# STOCHASTIC PROGRAMMING AND APPLICATIONS

## Overview

Uncertainty is a fundamental aspect of any decision making process. Thus the basic models in optimization are truly not free of it. In optimization uncertainty usually enters the data of the problem. There are several ways of handling uncertainty in optimization. One of the most effective ways is to assume to treat the uncertain data as random variables often following some statistical distribution. The mathematical approach to handle such classes of optimization problems is known as "STOCHASTIC PROGRAMMING". This approach was first brought into optimization by George Dantzig, one of the co-founders of linear programming and then many great optimization theorists have contributed to the growth of the subject. At present this approach to handle uncertainty is the most popular one in applications. In most cases it has been observed that solving a optimization problem involving uncertainty using the approach the stochastic programming provides a more effective solution rather than forcing a deterministic model to handle the problem. Stochastic optimization freely draws its tools from convex analysis, optimization, and probability and statistics. It is also applied to diverse fields like engineering, economics, management sciences and finance.

In India however the study of stochastic optimization is yet to establish its roots. Thus it is important to introduce this subject to students in engineering, operation research, economics, management , etc and also to the practitioner in the industry who would be able to use the techniques of stochastic programming in a useful way.

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| **Course Duration** | **20 - 28th March, 2018.**<br>**Number of participants outside of IITK campus for the course will be limited to forty.** |
| **Objectives** | ▪ To expose the participants to the modeling aspects and solution techniques of stochastic programming.<br>▪ As a by-product the participants will be also exposed to the fundamentals of convex analysis, optimization and probability theory.<br>▪ The participants will also get a solid grounding on the basic theory of stochastic optimization.<br>▪ The participants will also get an hands-on experience in modeling practical problems in the stochastic programming framework and also solving them using the algorithms that they will learn. |
| **Who can attend** | Ph.D. students, post-doctoral fellows working in optimization, operations research and management science, economics, engineering and applied mathematics. Practitioners from the finance industry and also various management organizations can participate. |
| **Fees** | The participation fees for taking the course is as follows:<br>**Participants from outside the campus : 2000/-**<br>**Participants from the campus: 1500/-**<br>The above fee include all instructional materials, computer use for tutorials and assignments, 24 hr free internet facility. The participants will be provided with food and accommodation on payment basis. |
| **Organizing Institute** | **Indian Institute of Technology, Kanpur, India.** |

## The Faculty

**Prof. John R. Birge** is Jerry W. and Carol Lee Levin Distinguished Service Professor of Operations Management, The University of Chicago Graduate School of Business (2004-present). His research interests include Mathematical Modeling of Systems with Uncertainty, Stochastic Programming, LargeScale Optimization, Operational and Financial Modeling.
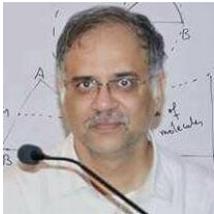
**Prof. Joydeep Dutta** is Head of the Department of Economic Sciences, Indian Institute of Technology Kanpur. His research interest primarily involves convex optimization, variational inequalities, bilevel programming and applications of optimization in Economics.

## Course Co-ordinator

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