

Syllabus

B.Sc. (Physics)

(Semester- III)

Name of the Course: S.Y.B.Sc. Physics (SEM-III)
Paper I –MJ: 3: Mathematical Methods for Physics (2 Credits)

Sr. No.	Heading	Particulars
1.	Description the course : Including but Not limited to:	Introduction, relevance, Usefulness, Application, interest, connection with other courses, demand in the industry, job prospects etc.
2.	Vertical :	Major /Minor/Open Elective /Skill Enhancement / Ability Enhancement/Indian Knowledge System
3.	Type :	Theory / Practical
4.	Credits :	2 credits (1 credit = 15 Hours for Theory or 30 Hours of Practical work in a semester)
5.	Hours	30 Hours
6	Marks Allotted:	50 Marks
7.	Course Objectives (CO): After successful completion of this course students will be able to: CO 1. Apply the knowledge of differential equations and solve problems using them. CO 2. Learn the first order and second order homogeneous and non- homogeneous differential equations with variable coefficients and constant coefficients. CO 3. Describe variable separable method and exact differentials equation, Linear Differential equation and Second-order homogeneous differential equations with constant coefficients. CO 4. Solve important partial differential equations in physics, method of separation of variables. Partial differential equations and its type CO 5. Understand applications of Partial Differential Equations in physics.	
8.	Course Outcomes (OC): After successful completion of this course OC 1. Students will acquire fundamental knowledge of ordinary differential equations and its types OC2. Students understand first order linear and Second-order homogeneous differential equations with constant coefficients and Problems depicting physical situations like LC, RL and LCR circuits. OC 3. Students understand important Partial differential equations in and its type (Parabolic, Hyperbolic and Elliptical) OC 4. Students Comprehend important applications of Partial Differential Equations. OC 5. Students understand problem solving skills in all the topics covered.	

9.	Unit I:Differential Equations (15 Lectures)
	Introduction, Ordinary differential equations: first order homogeneous and non-homogeneous differential equations with variable coefficients, Second-order non homogeneous equations with constant coefficients, Variable separable method, exact differentials equation, General first order Linear Differential equation and Second-order homogeneous differential equations with constant coefficients. Problems depicting physical situations like LC, RL and LCR circuits.
10.	Unit II: Partial Differential Equations: (15 Lectures)
	Introduction,some important partial differential equations in physics, method of separation of variables. Partial differential equations and its type (Parabolic, Hyperbolic and Elliptical), Applications of Partial Differential Equations: 1. Modeling of a vibrating stretched string. 2. The two-dimensional heat flow equation. 3. Solution of the wave equation and Helmholtz's equation.
11.	References: 1.Introduction to Partial Differential Equations – K Sankara Rao 2. Mathematical Physics, Sathya Prakash, Sultan Chand, 6 th edition (2014) Additional References: 3.Mathematical Physics, B.D. Gupta-Vikas Publishing House, 4 th Edition (2006) 4. Mathematical Methods in Physical Science – Mary and Boas. 5. Mathematical Physics, H.K. Dass, S. Chand & Co., Eighth edition (2018) 6. Mechanics and mathematical methods by R Murugesan, S Chand.