

1.	Title of the course	Optimization Techniques
2.	Course number	CH4024
3.	Status of the course	Elective
4.	Structure of credits	3-0-0-3
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	CoT
10.	Whether approved by the Department	Yes
11.	Course Objective(s): To introduce the fundamentals of optimization theory, and discuss solution methods to various classes of optimization problems.	
12.	Course Content: Introduction to optimization problems: cost function, constraints; Formulation for engineering applications; Convex sets and functions; Local and global optimality; Unconstrained optimization: optimality conditions, line search and trust region methods; Constrained optimization: Karush-Kuhn-Tucker conditions, concept of duality, method of Lagrange multipliers; Linear programming: simplex method; Quadratic programming: active set method; Nonlinear programming: sequential quadratic programming algorithm; Introduction to integer and stochastic optimization.	
13.	Textbook(s): 1. Nocedal O J and Wright S J, <i>Numerical Optimization</i> , 2nd Edition, Springer India (2006). 2. Rao S S, <i>Engineering Optimization: Theory and Practice</i> , 4th Edition, John Wiley & Sons (2009).	
14.	Reference(s): 1. Edgar T F, Himmelblau D M and Lasdon L S, <i>Optimization of chemical processes</i> , 2nd Edition, McGraw Hill (2001). 2. Ravindran A, Ragsdell K M and Reklaitis G V, <i>Engineering Optimization: Methods and Applications</i> , 2nd Edition, John Wiley & Sons (2006).	