Philadelphia University	PHILADELPHIA UNIVERSITY THE WAY TO THE FUTURE	**Approval date: 20/02/2025**
Faculty of Science		**Issue:**
Department of Math		**Credit hours: 3**
Academic year 2024/2025	**Course Syllabus**	**Bachelor**

Course information

Course#	Course title	Prerequisite	
0250232	**Probability Theory**	**Elementary Prob. & Stat. 0216121**	
Course type		**Class time**	**Room #**
☐ University Requirement ☐ Faculty Requirement ☒ Major Requirement ☐ Elective ☒ Compulsory		ST 09:45 – 11:30	2827
Degree / NQF Level	☒ Diploma degree (6)	☐ Bachelor degree (7)	

Instructor Information

Name	Office No.	Phone No.	Office Hours	E-mail
Feras Awad	822	2132	SM 11:15 – 12:15 ST 12:30 – 13:30	fawad@philadelphia.edu.jo

Course Delivery Method

Course Delivery Method			
☒ **Physical** ☐ **Online** ☐ **Blended**			
Learning Model			
Precentage	**Synchronous**	**Asynchronous**	**Physical**
	0%	**0%**	**100%**

Course Description

This course introduces the fundamentals of probability theory, covering sample spaces, probability axioms, counting techniques, conditional probability, and independent events. It explores random variables, distribution functions, expected values, and moments, alongside key probability laws such as Bernoulli, Binomial, Poisson, Uniform, Exponential, and Normal distributions. Students will gain a strong foundation in probability concepts and their applications.

Course Learning Outcomes

Number	Outcomes	Corresponding Program outcomes
Knowledge		
K1	Define key probability concepts, including sample spaces, probability axioms, and distribution functions.	**K_p1**
Skills		
S1	Apply probability axioms and counting techniques to solve real-world problems involving finite and infinite sample spaces.	**S_p2**
Competencies		
C1	Work in a team to implement one of the tasks of the course.	**C_p2**

Learning Resources

Course textbook	• Harold J. Larson (1991) Introduction to Probability Theory and Statistical Inference (3rd ed.). John Wiley and Sons.
Supporting References	• Irwin Miller, Marylees Miller (2012) John E. Freund's Mathematical Statistics with Applications (8th rd.). Pearson.
Supporting websites	GeoGebra: www.geogebra.org/
Teaching Environment	☒**Classroom** ☐ **laboratory** ☐**Learning platform** ☐**Other**

Meetings and Subjects Timetable

Week	Topic	Learning Methods	Tasks	Learning Material
1	Explanation of the study plan for the course, and what is expected to be accomplished by the students. **Chapter 1: Set Theory** 1.1 Set Notations, Equality and Subsets 1.2 Sets Operation	Lecture		Course Syllabus Chapter 1
2	**Chapter 2: Probability** 2.1 Sample Space; Events	Lecture		Chapter 2
3	2.2 Probability Axioms 2.3 Finite Sample Spaces	Lecture		Chapter 2
4	2.4 Counting Techniques	Lecture	Quiz	Chapter 2
5	**Blessed Eid al-Fitr holiday**			
6	2.5 Some Particular Probability Problems	Lecture		Chapter 2
7	2.6 Conditional Probability 2.7 Independent Events	Lecture		Chapter 2
8	**Chapter 3: Random Variables and Distribution Functions** 3.1 Random Variables 3.2 Distribution Functions and Density Functions	Lecture	Midterm	Chapter 3
9	3.3 Expected Values and Summary Measures	Lecture		Chapter 3
10	3.4 Moments and Generating Functions	Lecture		Chapter 3
11	**Chapter 4: Some Standard Probability Law** 4.1 The Bernoulli and Binomial Probability Laws	Lecture		Chapter 4
12	4.2 Geometric and Negative Binomial Probability Laws 4.4 The Poisson Probability Law	Lecture	Quiz	Chapter 4
13	4.5 The Uniform, Exponential and Gamma Probability Laws	Lecture		Chapter 4
14	4.6 The Beta and Normal Probability Laws	Lecture	Quiz	Chapter 4
15	**Blessed Eid al-Adha holiday**			
16	**Final Exam**			

* Includes: Lecture, flipped Class, project- based learning, problem solving based learning, collaborative learning

Course Contributing to Learner Skill Development

Using Technology
• Use GeoGebra to perform probability calculations.
Communication Skills
• Select a probability problem, present it to the students, and explain the method for solving it.
Application of Concepts Learnt
• Select a well-known probability problem from YouTube and simulate its solution using GeoGebra.

Assessment Methods and Grade Distribution

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

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

Alignment of Course Outcomes with Learning and Assessment Methods

Number	Learning Outcomes	Learning Method*	Assessment Method**
Knowledge			
K1	Define key probability concepts, including sample spaces, probability axioms, and distribution functions.	Lecture	**Exam**
Skills			
S1	Apply probability axioms and counting techniques to solve real-world problems involving finite and infinite sample spaces.	Lecture	**Quiz**
Competencies			
C1	Work in a team to implement one of the tasks of the course.	Project	**Homework**

* Includes: Lecture, flipped Class, project- based learning, problem solving based learning, collaborative learning

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

Course Polices

Policy	Policy Requirements
Passing Grade	The minimum passing grade for the course is (50%) and the minimum final mark recorded on transcript is (35%).
Missing Exams	• Missing an exam without a valid excuse will result in a zero grade to be assigned to the exam or assessment. • A Student who misses an exam or scheduled assessment, for a legitimate reason, must submit an official written excuse within a week from an exam or assessment due date. • A student who has an excuse for missing a final exam should submit the excuse to the dean within three days of the missed exam date.
Attendance	The student is not allowed to be absent more than (15%) of the total hours prescribed for the course, which equates to six lectures days (M, W) and six lectures (S, T). If the student misses more than (15%) of the total hours prescribed for the course without a satisfactory excuse accepted by the dean of the faculty, s/he will be prohibited from taking the final exam and the grade in that course is considered (zero), but if the absence is due to illness or a compulsive excuse accepted by the dean of the college, then withdrawal grade will be recorded.
Academic Honesty	Philadelphia University pays special attention to the issue of academic integrity, and the penalties stipulated in the university's instructions are applied to those who are proven to have committed an act that violates academic integrity, such as: cheating, plagiarism (academic theft), collusion, and violating intellectual property rights.

Program Learning Outcomes to be Assessed in this Course

Number	Learning Outcome	Course Title	Assessment Method	Target Performance level
S_p2	The ability to employ mathematics in various real-life problems.	Probability Theory	Homework	100% of the students get 70% or more on the rubric

Description of Program Learning Outcome Assessment Method

Number	Detailed Description of Assessment
S_p2	The student is presented with a real-life probability problem or puzzle and attempts to solve it by applying the concepts learned in the course.

Assessment Rubric of the Program Learning Outcome

	Poor (1 pt.**)**	**Fair (**2 pts**)**	**Good (**3 pts**)**
Problem Understanding	Misinterprets the problem or does not identify key components.	Understands the problem but may miss some key details.	Clearly understands the problem and identifies all relevant details.
Application of Concepts	Uses incorrect or irrelevant probability concepts.	Use appropriate probability concepts but with minor errors or gaps.	Apply correct probability concepts accurately and appropriately.
Mathematical Accuracy	Contains major calculation errors that affect the solution.	It has minor calculation errors but does not significantly impact the solution.	All calculations are correct and well-explained.
Clarity of Explanation	Solution is unclear, disorganized, or lacks reasoning.	Provides a mostly clear explanation but may have some gaps in reasoning.	Provides a well-structured, clear, and logical explanation.