



**C. U. Shah University, Wadhwan City**  
**Faculty of Computer Science**  
**Name of Program: Bachelor of Science (Information Technology)**  
**(B.Sc.IT)**

**Semester : II**

**W.e.f. June – 2016**

**Teaching & Evaluation Scheme**

Sr. No	Subject Code	Subject Name	Teaching Hours/Week				Credits	Evaluation Scheme/Semester							
			Th	Tu	Pr	Total		Theory				Practical			Total Marks
								Sessional Exam		University Exam		Internal		Uni.	
								Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
2	4CS02ICN2	Computer Oriented Numerical Methods	4	-	-	4	4	30	1.5	70	3	-	-	-	100

**Objectives:** To impart the numerical mathematical solution techniques.

**Pre-requisites:** A basic understanding of Mathematical techniques and Programming language C is necessary.

**Course Outline:**

Chapter No	Chapter Name	Course Contents	Lect. Hours
1.	Programming of Matrix	1.1 Trace of the matrix 1.2 Transpose of matrix 1.3 Addition of matrix 1.4 Subtraction of matrix 1.5 Multiplication by a scalar 1.6 Multiplication of two matrices 1.7 Adjoint of a matrix 1.8 Inverse of matrix	9
2	Linear system of equation	2.1 Solution of linear equation using direct methods 2.2 Gauss –elimination method 2.3 Gauss- Jordan method 2.4 Gauss-Jacobi method 2.5 Gauss-Seidal method	10
3	Finite difference & Interpolation	3.1 Definition 3.2 forward- difference table 3.3 backward-difference table 3.4 Newton's forward difference formula 3.5 Newton's backward difference formula 3.6 Langrage's interpolation	10
4	Solution of Algebraic and Transcendental equations	4.1 Bisection method 4.2 False Position method 4.3 Secant Method 4.4 Newton Raphson method	10

5	Numerical Integration	5.1 Trapezoidal method 5.2 Simpson's 1/3 rule 5.3 Simpson's 3/8	6
6	Numerical solution of ordinary differential equations	6.1 Euler's method 6.2 Modified Euler's method 6.3 Rungekutta 2 <sup>nd</sup> order method 6.4 Rungekutta 4 <sup>th</sup> order method	10
<b>TOTAL</b>			<b>55</b>

**Reference books:**

1. "Computer Oriented Numerical Methods", V. Rajaraman, PHI Publication (3<sup>rd</sup> Edition)
2. Discrete Mathematical Structure (Third Edition), Bernard Kolman, Robert C. Busby, Sharon Roass, Prentice Hall of India Pvt. Ltd.
3. "Numerical Method" E. Balagurusamy, TMH Publication (7<sup>th</sup> Edition)
4. "Computer Oriented Numerical Methods", R.S. Salaria, Khanna Book Publication (4<sup>th</sup> Edition)
5. Discrete Mathematics and Its Applications, Tata Mcgraw Hill (5<sup>th</sup> Edition), Kenneth .H. Rosen

## **Program list**

### **Chapter 1: Matrix**

1. Write a Program to find the trace of the matrix.
2. Write a Program to find transpose of the matrix.
3. Write a Program to find the adjoint of the matrix.
4. Write a Program to find the inverse of the matrix

### **Chapter 2: Linear system of equation**

5. Write a Program to find the solution of equations using Gauss elimination method.
6. Write a Program to find the solution of equations using Gauss Jordan method.
7. Write a Program to find the solution of equations using Gauss Jacobi method.
8. Write a Program to find the solution of equations using Gauss Seidal method.

### **Chapter 3: Finite difference & Interpolation**

9. Write a Program to create and display forward difference table.
10. Write a Program to create and display backward difference table.
11. Write a Program to find the solution using Newton's forward difference formula
12. Write a Program to find the solution using Newton's backward difference formula.
13. Write a Program to find the solution using Lagrange's interpolation formula.

### **Chapter 4: Solution of Algebraic and Transcendental equations**

14. Write a Program to find the solution using Bisection method.
15. Write a Program to find the solution using False Position method.
16. Write a Program to find the solution using Secant Method.
17. Write a Program to find the solution using Newton Raphson method.

### **Chapter 5: Numerical Integration**

18. Write a Program to find the solution using Trapezoidal rule.
19. Write a Program to find the solution using Simpson's 1/3 rule.
20. Write a Program to find the solution using Simpson's 3/8 rule.

### **Chapter 6: Numerical solution of ordinary differential equations**

21. Write a Program to find the solution using Euler's method.
22. Write a Program to find the solution using Modified Euler's method.
23. Write a Program to find the solution using Runge-Kutta 2<sup>nd</sup> order method.
24. Write a Program to find the solution using Runge-Kutta 4<sup>th</sup> order method.