K L UNIVERSITY

Partial Differential Equations and Numerical Methods (11 – BS 206)

SYLLABUS

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Partial Differential Equations: Introduction, Formation of PDE, solutions of first order linear and non linear PDEs by direct integration method, Lagrange's method and Charpit's method. Solutions of second order homogeneous and non homogeneous PDE with constant coefficients.

Numerical Methods: Solution of algebraic and transcendental equations-bisection method, Regula falsi method, iterative method and Newton -Raphson method,

Solutions of linear simultaneous equations- Jacobi and Gauss Seidal methods, Relations between the difference operators, Newton's forward and back ward interpolation formulae, Gauss, Sterling and Bessel central difference formulae, Lagranges and Newton's divided difference formulas for unequal intervals,

Numerical differentiation by Newton's forward and backward formulae,

Numerical integration by Trapiziodal, Simpson's $1/3^{rd}$ and $3/8^{th}$ rule.
Numerical solutions of ODE-Picard's, Taylor's ,Eulers, Modified Eulers's and Runge-Kutta method of fourth order.

Numerical solutions of PDE: Classification of second order PDE.
Finite element methods and their applications

Text Books:
1. Numerical methods for scientific and engineering computation by M.K.Jain, S.R.K.Iyengar and R.K.Jain, New age international publishers(Fifth edition), New Delhi, 2007.
2. Higher Engineering Mathematics by B.S.Grewal, 41st Edition. khanna publishers,New Delhi.

Reference Books:
1. Advanced Engineering Mathematics by Ervin Kreyszig, 8th Edition, John Wiley student edition, New Delhi.
2. Applied numerical methods with MATLAB for engineers and Scientists by Steven C Chapra, Tata McGraw Hill, New Delhi, Third Indian reprint 2008.

List of Experiments:
12 Numerical Exercises will be solved using MATLAB / C Language