

Philadelphia University
Introduction to Probability and Statistics

Faculty: Science

Department: Basic Sciences

Module Name: Introduction to Probability and Statistics

Module Number: 210231

Level: 1

Credit Hours: 3 credit hours

Prerequisite /Co-Requisite: None

Lecturer: Associate Professor Dr. Jaffar Almousawi

Office Number: 824, Faculty of Science

Office Hours: 9:00-10:00 S, T, Th and 10:00-11:00 M, W

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Module Coordinator: Dr. Jaffar Almousawi

Aims (Module Purpose)

This is an introductory course in statistics. The course is planned so that students learn the basic concepts needed in probability theory and statistics. It familiarizes students with statistical terms such as population, sample, sample size, random variable, mean, variance, and much more. The course covers materials such as collecting data, graphical methods, descriptive statistics, regression and correlation, probability basics, confidence intervals and hypothesis testing.

Teaching Methods

Duration: 16 weeks in second semester, 32 hours in total.

Lectures: 45 hours in total, 3 per week (including two 1-hour midterm exams).

Learning Objectives

Upon completion of the course, the student will be able to:

- 1. Collect data*
- 2. Present data using various graphical methods*
- 3. Calculate and interpret numerical summaries*
- 4. Use and apply laws of probability and learn how these laws are used in statistical inference*
- 5. Use the concepts of sampling distributions and learn how it applies in making statistical inferences be based on sample of data*
- 6. Be familiar with some important discrete and continuous distributions*
- 7. Make appropriate use of statistical inference*

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Module Outlines

Week	Day	Subject
(1)		Introduction and Data collection, Why Data are Needed, Types of Data and Their Sources, Design of Survey Research, Types of Sampling Methods, Some important Definitions, Population, sample, parameter, statistic, Descriptive statistics, Inferential Statistics, Data Sources, Types of Samples
(2)		Presenting Data in Tables and Charts, Organizing Numerical Data, The Ordered Array and Stem-Leaf Display, Tabulating and Graphing Univariate Numerical Data, Frequency Distributions: Tables, Histograms
(3)		Numerical Descriptive Measures, Measures of Central Tendency, Quartiles, Measures of Variation, Shape, The Empirical Rule
(4)		Simple Linear Correlation and Regression, The Scatterplot, The Least-Squares Equation, Slope of a Line, Intercept
(5)		Basic Probability, Sample spaces and events, Simple Probability, Joint Probability, Conditional Probability, Statistical independence, Marginal Probability, Counting Rules
(6)		Some Important Discrete Probability Distributions, The Probability of a Discrete Random Variable, Binomial Distribution
(7)-(8)		The Normal Distribution, The Standardized Normal Distribution
(9)		Sampling Distributions, Sampling Distribution of the Mean, The Central Limit Theorem
(10)-(11)		Confidence Interval Estimation, Point Estimates, Interval Estimates, Confidence Interval Estimation for the Mean (Variance Known), Confidence Interval Estimation for the Mean (Variance Unknown), Factors Affecting the Width of Confidence Interval, Determining Sample Size
(12)		Fundamentals of Hypothesis Testing: One-Sample Tests, Hypothesis Testing Methodology, Z Test for the Mean (Variance Known)
(13)		Connection to Confidence Interval Estimation, One-Tail Tests
(14)		t Test for the Mean (Variance Unknown)
(15)		Z Test for the Proportion

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Modes of Assessment

Mode of Assessment	Weight	Date
First Test	25%	
Second Test	25%	
Final : (Comprehensive; Written)	50%	

- Make-up exams will be offered only for valid reasons with consent of the dean.
- Make-up exams may be different from regular exams in content and format.

Attendance Policy

Lecture attendance is expected. The course notes and textbook are not comprehensive. Additional materials will be covered in lecture. Students are responsible for all materials covered in lectures.

Expected Workload

On average, you should expect to spend at least (9) hours per week on this module.

Textbook(s) and Supporting Materials

Textbook:

Title: *Introductory Statistics*
Author: Neil A. Weiss
Publisher: Addison-Wesley
ISBN: 0-201-60045-3

Reference:

Title: *Applied Statistics and Probability for Engineers*
Author: Douglas C. Montgomery and George C. Runger
Publisher: John Wiley & Sons
ISBN: 0-471-17027-5

Website of Interest:

<http://www.richland.edu/james/lecture/m170/> - 6k -