**17SH2201-ENGINEERING MATHEMATICS -III**

**(Common to ECE & EEE)**

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| **Course Category:** | Basic Sciences | **Credits:** | 3 |
| **Course Type:** | Theory | **Lecture -Tutorial-Practical:** | 2-2-0 |
| **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 one dimensional Wave equation, One dimensional Heat flow equation and Two dimensional Laplace equations. 2. Legendre and Bessel functions. 3. The concepts of Cauchy - Riemann equations, Construction of Analytic function, Applications to flow problems and Bilinear transformations. 4. Line integral, Cauchy’s theorem and Cauchy’s integral formula. 5. The concepts of Residues. 6. Random variables, Discrete and Continuous distributions. | |
| **Course Outcomes** | After completing the course the student will be able to | |
| CO1 | Have a sound knowledge in analyzing One-dimensional wave equation, Heat flow equation and Two-dimensional Laplace equations. |
| CO2 | Attains skills in analyzing the Bessel functions and Legendre functions. |
| CO3 | Understand effectively the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations. |
| CO4 | Recognize and apply the Cauchy’s integral formula and the generalized Cauchy’s integral formula. |
| CO5 | Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues. |
| CO6 | Have a well-founded knowledge of standard distributions (Binomial, Poisson and Normal distributions) which can describe real life phenomena. |
| **Course**  **Content** | **UNIT-I**  **Applications of Partial Differential Equations**: Methods of Separation of Variables - One dimensional Wave equation - One dimensional Heat flow equation - Two dimensional Laplace equations.  **UNIT-II**  **Special functions**: Bessel functions – Properties - Recurrence formulae for Bessel function - Generating function for Jn(x) - Orthogonality of Bessel Functions. Legendre functions - Rodrigue’s formula - Recurrence relation for Pn(x) - Generating function for Pn(x) - Orthogonality of Legender polynomials.  **UNIT-III**  **Complex Analysis-I**: Analytical functions, Cauchy - Riemann equations, Construction of Analytic function - Applications to flow problems - Harmonic and Conjugate harmonic functions - Bilinear transformations.  **UNIT-IV**  **Complex Analysis-II**: Complex integration - Line integral –Cauchy’s theorem - Cauchy’s integral formula - Generalized Cauchy’s integral formula.  **UNIT-V**  **Residues**: Taylor’s theorem and Laurent’s theorem (without proof) – Singularities – Poles - Residues - Residue theorem - Evaluation of real definite integrals.  **UNIT-VI**  **Probability and Statistics**: Introduction - Random experiments - Random variables - Discrete and Continuous distributions - Binomial distribution - Poisson distribution - Normal distribution. | |
| **Text Books and Reference Books:** | **TEXT BOOKS:**   1. Higher Engineering Mathematics - B.S. Grewal, Kanna Publishers, New Delhi. 2. Engineering Mathematics - B.V. Ramana, Tata Mc Graw-Hill Education Pvt. Ltd, New Delhi. 3. Advanced Engineering Mathematics - Erwin Kreyszig, Wiley, India   **REFERENCE BOOKS:**   1. Higher Engineering Mathematics - H.K. Dass, Er. RajnishVerma, S. Chand Publication, New Delhi. 2. Engineering Mathematics -III - Dr.T.K.V. Iyengar, Dr.B. Krishna Gandhi, S.Ranganatham, Dr.M.V.S.S.N. Prasad, S. Chand Publication, New Delhi 3. Special functions and complex variables (Engineering Mathematics-III) – Shahnaz Bathul, PHI, New Delhi. | |