

Applied Probability and Statistics (m62110p)

Instructors: *ST.VAKEROUDIS*

Core Course, 1st semester, 5 ECTS units

Course level: Graduate (MSc)

Language: Greek (or English if foreign students attend)

Course Description

Random Experiment. Sample Space. Axioms of Kolmogorov. Properties of Probabilities. Law of total probability. Bayes's Rule. Discrete and Continuous random variables. Expected value and variance of random variables. Moment generating function. Characteristic function. Binomial distribution. Geometrical Distribution. Poisson Distribution. Hypergeometrical Distribution. Uniform Distribution. Exponential Distribution. Normal Distribution. Central Limit Theorem. Law of Large Numbers. Independence of random variables. Multidimensional random variables. Estimator of unknown parameter. Unbiased Estimator. Consistent Estimator. Sufficient Estimator. Rao-Blackwell Estimator. Cramer-Rao lower bound. Method of maximum likelihood. Methods of moments.

Prerequisites

Knowledge of Calculus and of Linear Algebra.

Target Learning Outcomes

- The students will be able to compute probabilities of events, expected values and variances of discrete and continuous random variables. They will also be able to apply the central limit theorem and find estimates of unknown parameters.
- The students will be able to solve realistic problems that are related with random experiments.

Recommended Bibliography

- S. M. Ross, "A first course in Probability"
- G. Roussas, "Statistical Inference"

Teaching and Learning Activities

In Class, distant learning.

Assessment and Grading Methods

Written final exam, Assignments.