

## **MA110 MATHEMATICS- I**

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**3-1-0**

### **COURSE OBJECTIVE:**

The objective of this foundational course is to review mathematical concepts already learnt in higher secondary. This course will also introduce fundamentals of mathematical functions, derivatives and aspects of calculus to students.

### **COURSE CONTENT:**

Recapitulation of Mathematics: Basics of Differentiation, Rolle's and Lagranges Theorem, Tangents and Normals, Indefinite Integral (Substitution, Integration using Trigonometric Identity & Integration by Parts & Definite Integral).

Ordinary Derivatives & Applications: Expansion of functions by Maclaurin's & Taylor's Theorem (One Variable), Maxima and Minima of functions of two variables, Curvature (Radius, Center & Circle of Curvature for Cartesian Coordinates), Curve Tracing.

Partial Derivatives & Applications: Definition, Euler's Theorem for Homogeneous Functions, Differentiation of Implicit Functions, Total Differential Coefficient, Transformations of Independent Variables, Jacobians, Approximation of Errors.

Integral Calculus: Definite Integrals as a Limit of Sum, Application in Summation of series, Beta and Gamma functions (Definitions, Relation between Beta and Gamma functions, Duplication formula, Applications of Beta & Gama Functions).

Applications of Integral Calculus: Multiple Integral (Double & Triple Integrals), Change of Variables, Change the Order of Integration, Applications of Multiple Integral in Area, Volume, Surfaces & Volume of Solid of Revolution about X-Axis & Y-Axis.

### **COURSE OUTCOMES**

The curriculum of the Department is designed to satisfy the diverse needs of students. Coursework is designed to provide students the opportunity to learn key concepts of mathematical functions, partial derivatives as well as fundamentals and applications of integral calculus.

### **EVALUATION**

Evaluation will be continuous an integral part of the class as well through external assessment.

### **REFERENCES**

*Michael Greenberg, Advanced Engineering Mathematics, Second Edition, Pearson Education, 2002 (Indian Edition).*

*B.V. Rammana, Higher Engineering Mathematics, Tata McGraw Hill Publishing Company, 2007. Potter, Goldberg & Edward, Advanced Engineering Mathematics, Oxford University Press.*

*S. S. Shastry, Engineering Mathematics, PHI Learning*

*C.B. Gupta, Engineering Mathematics I & II, McGraw Hill India, 2015*