THE GEORGE WASHINGTON UNIVERSITY
Department of Statistics
Statistical Computer Packages

Course: STAT 2183W.10 (CRN41581)
Semester: Fall 2023
Class Time: Monday and Wednesday 12:45PM - 02:00PM, ROME B104
Office Hours: Wednesday 11:00 AM-12:00 PM   or by appointment.
Office Location: Rome Hall 760B
Instructor: Prof. Reza Modarres,
E-mail: reza@gwu.edu
TA: Mr. Yong Wang
E-mail:

Course Description
To teach the methodology and the skills needed to use the statistical packages SAS and R to analyze data from experiments or surveys. The student is expected to be familiar with the concepts of confidence intervals, hypothesis testing and the central limit theorem. In addition to presenting information on statistical packages, this course will present many new statistical techniques on an applied level. Topics to be covered include:

A)   Parametric Inference
1)   Review: one-sample z and t tests
2)   Review: two-sample z and t tests
3)   Categorical data analysis
4)   Analysis of variance (one-way and two way)
5)   Tests of independence and goodness of fit tests
6)   One, two-sample test for the variance
7)   Regression and correlation (simple and multiple)
8)   Analysis of covariance
B)   Nonparametric Inference
1)   Permutation tests
2)   One-sample sign and Wilcoxon tests
3)   Two-sample Wilcoxon test for location
4)   Kruskal-Wallis test
5)   Friedman test

Principal component analysis will be covered if time permits.

Bulletin Course Description: Application of program packages (e.g., SAS, R) to the solution of one-, two- and k-sample parametric and nonparametric statistical problems. Basic concepts in data preparation, modification, analysis and interpretation of results. Includes a significant engagement in writing as a form of critical inquiry and scholarly expression to satisfy the WID requirement.

Class Policies: Late work will not be accepted.   Except for emergencies with proper documentation, there will be no make-up exams.

Exams: Exams are closed notes but open book.

Blackboard

I will upload   all handouts, examples, project descriptions, old exams, etc. on the Blackboard. I am available to answer questions during class, after class, during my office hours, by email, and by appointment.   If you feel you do not understand a concept or are falling behind, let me know as soon as possible and ask for help.

Prerequisites

An introductory statistics course: Stat 1051, Stat 1053, Stat 1111, or equivalent.

Recommended Text

Author	Title	Edition
Ott and Longnecker	An Introduction to Statistical Methods and Data Analysis	6th

Software

R: To download it, go to: https://www.r-project.org/

It is also recommended to download R-Studio: https://www.rstudio.com/products/rstudio/download/

SAS: To get your own copy of SAS, go to the following site for instructions: https://itl.gwu.edu/sas-software-distribution

Alternatively, if you have a Mac, or are unable to download the full version of SAS then you can use SAS University Edition: http://www.sas.com/en_us/software/university-edition.html

Learning Outcomes:

As a result of completing this course, students will be able to:

1. Perform all of the relevant tests from the topics covered, and determine which test is appropriate for any given data set.
2. Perform all of the tests using SAS and R.
3. Write quality statistical reports, detailing the statistical analysis and conclusions.

Average minimum amount of independent, out-of-class, learning expected per week:

Over 15 weeks, students will spend 2.5 hours (150 minutes) per week in lecture. Homework assignments and other out-of-class work is estimated at around 5 hours per week (75 hours for the semester) and includes a 2-hour final exam for which approximately 10 hours of review is assumed.

Grading

- Assignments (40%)
- Midterm Exam (30%)
- Final Exam (30%)

Projects: The programming language that you must use (SAS or R) is stated on each project. Your first attempt of each project is due 10 days after it is first discussed in class. You will receive comments on your approach and write-up. You should use these comments to revise your solution. The hard deadline for each project is given in the course calendar. Your project score is 20 points for the first attempt and 80 points for the second attempt.

Student Blackboard Support: GW Information Technology Support Center:Phone: Monday - Friday, 7:00am - 10:00pm*, 202-994-4948, option 2
Email: ithelp@gwu.edu

University Policies

Use of Electronic Course Materials and Class Recordings

Students are encouraged to use electronic course materials for private personal use in connection with their academic program of study. Electronic course materials and recorded class sessions should not be shared or used for non-course related purposes unless express permission has been granted by the instructor. Students who impermissibly share any electronic course materials are subject to discipline under the Student Code of Conduct. Please contact the instructor if you have questions regarding what constitutes permissible or impermissible use of electronic course materials and/or recorded class sessions. Please contact Disability Support Services at disabilitysupport.gwu.edu if you have questions or need assistance in accessing electronic course materials.

Academic Integrity Code

Academic Integrity is an integral part of the educational process, and GW takes these matters very seriously. Violations of academic integrity occur when students fail to cite research sources properly, engage in unauthorized collaboration, falsify data, and in other ways outlined in the Code of Academic Integrity. Students accused of academic integrity violations should contact the Office of Academic Integrity to learn more about their rights and options in the process. Outcomes can range from failure of assignment to expulsion from the University, including a transcript notation. The Office of Academic Integrity maintains a permanent record of the violation. More information is available from the Office of Academic Integrity at studentconduct.gwu.edu/academic-integrity. The University's "Guide of Academic Integrity in Online Learning Environments" is available at studentconduct.gwu.edu/guide-academic-integrity-online-learning-environments. Contact information: rights@gwu.edu or 202-994-6757.

University policy on observance of religious holidays: In accordance with University policy, students should notify faculty during the first week of the semester of their intention to be absent from class on their day(s) of religious observance. For details and policy, see "Religious Holidays" at provost.gwu.edu/policies-procedures-and-guidelines

Support for students outside the classroom

Virtual academic support: A full range of academic support is offered virtually in Fall 2022. See coronavirus.gwu.edu/top-faqs for updates. Tutoring and course review sessions are offered through Academic Commons in an online format. See academiccommons.gwu.edu/tutoring

Writing and research consultations are available online. See academiccommons.gwu.edu/writing-research-help

Coaching, offered through the Office of Student Success, is available in a virtual format. See studentsuccess.gwu.edu/academic-program-support

Writing Center

GW's Writing Center cultivates confident writers in the University community by facilitating collaborative, critical, and inclusive conversations at all stages of the writing process. Working alongside peer mentors, writers develop strategies to write independently in academic and public settings. Appointments can be booked online. See gwu.mywconline.

Academic Commons

Academic Commons provides tutoring and other academic support resources to students in many courses. Students can schedule virtual one-on-one appointments or attend virtual drop-in sessions. Students may schedule an appointment, review the tutoring schedule, access other academic support resources, or obtain assistance at academiccommons.gwu.edu.

Disability Support Services (DSS) 202-994-8250

Any student who may need an accommodation based on the potential impact of a disability should contact Disability Support Services to establish eligibility and to coordinate reasonable accommodations. disabilitysupport.gwu.edu

Counseling and Psychological Services 202-994-5300

GW's Colonial Health Center offers counseling and psychological services, supporting mental health and personal development by collaborating directly with students to overcome challenges and difficulties that may interfere with academic, emotional, and personal success. **healthcenter.gwu.edu/counseling-and-psychological-services**

Safety and Security: In an emergency: call GWPD 202-994-6111 or 911

- For situation-specific actions: review the Emergency Response Handbook at safety.gwu.edu/emergency-response-handbook
- In an active violence situation: Get Out, Hide Out, or Take Out. See go.gwu.edu/shooterpret

Stay informed: safety.gwu.edu/stay-informed

Fall Semester 2023

First Day of Classes	Thursday, August 24, 2023
Labor Day (no classes)	Monday, September 4, 2023
Fall Break (no classes)	Thursday - Friday, October 12-13, 2023
Thanksgiving Break (no classes)	Monday, November 20 - Saturday, November 25, 2023
Last Day of Classes	Monday, December 11, 2023
Make-up/Reading Day	Tuesday, December 12, 2023
Final Exams	Wednesday, December 13 - Tuesday, December 19, 2023

Tentative Class Schedule

Date	Topic(s) covered	Activity
Week 1: Aug 28, Aug 30	Review: Confidence Intervals and Hypothecs testing	Sections 5.2, 5.4, 5.6, 5.7
Week 2: Sep 6, 11	Introduction to SAS and R Discuss P-1	Class Notes
Week 3: Sep 13, 18	One Sample Inference: t-test and sign test	Sections 5.7, 5.9
Week 4: Sep 20, 25	Comparing Two Sample Independent Samples: t-test and Wilcoxon Rank Sum test	Sections 6.2, 6.3
Week 6: Oct 2, 4	Comparing Two Paired Samples: Paired t-test and Wilcoxon Signed Rank Test Discuss P-2	Sections 6.4, 6.5
Week 7: Oct 9, 11	Inferences about Population Variances, Categorical Data Analysis: Chi-Square tests	P-1 Due (Oct 5) Sections 7.1-7.3 Sections 10.2-10.5
Week 8: Oct 16 , Oct 18	One Way ANOVA: Completely Randomized and Randomized Block Designs	Sections 8.1, 8.2, 8.4, 8.6, parts of Chapter 9 Sections 15.2, 15.5
Week 9: Oct 23, Oct 25	Factorial Experiments: Two-Way ANOVA Discuss P-3 Review for midterm exam	Chapter 14
Week 10: Oct 30,	ANOVA **Midterm**	P2- Due (Oct 26) Chapter 14
Week 11: Nov. 6, 8	Simple Linear Regression	Chapter 11
Week 12: Nov 13, 15	Simple Linear Regression Discuss P-4	Chapter 11
Week 13: Nov. 27, 29	Multiple Linear Regression	P-3 Due (Nov 16) Chapter 12, 13
Week 14:Dec 4, 6	Multiple Linear Regression	Chapter 12, 13
Week 15: Dec 11	Multiple Linear Regression Review for Final Exam	P-4 Due (Dec 9) Chapter 12, 13
FINAL EXAM: Monday December 18	ROME B104 12:40-2:40 pm	
NOTE: In accordance with university policy, the final exam will be given during the final exam period and not the last week of the semester		