-- Complex variables and complex functions:
   Cauchy-Riemann equations, Riemann sheets, analytic functions, line
   integral in the complex plane, Cauchy theorem, Laurent series,
   isolated singularities, removable singularities, residue.

-- Use of residues to calculate integrals on the real axis.

-- Fourier series and Fourier Transforms.

-- Convolution.

-- Laplace Transform.

-- Solving ODE by substituting series.

-- Eigenfunctions as analogue of eigenvectors, self-adjoint
   operators, orthonormal sets of eigenfunctions, completeness and
   closure.

-- Green's functions.

-- Very short intro to Partial Differential Equations (PDE-s).

-- PDE solution through separation of variables.

-- Legendre Polynomials and Functions.

-- Spherical Harmonics.

Recommended textbook:

Mathematical methods of physics

by Jon Mathews and R.L. Walker