Course Title	**MATHEMATICAL METHODS**
Course Code	**MPHY-251**
Credit Hours	**CH3**
Pre- requisites	**MPHY-101, MPHY-102**
Learning outcomes	The main objective of this course is to introduce students with some applied mathematical methods.
Contents	**Complex numbers and hyperbolic functions:** Complex numbers, manipulation of complex numbers, polar representation of complex numbers, De Moivre's theorem, Complex logarithm and complex powers, Applications to differentiation and integration, Hyperbolic functions **Series and limits:** Series, Summation of series, Convergence of infinite series, operations with series, Power series, Taylor series, Evaluation of limits. **Vector Analysis:** Vectors in 2-space and 3-space, Vector products, Lines and planes in 3-space, Vector spaces, Vector algebra (addition, subtraction and multiplication of vectors), Basis vectors, components and magnitude, Multiplication of two vectors, triple products, equation of lines, planes and spheres, distance formula using vectors, reciprocal vectors, Vector functions, motion on a curve, curvature and components of acceleration, partial derivatives, directional derivatives, tangent planes and normal lines, curl and divergence, line integrals, independence of the path, double integrals, double integrals in polar coordinates, Green's theorem, surface integrals, Stokes' theorem, triple integrals, divergence theorem, change of variables in multiple integrals, Vector operators acting on sums and products, combinations of grad, div and Curl, Successive applicators of ∇.
Teaching-learning Strategies	Classroom teaching / Lecturing
Assignments- Types and Number	Problem sheet: 3-4
Assessment and Examinations	Mid-Term Assessment: 35% Formative Assessment: (25%): It includes classroom participation, attendance, assignments and presentations, homework, attitude and behavior, hands-on-activities, short tests, quizzes etc. Final Term Assessment: 40%
Text Books	1. Mathematical Methods for Physicists (7th Edition) by G. B. Arfken, H. J. Weber and F. E. Harris, Academic Press (2012). 2. Advance Engineering Mathematics by D. G. Zill and W. S. Wright (6th Edition), Jones and Bartlett (2018). 3. Mathematical methods for physics and engineering by K. F. Riley, M. P. Hobson, and S. J. Bence (3rd Edition), Cambridge (1999). 4. Advance Engineering Mathematics by E. Kreyszig (9th Edition), Jone Wiley & Sons (2006). 5. Mathematical Methods for Physicists: A Concise Introduction by T. L. Chow, Cambridge (2000).