

# STA 371G Outline

## Fall 2018

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Office Hours: Monday & Wednesday 5:00-6:00 PM. You are welcome to come by my office at other times.

### Wednesday, August 29

#### Topics:

- Introduction
- Probability
- Random variables

#### Reading Assignments:

You are recommended to read:

Chapter 1 of OpenIntro Statistics, 3rd edition

### Wednesday, September 5

#### Topics:

- Probability distributions
- Mean, variance and standard deviation of a random variable

#### Reading Assignments:

If you are not familiar with the topics discussed in class, you are recommended to read:

pp. 140-142, 740-741 Business Analytics: Business Analytics: Data analysis and decision making, 6th edition

or

pp. 156-168, 189-195, of Data analysis and decision making, 4th edition

or

pp. 196-206, 225-231 of Data analysis and decision making, 3rd edition

You are also recommended to read:

pp. 1-14 of “1TopicSummary\_ProbabilityConceptsAndNormalDistributions.pdf” (available in Canvas/files)

To learn more about these topics, you may further read:  
Chapters 2.1, 2.2, 2.4, and 2.5 of OpenIntro Statistics, 3rd edition

## Monday, September 10

- Add a constant to a random variable
- Multiply a random variable by a constant
- Independent random variables, sum of independent random variables
- Continuous random variables
- Probability density function: area under the curve represents probability
- Standard normal distribution  $Z \sim \mathcal{N}(0, 1)$
- Normal distribution  $X \sim \mathcal{N}(\mu, \sigma^2)$

### Reading Assignments:

To get familiar with the normal distribution, you are recommended to read:  
pp. 167-171, 174-182 of Business Analytics: Data analysis and decision making, 6th edition

or

pp. 211-215, 217-225 of Data analysis and decision making, 4th edition

or

pp. 247-250, 253-260 of Data analysis and decision making, 3rd edition

You are also recommended to read:

pp. 15-30 of “1TopicSummary\_ProbabilityConceptsAndNormalDistributions.pdf” (available in Canvas/files)

You may further read:

Chapters 3.1.1, 3.1.2, 3.1.4 and 3.1.5 of OpenIntro Statistics, 3rd edition

## Wednesday, September 12

- If  $X \sim \mathcal{N}(\mu, \sigma^2)$ , then  $P(X < x) = P(\frac{X-\mu}{\sigma} < \frac{x-\mu}{\sigma}) = P(Z < \frac{x-\mu}{\sigma})$ .
- Standard normal calculations in Excel: NORMSDIST, or in R: pnorm (type “?pnorm” in R for help).
- Understand the meaning of the standard deviation  $\sigma$  in a normal distribution:  $P(\mu - \sigma < X < \mu + \sigma) = ?$  and  $P(\mu - 2\sigma < X < \mu + 2\sigma) = ?$
- Normal calculations in Excel: NORMSDIST, NORMDIST, NORMSINV, NORMINV or in R: pnorm, qnorm (type “?pnorm” and “?qnorm” in R for help).

- Standardizing a normal random variable  $Z = \frac{X-\mu}{\sigma} \sim \mathcal{N}(0, 1)$   
Interpretation: the value of  $Z$  is the number of standard deviations that  $X$  deviates towards the left (if  $Z < 0$ ) or the right (if  $Z > 0$ ) of the mean.
- Plot a normal distribution in Excel and R

## Monday, September 17

- Example: Testing at ZTel, we will make an Excel spreadsheet for calculations
- Case study, Texas BBA Salary Statistics
- Expectation of a continuous random variable
- Population mean, variance, standard deviation
- Sample mean, sample variance, standard error of the sample mean
- Sampling distribution of the sample mean

### Reading Assignments:

To learn more about estimation and sampling distribution, please read:  
pp. 280-281, 292-297, 299, 312-318 of Business Analytics: Data analysis and decision making, 6th edition

or

pp. 352-353, 366-371, 374, 388-395 of Data analysis and decision making, 4th edition

or

pp. 378-379, 393-398, 400-401, 422-430 of Data analysis and decision making, 3rd edition

You are also recommended to read:

“2TopicSummary\_EstimationAndSamplingDistributions.pdf” (available in Canvas/files)

For this topic, you may further read:

Chapters 4.1, 4.2, 4.4 and 5.3 of OpenIntro Statistics, 3rd edition

## Wednesday, September 19

- Sampling distribution of the sample mean
- Confidence interval
- Simple linear regression
- Linear prediction:  $Y = b_0 + b_1X$

**Reading Assignments:**

Chapters 7.1 and 7.2 of OpenIntro Statistics, 3rd edition

pp. 418-441 of Business Analytics: Data analysis and decision making, 6th edition  
or

pp. 531-551 of Data analysis and decision making, 4th edition  
or

pp. 562-584 of Data analysis and decision making, 3rd edition