

Course Objectives

This course is concerned with quantitative modelling and analysis of real-world decision-making problems using Probability, Statistics, and Operations Research. MBA651 introduces main topics in these domains at a level suitable for the MBA students.

Prerequisites

High school calculus

Course Contents

Probability: Random experiment and probability; Conditional probability and independence; Random variables; Common probability distributions; Mean, variance and quantiles; Jointly distributed random variables; Conditional distribution and independence.

Statistics: Sum of random variables; Covariance and correlation; Limit theorems; Population and sample; Estimation of parameters; Confidence intervals; Hypothesis testing; Two-sample tests; Simple linear regression; Multiple linear regression.

Operations Research: Linear programming – modelling, solution techniques, and sensitivity analysis; Transportation and Assignment problems; Network-flow models; Modelling using integer variables, Decision making under uncertainty.

Class Schedule

Wednesday and Friday 5:10 – 6:25 pm in C1

Extra classes: 2nd October (*in online mode*)

Instructor

Dr. Avijit Khanra (Email: kavijit@iitk.ac.in)

Office hour: Thursday, 2:30 – 3:30 pm

TA

To be communicated by email once the TA assignment is finalized.

Evaluation

1) End-sem exam	40%
2) Mid-sem exam	30%
3) Quizzes ¹	20%
4) Class participation ²	10%

Total	100%

¹ There will be two quizzes, one before and one after the mid-sem exam. Quiz dates will be announced beforehand. There will be no make-up quiz.

² Evaluation of class participation is subjective. It will be measured by student's preparedness during the classes and regularity in the home assignments.

Home Assignments

After most classes, a homework will be given to complement the class discussion. Students shall attempt the problems on their own and submit photo of the handwritten answer (*as pdf*) on the HELLO IITK portal (<https://hello.iitk.ac.in/user/login>) before the solution is discussed in the next week. *These assignments will not be evaluated.*

Attendance Policy

It goes without saying that 100% attendance is compulsory. Any student who wishes to take leave shall inform the instructor regarding his/her absence.

Grading Policy

A combination of absolute and relative grading policies will be adopted. Marks obtained in every evaluation component will be divided by the highest marks in that component before arriving at the total score. This shall take care of the difficulty level of the exams. Next, the interval [0,100] will be split into sub-intervals corresponding to A, B⁺, ..., F grades. The sub-intervals will be chosen according to the distribution of the scores.

Textbooks & References

This being a PG course, there is no specific textbook. The following books are recommended as references, with the first and the fourth ones likely to be the most useful.

1. *Dekking, Kraaikamp, Lopuhaa and Meester, A Modern Introduction to Probability and Statistics: Understanding Why and How, Springer International Edition*
2. Newbold, Carlson and Thorne, *Statistics for Business and Economics*, Pearson India
3. H.J. Larson, *Introduction to Probability Theory and Statistical Inference*, Wiley
4. *W.L. Winston, Operations Research: Applications and Algorithms, Cengage Learning*
5. Hillier and Lieberman, *Introduction to Operations Research*, McGraw Hill

I will provide lecture notes beforehand. Students are expected to read the relevant parts from it before a class. This will lead to better understanding and faster coverage.