

Department of Chemical Sciences

Graduate Course on

Mathematical Methods

Course Content

- *Determinants and Matrix Algebra*
Properties of determinants and matrices, Linear transformation, Eigenvector-Eigenvalue problems, Similarity and unitary transformations
- *Differential Equations*
Separable, Exact, and First-order homogeneous linear differential equations, Sturm-Liouville eigenvalue problem, Legendre polynomials and properties, Spherical harmonics, Bessel equations and properties
- *Vector Algebra*
Gradient, Divergence, Curl, Gauss and Stokes theorem, Curvilinear coordinates, Tensor analysis
- *Complex Analysis*
Cauchy-Riemann conditions, Analytic functions, Contour integrals, Taylor and Laurent series, Singularities, Residue theorem, Gamma and Beta function, Method of steepest descent, Stirling series, Asymptotic series, Convergence tests
- *Integral Transforms*
Fourier series, Fourier transform, Laplace transform, Solution of initial boundary-value problem, Convolution
- *Error Analysis*

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Venue: NMR Seminar room
Days: Tuesdays and Wednesdays
Time: 9:30 hr to 11:00 hr

The first lecture starts on August 3, 2016.