**17SH1204 - ENGINEERING MATHEMATICS - I**

**(Common to all Branches)**

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| **Course Category** | Basic Science | **Credits** | 4 |
| **Course Type** | Theory | **Lecture-Tutorial-Practical** | 3 - 2 - 0 |
| **Prerequisite** | Intermediate Mathematics | **Sessional Evaluation**  **Semester End Evaluation**  **Total Marks** | 40  60  100 |

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| **Course**  **Objectives** | 1. The basic concepts of matrices. 2. Solving Higher order differential equations with RHS of different types by using analytical techniques. 3. Taylor’s and Maclaurin’s series, maxima and minima of the functions of two and three variables. 4. The concepts of double and triple integrals, areas and volumes. 5. The gradient, divergence and curl operators, Solenoidal and irrotational vectors. 6. The basic concepts of vector integration. | |
| **Course**  **Outcomes** | 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 triple 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. |
|  | **UNIT-I**  **MATRICES:** Rank of matrix - Echelon form and Normal form - Consistency of system of linear equations - Eigen values and Eigen vectors. | |
| **Course**  **Content** | **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 – 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. | | |
| **Textbooks**  **& References** | **TEXTBOOKS:**   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. RajnishVerma, S. Chand Publication, New Delhi. 2. Advanced Engineering Mathematics - N.P. Bali & M. Goyal, Lakshmi Publishers and 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. | |