

1.	Title of the course	Computational Techniques for Chemical Engineers
2.	Course number	CH304M
3.	Structure of credits	3-0-3-5
4.	Offered to	UG
5.	New course/modification to	Modification To CH3107/12
6.	To be offered by	Department of Chemical Engineering
7.	To take effect from	July 2022
8.	Prerequisite	Nil
9.	Course Objective(s): To demonstrate solution strategies for algebraic and differential equations (linear and nonlinear). To solve chemical engineering problems for the discussed numerical techniques using suitable software.	
10.	Course Content: Significance of numerical methods; Approximations, round-off and truncation errors, uncertainty in experimental data, error propagation, rate of convergence; Solution of linear algebraic equations, eigenvalues and eigenvectors; Solution of nonlinear algebraic equations; Solution to material balance on process units; Regression, curve fitting, cubic splines; Analysis of reaction kinetic data; Numerical differentiation and integrations; Solution to ordinary differential equations: initial value and boundary value problems; Solution to heat conduction equation, falling sphere in a fluid; Solution to partial differential equations; Solution to diffusion equation. Laboratory: Application of the above techniques to chemical engineering problems using suitable software.	
11.	Textbook(s): 1. Chapra S C and Canale R P, <i>Numerical Methods for Engineers</i> , 7th Edition, Tata McGraw Hill (2015). 2. Gupta S K, <i>Numerical Methods for Engineers</i> , 2nd Edition, New Age International (2010).	
12.	Reference(s): 1. Beers K J, <i>Numerical Methods for Chemical Engineering: Applications in MATLAB</i> , 1st Edition, Cambridge University Press (2006). 2. Chidambaram M, <i>Mathematical Modelling and Simulation in Chemical Engineering</i> , Cambridge University Press (2018). 3. Finlayson B A, <i>Introduction to Chemical Engineering Computing</i> , 2nd Edition, Wiley India (2012). 4. Ghosh P, <i>Numerical, Symbolic and Statistical Computing for Chemical Engineers using Matlab</i> , PHI Learning (2018).	