1.	Title of the course	Mathematical Methods for Basic Sciences I
2.	Course number	ID501L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To ID5101/2
6.	To be offered by	Department of Physics
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	**Course Objective(s):** To introduce mathematical techniques to post-graduate/PhD students in Basic Sciences to pose, and solve, problems in Physics and Chemistry.	
10.	**Course Content:** Vectors and Tensors. Applications in condensed matter, electrodynamics and astrophysics. Linear vector spaces, Dirac notation. Basis sets, Inner Products. Orthonormality and completeness. Gram-Schmidt orthonormalization process. Linear operators, Matrix Representations, Diagonalization, Orthogonal, Hermitian and Unitary matrices. Transcendental and Special Functions. Ordinary Differential Equations of 2nd Order. Applications in Mechanics, Electrodynamics and Quantum Mechanics. Generalized functions, Dirac delta function – Normalization of continuum eigen states. Partial Differential Equations: Applications in Electrodynamics and Quantum Mechanics.	
11.	**Textbook(s):** 1. Arfken G and Weber H J, *Mathematical Methods for Physicists*, 7th Edition, Academic Press (2012). 2. Boas M, *Mathematical Methods in Physical Sciences*, 3rd Edition, John Wiley, International Edition (2006).	
12.	**Reference(s):** 1. Dennerey P and Kryzwicki A, Mathematics for Physicists, Dover Publications (2005). 2. Riley K F and Hobson M P, *Foundation Mathematics for the Physical Sciences*, Cambridge University Press (2011).	