Philadelphia University	PHILADELPHIA UNIVERSITY THE WAY TO THE FUTURE	**Approval date:**
Faculty of Science		**Issue:**
Department of Mathematics		**Credit hours: 3**
Academic year 2023/2024	**Course Syllabus**	**Bachelor**

Course information

Course #	Course title	Prerequisite
0250332	**Mathematical Statistics**	**0250232**

Course type	Class time		Room #
☐ University Requirement ☐ Faculty Requirement ☑ Major Requirement ☐ Elective ☑ Compulsory	Sat, Mon	8:15 – 9:05	21009
	Sun, Tues	12:40 – 13:30	21005

Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
Dr. Heba Ayyoub	21019	2466	Sat to Tues 10:00 – 11:00	hayyoub@philadelphia.edu.jo

Learning Method

Learning Method		
☐ **Face to face**	☐ **Online**	☑ **Blended**

Course Description

Course Description
This course covers multivariate distribution, marginal and conditional distributions, moments of linear combinations of random variable, conditional expectation, multinomial distribution, bivariate normal distribution, methods of probability distribution, transformation, moment generating functions, order statistics, sampling distributions, t-distribution and F-distribution.
Course Objectives
At the conclusion of the course, students will be able to 1) Learn probability, conditional probability, concept of independence. 2) Study the discrete probability distributions, cumulative probability distribution as Binomial and Poisson distributions and their mean and variance. 3) Finally, learn the continuous probability distributions as Normal distribution, Standard normal distribution.

Course Learning Outcomes

Outcomes	
Knowledge	
K1	Understanding the fundamental concepts for bivariate (discrete and continuous) variables.
K2	Learn probability, conditional probability, concept of independence.
Skills	
S1	Students will use various techniques for concisely describing bivariate variables.
S2	Students will effectively apply the statistics in working with probabilities.
Competence	
C1	Students will have learned to find means, variances and moment generating functions of random variables or functions of random variables.
C2	Students will understand different methods for distribution functions of random variables.

Learning Resources

Course textbook	Mathematical Statistics with Applications, Dennis D. Wackerly, William Mendenhall and Richard L. Scheaffer, 7th Edition, Thomson.
Supporting References	Probability and Statistical Inference, Robert V. Hogg, Elliot A. Tanis and Dale L. Zimmerman, 9th Edition.
Teaching Environment	☑ **Classroom** ☐ **Laboratory** ☑ **Learning platform** ☐ **Other**

Meetings and Subjects Timetable

Week	Topic	Learning Methods	Tasks
1	**Course Syllabus:** Explanation of the study plan for the course, and what is expected to be accomplished by the students. **Technology Preliminaries:** Moodle, Microsoft Teams. **CHAPTER 5: Multivariate Probability Distributions** 5.1 Introduction	Face to Face and platform Learnings	
2	5.2 Bivariate and Multivariate Probability Distributions	Face to Face and platform Learnings	
3	5.3 Marginal and Conditional Probability Distributions	Face to Face and platform Learnings	
4	5.4 Independent Random Variables	Face to Face and platform Learnings	Quiz
5	5.5 The Expected Value of a Function of Random Variables 5.7 The Covariance of Two Random Variables 5.8 The Expected Value and Variance of Linear Functions of Random Variables	Face to Face and platform Learnings	Assignment
6	5.9 The Multinomial Probability Distribution	Face to Face and platform Learnings	Quiz
7	**Chapter 6: Functions of Random Variables** 6.1 Introduction 6.2 Finding the Probability Distribution of a Function of Random Variables	Face to Face and platform Learnings	

8	6.3 The Method of Distribution Functions	Face to Face and platform Learnings	
	Midterm Exam		
9	6.4 The Method of Transformations	Face to Face and platform Learnings	
10	6.5 The Method of Moment-Generating Functions	Face to Face and platform Learnings	Assignment
11	6.7 Order Statistics	Face to Face and platform Learnings	
12	**Chapter (7): Sampling Distributions and the Central Limit Theorem** 7.1 Introduction 7.2 Sampling Distributions Related to the Normal Distribution	Face to Face and platform Learnings	Quiz
13	7.3 The Central Limit Theorem	Face to Face and platform Learnings	
14	**Chapter (9): Properties of Point Estimators and Methods of Estimation** 9.6 The Method of Moments	Face to Face and platform Learnings	
15	9.7 The Method of Maximum Likelihood	Face to Face and platform Learnings	
16	**Final Exam**		

Assessment Methods and Grade Distribution

Assessment Methods	GradeWeight	Assessment Time (Week No.)	Link to Course Outcomes
Mid Term Exam	30%	8	K1, K2, C1
Various Assessments *	30%	Continuous	S1, S2, C1, C2
Final Exam	40%	16	K1, K2, C1
Total	100%		

* Includes: quiz, in class and out of class assignment, presentations, reports, videotaped assignment, group or individual projects.