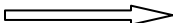


M.A/M.Sc Mathematics Semester 3rd

Effective from academic session 2011  **Repetition for 2012 with minor change**

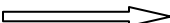
S.No	Subject Code	Subject Name	Theory		Internal	
			Max	Min.	Max	Min
1	MM-CP-301	Ordinary Differential Equations	80	32	20	08
2	MM-CP-302	Functional Analysis-II	80	32	20	08

Optional Courses

Any three of the following

S.No	Subject Code	Subject Name	Theory		Internal	
			Max	Min.	Max	Min
1	MM-OP-303	Advanced topics in Topology & Modern Analysis	80	32	20	08
2	MM-OP-304	Abstract Measure Theory	80	32	20	08
3	MM-OP-305	Theory of Numbers-I	80	32	20	08
4	MM-OP-306	Advanced topics in Mathematical Modelling	80	32	20	08
5	MM-OP-307	Operations Research	80	32	20	08
6	MM-OP-308	Computer Programming	80	32	20	08
7	MM-OP-309	Advanced topics in Linear Algebra	80	32	20	08

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ORDINARY DIFFERENTIAL EQUATIONS

Course No. MM-CP-301

Unit I

First order ODE, Singular solutions, p-discriminate and c-discriminate, Initial value problems of first order ODE, General theory of Homogeneous and Non-homogeneous linear ODE, Picard's theorem on the existence and uniqueness of solutions to an initial value problem, Factorization of Operator. Method of variation of parameters.

Unit II

Solution in Series: (i) Roots of an Indicial equation, un-equal and differing by a quantity not an integer. (ii) Roots of an Indicial equation, which are equal. (iii) Roots of an Indicial equation differing by an integer making a coefficient infinite. (iv) Roots of an Indicial equation differing by an integer making a coefficient indeterminate.

Simultaneous equation $dx/P = dy/Q = dz/R$ and its solutions by use of multipliers and a second integral found by the help of first. Total differential equations $Pdx + Qdy + Rdz = 0$. Necessary and sufficient condition that an equation may be integrable. Geometric interpretation of the $Pdx + Qdy + Rdz = 0$.

Unit III

Existence of Solutions, Initial value problem, Ascoli- lemma, Cauchy Piano existence theorem, Uniqueness of solutions with examples, Lipschitz condition and Gronwall inequality, Method of successive approximation, Picard-Lindlof theorem, Continuation of solutions, System of Differential equations, Dependence of solutions on initial conditions and parameters.

Unit IV

Maximal and Minimal solutions of the system of Ordinary Differential equations, Cartheodary theorem, Linear differential equations, Linear Homogeneous equations, Linear system with constant coefficients, Linear systems with periodic coefficients, Fundamental matrix and its properties, Non-homogeneous linear systems, Variation of constant formula. Wronskian and its properties.

Recommended Books:

1. H.T.H. Piaggio, Differential Equations, CBS Publishers and Distributors, New Delhi
2. P.Hartmen : Ordinary Differential Equations
3. W.T.Reid : Ordinary Differential Equations
4. E.A.Coddington and N.Levinson :Theory of Ordinary Differential Equations.
5. D. Somasundaram, Ordinary Differential Equations, Narosa Publishers, New Delhi.