

INSTITUTE OF MATHEMATICS  
College of Science  
University of the Philippines Diliman

**Math 150.1 Course Syllabus**

**A. Course Catalogue Description**

Course Number	Math 150.1
Course Title	Mathematical Statistics I
Course Description	Combinatorial probability; probability distributions; joint and conditional distributions; random variables; distributions of functions of random variables; mathematical expectation; moment-generating functions; sampling distributions
Prerequisite	Math 23/equiv. and Stat 101/equiv.
Course Credit	3 units
Number of Hours	3 hours/week

**B. Course Content**

- I. Course Introduction and Orientation
- II. Probability Space
  1. Outcome space, sigma field and probability measure
  2. Conditional probability and its properties
  3. Independent Events and Bayes' Rule
- III. Random Variables and Distribution Functions
  1. Random variables (continuous and discrete)
  2. Distribution Functions
    - a. Cumulative distribution function
    - b. Probability density/mass functions
    - c. Moment generating functions
  3. Mathematical Expectation
  4. Raw and central moments, mean and variance
  5. Chebyshev's Inequality
- IV. Discrete Distributions
  1. Uniform (Empirical) distribution
  2. Bernoulli and Binomial distributions
  3. Hypergeometric distribution
  4. Poisson distribution
  5. Geometric and Negative Binomial distributions
- V. Continuous Distributions
  1. Uniform (Rectangular) distribution
  2. Normal distribution
  3. Exponential distribution
  4. Other distributions
    - a. Gamma distribution
    - b. Beta distribution
    - c. Lognormal distribution
- VI. Multivariate Distributions
  1. Joint distributions
  2. Marginal distributions
  3. Marginal expectations

4. Covariance and correlation
5. Conditional expectations
6. Bivariate Normal distribution

VII. Sampling Distribution

1. Sampling, sample mean and sample variance
2. Law of Large Numbers
3. Central Limit Theorem

For a more detailed syllabus, send an email request to [ddapr@math.upd.edu.ph](mailto:ddapr@math.upd.edu.ph).