# 17SH1204 - ENGINEERING MATHEMATICS - I

(Common to all Branches)

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| **Course Category:** | Basic Sciences | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture - Tutorial - Practical:** | 3-1-0 |
| **Prerequisite:** | Intermediate Mathematics | **Sessional Evaluation:**  **Univ. Exam Evaluation:**  **Total Marks:** | 40  60  100 |
| **Objectives** | Students undergoing this course are expected to understand:   * The basic concepts of Matrices. * Solving Higher Order Differential Equations with RHS of different types by using analytical techniques. * Taylor’s and Maclaurin’s series, Maxima and Minima of the functions of two and three variables. * The concepts of Double and Tripple integrals, Areas and Volumes. * The Gradient, Divergence and Curl operators, Solenoidal and Irrotational vectors. * The basic concepts of Vector Integration. | | |

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| **Course Outcomes** | After completing the course the student will be able to | |
| CO1 | Understand effectively the analyzation of the Rank of the matrix, Consistency of system of linear equations, Eigen values and Eigen vectors. |
| CO2 | Acquire knowledge in solving higher order differential equations by using various types. |
| CO3 | Attains skills in analyzing the Taylor’s and Maclaurin’s series and Maxima and Minima of the functions of two and three variables. |
| CO4 | Apply Double and Tripple integrals to find Areas and Volumes. |
| CO5 | Understand effectively Curl, Divergence and Gradient operators, Solenoidal and Irrotational vectors with their applications. |
| CO6 | Acquire knowledge in analyzing the applications of Green’s, Stoke’s and Gauss-divergence theorems. |
| **Course Content** | UNIT-I  **Matrices:** Rank of Matrix - Echelon Form and Normal Form - Consistency of system of linear equations- Eigen values and Eigen vectors.  UNIT-II  **Higher Order Differential Equations:** Homogeneous linear differential equations of second and higher order with constant coefficients with R.H.S. of the type, or,,V and .  UNIT-III  **Differential Calculus:** Taylor’s and Maclaurin’s series - Maxima and Minima of function of two variables - Lagrangian method of multipliers with three variables only.  UNIT-IV  **Multiple Integrals:** Double and Triple integrals - Change of order of integration - Change to polar coordinates - Area and Volumes by Double integration - Volume by Triple integration.  UNIT-V  **Vector Differentiation:** Gradient, Divergence, and Curl - Solenoidal and Irrotational vectors.  UNIT-VI  **Vector Integration:** Line, Surface and Volume integrals - Green’s, Stoke’s and Gauss-divergence theorem (without proof), Applications to theorems. | |
| **Text Books and References** | Text Books:   1. Higher Engineering Mathematics-B.S. Grewal, Khanna Publishers, New Delhi. 2. Engineering Mathematics – B.V. Ramana, Tata McGraw-Hill Education Pvt. Ltd, New Delhi. | |
| Reference Books:   1. Higher Engineering Mathematics - H.K. Dass, Er. Rajnish Verma, S. Chand Publication, New Delhi. 2. Advanced Engineering Mathematics - N.P. Bali & M. Goyal, Lakshmi Publishers, New Delhi. 3. Engineering Mathematics-I& II - Dr.T.K.V. Iyengar, Dr.B. Krishna Gandhi, S. Ranganatham, Dr.M.V.S.S.N. Prasad, S. Chand Publication, New Delhi. 4. Advanced Engineering Mathematics - Erwin Kreyszig, Wiley, India. | |