

INDIAN INSTITUTE OF TECHNOLOGY TIRUPATI
PROFORMA FOR NEW COURSE

1.	Title of the Course	Predictive Data Modelling
2.	Course Number	CS5025
3.	Status of the Course	Elective
4.	Structure of Credits	3-0-0-3
5.	Offered To	PG
6.	New Course/Modification to	New
7.	To be Offered by	Dr. Ravi Prakash Iyer G
8.	To take effect from	January 2019
9.	Prerequisite	CoT
10.	Whether approved by the Department	Yes
11.	Course Objective: 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.	
12.	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.	
13.	Text book(s): 1. Stephen Boyd, Lieven Vandenberghe, <i>Convex Optimization</i> , Cambridge University Press, (2018). 2. Tony Nowatzki, Michael Ferris, Karthikeyan Sankaralingam, Cristian Estan, Nilay Vaish, David Wood, <i>Optimization and Mathematical Modeling in Computer Architecture</i> , Morgan & Claypool Publishers, (2013).	
14.	Reference(s): 1. Daniel P. Palomar, 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, Arkadi Nemirovski, <i>Lectures on Modern Convex Optimization: Analysis, Algorithms, and Engineering Applications</i> , MOS-SIAM Series on Optimization, (2001).	