Marwadi University

FACULTY OF COMPUTER APPLICATIONS

Bachelor of Science (Information Technology)
B.Sc. (IT)

- **Sem.** : 2
- **Subject Code** : 05BS0201
- **Subject** : Applied Mathematics–2
- **Course Objectives** :

1. Students would gain knowledge of various error handling using these methods and need to analyze and predict it.

2. To provide suitable and effective methods called Numerical Methods, for obtaining approximate representative numerical results of the problems.

3. To solve complex mathematical problems using only simple arithmetic operations. The approach involves formulation of mathematical models that can be solved with arithmetic operations.

4. To deal with various topics like finding roots of equations, solving systems of linear equations, interpolation, numerical integration and differentiation , differential equations .

5. To facilitate numerical computing.

- **Prerequisites** :
Basic knowledge of Functions, Differentiation & Integration.

No.	Topics Covered	No of lectures required
1	**FLOATING-POINT ARITHMETIC:** Addition Operation, Subtraction Operation, Multiplication Operation,	**10**

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	Division Operation • **ERRORS:** Data Errors, Truncation Errors , Round off Errors, Percentage Error • **MEASURES OF ACCURACY:** Absolute Error, Relative Error	
2	**ITERATIVE METHODS FOR FINDING ROOTS:** • Bisection Method(without proof) • False position Methods(without proof) • Secant Methods(without proof) • Successive Approximation Method(without proof) • Newton – Raphson Method	**10**
3	**INTERPOLATION :** • Lagrange Interpolation • Inverse Lagrangian Interpolation Formula • Newton's forward Difference Interpolation, • Newton's backward Difference Interpolation, • Newton's Divided Difference Interpolation	**10**
4	**NUMERICAL DIFFERENTIATION & INTEGRATION:** • **Differentiation** : • Using Newton's Forward Difference, Newton's Backward Difference, Newton's Divided Difference (First Order Differentiation only) • **Integration** : • Using Trapezoidal rule, Simpson's 1/3 &Simpson's 3/8 rules	**10**
5	**SOLUTION OF SIMULATANEOUS LINEAR &DIFFERENTIALEQUATIONS:** • **Solution of Simultaneous LinearEquations:** • Gauss Elimination method, Gauss-Jordan method, Gauss- Seidel Method, Jacobi Method • **Predictor-Corrector Methods:**	**10**

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	• Milne- Simpson's Method • Adams Multon Method	

Course Outcomes :

1. To diagnose different type of errors occurring in numerical calculation & solution of them.
2. Ability to apply of numerical iterative methods for the basic problems of numerical analysis.
3. To demonstrate algorithmic implementation of different interpolation methods.
4. Application of concept of differentiation, integration in numerical calculation.
5. Able to understand the application and solution of linear differential equations & predictor –corrector methods

Course Outcomes – Program Outcomes Mapping Table :

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1	L		L				M		L	
CO2	H		M				H		M	
CO3	H		M				H		M	
CO4	H	M	H				H	L	M	
CO5	H		H				H	L	M	

Text Book :

1. **Computer Oriented Numerical Methods by R. S. Salaria,Khanna Publisher**

Reference Books :

1. **Numerical Methods with Programs in C, T Veerarajan, T Ramachandran, , Tata McGraw Hill Publication, 2nd Edition**
2. **Numerical Methods, V. Rajaraman Prentice-Hall India Pvt. Ltd. 3rd Edition,**
3. **Numerical Methods with C++Programming, R M Somasundaram, R M Chandrasekaran Prentice-Hall India Pvt. Ltd.**

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Web References :

1. **https://nptel.ac.in/courses/122106033/**

App References :

1. **NumericalMethodstools [https://play.google.com/store/apps/details?id=com.chatosolutions.numericalmethodstools&hl=en_IN&gl=US]**

Syllabus Coverage from text /reference book & web/app reference:

Unit #	Chapter Numbers
1	2 [2.5, 2.7, 2.8]
2	3 [3.6, 3.7, 3.8, 3.10]
3	6 [6.4, 6.5, 6.6(6.6.1 to 6.6.3), 6.7(6.7.1 to 6.7.3), 6.8]
4	8 [8.1 to 8.3] , 9 [9.2(9.2.1, 9.2.2, 9.2.3)]
5	5 [5.1, 5.2, 5.3, 5.4(5.4.1 & 5.4.2), 5.5.2 , 5.6] , 10 [10.8, 10.9(10.9.2 & 10.9.3)]