

**Agabek Kabdullin**  
Harkness 309  
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## Description

Course introduces data analysis, statistical inference, and research design.

## Requirements

Final grade is based on textbook problems (32%), R problems (32%), discussions (32%) and minor quizzes.

## Textbook

David Diez, Christopher Barr, and Mine Cetinkaya-Rundel (2019). *OpenIntro Statistics*, 4th ed.

## Course Schedule

### Module 0: Introductions

Please introduce yourself in this Blackboard tread to me and your peers. Tell us your name and why you're taking this class. Also, tell us one boring thing about yourself and if you were a type of bread what kind of bread would you be?

*Objectives:* In this section we learn about each other and course expectations.

Assignment:

- Quiz on syllabus (1 pt.)
- Fill out doodle form to find best time slots for individual tutorials (1 pt.)
- Installing R/RStudio (1 pt.)
- Self-Introduction (1 pt.)

**Deadline:** June 29th, 11:59 PM. **Total points:** 4

## Module 1: Data and Probability

*Objectives:* In this section we learn measures of centrality (mean, median, mode and IQR), their properties, when to use these measures appropriately and how to take advantage of R in doing that (e.g. via boxplots). We learn how to interpret conditional probabilities, random variables, as well as how to distinguish discrete/continuous variables and construct and describe histograms in R.

Assignment:

- Solve textbook problems: 2.10, 2.16, 2.32, 2.34, 3.8, 3.12, 3.16, 3.40 (8 pts.)
- R problem set on Blackboard: Work with Freedom House and World Bank data, interpret summary statistics and visualize and interpret the data (8 pts.)
- See discussion on Blackboard (8 pts.)

**Deadline:** July 6th, 11:59 PM. **Total points:** 24

## Module 2: Probability Distributions

*Objectives:* In this section we learn distributions: uniform, normal, standard normal, binomial and Bernoulli as a special case of binomial. You will be able to interpret Z-scores, how to use z-tables as well as how to apply these concepts R. We will cover how to use R to talk about sampling distributions and how to create for-loops and while-loops.

Assignment:

- Solve textbook problems: 4.2, 4.4, 4.6, 4.10, 4.22, 4.36, 4.40, 4.44 (8 pts.)
- R problem set on Blackboard: Work with attitudes towards religions data, draw random samples from various distributions, plot probability densities and compare how changing underlying distribution parameters affect statistics (8 pts.)
- See discussion on Blackboard (8 pts.)

**Deadline:** July 13th, 11:59 PM. **Total points:** 24

### Module 3: Statistical Inference

*Objectives:* In this section we learn how inference is conducted by interpreting roles of random samples, sampling distribution, population parameters, estimators and estimates in that process. You will be able to create hypotheses, test them and recognize types of error. We will discuss the relationship among confidence intervals, p-value and statistical tests like t-test, z-test, chi-square (we will conduct these by hand and in R).

Assignment:

- Solve textbook problems: 5.6, 5.8 & 5.10, 5.30, 6.26, 6.34, 6.50, 7.14, 7.20 (8 pts.)
- R problem set on Blackboard: Work with data on federal spending in US counties, construct and test hypotheses (8 pts.)
- See discussion on Blackboard (8 pts.)

**Deadline:** July 20th, 11:59 PM. **Total points:** 24

### Module 4: Regression Analysis

*Objectives:* In this section we learn bivariate regression and its relation to correlation/covariance, fitting a line and minimizing residuals. You will be able to implement appropriate inference for a bivariate regression and multiple regression, as well as interpret coefficients' significance and effect of continuous and dummy variables. We will also cover how to create scatter plots and 3D plots, and how to conduct regressions in R.

Assignment:

- Solve textbook problems: 8.4, 8.6, 8.8, 8.16, 8.18, 8.26, 8.34, 8.44 (8 pts.)
- R problem set on Blackboard: (8 pts.)
- See discussion on Blackboard (8 pts.)

**Deadline:** July 27th, 11:59 PM. **Total points:** 24

## PSC200 – Assignment Checklist – June 29 – July 24

*Consider saving this, printing out and displaying in your personal study space.  
Check off assignments as you complete them to help you stay on track.*

Module	Due Dates
Modules 0 & 1 – Introductions & Data and Probability  <i>June 29 – July 3</i> <i>(Week 1)</i>	<input type="checkbox"/> Online quiz on course information (1 pt.) – 6/30 <input type="checkbox"/> Online Introductions (1 pt.) – 6/30 <input type="checkbox"/> Doodle form (1 pt.) – 6/30 <input type="checkbox"/> Install R/RStudio (1 pt.) – 6/30 <input type="checkbox"/> Textbook problems (8 pts.) – 7/6 <input type="checkbox"/> R problems (8 pts.) – 7/6 <input type="checkbox"/> Discussion (8 pts.) – 7/6
Module 2 – Probability Distributions  <i>July 6 – July 10</i> <i>(Week 2)</i>	<input type="checkbox"/> Textbook problems (8 pts.) – 7/13 <input type="checkbox"/> R problems (8 pts.) – 7/13 <input type="checkbox"/> Discussion (8 pts.) – 7/13
Module 3 – Statistical Inference  <i>July 13 – July 17</i> <i>(Weeks 3)</i>	<input type="checkbox"/> Textbook problems (8 pts.) – 7/20 <input type="checkbox"/> R problems (8 pts.) – 7/20 <input type="checkbox"/> Discussion (8 pts.) – 7/20
Module 4 – Regression Analysis  <i>July 20 – July 24</i> <i>(Weeks 4)</i>	<input type="checkbox"/> Textbook problems (8 pts.) – 7/27 <input type="checkbox"/> R problems (8 pts.) – 7/27 <input type="checkbox"/> Discussion (8 pts.) – 7/27