Module Code: MATH-420
Module Title: **Computer Applications**
Module Rating: 3 Cr. Hours

Flow Chart, Algorithm and Programming of the following Numerical Methods

- System of linear equations
  Jacobi's iterative method, Gauss-Seidel method
- Solutions of non-linear equations
  Bisection method, Newton-Raphson method, Secant method, Regula Falsi method
- Interpolation
  Langrage interpolation, Newton's divided and forward difference interpolation
- Numerical integration:
  Rectangular rule, Trapezoidal rule, Simpson's rule, Booles rule, Weddles rule
- Differential equations:
  Euler's method, Runge- Kutta methods, predictor-corrector methods

Mathematica

- Introduction of mathematica, numerical calculations, algebraic calculations, symbolic and numerical mathematics, numbers, mathematical functions, algebraic manipulations, manipulating equations, series, limits and residues, linear algebra, graphs

Recommended Books

1. Michel Metcalf, John Reid and Malcolm Cohen, *Fortran 95/2003 Explained*, (Oxford University Press, 2004)
2. Stephen Wolfram, *The Mathematica*, 3rd edition, (Cambridge University Press 1996)
3. V. Rajaraman, *Computer Programming in Fortran 90 and 95*, (Prentice Hall of India, New Delhi, 1999)
4. Roman E. Maeder, *Computer Science with Mathematics*, (Cambridge University Press, 2000)
5. Martha L. Abell, James P. Braselton, *The Mathematica Handbook*, (Academic Press Inc., 1992)