



Code	Subject Title	Cr. Hrs	Semester
PHY-302	Mathematical Methods of Physics-I	3	V
Year	Discipline		
3	Physics		

Vectors, divergence theorem, Green's theorem, Stokes's theorem, curvilinear coordinates, orthogonal curvilinear coordinates, gradient in orthogonal curvilinear coordinates, divergence and curl in orthogonal curvilinear coordinates, Laplacian, spherical polar coordinates.

Complex numbers, Euler's formula, De Moivre's theorem, elementary functions, analytic functions of complex variables, Cauchy-Riemann equation, harmonic functions, complex integration, Cauchy's theorem, Cauchy's integral formula, Taylor and Laurent series, Contour integrals, singularities and residues, residue theorem, poles on the real axis, branch points and integrals of multivalued functions.

Tensors, coordinate transformation, rank of a tensor, covariant and contravariant tensors, Tensor algebra, metric tensor, Christoffel symbols, equation of geodesic, Riemann tensor.

Books Recommended:

1. *Advanced Engineering Mathematics* by E. Kreyszig, Wiley, New York, 1999.
2. *Mathematical Methods for Physicists* by G. B. Arfken and H. J. Weber, A. Press, New York, 1995.
3. *Mathematical Methods for Physics and Engineering* by K. F. Riley, M. P. Hobson and S. J. Bence, Cambridge University Press, Cambridge, 1997.
4. *Complex Variable* by Murray R Spiegel, Schaum's outlines series, McGraw Hill 1974.