

<b>Subject Code: MA1L004</b>	<b>Name: Linear Algebra and Complex Analysis</b>	<b>L-T-P-C: 3-1-0-4</b>
<b>Prerequisite:</b> None		
<p><b>Linear Algebra:</b></p> <p>Module 1: (Systems of Linear Equations and Vector Spaces) (7 Hours) System of linear equations, Consistency conditions, Elementary row operations, Matrix inversion by row operations; Vector spaces, Subspaces, span, Linear dependence, independence of vectors, Basis, dimension</p> <p>Module 2: (Linear Transformations and Associated Matrices) (6 Hours) Linear transformations, Range, Kernel, Rank, Nullity of linear transformation, Space of all linear transformations, Cayley Hamilton Theorem, Matrix associated with a linear map, Linear map associated with a matrix</p> <p>Module 3: (Eigenvalues and Eigenvectors) (5 Hours) Eigenvalues and eigenvectors, Hermitian and skew Hermitian matrices, Orthogonal and unitary matrices.</p> <p><b>Complex Analysis:</b></p> <p>Module 4: (Analytic Functions) (6 Hours) Limit, continuity, differentiability and analyticity of functions Cauchy-Riemann equations (Cartesian and polar), Harmonic functions, Elementary complex functions</p> <p>Module 5: (Integration Over Closed Curves) (6 Hours) Line integrals, Upper bounds for moduli of contour integrals, Cauchy's integral theorem, Cauchy's integral formula, Derivatives of analytic functions</p> <p>Module 6: (Series Expansion and Residue Theorem) (6 Hours) Power series, Taylor's series, Laurent's series, Zeros and singularities, Residue theorem, Evaluation of improper integrals by residue theorem</p> <p><b>Text Books:</b></p> <ol style="list-style-type: none"> <li>1. Strang G. Linear Algebra and its applications, Cengage Learning</li> <li>2. Hoffman K. and Kunze R. Linear Algebra, Pearson Pub</li> <li>3. Churchill R.V. and Brown J.W. Complex Variables and Applications, Mc-Graw Hill</li> </ol> <p><b>Reference Books:</b></p> <ol style="list-style-type: none"> <li>1. Kreyszig E. Advanced Engineering Mathematics, John Wiley &amp; Sons</li> <li>2. Jain R. K. and Iyengar S. R. K. Advanced Engineering Mathematics, Narosa</li> <li>3. Axler S. Linear Algebra Done Right, UTM, Springer</li> </ol>		