Honors Applied Statistics with R-Coding Course Syllabus

Please, sir, I'd like some more.
– Oliver Twist

The sexy job in the next ten years will be the statisticians. And I am not kidding.
– Hal Varian, Chief Economist at Google

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Course Description

This course is designed to help students discover the power, diversity and broad applications of statistics in multiple professional fields. Students will learn a variety of data analysis techniques, such as multiple regression, simulation studies, and ANOVA, with an emphasis on showing how these methods have revolutionized the use of statistics in the fields of engineering, environmental studies, economics, and medicine to name a few. Students will learn how to investigate data by writing code in R, which is the most widely used and powerful open-source statistical programming language used by such companies as Boeing, Facebook, Google, FDA, Zillow, the New York Times and Zillow.

Course Site

Assignments will be posted and submitted via Google Classroom. Students must enroll in our Google Classroom; if parents/guardians would like to receive Guardian Summaries, they can contact their child's teachers to sign up.

Learning Resources

R and R-Studio Software (Open-source software)
Google Classroom: Provides daily lessons and assignments.
You will also need an organizational system for taking notes.
I will be providing computers, but you may also use your own.

Student Expectations

Engagement

AP Statistics content is the prerequisite. Building on basic concepts and methods learned in that course, students will be empowered to analyze richer data sets that include more variables and address a broader range of research questions. This will always be an open-notes course. You may use any and all resources at your disposal.

Academic Honesty

Honesty is a compelling principle by which we operate all aspects of student and school life. Once you are a college student and if you are unfortunate enough to be caught cheating, you run the risk of serious consequences. Since this is a college level class, cheating will lead to significant consequences. Best bet, stay true to your strong character and be honest in your work. With that said, I encourage you to be constantly collaborating with your peers and with me. You may ask for help, seek guidance, and edit your work throughout the course.

Communications and Self-Advocacy

Students need to be comfortable advocating for themselves. If you have questions or concerns, please email your teacher and/or counselor. We cannot help you unless we know what you need.

Policies & Procedures

Grading - The course will be graded with the following weighted categories:

Tests/Major Projects: 70%
Each test will cover one or more chapters and will be worth 100 points. A final exam will cover the entire semester's work and be worth 200 points. Projects will be assigned throughout the course to further assess student learning, to reinforce prior learning and to introduce new topics. The American Statistical Association (ASA) runs a national poster and a national project competitions; these will be graded as tests (more on these as the class proceeds).

Quizzes: 20%
Quizzes will be given quite frequently and mostly will be scheduled. I do reserve the right to assess your understanding of concepts, either prior or newly introduced, without much heads-up (though these will probably be done in groups). Quizzes can be made-up. Notes are sometimes allowed. Minor projects will also be assigned. Most projects will be completed within the class time we are allowed.

Assignments: 10%
You will be assigned problems from the text daily. Homework assignments will assess both textbook questions, and R-Code techniques. Homework questions will be answered and work collected at the beginning of each class. I encourage you to collaborate on these assignments.

Grade Mark	Description	High	Low
A	A	100.00%	93.00%
A-	A-	92.99%	90.00%
B+	B+	89.99%	87.00%
B	B	86.99%	83.00%
B-	B-	82.99%	80.00%
C+	C+	79.99%	77.00%
C	C	76.99%	73.00%
C-	C-	72.99%	70.00%
D+	D+	69.99%	67.00%
D	D	66.99%	60.00%
F	F	59.99%	0.00%

Submitting Assignments

- **Turning in work:** Work will be submitted and uploaded primarily on google classroom.
- **Late Work:** Work should be submitted on time for full credit. If you are turning in work late, half credit will be assigned unless the absence is excused, or there is a conversation between teacher and student for an exception to be considered.

Technology

To fully participate in this course, you will need
1. Graphing calculator: TI-83 Plus or higher is required. TI-84 Plus CE is highly recommended.
2. Please use a BISD assigned laptop with a harddrive and/or a similar device that you own. I have noticed students have found it easier to have a computer at home to enhance their coding skills. This is not a requirement, but if you have a computer at home please consider downloading R and R-Studio to provide yourself more flexibility.

For tech support, please go to www.bisd303.org/techsupport and report your issue.

Topics

Semester I

Unit 1 Review of All Inference Tests and Confidence Intervals from AP Statistics Curriculum

Unit 2 Linear Regression Inference and an Introduction to R-Coding

Unit 3 Multiple Regression Inference and a Deep Dive Into R-Coding and Data Visualization

Unit 4 ASA (American Statistical Association) National Data Visualization Poster Contest

Unit 5 Course Final (Part I: Data Exploration and Part II Inference Identification and Basic Skills)

Semester II

Unit 6 ANOVA Inference (Single Factor)

Unit 7 ANOVA Inference (Two-Way)

Unit 8 Logistic Regression

Unit 9 Intro to Python or GIS

Unit 10 ASA National Competition: Final Statistical Research Paper