Probability & Statistics I
Tentative Topics Schedule

MTH 461 Section A
Fall 2024
University of Portland

See Books & Online Resources Lists for the readings & practice materials.

The reading materials are not mandatory but it is encouraged.

The "Reading" column in the table below contains page numbers (Pg.) or chapters (ch.) on which it refers to a label in the Books & Online Resources List. For example "Pg. 1-5 [S]" refers to pages 1-5 of the first item in the list, which is the textbook titled "Probability, Statistics, and Data: A Fresh Approach Using R".

Topics and Materials

Week	Day	Topic	Worksheet	Homework	Reading
1	Tu 8/27	Introduction and Orientation to Probability & Statistics	Review Set Theory & Calculus	-	Syllabus
	Th 8/29	Basic Definition of Probability	Computing Probabilities and Random Sampling	-	Sect. 1.1,1.2,&1.3 [B]
2	Tu 9/3	Counting and Arranging	Introduce the Basics of Combina-torics	-	Sect. 1.4 & 1.5 [B], andSect. 2.4 [S]
	Th 9/5	General Definition of Probability	Understand the Properties of Probability	-	Sect. 1.6 [B], andSect. 2.1&2.2 [S]
3	Tu 9/10	Conditional Probability	Think Conditionally	-	Sect. 2.1 & 2.2 [B], andSect. 2.3 [S]
	Th 9/12	Baye's Theorem, &The Law of Total Probability	Update Conditional Probabilities	Assigned: Homework 1	Sect. 2.3 & 2.4 [B]
4	Tu 9/17	Random Variables &Probability Functions	Describe a Random Variable	-	Sect. 3.1 [B]
	Th 9/19	Expectation &The Law of Large Numbers	Compute the Expected Value	-	Sect. 4.1, 4.2, & 4.3 [B]

Week	Day	Topic	Worksheet	Homework	Reading
5	Tu 9/24	Discrete Random Variables &Probability Mass Functions	Create Probability Mass Functions	-	Sect. 3.2 & 3.3
	Th 9/26	Discrete Probability Distributions	Understand Known Discrete Probability Distributions	Assigned: Homework 2	Sect. 3.4, 3.5, & 3.6 [B]
6	Tu 10/1	Expectation and Variance of Discrete Random Variables	Interpret the Expected Value and Variance	-	Sect. 4.4, 4.5, & 4.6 [B]
	Th 10/3	Continuous Random Variables &Probability Density Functions	Create Probability Density functions	-	Sect. 5.1 [B]
7	Tu 10/8	*Review*	Exam 1 Examples	-	Exam 1 Topics
	Th 10/10	**Exam 1**	-	-	-
8	Tu 10/15	*Fall Vacation*	-	-	-
	Th 10/17	*Fall Vacation*	-	-	-
9	Tu 10/22	Continuous Probability Distributions	TBA	-	TBA
	Th 10/24	Expectation and Variance of Continuous Random Variables	TBA	Assigned: Homework 3	TBA
10	Tu 10/29	Moment Generating Functions	TBA	-	TBA
	Th 10/31	Joint and Marginal Distributions	TBA	-	TBA
11	Tu 11/5	Conditional Distributions	TBA	-	TBA
	Th 11/7	Conditional Expectation and Variance	TBA	Assigned: Homework 4	TBA
12	Tu 11/12	Maximum Likelihood Estimation	TBA	-	TBA
	Th 11/14	Markov Chains	TBA	-	TBA
13	Tu 11/19	*Review*	Exam 2 Examples	-	Exam 2 Topics
	Th 11/21	**Exam 2**	-	-	-
14	Tu 11/26	Markov Chain Monte Carlo	TBA	-	TBA
	Th 11/28	*Thanksgiving Vacation*	-	-	-
15	Tu 12/3	Statistical Inference	TBA	-	TBA
	Th 12/5	Statistical Learning	TBA	-	TBA
16	Tu 12/11	**Final Exam Section A**	-	-	-

Along with textbooks [S] and [B], some of the course materials (contents of worksheets and homework) of

each topic was taken from these following sources:

- The elements of statistical learning: data mining, inference, and prediction by Hastie et al. (2009)
- An introduction to statistical learning with Applications in R by James et al. (2013)

Books & Online Resources Lists

Click on the link to access the resources.

Textbooks

[S] Speegle D, Clair B (2021). *Probability, Statistics, and Data: A Fresh, Approach Using R*. Chapman and Hall/CRC. https://probstatsdata.com/.

[B] Blitzstein JK, Hwang J (2019). *Introduction to probability*, 2nd, edition. Chapman and Hall/CRC. http://probabilitybook.net/.

References

Hastie, T., Tibshirani, R., Friedman, J. H., & Friedman, J. H. (2009). *The elements of statistical learning: Data mining, inference, and prediction* (2nd ed.). Springer. https://hastie.su.domains/ElemStatLearn/

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). *An introduction to statistical learning with applications in r* (2nd ed.). Springer. https://www.statlearning.com/