Math 331-01 Data Analysis With R

Grading

Your grade in this class will be based on 7 components: class participation, course binder, homework assignments, article reflections, course projects, one midterm exam, and one final exam.

- Class participation == 50 points. Class participation will include attendance as a small part (20 points, 1 point per day attended up to 20), and also includes participation in in-class activities such as presenting work and participating in discussions.
- Homework assignments == 40 points each X 5 assignments == 200 points. Students will practice techniques in problem solving, data cleaning, the application of mathematical and statistical ideas to data analysis, and the production of graphics.
- Article reflections == 50 points each X 4 assignments == 200 points. Students will read short articles in the natural and social sciences involving data analysis and reflect on the methods and effectiveness of data analysis in them.
- Course projects == 150 points each X 2 assignments == 300 points. In small groups of 2 to 4, students will analyze data sets and present the results in a professional written form.
- Exam 1 == 125 points. Students will demonstrate their knowledge of the course content in Units 1 through 3 on a written exam.
- Exam 2 == 125 points. Students will demonstrate their knowledge of the course content in Units 4 and 5 on a written exam.

There are 1000 points available in the course. Extra credit may be available at instructor discretion. Your letter grade will be assigned by computing the total number of points you earn, looking that total up in the following table, and selecting the letter grade vertically aligned with that total in the table.

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
921-1000	891-920	861-890	821-860	791-820	761-790	721-760	691-720	661-690	621-660	591-620	below 590

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Course Schedule

Week	Course Topics and Readings	Course Assessments
1	**Unit 1: Introduction to R** Installing R and RStudio Introduction to R	Homework 1 assigned
2	Data cleaning and tidying	
3	**Unit 2: Descriptive Statistics** Creating and interpreting statistical summaries of data	Homework 1 due Homework 2 assigned
4	Creating and interpreting statistical graphics	
5	Graphics (continued)	Article reflection 1 assigned
6	**Unit 3: Models and Inference** Probability basics Bayes' Rule	Homework 2 due Homework 3 assigned
7	Random variables and probability distributions Simulations to produce distributions	Article reflection 1 due
8	Hypothesis testing Confidence intervals	Article reflection 2 assigned Course Project 1 assigned
Exam 1 covers units 1 through 3		
9	**Unit 4: Regression** Linear regression	Homework 3 due Homework 4 assigned
10	Linear regression (multivariable) Logistic regression	Article reflection 2 due
11	Logistic regression (continued)	Article reflection 3 assigned Course Project 1 due
12	**Unit 5: Classification and Learning** Classification problems Supervised versus unsupervised learning Supervised learning: Logistic regression for classification	Homework 4 due Homework 5 assigned Course Project 2 assigned
13	Other classifiers: trees Testing the performance of classifiers: the train/test set framework	Article reflection 3 due
14	Unsupervised learning: Cluster analysis	Article reflection 4 assigned
15	Cluster analysis (continued)	
Exam 2 covers units 4 and 5		
Finals	Final exam period will be presentations of course project 2.	Article reflection 4 due Course Project 2 due