

## **Engineering Mathematics –I :100011**

### **Course Objectives:**

- To understand the techniques of differential and integral calculus in engineering problems
- To expose to the concept of ordinary and partial differentiation
- To explore with matrix and its applications
- To understand Boolean algebra and graph theory

### **Unit 1:**

**Maclaurin's and Taylor's theorem, Partial differentiation, Euler's theorem, Jacobian, Maxima and Minima of one and two variables, Convergence of Sequence and series Test.**

### **Unit 2:**

**Definite integral as limit of a sum, application in summation of series, Beta and Gamma function and its properties, transformation of Beta function, Gamma functions, transformation of Gamma function, relation between Beta and Gamma function, Legendre's duplication formula, double & triple integral, Change of order of integration, Length of the curves, Volumes and surfaces.**

### **Unit 3:**

**Ordinary differential equations of first and higher order, Linear higher order differential equation with constant coefficients, Homogeneous linear differential equation and Simultaneous differential equations.**

### **Unit 4:**

**Matrix, Rank of Matrix, Echelon form, Normal form of matrix, Solution of simultaneous equation by elementary transformation, Consistency of equation, Eigen values and Eigenvectors, Normalized eigenvector, Cayley Hamilton theorem and its application to finding inverse of matrix.**

### **Unit 5:**

**Introduction to Algebra of Logic, statement, Logical connector, Types of Conditional statement, Logical equivalence, CNF and DNF, Algebraic laws, De Morgan's laws, Boolean algebra, Principle of duality basic theorems, Boolean expressions and function, DNF and CNF form and Switching circuit. Graph Theory, graph, Types of graphs, walk, path, circuit, Hamiltonian graph, Euler graph and its applications, Tree, Spanning tree and its properties.**

### **Course Outcomes**

After completing this course, student will be able to:

- CO1 Apply differential calculus in solving basic engineering problems
- CO2 Use integration techniques to determine the solution of various complex problems
- CO3 Solve linear higher order differential equation with constant coefficients
- CO4 Apply the concepts, terminology, methods and conventions of Matrix to solve the mathematical problems.
- CO5 Concept of Boolean algebra and graph theory

### **Recommended Books:**

1. E. Kreyszig: Advance Engineering Mathematics, John Wiley & Sons, 10<sup>th</sup> Edition (2011).
2. C.L Liu: Discrete Mathematics, 4<sup>th</sup> Edition 2012.
3. R. K. Jain, S. R. K. Iyengar: Advance Engineering Mathematics, Narosa Publishing House Pvt.Ltd, 5<sup>th</sup> Edition (2016).
4. F. B .Hildebrand: Advanced Calculus for application, Englewood Cliffs, N. J. Prentice- Hall, 2<sup>nd</sup> Edition (1980).
5. B. S. Grewal: Higher Engineering Mathematics, Khanna Publishers, 43<sup>rd</sup> Edition (2015).
6. B.V. Ramanna: Higher Engineering Mathematics, McGraw Hill Education, 1<sup>st</sup> Edition (2017).