

EFOP 2410
Applied Regression Analysis
School of Education, University of Pittsburgh
Fall Term 2021

Wednesday 3:00 pm
5602 Wesley W Posvar Hall

Instructor: Xu Qin (xuqin@pitt.edu)

Office Hour: By appointment on Zoom (<https://pitt.zoom.us/my/xuqin>)

Teaching Assistant: Shangmou Xu (SHX23@pitt.edu)

Office Hour: By appointment

Course Overview:

This course offers an introduction to regression analysis. Regression is one of the most important statistical analysis tools in a data analyst's toolkit. These models allow you to assess the relationship between variables. The course blends theory and applications -- avoiding the extremes of presenting unneeded theory in isolation, or of giving application tools without the foundation needed for practical understanding. You will learn the fundamental theory behind regression and, through data examples, learn to utilize regression models to examine relationships between variables. Study of topics include model specification and assumptions, estimation and inference of model parameters, model diagnostics, and variable selection techniques, etc. The course will be predominantly lecture format, with details on how to use SPSS software for all statistical analyses.

The course will serve two purposes: a) convey sufficient knowledge and skill regarding regression techniques to enable students to apply these procedures properly in their own research, and b) lay the foundation for more advanced studies in multivariate analysis, structural equation modeling, and multilevel modeling. This course is frequently taken by students wishing to solidify and extend their quantitative and statistical data analysis skills.

Prerequisites

EFOP 2018 or an equivalent introductory statistics course which covers descriptive statistics, correlation analysis and simple linear regression, and statistical hypothesis testing.

Textbook:

Cohen, J., Cohen, P., West, S.G., & Aiken, L.S. (2003). Applied multiple regression/correlation analysis for the behavioral sciences, 3rd edition. Mahwah, NJ: LEA.

Please use this permalink for accessing the e-textbook *Applied multiple regression/correlation analysis for the behavioral sciences*: <https://www.oreilly.com/library/view/applied-multiple-regressioncorrelation/9780805822236/?ar> (*Links to an external site.*)

When being asked to select your institution, you will need to look at the top of the list of institutions and select "Not listed? Click here." You will then be asked for your Pitt email address. Once you add your email address, you will be prompted to authenticate with your Pitt credentials. Once you authenticate, you will have access to the book.

Course Documents:

For maximizing your learning effectiveness, we think the best way is to carefully watch the videos before each lecture. On each lecture date, we will meet in the classroom.

- **Before class: One week before the lecture date listed on the last page, slides, pre-recorded videos, lab materials, and assignment for the lecture will be posted on Canvas.** In the videos that are based on the slides, I will introduce the concepts and show how to use statistical methods to address substantive research questions by conducting analyses and interpreting the results. Please read the associated chapters listed on the last page, slides, and lab materials, and watch the videos before the lecture date.
- **In class: On the lecture date listed on the last page, we meet in the classroom.** We will quickly go over the slides that you find easy to understand and spend more time on the slides that you find challenging. Therefore, it is crucial for you to carefully watch the videos before the class. If some challenges are caused by a poor grasp of what you should have learned in introductory statistics, we will also have enough time to review the old knowledge, which will ease your understanding of new knowledge. The ultimate goal is to deepen and solidify your understanding of the lectures. We will also discuss the assignment that you will submit by 11:59 pm on Canvas after the session.
If you are not able to attend due to a valid emergency, you should contact the instructor beforehand.

Software:

Statistical computing is an integral part of PSYED 2410. We will use SPSS, a copy of which can be obtained from the PITT download center (<http://software.pitt.edu/>). I assume that you have used SPSS to perform statistical analyses in the past. If not, please ask me for introductory materials of SPSS. It is fine if you prefer to use other statistical software (e.g., SAS, STATA, and R) for your assignments.

Collaboration and Study Groups:

Collaborative learning is central in this course and serves as a way to foster deep learning and leverage expertise. 3 or 4 students from different disciplines will be assigned to one study group. Discussions about the course materials and assignments within study groups are strongly encouraged. Discussion boards are available on Canvas. If you have any questions, please feel free to post them on either the class discussion board (see main menu on the left of your homepage) or the group discussion board in your own group's view (click your group number on the right of your homepage).

Homework Assignments:

There will be a homework assignment associated with every lecture. Homework exercises will assess knowledge of both theoretical principles and application methods. Each homework assignment will be posted on Canvas two weeks before the due date and should be submitted by 11:59 pm on the due date listed on the last page.

- For your safety, to reduce contact during Covid-19, please submit your assignment on Canvas following the instruction here: <https://community.canvaslms.com/t5/Student-Guide/How-do-I-upload-a-file-as-an-assignment-submission-in-Canvas/ta-p/274>
- Collaborations within assigned study groups are encouraged. Please understand that each student must turn in individual homework assignments, not group work. Your text should reflect your own understanding of the material. **Students who submit group homework assignments will be given zeros.** To properly acknowledge the contribution of your

collaborators, please indicate on the cover page of each assignment the names of the people with whom you worked.

- Because homework solutions are made available after the homework is turned in, **late homework will not be accepted**. In a valid emergency appropriate accommodations will be made. It is best, if possible, to contact the instructor prior to the due date.
- If you have questions/concerns about your grades, please directly email the instructor and TA rather than leaving a comment on the Canvas grading page, because we will not get automatic notifications.

Additional Practice:

There are exercises/problems at the end of each chapter in the textbook, and you are strongly encouraged to go over them carefully. You may not need to do all of the exercises, but you should do as many of them as you can (or need).

Midterm and Final Examinations:

There will be one midterm exam and one final exam, which will assess knowledge of both theoretical principles and application methods. To reduce your stress during the pandemic, the exams will take place remotely. The midterm exam will be available on Canvas from 1:00 pm on Oct 20 to 1:00 pm on Oct 22, and the final exam will be available from 1:00 pm on Dec 15 to 1:00 pm on Dec 17. You can take the exams at your convenience during the time windows. Each exam is timed for 3 hours by the system. Once you begin the exam, the system will not allow you to start over.

Grading:

You will be evaluated on the basis of your weekly assignments (60%), midterm exam (20%), and the final exam (20%). Letter grades will be based on actual points earned as follows:

Point	Letter	Point	Letter
≥ 93	A	77 - < 80	C+
90 - < 93	A-	74 - < 77	C
87 - < 90	B+	70 - < 74	C-
84 - < 87	B	67 - < 70	D+
80 - < 84	B-	64 - < 67	D
		60 - < 64	D-
		<60	F

Academic Integrity:

Please make sure you read the university guidelines on Academic integrity (<http://www.pitt.edu/~provost/ai1.html>). Attention to this policy is particularly important in a course like PSYED 2018, in which collaboration with other students is encouraged. If, for instance, you work closely with other students during the planning, execution, or interpretation of your data analyses – a process that I encourage and fully support – you should make sure that the other students’ contributions are recognized explicitly in your written account. If you have any questions about what constitutes appropriate collaboration, or how to define what constitutes your own work, please see me.

Special Accommodation:

If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and Disability Resources and Services, 140 William

Pitt Union, (412) 648-7890/(412)383-7355 (TTY), as early as possible in the term. DRS will verify your disability and determine reasonable accommodations for this course.

Health and Safety Statement

During this pandemic, it is extremely important that you abide by the public health regulations, the University of Pittsburgh's health standards and guidelines, and Pitt's Health Rules. These rules have been developed to protect the health and safety of all of us. Universal face covering is required in all classrooms and in every building on campus, without exceptions, regardless of vaccination status. This means you must wear a face covering that properly covers your nose and mouth when you are in the classroom. If you do not comply, you will be asked to leave class. It is your responsibility have the required face covering when entering a university building or classroom. For the most up-to-date information and guidance, please visit coronavirus.pitt.edu and check your Pitt email for updates before each class.

If you are required to isolate or quarantine, become sick, or are unable to come to class, contact me as soon as possible to discuss arrangements.

Course Outline (subject to change)

Week	Date	Topic	Reading	Assignment Due
1	09/01/2021	Review of basic statistical concepts Correlation		
2	09/08/2021	Simple Linear Regression (I)	Chapter 2	Assignment 1
3	09/15/2021	Simple Linear Regression (II)	Chapter 2	Assignment 2
4	09/22/2021	Multiple Linear Regression (I)	Chapter 3 (3.1 – 3.4)	Assignment 3
5	09/29/2021	Multiple Linear Regression (II)	Chapter 3 (3.5 – 3.6)	Assignment 4
6	10/06/2021	Diagnostics (I)	Chapter 4	Assignment 5
7	10/13/2021	Diagnostics (II) Midterm review	Chapter 10 Chapter 6 (6.1, 6.2)	Assignment 6
8	10/20/2021 10/22/2021	Midterm exam		
9	10/27/2021	Review of midterm exam Model building		
10	11/03/2021	Categorical independent variables	Chapter 5 (5.3 – 5.5)	Assignment 7
11	11/10/2021	Interaction with categorical variables	Chapter 8 (8.1 – 8.3, 8.5)	Assignment 8
12	11/17/2021	Interactions among continuous variables Mediation and Power Analysis	Chapter 9	Assignment 9
13	11/24/2021	No class	Chapter 7 Chapter 3 (3.7) Chapter 5 (5.6)	Assignment 10
14	12/01/2021	Logistic Regression	Chapter 13 (13.1 – 13.2)	Assignment 11
15	12/08/2021	Final Review		Assignment 12
16	12/15/2021 12/17/2021	Final exam		