

Syllabus for **STAT 6031 (#)** Applied Regression Analysis, Fall 2025

W/F, 12:30 am – 1:50 am, 60WCHARL 273

Instructor: Bledar Alex Konomi
Department of Mathematical Sciences, French Hall West 5043
Phone (513) 556-4050 (6-4050 from on campus phones)

Office Hours: W 11am-11:50am, or by appointment online after request,

Course Description: This 3-credit course covers statistical inference and data analysis in simple linear regression models and multiple linear regression models. Specific topics include: sampling distribution, hypothesis testing, correlation coefficient, statistical inference of parameters in regression, checking model assumptions, variable selection, transformations of variables and diagnostics. Nonlinear, nonGaussian and regularized regression models will also be discussed. Students are responsible for all material covered in class, in the assigned readings, and in homework problems. This course is a required course to prepare MS/PhD-STAT students for the statistics qualifying exam.

Objective: In this course students will develop transferable skills that will translate to many different career settings:

Skill #1 Critical Thinking: Understand basic concepts of statistics and probability, critically evaluate statistical arguments, and recognize the importance of statistical ideas.

Skill #2 Quantitative Reasoning: Comprehend statistical methods to analyze data quantitatively and apply to real-world problems.

Skill #3 Natural Sciences: Understand how to use statistical methods (hypothesis testing and regression) properly to analyze scientific data and draw conclusions.

Skill #4 Teamwork and Collaboration: Work collaboratively on team projects.

Prerequisites: Prerequisite: Probability & Statistics I & II (15 STAT 2037, 3038) Students are assumed to have background knowledge of basic concepts of probability and distribution theory and inferences about population means and variance.

Textbook: Detailed lecture notes will be posted on canvas. However a good reference for the class is:

Introduction to Probability and Statistics, 4th edition, by Milton and Arnold. (MA)

Applied Linear Statistical Models, 5th edition, by Kutner, Neter, Nachtsheim & Li. (KNN) The textbooks are large and heavy but they provide substantial examples and graphs.

The instructor may specify which parts are important and which can be skimmed over or skipped in class. Complementary textbooks will be:

Course Webpage: All course related information are posted on UC canvas, including course syllabus, reading assignments, lecture notes, handouts, homework assignments, codes, announcements, etc. Visit Canvas frequently.

Table 1: Grade weighting

Attendance	Homework	Midterm Exam	Final Exam	Project
5%	25%	25%	30%	15%

Grade: Your final course grade will be based on the following weighting of assessment components: Your final course letter grade will be assigned according to the following grading scale: A 93–100, A- 90 – 92, B+ 87–89, B 83–86, B- 80 – 82
C+ 77–79, C 73 – 76, C- 70 – 72, D+ 67– 69, D 63 – 66, D- 60 – 62
F below 60

Attendance: Students should attend the class. If you miss more than three classes into the semester, you should provide justification. For an unjustified absence there will be one point reduction in your overall score.

Starting Fall 2016, Title IV provisions will require that undergraduate students who wish to maintain their eligibility to receive federal financial aid show that they have participated in each course in which they have enrolled. To accomplish this, the University and A&S have developed a simple procedure that will be made available through Blackboard. When you access the sites for each of your courses, you will see a link at the top of the control panel at left entitled “Attendance Verification.” Clicking on this link will take you to a simple question. By answering this question, you will have verified participation.

Advice

Attendance is essential if you wish to do well. You are expected to attend every class.

Computation & Math: One focus of this course is on learning how to do good and appropriate statistical analysis of scientific data, instead of math. The use of R will simplify most of the computational tasks, although we will use mathematics extensively. For graduate students that plan to take the Qualifying in Statistics, the mathematical derivation and justification should be paid special attention to. Some qualifying exam problems in past years will be covered in class.

Reading

Before class: Quick & First pass to get a general idea; make a note of difficult or confusing parts.

After class: Read at detailed level for material covered in class & Practice with homework problems.

The course moves very quickly; we will cover roughly 1-2 chapters per week. If you are having difficulty, please get help from the instructor asap.

Do the assigned homework on time. **DO NOT** wait until the last minute before trying homework problems. Take advantage of the office hours.

Please **provide sufficient detail in writing up solutions for grading.** It is also important to present the solutions in a clear, easy to read and follow format. No credit will be given if the homework is too sloppy to read.

Homework: Homework will generally be assigned on canvas (tentatively) every one-two week throughout the semester (Tentatively 4-5 HWs). Preferably, homework will be submitted in a pdf, Microsoft word or equivalent – Using Latex or equivalent program is encouraged. Handwritten homework will be also accepted in non computer based problems if they are clearly written. The due date of the homework will be announced in the HW and/or class room. Homework will be collected at the start of the class on the due date,

and this is the only acceptable way to turn in homework. **No late assignments will be accepted unless there are extreme and document-able circumstances that are approved by the instructor.**

Exam: There will be one Midterm exam in class as well as a two-hour Final Exam in the regular classroom. All the exams are closed book and closed notes. The Final Exam will be comprehensive with slight emphasis on topics covered after the midterm exam. Full credit for exam problems can only be earned through showing justification for or work in proper English in terms of the problems. Midterm exam potential date October 15-17.

Project: A group project will be assigned with a dataset posted on Kaggle. You will be required to write a project report (no more than 5 pages, single spacing, 11pt font) and a presentation and do the following:

1. Form your group with minimum of 2 and maximum of 3 students.
2. Describe data using descriptive statistical tools you find related and appropriate (summary statistics, scatter plots, histogram, boxplots, etc.)
3. Analyze the dataset using linear regression models. Carry out model diagnostic analysis. If there is any violation of the model assumptions, propose and carry out possible remedies. Select the "best" model for the dataset. Upload your predictions to Kaggle which will automatically rank the models from all groups based on certain quantitative criteria.
4. Summarize your findings in the project report and present your findings in class as a group.
5. The final report must be submitted by the deadline (TBD).
6. The contributions by each group member must be explicitly described on the cover page of the final report. Every group member must sign on this cover page of the project report. The group project will not be graded if the contribution descriptions or the signature of any group members is not included.

Communication Devices Personal communication devices such as cell phones and PDAs must be either turned off or put on vibrate during class. Additionally, please refrain from texting during class.

Academic Integrity Please help maintain an academic environment of mutual respect and fair treatment. You are expected to produce original and independent work on the exams. For homework, group work is encouraged. However, it is plagiarism to copy someone else's work and call it your own. All students must submit their own written work in their own words. Academic misconduct will not be tolerated (http://www.uc.edu/conduct/Academic_Integrity.html).

Issues of Differing Abilities: Reasonable accommodations will be made for students with verifiable disabilities. In order to take advantage of those available accommodations, students must contact the Disability Services Office at 210 University Pavilion (513-556-6823).
<http://www.uc.edu/aess/disability.html>.

Religious Accommodations Ohio law and the University's Student Religious Accommodations for Courses Policy 1.3.7 permits a student, upon request, to be absent for reasons of faith or religious or spiritual belief system or participate in organized activities conducted under the auspices of a religious denomination, church, or other religious or spiritual organization and/or to receive alternative accommodations with regard to examinations and other course requirements due to an absence permitted for the above-described reasons. Not later than fourteen days after the first day of instruction in the course, a student should provide the instructor with written notice of the specific dates for which the student requests alternative accommodations.

For additional information about this policy, please contact the Executive Director of the Office of Equal Opportunity and Access at (513) 556-5503 or oeohelp@UCMAIL.UC.EDU. The university policy can be found at <https://www.uc.edu/about/equity-inclusion/equal-opportunity/student-religious-accommodations-for-courses-policy.html>

Drop and Withdraw Dates The last day to drop without entry to academic record is September 9, 2024. The last day to withdraw is November 22, 2024.

(This syllabus is subject to changes.)