



Birzeit Univeristy
Mathematics Department
Second Semester 2023/2024
STAT 3321 – PROBABILITY THEORY
Course Outline

Classes / Instructors / Office Hours:

- **Classes:** Check Ritaj.
- **Instructor:** Dr. Hani Kabajah
- **Office Hours:** Check Ritaj.

Textbook:

- R. V. Hogg and A. T. Craig. **Introduction to Mathematical Statistics**, 5th edition, Prentice-Hall, 1995.

References:

- D. Wackerly, W. Mendenhall, and R. L. Scheaffer, **Mathematical Statistics with Applications**, 7th edition, Thomson Learning, 2008.
- I. Miller and M. Miller, **John E. Freund's Mathematical Statistics with Applications**, 8th edition, Pearson, 2014.

Grading Policy:

- The grading policy will be announced. Check Ritaj continuously!

Dates / Topics of Exams:

- The dates and the topics of the exams will be announced when the reservation system is open. Check Ritaj continuously!

Notes:

- You must attend all lectures.
- You need a scientific calculator for the lectures and the exams.
- You are highly encouraged to take notes during the lecture.
- Further notes, material, and information will be posted using Ritaj Course Board. Check Ritaj continuously!

In the following you can find:

- The lectures planned for each topic (where 1 lecture stands for 80 minutes).
- **The best way of studying is to solve questions.**
- **Check the Exercises/Problems at the end of each Chapter/Section.**

Detailed Topics:

Lecture	Chapter 1	Probability and Distributions
1	1.1	Introduction
2	1.2	Set Theory
3	1.3	The Probability Set Function
4	1.4	Conditional Probability and Independence
5	1.5	Random Variables of the Discrete Type
6	1.6	Random Variables of the Continuous Type
7	1.7	Properties of the Distribution Function
8	1.8	Expectation of a Random Variable
9	1.9	Some Special Expectations
10	1.10	Chebyshev's Inequality
Lecture	Chapter 2	Multivariate Distributions
11	2.1	Distributions of Two Random Variables
12	2.2	Conditional Distributions and Expectations
13	2.3	The Correlation Coefficient
14	2.4	Independent Random Variables
15	2.5	Extension to Several Random Variables
Lecture	Chapter 3	Some Special Distributions
16	3.1	The Binomial and Related Distributions
17	3.2	The Poisson Distribution
18	3.3	The Gamma and Chi-Square Distributions
19	3.4	The Normal Distribution
20	3.5	The Bivariate Normal Distribution
Lecture	Chapter 4	Distributions of Functions of Random Variables
21	4.1	Sampling Theory
22	4.2	Transformations of Variables of the Discrete Type
23	4.3	Transformations of Variables of the Continuous Type
24	4.4	The Beta, t , and F Distributions
25	4.5	Extensions of the Change-of-Variable Technique
26	4.6	Distributions of Order Statistics
27	4.7	The Moment-Generating-Function Technique
28	4.8	The Distributions of \bar{X} and nS^2/σ^2
29	4.9	Expectations of Functions of Random Variables