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|  | **Tentative lectures break up for MATHEMATICS-II(Spring 2016-17)** |  |
| **Chapter** | **Linear Algebra(10 Lectures)** |  |
| 1 | **i**.Algebra of matrices, Vector spaces, basis and dimension, Linear Transformation, linear dependence and independence of vectors**,[K 7.1, 7.2, 7.9] (3 Lectures)**  **ii .** Rank of a matrix and its properties, Solution of system of equations using rank concept**[K 7.4,7.5] (2 Lectures)**  **iii.** Hermitian, Skew Hermitian and Unitary matrices, eigenvalues, eigenvectorsandeigenvalues of Hermitian, Skew Hermitian and Unitary matrices**[ K 8.1, 8.3] (3 Lectures)**  **v**. Similarity of matrices & Diagonalization**[K 8.4] (1 Lecture)** |  |
| 2 | **Numerical Analysis(8 Lectures)** |  |
|  | **i.**Relative error, Round off errors and accuracy.  **ii**. Gauss elimination method to solve system of linear equations (homo& non-homo) **[K 7.3, 20.1]**  **(1 Lecture)**  **iii.** Iterative method for solution of system of linear equations, Jacobi and Gauss Seidal method  **[K 20.1, 20.3] (1 Lecture)**  **iv.** Solution of transcendental equations: Bisection, Fixed point Iteration(Sufficient conditions for its convergence, order of convergence) , Newton-Raphson methods( including order of convergence) **[K 19.2, and Page 805 in K or page 796 in K1] (2 Lectures)**  **v.** Finite differences, interpolation, error in interpolation polynomial, Newton's forward and backward interpolation formulae, Lagranges interpolation and error estimates **[K 19.3] (2 Lectures)**  **vi.** Numerical integration: Trapezoidal rule with error bounds and Simpson's 1/3rd rules error bounds. **[K 19.5, Except differentiation] (2 Lectures)** |  |
| 3 | **Integral Calculus(10 Lectures)** |  |
|  | **i**. Convergence of improper integrals, test of convergence **[P-I: 11.7, SN 13.4, SN 13.63] (2 Lectures)**  **ii**. Beta and Gamma functions with their elementary properties **[SN- 7.1-7.5]** **] (2 Lectures)**  **iii.** Differentiation under integral sign, differentiation of integrals with variable limits - Leibnitz rule **[P-I: 11.10]** **] (1 Lecture)**  **iv.** Double **[P-II: 2.1-2.3],** Change in order of integration **[SN 12.4]** **(2 Lecture)**  **v.** Change of variables in double integrals - Jacobians of transformations  **[P-II: 2.6, 2.13],** Triple integrals **[P-II: 2.11,--2.12]** **(2 Lectures)**  **vi.** Computations of surfaces, area and volumes **[P-II: 2.4,2.7]**  **vii.** Integrals dependent on parameters applications **[P-II: 2.15]** **(vi & vii both 1 Lecture)** |  |
| 4 | **Vector Calculus(7 Lectures)** |  |
|  | **i.** Scalar and vector fields, level surfaces; limit, continuity and differentiability  of vector functions, Curves and Arc-Length **[K 9.4, 9.5(except curvature and Torsion)] (2 Lectures)**  **ii.** Directional derivative, Gradient, Curl and Divergence and geometrical  interpretation **[K 9.7, 9.8, 9.9] (2 Lectures)**  **iii.** Line and surface integrals, theorems of Green, Gauss and Stokes, line integrals independence of path. **[K 10.1, 10.2, 10.4, 10.5, 10.6, 10.7, 10.9] (3 Lectures)** |  |

**References:**

[K]: Kreyszig: Advanced Engineering Mathematics, 10th Edition

[K1]: Kreyszig: Advanced Engineering Mathematics, 9th Edition

[SN] : S. Narayan and R. K. Mittal: Integral Calculus, Revised Edition

[P-I, P-II respectiely]: N. Piskunov: Differential and Integral Calculus Volume I & II, Reprint 1999