



MG221 Aug 2:1

Applied Probability and Statistics

Instructor

Chiranjit Mukhopadhyay

Email: cm@iisc.ac.in

Teaching Assistant

NA

Email:

Department: Management Studies

Course Time: Monday & Thursday 14:00-17:00

Lecture venue: MS Seminar Hall

Detailed Course Page: <http://mgmt.iisc.ac.in/CM/MG221/>

Announcements

Brief description of the course

It is a preparatory course in basic Probability Theory and elementary Statistics for next level courses in Statistical Methods and Machine Learning. Apart from these basics, it also covers elementary univariate Applied Statistical Methods, useful for everyday usage in empirical research. Thus it is meant for preparing students intending to pursue a career in Analytics, and empirical or experimental researchers heavily dependent upon statistical analysis.

Prerequisites

Basic Multivariable Calculus & Elementary Linear Algebra.

Syllabus

In the Probability front, the course covers the basics of (non-measure theoretic) Probability Theory, Random Variables and Vectors, and standard Univariate Discrete and Continuous Probability Models like Binomial, Poisson, Geometric, Negative Binomial, Hypergeometric, Uniform, Exponential, Normal and Gamma distributions. After a gentle introduction to the mathematical statistics of Point & Interval Estimation and Hypothesis Testing, the course covers the basic univariate parametric and non-parametric applied statistical

methods for one and two sample problems for Location, Scale and Proportions, in terms of the z, t, chi-square, F, Sign, Wilcoxon Rank Sum, Signed-Rank and Fisher's exact tests.

Course outcomes

1. Acquiring a basic knowledge of Probability Theory, useful for modeling uncertain phenomena, and required for understanding the logic of Statistical Methods and Machine Learning.
2. Learning the general methods of frequentist estimation and hypothesis testing.
3. Learning standard statistical methods useful for everyday routine elementary applications.

Grading policy

50% - Midterm

50% - Final

Pre-Midterm Assignment marks adjusted in Midterm; and likewise post-midterm Assignment marks are adjusted in Final.

Assignments

1. Experiencing Central Limit Theorem through Simulation
2. Analysis of Titanic Survival

Resources

1. Class Notes.
2. Lecture Notes Available at <http://mgmt.iisc.ac.in/CM/MG221/ln.html>
3. Text Books:
 - A. Applied Statistics and Probability for Engineers by Douglas C. Montgomery & George C. Runger. Fifth Edition, 2014. Willey.
 - B. Statistics by David Freedman, Robert Pisani & Roger Purves. Fourth Edition, 2010. Viva Books.
 - C. Elementary Probability Theory with Stochastic Processes by Kai Lai Chung. Third Edition, 1974. Narosa Publishing House.