

# Department of Mathematics—Philadelphia University

## Course Syllabus

Course Title	Probability Theory
Course Code	250232
Semester	Second/2022–2023
Lecturer	Amin Witno
Office Room	814 Faculty of Science
Office Hours	Sun/Tue: 09:30–11:00; Mon/Wed: 11:00–12:30
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## Short Description

This course is an introduction to probability theory, covering standard topics such as sample space, events, counting technique, probability axioms, discrete and continuous random variables, mathematical expectation and variance, some important probability distributions.

## Topics by the Week

1. Counting techniques: permutations, combinatorial methods, binomial coefficients.
2. Probability: sample spaces, events, probability of an event, rules of probability.
3. Conditional probability, independent events, Bayes' theorem.
4. Random variables, discrete and continuous, probability distributions and probability density functions.
5. Bivariate distributions, joint probability distributions and probability densities.
6. Marginal distributions, conditional distributions.
7. Mathematical expectations, mean and variance.
8. Moments, Chebyshev's theorem, moment-generating functions.
9. Covariance, moments of linear combinations of random variables.
10. Conditional expectation, conditional mean and variance.
11. Special probability distributions: discrete uniform distribution, Bernoulli distribution, the binomial distribution
12. The negative binomial distribution, geometric distribution, hypergeometric distribution, the Poisson distribution.
13. Special probability densities: the uniform distribution, exponential distribution, the normal distribution.
14. The standard normal distribution, normal approximation to the binomial distribution.

## Recommended Textbooks

- (1) Sheldon Ross, A First Course in Probability, Tenth Edition, Pearson, 2019.
- (2) Miller and Miller, Mathematical Statistics with Applications, Eighth Edition, Pearson, 2014.

## Supporting Material

There are no lecture notes. Lecture slides and all hand-outs and other supporting materials will be linked at the URL below.

<https://www.philadelphia.edu.jo/academics/awitno>

## Online Resources

The following shortcut will take you to my web homepage at the University, where you find the course syllabus, exam dates, copies of old exams, links to the above materials, and any important announcement related to the current semester.

<http://phi.witno.com>

## Grade Distribution

The following guideline is tentative; it may be modified as necessary according to the University directive for the current semester.

Homeworks	
Quizzes	30%
Class participation	
Midterm Exam	30%
Final Exam	40%

## Exam Dates

Exam dates, once determined, will be posted online at the homepage as well as at the University student-portal page.

## Homework Exercises

Homework exercises with check answers have been uploaded in the Moodle coursepage as well as at the MicroSoft Teams channel.