Engineering Mathematics

- Fourier Series and application to compute infinite series
- Fourier Integrals and application to compute proper and improper integrals
- Modeling wave equation and solving it by Fourier series and integrals
- Applying Fourier series and integrals to solve Laplace and heat equations and other boundary and initial problems
- Elliptic, parabolic and hyperbolic PDEs and standardize second order PDEs
- Complex functions, limit and derivative
- Cauchy-Riemann equations, Sufficient Conditions, The Cauchy-Riemann Equations in Polar Form
- Analytic functions, Harmonic functions, Elementary functions
- Translation, rotation, reflection and Mobius transformations and mapping by elementary functions
- Complex integrals on curves, Cauchy-Goursat theorem, Cauchy integral formula, Maximum moduli of functions, the fundamental theorem of algebra
- Taylor and Laurent series, Integration and Differentiation of power series, zeros of analytic functions
- Residues and poles and application of residues in computing real and complex integrals
- Conformal mapping and application for solving PDEs and fluid mechanics such as source and sink and vortex line
- Z-transformation and application for solving Linear constant-coefficient difference equations and discrete-time systems
- The Schwarz-Christoffel transformation and applying it in mapping polygons, Poisson integral and applying in boundary value problems