**20SH1105-ENGINEERING MATHEMATICS –I**

**(**Common to all branches**)**

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| **Course Category:** | Basic Sciences | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture-Tutorial-Practical:** | 3-0-0 |
| **Pre -requisite:** | Intermediate Mathematics | **Sessional Evaluation:**  **External Evaluation:**  **Total Marks:** | 40  60  100 |

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| **Course**  **Objectives:** | To make the student learn about | |
| 1. The concepts of Newton’s law of cooling, Law of natural growth and decay. 2. Solving higher order differential equations with RHS of different types by using analytical techniques. 3. The concepts of first shifting theorem, Change of scale property, Laplace transformation of multiplied by t and division by t and transformation of derivatives and integrals. 4. The application of Solutions of Ordinary Differential Equations. 5. The basic concepts of Matrices. 6. Taylor’s and Maclaurin’s series, Maxima and Minima of the functions of two and three variables. | |
| **Course Outcomes:** | After completing the course the student will be able to | |
| **CO1** | Attains skills in solving first order differential equations and its applications. |
| **CO2** | Acquire knowledge in solving higher order differential equations by using various types. |
| **CO3** | Acquire basic knowledge in Laplace transforms and their applications. |
| **CO4** | Develop analytical skills in solving the Ordinary Differential Equations by using the Laplace transform technique. |
| **CO5** | Understand effectively the analyzation of the Rank of the matrix, Consistency of system of linear equations, Eigen values and Eigen vectors. |
| **CO6** | Attains skills in analyzing the Taylor’s and Maclaurin’s series and Maxima and Minima of the functions of two and three variables. |
| **Course**  **Content:** | **UNIT - I**  **First order Differential Equations**: Differential Equations of first order and first degree – exact, linear and Bernoulli. Applications to Newton’s law of cooling, Law of natural growth and decay.  **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**  **Laplace Transformation:** Laplace Transformations of standard functions, First shifting theorem, Change of scale property, Laplace transformation of multiple by t and division by t, Transformation of derivatives and integrals.  **UNIT - IV**  **Inverse Laplace Transformation:** Inverse transforms, Method of partial fractions, Shifting property, Inverse Laplace transform of a multiple by s and division by s, Inverse Laplace transform of derivatives and integrals, Convolution theorem. Application to Solutions of Ordinary Differential Equations.  **UNIT - V**  **Matrices:** Rank of Matrix by Echelon form, System of homogenous and non- homogenous linear equations, Eigen values and Eigen vectors and their properties.  UNIT - VI  **Differential Calculus:** Taylor’s and Maclaurin’s series , Maxima and Minima of function of two variables and Lagrangian method of multipliers with three variables only. | |
| **Textbooks:**  **& Reference Books:** | **TEXTBOOKS:**   1. Higher Engineering Mathematics - B.S.Grewal, Kanna 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. Advanced Engineering Mathematics - Erwin Kreyszig, Wiley, India | |