



DECISION MODELING

PROF. BISWAJIT MAHANTY

Department of Management
IIT Kharagpur

PRE-REQUISITES : 1) Basic Probability and Statistics 2) Basic Operations Research

INTENDED AUDIENCE : Students from Bachelors in Engineering, Masters in Business Administration, Masters in Economics, Masters in Industrial Engineering, Masters in Operations Research/Operations Management, PhD in related fields

INDUSTRIES APPLICABLE TO : Manufacturing Industry, Chemical Industry, Service Industry, Management Consultancy Houses, Corporate Planning Groups.

COURSE OUTLINE :

Decision Modeling is an important component of Operations Research. With the advent of globalization, only those industries survive who would be able to make effective decisions. Out of the vast coverage of decision models, this course focuses on decision analysis, waiting line or queuing models, simulation models, and network models. This course will be of immense value not only for the people working in manufacturing or service industry but also to undergraduate and postgraduate students of all fields of engineering and management.

ABOUT INSTRUCTOR :

Prof. Biswajit Mahanty is a professor at the Department of Industrial and Systems Engineering of IIT Kharagpur. He has obtained his B.Tech (Hons) degree in Mechanical Engineering, and his M.Tech and PhD degrees from IIT Kharagpur. He has had a rich and varied professional career with six years in industry and more than 26 years in teaching, research, and industrial consulting. His areas of interest are in Operations Research, Systems, Project Management, and Information Systems. He has guided 12 doctoral and more than 100 undergraduate and post-graduate level dissertations. He has also carried out a large number of sponsored research and industrial consulting projects. He has, to his credit, a number of publications in international journals of repute. He has developed a 29-lecture NPTEL course on 'Management Information System' available on YouTube. He has also taught at the School of Management at Asian Institute of Technology, Bangkok as a visiting faculty member.

COURSE PLAN :

- Week 1:** Decision Analysis: Introduction to Decision modeling, Probability Concepts, Decision modeling for deterministic, uncertainty, and risk situations
- Week 2:** Decision Analysis: Bayes Theorem, Decision Making with and without Experimentation, Decision Trees
- Week 3:** Waiting Line Models: Elements of Queuing models, Queuing models based on the birth-and-death process
- Week 4:** Waiting Line Models: Priority-Discipline Queuing Models, Finite population models, Queuing cost models
- Week 5:** Simulation: Discrete-Event Simulation modelling, Random numbers and Random Variates, Input Modelling and Output analysis
- Week 6:** Simulation: Continuous Simulation, System Dynamics
- Week 7:** Network Models: Introduction to Graph theory, Tree and Spanning Tree, Maximal Flow algorithms
- Week 8:** Network Models: Maximal Flow algorithms (continued), Shortest Path algorithms