

1.	Title of the course	Computational Techniques for Chemical Engineers
2.	Course number	CH3107
3.	Status of the course	Core
4.	Structure of credits	3-0-3-5
5.	Offered to	UG
6.	New course/modification to	New course
7.	To be offered by	Department of Chemical Engineering
8.	To take effect from	July 2020
9.	Prerequisite	Nil
10.	Whether approved by the Department	Yes
11.	<b>Course Objective(s):</b> 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.	
12.	<b>Course Content:</b> 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.  <b>Laboratory:</b> Application of the above techniques to chemical engineering problems using suitable software.	
13.	<b>Textbook(s):</b> 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).	
14.	<b>Reference(s):</b> 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).	