Philadelphia University

Faculty: Science

Department: Basic Sciences

Module Name: Mathematical Statistics
Module Number: 250332
Level: 3
Credit Hours: 3 credit hours
Prerequisite /Co-Requisite: math 250232
Lecturer: Associate Professor Dr. Jaffar Almousawi
Office Number: 824
Office Hours:
Phone: +00 962 2 637 4444 Ext: 340
e-mail: jalmousawi@philadelphia.edu.jo
Module Coordinator: Dr. Jaffar Almousawi

Aims (Module Purpose)

This is the third course of statistics and probability a student in the mathematics department takes. Statistics is the science of interpreting, understanding, and deducing information from data. We will emphasize the meaning of statistical results, and the mathematics used to perform statistical calculations. Our goal will be to cover some important concepts, in particular, Functions of Random Variables, Sums of Random Variables, Order Statistics, Methods of Estimation, Confidence Intervals, and Tests of Statistical Hypotheses.

Teaching Methods

Duration: 16 weeks in second semester, 48 hours in total.
Lectures: 32 hours in total, 2 per week (including two 1-hour midterm exams).

Learning Objectives

Upon completion of this course, the student will

1. have an understanding of the vocabulary related to inferential statistics.
2. master the notions of confidence intervals and have a solid understanding of the normal, t, chi-square, and F distributions.
3. understand the theory and reasoning behind hypothesis tests as well as possessing the ability to carry out such tests.
4. be exposed to the mathematics behind the methods and techniques used in previous courses of statistics

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Mathematical Statistics (math 2503324)

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Contribution to Program Learning Outcomes:
(A_1, B_1)

Module Outlines

Week	Day	Subject
(1)–(2)		Functions of Random Variables, The Probability Distribution of a Function of a Random Variable both the discrete and continuous cases, The Joint Probability Distribution of a Function of a Bivariate Random Variable
(3)–(4)–(5)		Sums of Random Variables, Sums of Random Variables and Sampling Distributions, The pdf's of the Sample Mean and Sample Variance
(6)–(7)		Order Statistics, Definition of Order Statistics, Theorems on Order Statistics, Joint and marginal Distributions, The Distributions of Minimum and Maximum
(8)–(9)		Methods of Estimation, Method of Moment (MOM), Examples on Discrete and Continuous Random Variables, Maximum likelihood Method (MLM)
(10)		Properties of Point Estimators, Unbiasedness, Minimum Variance
(11)–(12)–(13)		Confidence Intervals, Confidence Intervals for the Mean of a Normal Population with Known Variance, Confidence Intervals for the Mean of a Normal Population with Unknown Variance, Confidence Intervals for the Variance of a Normal Population with Unknown Mean
(14)–(15)		Tests of Statistical Hypotheses, a General Example, the Critical Region, the Power of the Test
(16)		Review

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Modes of Assessment

Mode of Assessment	Weight	Date
First test	20%	
Second Test	20%	
Homework assignments	10%	
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: Introduction to Mathematical Statistics
Author: Hogg & Craig
Publisher: Prentice Hall
ISBN: 0-02-355722-2

Reference:

Title: An Introduction to Applied Probability
Author: Ian F. Blake
Publisher: John Wiley & Sons
ISBN:

Website of Interest: