Lahore University of Management Sciences

MATH 230 – Probability

Fall Semester 2023-2024

Instructor	Sultan Sial
Room No.	
Office Hours	TBA
Email	sultans@lums.edu.pk
Telephone	042-35608018
Secretary/TA	Shazia Zafar & Noreen Sohail / (TBA)
TA Office Hours	TBA
Course URL (if any)	Lms.lums.edu.pk

Course Basics				
Credit Hours	3			
Lecture(s)	Nbr of Lec(s) Per Week	2	Duration	75min
Recitation/Lab (per week)	Nbr of Lec(s) Per Week		Duration	
Tutorial (per week)	Nbr of Lec(s) Per Week		Duration	

Course Distribution	
Core	Core course for all SSE majors except Math majors
Elective	
Open for Student Category	All students
Close for Student Category	Math majors

COURSE DESCRIPTION

This is a first course in probability which provides basic concepts related to modelling of chance events in practical life. It provides preparation for further courses in stochastic processes, statistics, statistical mechanics and an understanding of the probability concepts essential for students who want to pursue studies in physical sciences, social sciences, economics, and engineering. The course starts with an introduction of probability terms and methods of computing simple and conditional probabilities. The concepts of discrete and continuous random variables are covered. Special discrete and continuous probability distributions are explored with their real life applications.

COURSE PREREQUISITE(S)

-
-
-

Pre-req: MATH 101 & Anti-req: DISC 203 & Anti-req: MATH 230H & Equivalence: MATH 230H

Lahore University of Management Sciences

COURSE OBJECTIVES	
• • •	• Student will learn what probability is • Learn different concepts of probability & different ways of expressing probability • Learn how probability is helpful in quantification & modelling of everyday chance events to provide scientifically valid conclusions.

Learning Outcomes	
• • •	Having successfully completed the course the students will be able to • Explain the concepts of probability, including conditional probability • Explain the concepts of random variable, probability distribution, distribution function, expected value, variance and higher moments, and calculate expected values and probabilities associated with the distributions of random variables • Define basic discrete and continuous distributions, be able to apply them • Understand & apply Central Limit Theorem in different problems.

Grading Breakup and Policy
Two tests: 60% **Final Examination: 40%**

Examination Detail	
Midterm Exam	Yes/No: No
Final Exam	Yes/No: Yes Combine Separate: Combine Duration: 180min Exam Specifications: Closed book/Closed notes/No calculator

Tentative Lecture Schedule

Lahore University of Management Sciences

Serial	Topic	Textbook Reference
1.	Introduction of Randomness Overview of Set Theory.	1
	Basic Principles of Counting	2
2.	Permutation, Combination, Multinomial Coefficients	2
3.	Sample Space & Events	2
	Axioms of Probability	2
	Probability of Events	2
4.	Conditional Probability & Independence	2
	Conditional Probability	2
	Law of Total Probability; Bayes's Theorem	2
	Independent Events	2
5.	Random Variables	3
	Discrete Random Variables; Expected Value; Expectation of a function of Random Variables; Variance	3
6.	Bernoulli & Binomial Random Variable; Poisson Random Variable	3
7.	Continuous Random Variable	3
8.	Normal Random Variables	4
9.	Exponential Random Variables	5
10.	Joint Distributions	6
11.	Conditional Distributions; Discrete Case, Continuous Case	6
12.	Properties of Expectation	7
13.	Limit Theorems. Central Limit Theorem and applications	8

Textbook(s)/Supplementary Readings

Required Textbook:
Probability & Statistics for Engineers & Scientists 9th Edition
Ronald Walpole , Raymond Myers , Sharon Myers , Keying Ye

Additional References:
A First Course in Probability, 9th Edition, Sheldon Ross
Introduction to Probability Models, 10th Edition, Sheldon Ross
Probability for Dummies, 2006. Deborah Rumsey.