Guru Jambheshwar University of Science and Technology
Hisar-125001, Haryana
('A+' NAAC Accredited State Govt. University)

Department of Mathematics
Scheme of Examination and Syllabus for Additional Subjects
For the students of Dual Degree B.Sc. (Hons.) - M.Sc. Programme in Physics/Chemistry of University Teaching Departments
(w.e.f. Session 2025-26)

Subject: Mathematics

SECOND YEAR

Semester - III								
Type of Course	**Course Code**	**Nomenclature of Paper/Course**	**Credits**	**Contact Hours/ Week**	**External Marks**	**Internal Marks**	**Total Marks**	**Duration of Exam (Hrs)**
Core Course	BML-307 AD	Mathematics - III: Ordinary Differential Equations	4	4	70	30	100	3

Semester - IV								
Type of Course	**Course Code**	**Nomenclature of Paper/Course**	**Credits**	**Contact Hours/ Week**	**External Marks**	**Internal Marks**	**Total Marks**	**Duration of Exam (Hrs)**
Core Course	BML-407 AD	Mathematics - IV: Partial Differential Equations	4	4	70	30	100	3

BML-407 AD: Mathematics-IV: Partial Differential Equations

Semester-IV

Credits: 4
Marks (Theory) : 70
Marks (Internal Assessment) : 30

Marks (Total) : 100
Time : 3 Hrs

Note: Attempt five questions in all. The question paper will consist of **four** sections. **Question No. 1** will contain **seven** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory.** Each of the four sections **(I-IV)** will contain two questions and the students are required to attempt **one** question from each section. **All questions carry equal marks.**

Section – I

Partial differentiation: Basic concept of partial differentiation, Total Differentials, Composite functions & implicit functions, Change of variables, Homogenous functions & Euler's theorem on homogeneous functions.

Section – II

Partial differential equations: Formation, order and degree. Linear and Non-Linear Partial differential equations of the first order: Complete solution, singular solution, General solution. Solution of Lagrange's linear equations.

Section – III

Linear partial differential equations of second and higher orders, Linear and non-linear homogeneous equations with constant coefficients, their complimentary functions and particular integrals.

Section – IV

Classification of linear partial differential equations of second order, hyperbolic, parabolic and elliptic types, Reduction of second order linear partial differential equations to Canonical (Normal) forms and their solutions.

Books Recommended:

1. D.A. Murray, Introductory Course on Differential Equations, Orient Longman, (India), 1967
2. Erwin Kreyszing, Advanced Engineering Mathematics, John Wiley & Sons, Inc., New York, 1999
3. A.R. Forsyth, A Treatise on Differential Equations, Macmillan and Co. Ltd.
4. Ian N. Sneddon, Elements of Partial Differential Equations, McGraw Hill Book Company, 1988
5. Frank Ayres, Theory and Problems of Differential Equations, McGraw Hill Book Company, 1972
6. S.C. Malik, Mathematical Analysis, Wiley Eastern Ltd., Allahabad.

BML-307 AD: Mathematics-III: Ordinary Differential Equations

Semester-III

Credits: 4
Marks (Theory) : 70
Marks (Internal Assessment) : 30

Marks (Total) : 100
Time : 3 Hrs

Note: Attempt five questions in all. The question paper will consist of **four** sections. **Question No. 1** will contain **seven** short answer type questions without any internal choice covering the entire syllabus and shall be **compulsory.** Each of the four sections **(I-IV)** will contain two questions and the students are required to attempt **one** question from each section. **All questions carry equal marks.**

Section – I

Geometrical meaning of a differential equation. Exact differential equations, integrating factors. First order higher degree equations solvable for *x,y,p.* Solutions of Lagrange's equations, Clairaut's equations.

Section – II

Orthogonal trajectories in cartesian coordinates. Self orthogonal family of curves. Linear differential equations with constant coefficients. Homogeneous linear ordinary differential equations. Equations reducible to homogeneous linear form.

Section – III

Linear differential equations of second order: Reduction to normal form. Transformation of the equation by changing the dependent variable/ the independent variable. Solution by operators of non-homogeneous linear differential equations. Method of variations of parameters.

Section – IV

Ordinary simultaneous differential equations. Solution of simultaneous differential equations involving operators *(d/dx)* or *(d/dt)* etc. Simultaneous equation of the form $dx/P = dy/Q = dz/R$. Total differential equations. Condition for $Pdx + Qdy + Rdz = 0$ to be exact. Method of solving total differential equations using inspection method.

Books Recommended:

1. D.A. Murray, Introductory Course in Differential Equations. Orient Longaman (India). 1967
2. A.R. Forsyth, A Treatise on Differential Equations, Macmillan and Co. Ltd., London
3. E.A. Codington, Introduction to Differential Equations.
4. S.L. Ross, Differential Equations, John Wiley & Sons
5. B. Rai & D.P. Chaudhary, Ordinary Differential Equations, Narosa Publishing House Pvt. Ltd.