JCL 223 (Aug) (3-1-0)
Basic Mathematics
Instructor: Abhishek Kumar

Multivariable Calculus: Exact and inexact differentials, partial differentiation, Integrals

Vector Calculus: Gradient, Divergence, and curl and their physical significance, Vector products, Line integral, Green's theorem and Stoke's theorem.

Linear Algebra: Matrices, Eigen-value problems, Application of linear algebra tools

Differential Equations: Introduction and notation, Chain rule, Application of differential equations in quantum chemistry and chemical kinetics.

Function of complex variable: Analytical function, Contour integral, The residue theorem, Evaluation of Definite integral

Introduction of special functions: Fourier series, Dirac Delta function, Fourier transformations, Gaussian function, Error function, Application of mathematical functions in optical properties of materials

Numerical methods: Interpolation, root finding, curve fitting and error analysis.

Reference books:

1. Mathematical Methods for Physicists by Arfken, Weber and Harris
2. Mathematical Methods in the Physical Sciences by Mary L. Boas