The George Washington University
Department of Statistics

COURSE AND CONTACT INFORMATION

Course: Statistics 2118.10 (Regression Analysis)
Semester: Spring, 2024
Class : Monday and Wednesday 6:10PM - 07:25PM, Rome Hall, B104
Lab: STAT 218.36, Wednesday 5:10 PM - 06:00PM, Bell 108
Instructor: Prof. Reza Modarres
Campus Address: Rome Hall 760B
Office Phone: 202-994-9991
E-mail: **reza@gwu.edu**
Office hours: Monday 5:00 PM-6:00 PM
Teaching Assistant: Samuel Homan **Email**: shoman8@gwu.edu

COURSE DESCRIPTION

This course introduces basic concepts of simple and multiple linear regression analysis. Simple regression, including regression assumptions, inference procedures and residual analysis is covered in the first three chapters of the textbook. Chapter 5 is an introduction to matrix algebra with simple linear regression. Multiple regression, including inference procedures, assumptions, diagnostics and remedial measures is covered in chapter 6. Chapter 7 discusses tests of regression coefficients, partial correlation, and multicollinearity. Chapter 8 discusses polynomial regression, interaction and indicator variables, and chapter 9 is on model building techniques.

PREREQUISITE(S): An introductory statistics course such as Stat-1051 or Stat-2111

TEXT: Applied Linear Regression Models, 4th edition by Kutner, Nachtsheim, and Neter.

LEARNING OUTCOMES:

After completing this course, you will be able to:

1. Read and understand the literature in your fields that uses regression methodology
2. Analyze data using Regression methodology
3. Compose regression programs in SAS to analyze data using regression

GRADING:

15 %	**3 Quizzes**
25 %	**Computer projects**
30 %	**Midterm**
30 %	**Final**

Required time: You spend 3.5 hours per week in class. You will need to spend another 5-7 hours weekly on the course lectures and projects outside of class.

Homework/quizzes: Homework will be assigned per chapter, but not graded. Quizzes are announced. See the course calendar. Your TA will go over SAS and projects in the lab. There will be three projects that use SAS to analyze data. A typed report is with annotated SAS program and output is expected.

CLASS POLICIES

Attendance policy: You are expected to attend every lecture. You will need the textbook and a calculator. The material covered and the handouts distributed during both the lecture and the lab will become available on Blackboard.

Late work: Late penalty of 10% a day on all projects. Projects more than 3 days late are not accepted.

Make-up exams: Makeup examinations is only be given in exceptional circumstances (e.g. well documented medical emergency).

ACADEMIC INTEGRITY: It states: "Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information."

SUPPORT FOR STUDENTS OUTSIDE THE CLASSROOM
Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242.

UNIVERSITY COUNSELING CENTER (UCC) 202-994-5300
The University Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems.

Items from the Course syllabus

We will meet in person twice a week for 1:15 minutes. You also meet with the TA once a week. You can do your homework and projects on your computer. The TA will go over SAS programs with you and explains SAS output. Homework is assigned to make sure you keep up with the work. You should do the homework and ask questions in class and the lab.

I am available to answer questions during class, after class, during my office hours, and by email. The TA is available during lab and office hours. If you feel you do not understand a concept or are falling behind, let me know as soon as possible and ask for help. Read the assigned material before coming to class and ask questions when I go over the same material. We will cover Chapters 1-3 deal with simple linear regression. We skip chapter 4. Chapter 5 is an introduction to matrix algebra and the matrix approach to simple linear regression. Multiple regression is covered in chapters 6-9. We will cover selected sections from the above chapters.

Projects

You learn SAS during the lab sessions. You will have 3 programming projects in this course. Your TA will place the homework problems and projects on the Blackboard. For each project, I will provide you with a description of the problem and a data set along with several questions. Your task is to provide answers in a typed report and your SAS program and output. Your report will answer the questions with proper references to SAS output, which you must annotate. You will need to spend time working on your projects during and outside of the lab hours. If you need to email the TA or I with a question about your projects, make sure you attach your SAS program with your questions.

Quizzes and Exams

Quizzes and Exams are closed notes, but open book. You will see questions on the quizzes and exams that test your general knowledge of regression ideas such as "Define Forward Selection" or "Indicator variables", hand calculation type questions as well as questions using SAS output.

Blackboard

I will upload many handouts, examples, project descriptions, old exams, etc. on the Blackboard.

SAS: To obtain SAS for installation on their computers, students should visit
https://itl.gwu.edu/sas-software-distribution
Please be inform that SAS can only be installed on a Windows OS.

VCL: Virtual Computer Lab (VCL) is a cloud-based service that allows you to run Windows-based software through a web browser. To access SAS via VCL visit

https://academiccommons.gwu.edu/virtualcomputerlab

CCAS Cloud: You can also access SAS (and other software) on CCAS cloud.
Visit apps.ccas.gwu.edu
Login using your cloud ID. You may have to download a software called citrix. You will see a virtual desktop and from there you can run SAS and many other apps.

Tentative Class Schedule Spring 2024

Jan 17, 22	Review of Basic Stat Lab: Introduction to SAS
Jan 24, 29	Read Chapter 1: Skip 1.8 Read Appendix A: A6-A9 Do HW 1.20 and 1.24 Lab: Introduction to SAS
Jan 31	Read Chapter 1: Skip 1.8 Project-1 discussed
Feb 5, 7	Read Chapter 2 (Skip 2.6, 2.8 and 2.11, except Correlation) Do HW 2.5, 2.14 (except d), and 2.24 Lab: Work on Project-1 Discuss Chapter 2
Feb 12, 14	Chapter 2 (Skip 2.6, 2.8 and 2.11, except Correlation) Discuss Chapter 2
Feb 21, 26	Chapter 2 (Skip 2.6, 2.8 and 2.11, except Correlation) Discuss Chapter 2 **Feb 26: Quiz 1**
Feb 28	Read Chapter 3.1-3.4 and 3.8 Read chapter 12.3
Mar 4, 6	Discuss chapter 12.3 Handout on DW Test HW 3.1, 3.2, 3.4 (a-f) Handout on Diagnostics Project 1 due
Mar 11, 15	**Spring break**
Mar 18, 20	Read Chapter 5.1-5.13 HW 5.2,5.3,5.4, 5.12, 5.14, 5.23 Project 2 discussed **Mar 20: Quiz 2**
Mar 25, 27	Discuss chapter 5 Lab: Work on Project 3
Apr 1	Discuss chapter 5 Lab: Work on Project 3 Review for midterm

Apr 3	**Midterm EXAM** Lab: Work on Project 2 **Project 2 due**
Apr 8	Read Chapter 6.1-6.6, 6.7 (except joint inference) and 6.9 HW 6.1,6.2,6.9,6.10(a-d),6.11(a,c) Discuss Chapter 6 Project 3 discussed.
Apr 10	Read Chapter 7.1, 7.2, 7.3, 7.4, 7.6 HW 7.4,7.13,7.31,7.32
Apr 15	Discuss Chapter 7
Apr 27	Read Chapter 8.1, 8.2, 8.3, 8.5, 8.6, 8.7 Lab: Work on Project 4
Apr 22	Read Chapter 8 **Quiz 3**
Apr 24	Read chapter 9.1, 9.3(C_p, R^2, R^2_a, MSE), 9.4 Lab: Work on Project 4
Apr 29	Model selection
May 1	Review for Final Last Lab: **Project 3 due**
	Final EXAM TBA