

1.	Title of the course	Computational Techniques for Chemical Engineers
2.	Course number	CH215M
3.	Structure of credits (L-T-P-C)	3-0-3-5
4.	New course/modification to	Modified with CH304M/COMPUTATIONAL TECHNIQUES FOR CHEMICAL ENGINEERS
5.	To be offered by	Chemical Engineering
6.	Prerequisite	None
7.	Course Objective(s): To discuss solution strategies for algebraic and differential equations (linear and nonlinear). To solve chemical engineering problems for the discussed numerical techniques using suitable software.	
8.	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, unsteady settling of sphere in a fluid, one-dimensional steady heat conduction; Solution to partial differential equations: transient diffusion; Laboratory: Application of the above techniques to chemical engineering problems using suitable software.	
9.	Textbook(s): 1. Chapra S C and Canale R P, Numerical Methods for Engineers, 7th Edition, Tata McGraw Hill (2015). 2. Gupta S K, Numerical Methods for Engineers, 2nd Edition, New Age International (2010).	
10.	Reference(s): 1. Beers K J, Numerical Methods for Chemical Engineering: Applications in MATLAB, Cambridge University Press (2006). 2. Chidambaram M, Mathematical Modelling and Simulation in Chemical Engineering, Cambridge University Press (2018). 3. Finlayson B A, Introduction to Chemical Engineering Computing, 2nd Edition, Wiley India (2012). 4. Ghosh P, Numerical, Symbolic and Statistical Computing for Chemical Engineers using Matlab, PHI Learning (2018).	