Hunter College of The City University of New York

DRAFT Course Schedule, STAT29555.01 Fall 2020, ~~T&Th 4:10-5:25,~~ Asynchronous, ONLINE Course

STAT 295: Statistical Analysis of Biological Data **3 hrs., 3 credits**

Course Description: This course intends to be an introductory statistical data analysis course for biology students. It is a combination of theory and R practice. The course introduces basic statistical concepts together with basic statistical analysis using R. Numerous real biological data sets have been analyzed in the textbook and are available for downloading from the author's website below. Data sets required for homework will be made available on the Blackboard course site. The textbook also contains content for a graduate-level course, but we will not cover the text completely. In this undergraduate-level course, only basic content and R code will be covered, and the important concepts will be presented in narrated PowerPoint slides, made available on Blackboard every week. Four Homework (HW) assignments will also be available on Blackboard (Bb.)

Prerequisites: MATH 150 or 152

Instructor: Adjunct Professor, Jane Lee Delgado, Ph.D.
Email: jd1611@hunter.cuny.edu
Office Hours: Blackboard Collaborate Ultra Course Room, Thursday from 6:00 to 7:00 pm

Required Textbook: *Analysis of Biological Data,* 3rd edition, by Whitlock & Schluter. An ebook version is available for a reduced price (also on Amazon). Website: https://whitlockschluter.zoology.ubc.ca/
Whitlock BIOL300 website: https://www.zoology.ubc.ca/~whitlock/bio300/

Optional Textbook: *Getting Started with R: An Introduction for Biologists*, 2nd edition, by Beckerman, Childs, and Petchey. An ebook version is available for a reduced price on Amazon.

Required Software:

- **Adobe Reader** for pdf files.
- **Microsoft Office suite** (Word, Excel, PowerPoint) available through the CUNY portal: https://www.cuny.edu/about/administration/offices/cis/technology-services/
- **RStudio**: available in all Hunter computers or laptops. For personal computers, first download the basic R program: https://cran.r-project.org/ then, download RStudio: https://rstudio.com/products/rstudio/download/#download

Expected Learning Outcomes: At the end of the course, students in STAT 295 will be able to

- Understand basic descriptive statistics and inferences.
- Import a biological data set into RStudio for analysis; explore the data set and form general conclusions about the type of data, the quality of the data (missing, data entry errors, outliers, etc.) and make biological inferences.
- Use RStudio to visualize biological data sets.
- Develop hypotheses related to the data and form a theoretical model for analyses.
- Commit to quality (even if it takes longer) and to the search for robust inferences.
- Commit to abide by the highest ethical standards in the use of data and in reporting results.

Grading: Homework (20%), QUIZs/Pre-Tests (10%), EXAM #1 (30%), cumulative Final EXAM (40%).
EXAMS are criterion referenced, not norm referenced (curved). Quizzes and Exams are OPEN BOOK.
Extra Credit Opportunities are available and all extra credit is due by Midnight on the day of the FINAL EXAM. Students wishing to *request a CR/NCR grade* must notify the instructor one week before final, must have taken all the exams, and have at least a 40% average.

Suggested Class Schedule: The Class Schedule MAY CHANGE depending on our progress. The weekly narrated PowerPoint with the content lecture, and four separate Homework (HW) assignments will be uploaded to the "PowerPoint Slides" area of Bb. The HW will be DUE to "Assignments" on Bb about six days after upload. Quizzes and Exams will be DUE about two days after upload. Quiz feedback will be available before Exams are uploaded. See schedule detail…

	Chapters	Uploads & HW DUE	Topics
1	Chapter 1 & 2	Uploads Aug 27 – am	Sampling, Data & Variables. Displaying data.
2	Chapter 3	Uploads Sep 3 – am	Descriptive statistics: location (central tendency) and spread (variability).
3	RStudio HW 1	Uploads Sep 10 – am HW 1 DUE Sep 16 – 11pm	
4	Chapter 4 & 5	Uploads Sep 17 – am	Estimating w uncertainty (standard error, confidence. intervals). Introduction to probability.
5	Chapter 6	Uploads Sep 24 – am	Hypothesis testing.
6	RStudio HW 2	Uploads Oct 1 – am HW 2 DUE Oct 7 – 11pm	
7	QUIZ #1 (Pre-test)	Uploads Oct 8 – am DUE Oct 9 – 11pm	QUIZ#1 (10.8.20)
8	EXAM#1	Uploads Oct 15 – am DUE Oct 16 – 11pm	EXAM#1 (11.15.20)
9	Chapter 8 & 9	Uploads Oct 22 – am	Categorical: Chi-square tests "Goodness of Fit" in Frequency tables. Chi-square tests of association between two variables.
10	Chapter 10 thru 12	Uploads Oct 29 – am	The Normal distribution, properties. Inferences: One-sample t-tests. Comparing two means, Independent and Paired sample t-tests.
11	RStudio HW 3	Uploads Nov 5 – am HW 3 DUE Nov 11 – 11pm	
12	Chapter 14 & 15	Uploads Nov 12 – am	Designing Experiments. Reducing bias. Analysis of Variance (ANOVA)
13	Chapter 16 & 17	Uploads Nov 19 – am	Bivariate data: Correlation Simple Regression
14	Rstudio HW 4	Uploads Nov 25 – am HW 4 DUE Dec 3 – 11pm	
15	QUIZ #2 (Pre-test for FINAL)	Uploads Dec 8 - am DUE Dec 9 – 11 pm	QUIZ#2
	FINAL EXAM	Uploads Dec 15 - am DUE Dec 16 – 11 pm	FINAL EXAM

Academic Integrity/Plagiarism: You may work with a partner on most of the computer assignments and activities. Please work together and help each other. However, **your written answers or interpretations must be your own**. Do your own work and put it in your own words or you are probably plagiarizing. **DO NOT upload course materials to internet sharing sites or share with students who are not currently enrolled in this course.** "Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The college is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures."

From the Office of AccessABILITY: In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and/or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical and/ or Learning) consult the Office of AccessABILITY located in Room E1124 to secure necessary academic accommodations. For further information and assistance please call (212- 772-4857)/TTY (212- 650- 3230)

Sexual Misconduct: In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College. a. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444). b. All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123. CUNY Policy on Sexual Misconduct http://www.hunter.cuny.edu/diversityandcompliance/repository/files/cuny-policy-on-sexual-misconduct.pdf