

1.	Title of the Course	Mathematical Physics I
2.	Course Number	PH5101
3.	Status of the Course	Core
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Department of Physics
8.	To take effect from	July 2020
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	Course Objective: To equip students with the necessary mathematical tools to describe physical phenomena by introducing the essentials of linear algebra, tensors, ordinary, partial differential equations, and probability theory.	
12.	Course Content: Linear algebra: vectors, linear spaces, inner and outer product; Orthogonalization procedures, system of linear equations, matrix decomposition techniques; Tensors; Ordinary differential equations (ODE) of first and second order, Frobenius method, inhomogeneous linear ODEs, Sturm-Liouville theory, Green's functions, partial differential equations of first and second order, Laplace and Poisson's equations, diffusion equation; Probability theory: moments & generating functions, distribution functions, central limit theorem.	
13.	Text book(s): 1. Arfken G, Weber H and Harris F, <i>Mathematical Methods for Physicists: A Comprehensive Guide</i> , Academic Press (2013). 2. Spiegel M R, Lipschutz S and Spellman D, <i>Schaum Outline Series: Linear Algebra</i> , McGraw-Hill (2017).	
14.	Reference(s): 1. Balakrishnan V, <i>Mathematical Physics with Applications, Problems and Solutions</i> , Ane Books (2017). 2. Dass T and Sharma S K, <i>Mathematical Methods in Classical and Quantum Physics</i> , Universities Press (1998). 3. Riley K F, Hobson M P and Bence S J, <i>Mathematical Methods for Physics and Engineering</i> , Cambridge University Press (2018).	