Semester	**III**
Course	**Minor**
Paper Code	B2MT230321T
Paper Title	Numerical Methods [Economics +Computer Science]
No. of Credits	**4**
Theory / Practical / Composite	**Theory**
Minimum No. of preparatory hours per week a student has to devote	**4**
Number of Modules	Nil
Syllabus	Sources of Error in Numerical Methods [4]: Accuracy and Precision, Absolute error , Relative Error, Sources of Error : Truncation error and Round-Off error ;[2]; Error of a sum, difference, product & quotient of two approximate numbers [2]. Operators in Finite Differences [4]: Δ , ∇, μ , δ , E (Definitions and simple relations among them)[4]. Interpolation [12]: Polynomial Interpolation, Difference Tables, (Deduction) of Newton's Forward and Backward interpolation; Lagrange's interpolation formula; Newton's Divided Difference formula; properties and related problems. [12] Numerical Integration [6]: Integration of Newton's interpolation formula. Newton-Cotes'formula. Basic Trapezoidal, Simpson's 1/3 rd, rule and their composite forms. Degree of precision (definition only) and related problems. [6] Numerical solution to non-linear equations [10]: Location of a real root by Tabular method. Bisection method. Regula-Falsi and Newton-Raphson methods, their geometrical significance. Fixed point iteration method.[10] Numerical solution of a system of linear equations [8]: Direct methods— [Gauss elimination method, Operation count. Gauss-

	Jordan elimination method][4]. Iterative methods—[Jacobi iteration method, Gauss-Seidel method] [4]
	Solution of Ordinary Differential equations [8] —Euler's method, Picard's method, Runge-Kutta method fourth order)[4]. (Single step methods) Multistep methods: Adam's Bashforth method. [4]
Learning Outcomes	- Learning different types of error and its source and propagation. - To be acquainted with different linear operators like $\Delta \nabla \delta \mu E$. - To estimate value of unknown function and its derivative and corresponding error management. - To find the value of an integral whose analytical solution is not known. - To solve transcendental equation and linear system of equations and corresponding error estimation. - To be acquainted with various technique of solving ODE.
Reading/Reference Lists	(1) Elementary Numerical Analysis — Conte de Boor (2) Elementary Numerical Analysis — Atkinson (3) Numerical Analysis and Computational Procedures: S.A.Mollah

Evaluation	70	30

Paper Structure for Theory Semester Exam	7 questions each carrying 10 marks needs to be answered out of 12/13 questions.