Matrix – finding inverse, properties of inverse, adjoint method, row operations method, using inverse to solve a linear system 8.8: The eigenvalue problem- Definition, finding eigenvalues and eigenvectors, complex eigenvalues, eigenvalues and singular matrices, eigenvalues of inverse 8.9: Powers of Matrices- Cayley Hamilton theorem, finding the inverse 8.10: Orthogonal Matrices- symmetric matrices and eigenvalues, inner product, criterion for orthogonal matrix, construction of orthogonal matrix 8.12: Diagonalization- diagonalizable matrix-sufficient conditions, orthogonal diagonalizability of symmetric matrix, Quadratic Forms

**References:** 1 Soo T Tan: Calculus Brooks/Cole, Cengage Learning(2010 )ISBN 0-534-46579-X

2 Gilbert Strang: Calculus Wellesley Cambridge Press(1991)ISBN:0-9614088-2-0

3 Ron Larson. Bruce Edwards: Calculus(11/e) Cengage Learning(2018) ISBN: 978-1-337- 27534-7

4 Robert A Adams & Christopher Essex : Calculus Single Variable (8/e) Pearson Education Canada (2013) ISBN: 0321877403

5 Joel Hass, Christopher Heil & Maurice D. Weir : Thomas’ Calculus(14/e) Pearson (2018) ISBN 0134438981

6 Advanced Engineering Mathematics(7/e) Peter V O’Neil: Cengage Learning(2012)ISBN: 978-1-111-42741-2

7 Erwin Kreyszig: Advanced Engineering Mathematics(10/e) John Wiley & Sons(2011) ISBN: 978-0-470-45836-5

8 Glyn James: Advanced Modern Engineering Mathematics(4/e) 1 Pearson Educatio