

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Master of Technology				Branch/Spec.	Chemical Engineering		
Semester		I				Version	1.0.0.0		
Effective from Academic Year			2026-27			Effective for the batch Admitted in			July 2026
Subject code		3CH1105	Subject Name			Applied Numerical Methods			
Teaching scheme						Examination scheme (Marks)			
(Per week)	Lecture (DT)		Practical (Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	0	1	0	3	Theory	40	60	100
Hours	2	0	2	0	4	Practical	30	20	50
Pre-requisites:									
Pre-requisites: Basic Mathematics, Engineering Mathematics – I & II									
Course Outcomes									
On successful completion of the course, the students will be able to:									
CO1	Apply numerical methods to solve algebraic and transcendental equations.								
CO2	Implement numerical techniques for solving systems of linear equations.								
CO3	Use interpolation and curve fitting methods for engineering data analysis.								
CO4	Solve differential equations numerically for engineering applications.								
Theory syllabus									
Unit	Content								Hrs
1	Solution of Algebraic and Transcendental Equations: Errors in numerical computation, Bisection method, Regula-Falsi method, Newton-Raphson method, Secant method, Convergence criteria								6
2	Solution of System of Linear Equation: Gauss elimination method, Gauss-Jordan method, LU decomposition, Jacobi method, Gauss-Seidel method								8
3	Numerical Differentiation and Integration: Finite difference approximations, Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule, Romberg integration								6
4	Numerical solution of Ordinary differential equation: Concept of Ordinary differential equation, Runge-Kutta Method, Euler's Method- Error - estimate for the Euler's method, Modified Euler's method applies to chemical engineering processes., Taylor's series: For 2 nd order and 4 order differential equation related to chemical engineering processes.								10
Text Books									
1.	S.S. Sastry – Introductory Methods of Numerical Analysis, PHI Learning								
2.	B.S. Grewal – Numerical Methods in Engineering and Science, Khanna Publishers								
Reference Books									
1	Steven C. Chapra & Raymond P. Canale – Numerical Methods for Engineers, McGraw Hill.								
2	Jain, Iyengar & Jain – Numerical Methods for Scientific and Engineering Computation								
Practical Syllabus:									
1. Bisection and Newton-Raphson methods									
2. Gauss elimination method									
3. Lagrange interpolation									
4. Least square curve fitting									
5. Simpson's rule									
6. Runge-Kutta method									
ICT/MOOCs references									

<https://nptel.ac.in/courses/127106019>

Mapping of CO with PO and PSO:														
COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PSO1	PSO2	PSO3
CO1	3	3	-	1	2	-	-	-	-	-	1	2	-	-
CO2	3	3	-	1	2	-	-	-	-	-	1	2	-	-
CO3	3	3	-	2	2	-	-	-	-	-	1	3	1	-
CO4	3	3	1	2	3	-	-	-	-	-	2	3	2	1