**ENGINEERING MATHEMATICS –III**

**Code: 19SH2101**

**(*New regulations with effect from 2019 -20)***

**(Common to CE, MECH,EEE &ECE)**

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| **Course Category**  | Basic Science | **Credits** | 4 |
| **Course Type** | Theory | **Lecture - Tutorial -Practical** | 3 - 1 -0 |
| **Prerequisite**  | Intermediate Mathematics | **Sessional Evaluation**  | 40 |
| **Semester End Exam Evaluation** | 60 |
| **Total Marks** | 100 |

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| **Course Objectives** | To make the student learn about1. The basic concepts of numerical solutions of simultaneous linear and non-linear algebraic equations.
2. The numerical methods to solve Ordinary Differential Equations by using Taylor’s series method, Picard’s method, Euler’s and Modified Euler’s Methods and Runge-Kutta methods of 2nd and 4th order.
3. The concepts of Cauchy - Riemann equations, Construction of Analytic function, Line integral, Cauchy’s theorem and Cauchy’s integral formula.
4. The concepts of Residues.
5. The Properties of Z**-**Transforms, shifting properties, initial value and final value theorems and the applications of difference equations.
6. Foundation of the probability and statistical methods.
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| **Course Outcomes** | CO1 | Have a sound knowledge in analyzingthe simultaneous linear and non-linear algebraic equations by various numerical methods. |
| CO2 | Understand effectively the significancenumerical methods to solve Ordinary Differential Equations. |
| CO3 | Understand effectively the significance of differentiability for complex functions and be familiar with the Cauchy-Riemann equations and also Cauchy’s integral formula. |
| CO4 | Compute the Taylor and Laurent expansions of simple functions, determining the nature of the singularities and calculating residues. |
| CO5 | Attains skills in analyzingtheZ**-**Transforms and their applications. |
| CO6 | Have a well-founded knowledge of standard distributions (Binomial, Poisson and Normal distributions) which can describe real life phenomena. |
|  | **UNIT - I****SOLUTION OF SIMULTANEOUS LINEAR AND NON-LINEAR ALGEBRAIC EQUATIONS:** Iteration method, Gauss Jordon method, Gauss Elimination with Pivotal condensation method, Triangular Factorization method, Gauss-Seidal method and Newton-Raphson method. |

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| **Course Content** | **UNIT - II****NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS:** Solution by Taylor’s Series, Picard’s Method of Successive Approximations, Euler’s Methods and Runge-Kutta Method of 2nd order and 4th order.**UNIT - III****COMPLEX ANALYSIS:** Analytical functions, Cauchy - Riemann equations, Construction of Analytic function, Complex integration - Line integral, Cauchy’s theorem, Cauchy’s integral formula and Generalized Cauchy’s integral formula.**UNIT - IV****RESIDUES**: Taylor’s theorem and Laurent’s theorem (without proof), Singularities, Poles, Residues, Residue theorem and Evaluation of real definite integrals.**UNIT-V****Z-TRANSFORMS:**Z**-**Transform of some standard functions, Properties of Z**-**Transforms, Shifting Properties, Initial value theorem and final value theorem, Inverse Z-Transform, Convolution theorem, Inversion by partial fractions and Applications to difference equations.**Unit-VI****PROBABILITY AND STATISTICS**: Introduction, Random variables, Discrete and Continuous distributions, Binomial distribution, Poisson distribution and Normal distribution. |
| **Textbooks****& Reference books** | **TEXTBOOKS:**1. B.S. Grewal,*Higher Engineering Mathematics*,Khanna Publishers, New Delhi.
2. B. V. Ramana, *Engineering Mathematics,* Tata McGraw-Hill Education Pvt. Ltd, New Delhi.
3. Erwin Kreyszig,*Advanced Engineering Mathematics*, Wiley, India.

**REFERENCE BOOKS:**1. H.K. Dass, Er. RajnishVerma,*Higher Engineering Mathematics,* S. Chand Publication, New Delhi.
2. Dr.T.K.V. Iyengar, Dr.B. Krishna Gandhi, S. Ranganatham, Dr.M.V.S.S.N. Prasad,*Engineering Mathematics –III*, S. Chand Publication, New Delhi.
3. ShahnazBathul, *Special functions and complex variables (Engineering Mathematics-III)*, PHI, New Delhi.
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**CO-PO Mapping:**3-High Mapping, 2-Moderate Mapping, 1-Low Mapping, - -Not Mapping

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|   | **a** | **b** | **c** | **d** | **e** | **f** | **g** | **h** | **i** | **j** | **k** | **l** |
| **CO1** | 3 | 2 | - | 1 | 1 | - | - | - | - | - | - | 1 |
| **CO2** | 3 | 3 | 1 | 2 | 1 | - | - | - | - | - | 2 | 1 |
| **CO3** | 3 | 3 | 3 | 1 | 1 |  - |  - |  - |  - |  - |  - | 2 |
| **CO4** | 3 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | 2 |
| **CO5** | 3 | 3 | 2 | 2 | 1 | - | - | - | - | - | - | 2 |
| **CO6** | 3 | 3 | 1 | 1 | 1 | - | - | - | - | - | - | 1 |