EPSY 547 Multiple Regression in Educational Research

Online Fall 2021 (Aug. 23 – Dec. 10)

Instructor:	Yue Yin, Ph.D., 765-430-3545 (mobile), yueyin@uic.edu
Course Materials	Course materials will be released every Wednesday.
Homework Assignment:	Weekly homework assignment (if any) is due every Wednesday midnight (23:59 PM). You can work on the course materials at any time and at any pace before the homework assignment is due.
Office Hour:	By Appointment. You can email me to make an appointment for a talk on the phone or zoom.

Recommended 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: Lawrence Erlbaum.

You are highly encouraged to read a regression analysis textbook to get a deep and systematic understanding of the corresponding contents. Although the structure of the recommended textbook will be followed primarily and some examples in this book will be used, the homework assignment/exams are NOT directly from the textbook and you are NOT required to purchase this book. If you have an earlier version of this book or a standard regression analysis book that covers similar topics, it will work too.

The e-version of the textbook can be found at UIC library https://ebookcentral-proquest-com.proxy.cc.uic.edu/lib/uic/reader.action?docID=1222653

You will need to log in with your UIC ID to view it.

Supplementary Textbook

Field, A. (2018). *Discovering statistics using IBM SPSS statistics (5th ed).* Los Angeles: Sage Publications (ISBN-10: 9781526419521, ISBN-13: 978-1526419521

Field's book is an intermediate level statistics textbook, covering topics from introductory statistics, ANOVA, regression, and some more. It is reader-friendly, accessible and fun, for those who are relatively new to statistics and want to learn the application of many kinds of statistical techniques quickly.

Course Description

This course is a continuation of the topics covered in a course of introductory statistics (e.g., EPSY 503). It is an introduction to multiple correlation and regression techniques as tools for the analysis and interpretation of educational and behavioral science data. This course focuses on multiple regression and related statistical techniques, including bivariate association, regression with multiple continuous and categorical independent variables, interactions among independent variables, curvilinear regression, and logistic regression. Also, it introduces

diagnostic techniques and model selection strategies. SPSS will be used for most data analyses. Some hand computation will be needed from time to time to help students better understand concepts or to complete some analyses that cannot be done in SPSS.

Course Website

The course website will be on Blackboard: http://uic.blackboard.com/. Please go there to study weekly course materials.

Required Technology

Internet Access

You will need regular access to a computer with a connection to the Internet and that is capable of running Blackboard and play online videos. This is an online course, and all course materials and instruction are presented online. If you have difficulty accessing the course website, you need to take action immediately to solve the problem. It is your responsibility to maintain connectivity throughout the entire length of the course regardless of where you are, including vacations, work-related travel, etc. You may access the course from any computer that is capable of searching the Internet and running Blackboard; if you have difficulty with your home computer, please try a local public computer or a computer at work instead.

Software

- Internet browser capable of running Blackboard
- The Microsoft (MS) Office suite of software (including Word, PowerPoint, and Excel)
- SPSS: Information about it will be provided later on Blackboard.

Hardware

You must have a computer that has audio capabilities (i.e., a working sound card and speakers or headphones) so that you can listen to the audio lectures.

Learning Materials

Each **Wednesday**, the following learning materials will be available for you to view and/or download from the "Content" section in Blackboard. You are responsible for reviewing all of these materials thoroughly and completing the assigned activities. The table below lists the specific accessibility features and times when course materials will be made available to you.

Materials	Access	Release Time
Slide handout	PowerPoint Slides: can be downloaded and printed and also have scripts of the lecture in the notes	1:00 AM
Audio lecture	Audio PowerPoint Presentation: can only be played online	1:00 AM
Data sets (as needed)	Can be downloaded	1:00 AM

Homework assignment (hw) [a]	Can be downloaded	1:00 AM
Answer key to previous module's homework assignment (hw solution)[b]	Can be downloaded	As early as 1:00 AM[c]
Other course materials, such as required or supplementary readings	Can be downloaded	1:00 AM

Note:

a. The homework assignment is in the folder that contains the corresponding learning materials. e.g., homework for topic 3 is in the folder of topic 4.
b. The answer key to the homework assignment is in the folder that contains the next topic. E.g., the solution to the hw for topic 3 is in the folder of topic 4. Please review the solution to the previous homework assignment before you start to learn a new topic.
c. The answer key to the homework assignment is only available to those who have submitted their corresponding homework assignment. If you submit a homework assignment late, the corresponding homework answer key will not become available for you until you submit that homework assignment.

Suggested Learning Sequence

By every Wednesday, you need to submit your completed homework assignment from the last module and start to work on the next module. When working on each module, you need to view and/or download all the contents in the folder. You are responsible for studying all of these materials thoroughly and completing the assigned activities in the folder. To assist you with managing your time effectively, the following list of actions is a suggested sequence for using the course materials in each folder.

1. Review the homework solution to the last module's homework assignment. Before you study a new module, you need to review the homework solution to the homework assignment you submitted. Compare your homework assignment with the solution, correct your homework assignment as needed, and review the course materials about the items that you answered incorrectly or with uncertainty. If you are still confused, post your questions on the discussion board.
2. Read the assigned textbook chapter(s) for the current module.
3. Print the lecture handout for the current module.
4. View and listen to the lecture for the current module, and carefully complete the exercises given during the lecture. **Important:** Each lecture presentation contains exercises and their answer keys to help you apply the content of the lecture. When I suggest that you pause the presentation and complete an exercise, you should DO so to gain the maximum benefit from the exercise. Do NOT skip the exercise or check the key beforehand. Otherwise, you will lose an opportunity to practice what you are learning.
5. If a demonstration of data analysis is available, practice it on your computer.
6. Complete the homework assignment, and submit it by the due time.
7. Read the journal article(s)/supplementary materials, if any.
8. You need to contact me or discuss it with your classmates promptly if you have questions. DO NOT skip content that you do not understand, and DO NOT allow confusion to build over time.

Course Requirements

Homework Assignment (HW) -- 96 points

Purpose: In almost every module, you will be given a homework assignment to complete. The homework assignments serve three purposes: (1) to reinforce your learning, as the best way of learning is by doing; (2) to self-evaluate your ongoing learning, so that you can get timely feedback on how well you meet the instructional objectives and how you can improve learning; and (3) to give me feedback to improve my teaching. When you find anything confusing, please let me know as soon as possible so that I can help you and/or modify the teaching materials timely. Doing and reviewing your homework assignments are critical for you to learn the course materials and prepare for the exams. **Based on my previous experience, those who completed their homework assignments carefully and timely tend to learn well, do very well on the exams, and gain good grades in the course. Plus, homework assignments are worth 8 points. If you miss one homework assignment, it means that you need to get 8 more points on your exam to make it up, which is NOT easy.**

Due date/time: Unless specified otherwise, the weekly homework assignment is due at 11:59 PM (central US time) every Wednesday. You must upload your completed assignment on Blackboard *before* the due date/time.

Homework Submission: You are required to submit your completed homework assignments electronically on the Blackboard site by using the corresponding homework assignment link in the "Content" folder so that I can track everybody's work. Please do not send me your homework assignment via email. **Even if it is a late submission, please still submit it via the homework submission link on Blackboard, so that your homework assignment will be recorded appropriately and you will be able to see the corresponding answer key.**

Discussion and Group Work: While working on the homework assignments, you are welcome to discuss the assignment using the Blackboard discussion boards or through personal emails. However, you are not allowed to copy each other's work. If evidence of copying is detected, all parties involved will receive a 0 for the particular homework assignment.

Scoring: I will check your homework assignment for completion rather than correctness. (Each of you is responsible for reviewing the correctness of your homework assignment using the solution provided.) A homework assignment completed and submitted on time will earn full credit (8 points each) regardless of whether all of the problems are solved perfectly. If you don't know how to solve a problem, try your best and complete it as much as you can.

An assignment that is submitted on time but incomplete without trying will lose points proportionally. An assignment that is submitted late (i.e., after 11:59 PM central US time on the due day) will earn 0 points. I understand that everybody may have some emergency to deal with sometimes. Therefore, each of you will be allowed TWO opportunities to submit homework assignments up to one week late and still gain full credit for the homework assignment. When you need to use your late submission opportunities, please inform me as soon as you can. Again, when you submit your homework after the due time, please still submit your completed homework assignment on Blackboard.

You will be able to check your homework grade in "Tool→ My Grades" after the points have been awarded by the following week.

Answer Key (Feedback) and Self-Evaluation: I will provide a detailed solution file as a type of feedback for each homework assignment soon after you submit the completed

homework assignment on the due day. As it is a graduate-level course and we have frequent homework assignments, it is your responsibility to carefully compare your completed homework assignment with the answer key and correct any mistakes. However, if you have any questions about the homework assignments or you have trouble understanding the solution, please let me know or share your thoughts on the discussion board as soon as possible.

Sharing a Research Design -- 4 points

You are encouraged to discuss course contents and share course-related resources on the discussion board of blackboard, so that we can build a learning community and learn from each other, just like what you do in a regular classroom! You are also encouraged to read the discussion board regularly in case any of the information is helpful for you. Based on my prior experience, many students ask great questions and made great comments. So I wish that you can fully use this wonderful resource.

When we cover different regression techniques, I will suggest that you share a research design that uses the particular regression technique as an optional task. You do not have to complete this task every week. But you should design and share at least ONE study during the semester on the discussion board so that you can apply what you learned to a topic that you are interested in and others can learn from you. Once you have shared your design, you will gain the 4 discussion contribution points. You are encouraged to give each other feedback. This design task will be specified in the homework assignments.

Exams -- 200 points

There will be two exams during the course and each exam is worth 100 points. The midterm exam will focus on all the content up to and include Quantitative scales, curvilinear relationships, and transformations. The final exam will focus on the content from Interaction among continuous variables, but will not exclude the basic information covered before the midterm.

You will take the midterm and final exams online. On the exam week, the exam will be available on Blackboard from 12:00 AM (early morning) Wednesday morning to 11:59 PM (midnight) Saturday on the dates listed on the course schedule. You can start to take the exam anytime during this 96-hour time window, but you will have to complete and submit your exam within 4 hours once you start the test. If you submit the exam late or fail to submit the exam at all, your score on the exam will be a 0. During the exam, you can log off and log in to the test if only you have not submitted the test. However, the 4-hour timer keeps running from the moment that you first log in to the test, even when you log off the test temporarily. Therefore, you may schedule 4 uninterrupted hours for the exam to fully use the time when needed. Please make sure that your computer, internet, software, and everything related to the test-taking are all working well before you start the test.

Both exams are open-book and open-notes, so you can use any course materials or even search online for information when taking the exams. However, **you must take the exams independently and should NOT consult any other people inside or outside the class. Also, for test security, you should NOT release the exam information to anybody. Otherwise, it is unfair to any honest students, including yourself. If any cheating behavior or exam releasing**

behavior is detected, anybody involved will be scored a 0 on the exam and reported to the department, college, or even university.

After all the students have finished the exam, I will double-check computer scoring and send each student a feedback file with all the items you have missed. However, if your total score is lower than 70, such a file will not be sent because too many items and keys will be released. However, if you are interested in knowing what items you have missed, you are welcome to schedule a phone call with the instructor, so that the instructor can go over the items you missed with you.

To help you prepare for the online exam format, a sample exam will be available for you to practice before the midterm exam. However, your scores on the sample exam will NOT be counted as part of your course score.

Grading

The final letter grade received for the course will be based on homework assignments and two exams. The relative contribution of each element is as follows: homework assignment (96 points), sharing a research design using regression (4 points), midterm exam (100 points), and final exam (100 points). Your total course score = (homework assignment + one research design sharing + midterm score + final score)/3.

The letter grade will be assigned according to the following scale:

90 – 100%	A
80 – 89%	B
70 – 79%	C
60 – 69%	D
59% or below	F

For example, you turn in 10 homework assignments in time (8 * 10 = 80 points), use the one late submission opportunity and turn in one homework assignment one week late (8 points), and miss one homework assignment (0 points). You shared a research design (4 points). Also, you score 90 on the midterm exam and 95 on the final exam. You will get 30 points for the homework assignments. Your total score = (80 + 8 + 0 + 4 +90 + 95)/3 = 92.33. You will obtain an A for the course.

Communication with Instructor

If you ask clarification questions about the course contents (such as lectures, homework assignments, and solutions), please post your questions on the discussion board so that other students can participate in the discussion and benefit from your questions as well, just like in a regular classroom! I will also check the discussion board regularly and respond when needed. Even if you do not have questions about a topic, you are encouraged to read the discussion board regularly, share your ideas, contribute to the discussion, and/or learn from the discussions. If you have to email me your question and I find that your questions might be common or helpful for other students' learning, I will share your question anonymously and my answers on the discussion board, unless you ask me not to.

When you ask a personal question that is irrelevant to others, e.g., asking for a deadline extension for a homework assignment, you may email me at yueyin@uic.edu. When emailing me, please include "547" in the subject line, so that your email would be less likely to be missed.

When you post your question on the discussion board or email me, I will try my best to respond within 24 hours on weekdays. When you send me an email or post questions on the blackboard after 5:00 PM Chicago time on Friday, most likely I will respond on the following Monday. If you have not received my reply within this planned time, please repost/resend your question, as I may have missed your earlier message somehow. I would appreciate your reminder.

When you post your research design, which is required in some homework assignments, I will provide feedback on your research design within a week after the assignment is due.

When you share a research article, which is required in some homework assignments, I will not provide comments unless you raise specific questions about the article on the discussion board.

If you ask a question that needs a detailed and/or interactive answer, you may request a zoom meeting or phone call with me for efficiency and better quality.

Academic Honesty

Some students are clearer than others on the norms of academic integrity, and in particular, what counts as plagiarism. A useful treatment of forms of academic dishonesty, including plagiarism, can be found at https://dos.uic.edu/community-standards/academic-integrity/. Please familiarize yourself with the forms of academic dishonesty as recognized by the University. If you have any questions about whether a particular activity constitutes academic dishonesty, you can ask me, or contact the UIC Office of the Dean of Students at 312-996-4857.

Technical Support

If you are having technical problems with the course, please send an e-mail with your name, the course rubric (i.e., EPSY543), and the nature of your problem to exedtech@uic.edu or call (312) 996-5948. A staff member will respond to inquiries Monday - Friday, 8 a.m. - 8 p.m. CST, and Saturday - Saturday, 11 a.m. - 3 p.m. CST.

Special Needs

UIC is committed to the full inclusion and participation of people with disabilities in all aspects of university life. If you face or anticipate disability-related barriers while at UIC, such as documented learning disabilities, vision, or hearing impairments, and emotional or physical disabilities, please connect with the Disability Resource Center (DRC) at drc.uic.edu, via email at drc@uic.edu, or call (312) 413-2183 to create a plan for reasonable accommodations. To receive accommodations, you will need to disclose the disability to the DRC, complete an interactive registration process with the DRC, and provide me with a Letter of Accommodation (LOA). Upon receipt of an LOA, I will gladly work with you and the DRC to implement approved accommodations.

Diversity and Inclusion

UIC values diversity and inclusion. Regardless of age, disability, ethnicity, race, gender, gender identity, sexual orientation, socioeconomic status, geographic background, religion, political ideology, language, or culture, we expect all members of this class to contribute to a respectful, welcoming, and inclusive environment for every other member of our class. If there are aspects of the instruction or design of this course that result in barriers to your inclusion, engagement, accurate assessment, or achievement, please notify me.

Tentative Course Schedule and Topics*

Starting Date	Module	Reading	HW Due
08/25 (W)	1. Course introduction, review of introductory statistics, bivariate correlations, and regression	CCAW 2	
09/01 (W)	2. Multiple regression/correlation	CCAW 3	# 1 (HW1 due on 09/02)
09/08 (W)	3. Multiple regression/correlation	CCAW 3	# 2
09/15 (W)	4. Data visualization, exploration, and assumption checking: Diagnosing and solving regression problems I	CCAW 4	# 3
09/22 (W)	5. Data-analytic strategies	CCAW 5	# 4
09/29 (W)	6. Quantitative scales, curvilinear relationships, and transformations	CCAW 6	# 5
10/06 (W)	7. Interaction among continuous variables	CCAW 7	# 6
10/13 (W)-10/16 (Sat)	Midterm Exam		
10/20 (W)	8. Categorical or nominal independent variables	CCAW 8	# 7
10/27 (W)	9. Interaction with categorical variables	CCAW 9	# 8
11/03 (W)	10. Outliers and multicollinearity: Diagnosing and solving regression problems II	CCAW 10	# 9
11/10 (W)	11. Logistic regression	CCAW 13	# 10
11/17 (W)	12. Review, regression analysis report		# 11
11/24 (W)	13. Self-review, catch up, No new lecture		# 12
12/01 (W)-12/04 (Sat)	Final Exam*		
12/08 (W)	14. Introduction to other regression issues (Optional)	CCAW 12, 14, 16	

* Considering that students typically have too many final exams in the final week, the final exam of this course is scheduled for the week before the final week and the optional course topic (Introduction to other regression issues) is scheduled for the final week for students' convenience.

Resources

Many links to campus resources will be auto-populated for students on Blackboard and are also described in the UIC Student Handbook (https://dos.uic.edu/wp-content/uploads/sites/262/2019/01/FINAL-VERSION-2019.pdf). A comprehensive list of student

resources is available on the Current Student Resources (https://today.uic.edu/resources/current-student-resources).

GSIG Initiative

The GSIG initiative is a program created by and for graduate students to increase opportunities for interdisciplinary collaboration and socialization so students build a strong research community for graduate school and beyond. GSIGs are special interest groups in which graduate students engage in an interdisciplinary research community around common interests. GSIGs meet monthly to discuss research and developments in topic areas, collaborate on ongoing projects, and support one another through the academic process with a shared goal to connect, commune, research, and expand knowledge. The initiative also hosts multiple signature events throughout the academic calendar that include: research workshops, graduate community conversations, and writing retreats.

- Graduate Research Opportunities at UIC: https://education.uic.edu/our-research/graduate-student-opportunities/
- GSIG: https://education.uic.edu/our-research/graduate-student-opportunities/gsigs/

As some links may change over time, please let me know if you notice any broken links. Thanks!

The instructor sincerely welcomes everyone's input, suggestions, and feedback anytime during the course. Let's work together to have a fun and rewarding semester!