

First year of Five Years integrated M. Sc. (Physics / Chemistry / Mathematics)**M.Sc. –I, Semester.-II****MM 102: Mathematics II**

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- **DIFFERENTIAL CALCULUS** (07 Hours)
Partial differentiation, Euler's theorem for homogeneous function, Modified Euler's theorem, Taylor's and Maclaurin's series for two variables.
- **APPLICATIONS OF PARTIAL DIFFERENTIATION** (08 Hours)
Tangent plane and Normal line Error and Approximation, Jacobians with properties, Extreme values of function of two variables, Lagrange's methods of undetermined multipliers.
- **DIFFERENTIAL EQUATION OF HIGHER ORDER** (08 Hours)
Solution of homogeneous equations, complementary functions, Particular Integrals, Linear differential equation with variable coefficient, Cauchy's Euler and Legendre's equation with variable coefficient, Method of variation of parameters.
- **MATHEMATICAL MODELS** (07 Hours)
Electrical network models, Detection of diabetes model and Bending beam models.
- **SERIES SOLUTION AND SPECIAL FUNCTIONS** (07 Hours)
Regular point, Singular point, series solution of ODE of 2nd order with variable coefficient with special emphasis to differential equation of Legendre's and Bessel's for different cases of roots of indicial equations.
- **LAPLACE TRANSFORM** (07 Hours)
Laplace transform, Existence theorem, Laplace transform of derivatives and integrals, Inverse Laplace transform, Unit step functions, Dirac – delta functions, Laplace transform of periodic functions, Convolutions theorem, Application to solve simple linear and simultaneous differential equations.

(Total Contact Time (Theory): 44 Hours)**BOOKS RECOMMENDED :**

1. **Kreyszig E.** : *Advanced Engg. Mathematics*. 8th Ed, John Wiley & Sons., New York, 1995.
2. **Jain and Iyenger** , *Advanced Engg. Mathematics*, Narosa Publications, New Delhi, 1997.
3. **De J. S.**, *Calculus*, Thomson Asia, Singapore, 2003.
4. **Kapur J. N.** , *Mathematical Models in Biology and Medicine*, East west press, 1998.
5. **Hilderbrand F. B.**, *Methods of Applied Mathematics*, McGraw Hill, New York, 1968.