Syllabus for B.A./B.Sc., Mathematics, Semester-II

Course title: Integration & differential equations (6 credits)
Course code: MA-17201

Unit-I

Integration of algebraic rational functions; case of non-repeated or repeated linear factors. Case of linear or quadratic non-repeated factors. Integration of algebraic rational functions by substitution, integration of irrational functions. Reduction formulae for the integrals of circular functions and for the integrals of the form $\sin^m x \cos^n x$, $\cos^m x \cos nx$, $x^m \cos nx$.

Unit-II

Linear differential equations of first order, Bernoulli's differential equation, Exact differential equations, necessary and sufficient conditions for exactness. Symbolic operators, linear differential equations with constant coefficients. Differential equations of forms $f(D)y = \sin bx$, $\cos ax$, $e^{ax}V$, where V is any function of x. Homogeneous linear equations.

Unit-III

Miscellaneous forms of differential equations. First order higher degree equations solvable for x, y, z, p. Equations from which one variable is explicitly absent, Clairut's form, equations reducible to Clairut's form

Unit-VI

Formation of partial differential equations, order and degree of partial differential equations, concept of linear and non-linear partial differential equations, linear partial differential equation of first order, Lagrange's method. Geometric interpretation of the form $Pp+Qq = R$, Charpit's method, classification of second order partial differential equations into elliptic, parabolic and hyperbolic through illustrations only.

Text Books Recommended

(1) *Integral Calculus* by S.D. Chopra and M.L. Kochar, Kapoor publications.

(2) *Ordinary & partial differential equations* by M.D. Raisinghania, S Chand publishing.

(3) *Differential equations* by H.T.H Piaggio, CBS publishers.

Suggested Readings

(1) *Differential equations* by Shepley L Ross, Wiley.

(2) *Elements of partial differential equations* by Sneddon, McGraw-Hill.