

## Stat 260 – Spring 2023

**Textbook:** Essentials of Probability & Statistics for Engineers & Scientists by Walpole, Myers, Myers, & Ye.  
Introduction to Probability and Statistics, Tim Swartz.

**Supplementary Material:** See Brightspace; EPS=Essentials of Probability & Statistics by Walpole, Myers, Myers, Ye.

The numbered questions are found in Essentials of Probability & Statistics for Engineers & Scientists by Walpole, Myers, Myers, & Ye. Short solutions can be found in the back of the book.

Extra problems and reading are given in Devore, 7<sup>th</sup> edition which is on reserve in the library. Here the extra material is given as: Reading (exercises)

**NOTE:** You are responsible for topics covered in the lectures AND the material listed here.

Set #	Reading / Exercises
1	Course overview Reading: Section 1.1 and 1.2 [EPS 1.1, 1.2]
2	Descriptive statistics, histograms, boxplots Reading: Sections 2.1, 2.2, 2.3, 2.4 [EPS 4.1, 4.2, 4.8] Exercises: 4.3, 4.5, 4.7 (find the variance using the computational formula; check your answer using the statistical functions of your calculator), 4.9
3	Paired data, scatterplots, correlation Reading: Section 2.5 [EPS 4.8, 7.8 $S_{xy} = \sum (x_i - \bar{x})(y_i - \bar{y})$ ; $S_{xx} = \sum (x_i - \bar{x})^2$ see notes Brightspace] Exercises: Produce scatterplots and compute the sample correlation using your calculator for the data given in 7.1, 7.3, 7.5. Comment on your findings. [Answers $r=.312$ , $.986$ , $.707$ ]
4	Probability and Set Theory Reading: Sections 3.1, 3.2 [EPS 1.4] Exercises: 1.1, 1.3, 1.5, 1.7, 1.9, 1.11, 1.13
5	Probability Reading: Section 3.3 [EPS 1.5, 1.6, 1.7] Exercises: 1.39, 1.41, 1.43, 1.45, 1.47, 1.49, 1.53
6	Reading: Section 3.4 Conditional Probability [EPS 1.8] Exercises: 1.59, 1.61, 1.63, 1.65(a,b), 1.73, 1.75, 1.77, 1.79
7	Independence Reading: Section 3.4.1 (3.5, 3.6 are background and examples) [EPS 1.8] Exercises: 1.67, 1.69, 1.71
8	Discrete random variables Reading: Chapter 4, Section 4.1 [EPS 2.1, 2.2] Exercises: 2.1, 2.3, 2.5, 2.9, 2.11, 2.13, 2.17, 2.27
9 and 10	Expectations and Variance of a discrete random variables Reading: Section 4.2 [EPS discrete parts of 2.5 and 2.6] Exercises: 2.51, 2.53, 2.55, 2.63, 2.65, 2.75, 2.77 (Ignore the reference to Theorem 2.2. Find the variance of X using the computational form shown in class), 2.87, 2.93
11	Binomial distribution Reading: Section 4.3 [EPS 3.1] Exercises: 3.5, 3.7, 3.9, 3.11, 3.17, 3.19, 3.51
12	Poisson distribution Reading: Section 4.4 [EPS 3.5] Exercises: 3.37, 3.41, 3.43, 3.45, 3.47, 3.49, 3.53, 3.55
13 and 14	Continuous distributions, Expectations of continuous distributions Reading: Chapter 5, Section 5.1 [EPS 2.3, continuous parts of 2.5 and 2.6] Exercises: 2.7, 2.15, 2.19, 2.21, 2.23, 2.25, 2.57, 2.59, 2.69, 2.71, 2.73, 2.79, 2.81, 2.83

Set #	Reading / Exercises
15 and 16	Normal distribution Reading: Section 5.2 [EPS 3.7, 3.8, 3.9, 3.10] Exercises: 3.61, 3.63, 3.65, 3.67, 3.69, 3.71, 3.79, 3.81, 3.83, 3.85, 3.87
17	Gamma distribution, exponential distribution Reading: Section 5.3 [EPS 3.11] Exercises: 3.89, 3.91, 3.93, 3.95, 3.97, 3.99
18 and 19	Jointly distributed random variables Reading: The discrete parts of 5.4 [EPS the discrete parts of 2.4] Exercises: 2.29, 2.39, 2.43, 2.67. Also, for the joint probability function in 2.67 confirm numerically that $\text{Cov}(X,Y) = 0$ .
20	Statistics and their distributions Reading: Section 5.5 [EPS 4.3] Exercises: 4.13, 4.14, 4.19
21	The Central Limit Theorem Reading: Section 5.6 [EPS 4.4] Exercises: 4.17, 4.21, 4.25.
22	Confidence intervals for normal (variance known) and large samples Reading: Section 6.1, 6.1.1 [EPS bottom half of p. 198 – top half of p. 203] Exercises: 5.1, 5.3, 5.5, 5.7 Devore 7ed: Section 7.1 (1, 3, 5, 7)
23	Confidence intervals for normal samples (variance unknown), Student's t distribution Reading: Section 6.1.1 [EPS bottom half of p. 204 – end of 5.5] Exercises: 5.9, 5.11 Devore 7ed: Section 7.2 to page 265 [we use $n \geq 30$ as large] (13), 7.3 (29, 33, 35a, 37a, 39b, 41)
24	Confidence intervals for a Binomial proportion Reading: 6.1.2 [EPS 5.10] Exercises: 5.39, 5.41, 5.43, 5.45, 5.47, 5.49 Devore 7ed: Section 7.2 page 265-267 [we use the simpler formula] (19, 21, 23, 25)
25 and 26	Hypothesis testing Reading: Sections 6.2, 6.3 [EPS 6.1, 6.3, 6.4, 6.8] Exercises: 6.19, 6.21, 6.23, 6.25, 6.29, 6.55 (solution incorrect, this is a two-tailed test), 6.57, 6.59 Devore 7ed: Section 8.1 to page 287 (1, 3), 8.2, 8.3, 8.4 [we use the p-value approach of 8.4]()
27	More on Hypothesis testing Reading: Section 6.4 [EPS 6.2] Exercises: 6.1, 6.3, 6.9, 6.15 Devore 7ed: Section 8.1 page 287 -292 (5, 7, 9)
28 and 29	Inference for two samples, large sample and normal cases Reading: Chapter 7, Sections 7.1, 7.2 [EPS 6.5 up to middle of p. 260] Exercises: 5.25, 5.27, 5.29, 5.37, 6.27, 6.31, 6.33, 6.35, 6.39, 6.41
30	Inference for two Binomial samples Reading: Section 7.3 [EPS 5.11, 6.9] Exercises: 5.51, 5.53, , 6.61, 6.63, 6.65

Set #	Reading / Exercises
31	Paired data case Reading: Section 7.4 [EPS middle of p. 260 – end of 6.5] Exercises: 5.33, 5.35, 6.43, 6.45