

1.	Title of the course	Predictive Data Modelling
2.	Course number	CS509L
3.	Structure of credits	3-0-0-3
4.	Offered to	PG
5.	New course/modification to	Modification To CS5025/6
6.	To be offered by	Department of Computer Science and Engineering
7.	To take effect from	July 2022
8.	Prerequisite	CoT
9.	<p>Course Objective(s): To recognize and formulate convex optimization problems that arise in applications such as instruction set customization, data center resource management, spatial architecture scheduling, resource allocation in tiled architectures, signal processing. To present the basic theory of such problems, concentrating on results that are useful in computation using a off-the-shelf software to solve them. To give students a thorough understanding of how such problems are solved and some experience in solving them using off-the-shelf software.</p>	
10.	<p>Course Content: Concentrates on recognizing and solving convex optimization problems that arise in applications. Convex sets, functions, and optimization problems. Basics of convex analysis. Least-squares, linear and quadratic programs, semidefinite programming, minimax, extremal volume, and other problems. Optimality conditions, duality theory, theorems of alternative, and applications. Interior-point methods. Applications to instruction set customization, data center resource management, spatial architecture scheduling, resource allocation in tiled architectures, signal processing, statistics and machine learning, control and engineering, digital and analog circuit design, and finance using off-the-shelf software to solve them</p>	
11.	<p>Textbook(s):</p> <ol style="list-style-type: none"> 1. Stephen Boyd, Lieven Vandenberghe, <i>Convex Optimization</i>, Cambridge University Press (2018). 2. Tony Nowatzki, Michael Ferris, Karthikeyan Sankaralingam, Cristian Estan, Nilay Vaish and David Wood, <i>Optimization and Mathematical Modeling in Computer Architecture</i>, Morgan & Claypool Publishers (2013). 	
12.	<p>Reference(s):</p> <ol style="list-style-type: none"> 1. Daniel P Palomar and Yonina C Eldar, <i>Convex Optimization in Signal Processing and Communications</i>, Cambridge University Press (2009). 2. Stephen Boyd, Lieven Vandenberghe, <i>Introduction to Applied Linear Algebra- Vectors, Matrices, and Least Squares</i>, Cambridge University Press (2018). 3. Dimitri P Bertsekas, Angelia Nedic and Asuman E. Ozdaglar, <i>Convex Analysis and Optimization</i>, Athena Scientific, (2003). 4. Aharon Ben-Tal and Arkadi Nemirovski, <i>Lectures on Modern Convex Optimization: Analysis, Algorithms, and Engineering Applications</i>, MOS-SIAM Series on Optimization (2001). 	