C. U. SHAH UNIVERSITY
Wadhwan City

FACULTY OF: - Computer Science

DEPARTMENT OF: - Master of Computer Applications
SEMESTER: -III
CODE: - 5CS03MCN1
NAME: – Computer Oriented Numerical Methods (CONM)

Teaching and Evaluation Scheme

Subject Code	Name of the Subject	Teaching Scheme (Hours)				Credits	Evaluation Scheme							
							Theory				Practical (Marks)			
							Sessional Exam		University Exam		Internal		University	Total
		Th	Tu	Pr	Total		Marks	Hrs	Marks	Hrs	Pr/Viva	TW	Pr	
5CS03MCN1	COMPUTER ORIENTED NUMERICAL METHODS (CONM)	4	-	-	4		30	1.5	70	3	--	--	--	**100**

Objectives:-

- It is very important to develop efficient algorithms for solving problems in science, engineering, technology, insurance & banking.
- To enable students to obtain an intuitive and working understanding of numerical methods for the basic problems of numerical analysis and gain experience in the implementation of numerical methods using a computer.
- They are able to gain an appreciation of the concept of error in these methods and the need to analyze and predict it.

Prerequisite:-

- Basic knowledge of functions, logarithmic, trigonometric and exponential functions, graph of a function, polynomials, and roots of a polynomial, differentiation and integration, differential equations, simultaneous equations.

Course Outline:-

Sr. No.	Course Content	Hours
1	**Computer Arithmetic :** Binary Arithmetic addition; multiplication; Division; subtraction; floating point representation; errors; types of errors	**3**
2	**Iterative Methods(Theory Convergence/C Program/Examples) :** Bisection Method; Regula false method; Secant Method; Newton Raphson method; Successive approximation Method; Birge Vieta Method; Descrate's rule of sign	**9**

3	**Interpolation(Theory Convergence/C Program/Examples) :** Interpolation, Types of interpolation; Interpolation for regular intervals & irregular intervals; Lagrange's interpolation method; Lagrange's inverse interpolation method; Newton's forward interpolation method; Newton's backward interpolation method; Newton's divided difference interpolation method	**8**
4	**Curve fitting (C Program/Examples) :** Fitting line using Least square Method; Regression line X on Y, Y on X; Fitting Geometric curve; Fitting Exponential curve;Fitting Parabola Curve	**6**
5	**Numerical Differentiation & integration methods (C Program/Examples) :** **Introduction to differentiation;** Introduction to integration; Trepazoidal rule; Simpson's 1/3 rule; Simpson's 3/8 rule	**6**
6	**Solution of linear Equations(Examples):** Introduction to linear equation; Gauss elimination Method; Gauss Jordan Mehtod; Gauss seidal method; Jacobi method; Gauss elimination with pivoting	**8**
7	**Methods of Ordinary differential Equations(Theory Convergence/C Program/Examples):** Introduction to differential Mehtod; Deriving the formula of taylor series; Expansion of taylor series; Euler Method; Euler Modified Method; Rung-Kutta 2nd Order Method; Rung-Kutta 3rd Order Method; Rung-Kutta 4th Order Method; Predictor-Corrector Method; Milne-Simpson method; Adam's –Moulton Method	**8**

Learning Outcomes:

- Able to solve linear and non-linear algebraic equations, perform operations of calculus, fit curves, and solve differential equations using a computer.
- Appreciate problems due to rounding errors and convergence.

Teaching & Learning Methodology:

- Using Whiteboard & Multimedia or OHP

Books Recommended:

1. Computer Networking, ***Andrew S. Tanenbaum*****,** Prentice Hall, Fourth Edition.
2. Data Communications and Networking, ***Behrouz A. Forouzan*****,** Tata McGraw-Hill, Fourth Edition.
3. Computer Oriented Numerical Methods, **R. S. Salaria,** Khanna Publisher
4. Numerical Methods for Engineers, **Steven C. Chapra & Raymond P Canale,** Fifth Edition, Tata McGraw Hill Publication, Special Indian Edition.
5. Computer Oriented Numerical Methods, **Dr. N Datta,** Vikas Publication

Reference Books:

1. Numerical Methods with Programs in C by **T Veerarajan & T Ramachandran,** Second Edition, Tata McGraw Hill Publication.
2. Numerical Methods by **V. Rajaraman,** Third Edition, Prentice-Hall India Pvt.
3. Numerical Methods with C++ Programming by **R M Somasundaram & RM Chandrasekaran**, Prentice-Hall India Pvt. Ltd.
4. Applied Numerical Analysis by **C F Gerald & P O Wheatley**, Seventh Edition, Pearson Education Asia, New Delhi
5. Elementary Numerical Analysis by **Atkinson & Han** ,Wiley India Edition
6. Numerical Methods by **Dr. V. N. Vedamurthy & Dr. N.Ch. S.N. Iyengar,** Vikas Publication.
7. Numerical Analysis by **Richard L. Burden, J. Douglas Faires,** Cengage Publication.