

## MT508: Special Functions

**Syllabus:** Series solution of a second order linear differential equation near a regular/singular point (Method of Frobenius) with special reference to Gauss hypergeometric equation and Legendre's equation; Gauss hypergeometric function and its properties, Integral representation. Linear transformation formulas, Contiguous function relations. Differentiation formulae, Linear relation between the solutions of Gauss hypergeometric equation, Kummer's confluent hypergeometric function and its properties; Integral representation, Kummer's first transformation. Legendre polynomials and functions  $P_n(x)$  and  $Q_n(x)$ ; Bessel functions  $J_n(x)$ ; Hermite polynomials  $H_n(x)$ ; Laguerre and Associated Laguerre polynomials.

### UNIT SCHEDULE

- Unit 9** Series solution of a second order linear differential equation
- Unit 10** Gauss hypergeometric function & its properties and Integral representation
- Unit 11** Gauss and Confluent hypergeometric Functions
- Unit 12** Legendre polynomials and functions  $P_n(x)$  and  $Q_n(x)$
- Unit 13** Bessel functions
- Unit 14** Hermite polynomials
- Unit 15** Laguerre polynomials