



# Applied Regression Analysis

STP 530

## Instructor Info



Shiwei Lan



Office Hrs: TTh 9:30-10:30 AM



WXL R 544; Zoom: 8055899886



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## Course Info



Prereq: MAT 242, STP 226



TTh 10:30 – 11:45 AM



WXL R 107



<https://slan-teaching.github.io/STP530/>

## Grader Info



Haoran Shi



Office Hrs TBD



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## Description

This course focuses on simple and multiple linear regression, regression with categorical predictors, logistic regression, residual diagnostics, model building, etc. The software R will be taught in class through demonstrations, hands-on labs, and project exercises.

## Objective

By the end of the course, students should be able to apply a variety of linear regression based statistical methods to analyze different types of data and carry out residual diagnostics, model selection and experiment design. Students will also acquire concrete R skills for regression analyses.

## Textbooks

### Required

ALSM - Applied Linear Statistical Models (5th Edition) by M. Kutner, C. Nachtsheim, J. Neter, and W. Li.

### Recommended

SRC - Statistical Regression and Classification: From Linear Models to Machine Learning by N. Matloff

### Software

We will use the R computing language, and RStudio as an IDE.

## Grading Scheme

Homework	40 %
Quizzes	30 %
Final Project	30 %
Total	100 %

A+	[97%, 100%]	A	[93%, 97%]	A-	[90%, 93%]
B+	[87%, 90%]	B	[83%, 87%]	B-	[80%, 83%]
C+	[77%, 80%]	C	[70%, 77%]		
D	[60%, 70%]			E	[0%, 60%]

## Homework

There will be 11 homework assignments (textbook based or R lab work) to cover the corresponding material. Homework will be announced and submitted on canvas. Each homework report should be submitted in either Word or PDF format, no other formats accepted. Late homework will be penalized by 50% per day. Please do NOT send your homework by email! The lowest score of the assignments will be dropped.

## Quiz

There will be 12 weekly quizzes intended to check on your understanding of key concepts. The quizzes are administered on canvas, asynchronously, and open book. Each quiz allows two attempts. The higher score of the two attempts will be recorded. Late completion will NOT be recorded. The lowest two grades of all quizzes will be dropped.

## Final Project

The final project will consist of a data analysis using R on the assigned or self-proposed data. Students should form groups of 2 ~ 4 members to work on the proposed project together. Each group should submit (by the group leader only) a 1-2 page plan for their project including a scientific goal, a description of the chosen data set and allocation of work among members by **March 17**. Each group will present their findings in the last week. Finally each group will submit a written report (either word doc or pdf) to canvas by (**May 3** at midnight).

# FAQs

## ? Where can I find help?

! You can go to my virtual office hours and the grader's office hours. You can go to Math Community Center (MC2) located at WXL R A303 for help. In addition, you could also use [Canvas Discussion Board](#) to post your questions and help others.

## ? How do I keep track of the class?

! Constantly check [canvas](#) and the course website. I will make announcements, post homework solutions, etc..

## ? Do we have incentives?

! I will give bonus points through the semester for e.g. extra-credit homework problems, most helpful forum users, etc..

## ? When shall I drop if I choose to?

! Last Day to Register or Drop/Add Without College Approval is 01/14/2024. Tuition & Fees Refund Deadline is 01/21/2024 for session C. Course Withdrawal Deadline (without 'W' on your transcript) is 03/31/2024 for session C. Refer to <https://students.asu.edu/academic-calendar> for more deadlines.

## Disability Accommodations

Qualified students with disabilities are encouraged to make their requests at the beginning of the semester to get disability accommodations. Disability information is confidential. *Note: Prior to receiving disability accommodations, verification of eligibility from the Disability Resource Center (DRC) is required.* Therefore, you should contact DRC immediately. Their office is located on the first floor of the Matthews Center Building. DRC staff can also be reached at: 480-965-1234 (V), 480-965-9000 (TTY). For additional information, visit: [www.asu.edu/studentaffairs/ed/drc](http://www.asu.edu/studentaffairs/ed/drc). Their hours are 8:00 AM to 5:00 PM, Monday through Friday.

## Make-up Policy

In case of valid absence (such as serious illness, going to court, etc.) during scheduled exam, you must notify the instructor BEFORE the exam, if the circumstances allow. To be eligible for make-up exam, valid excuse has to be supported by valid documentation (such as doctor's note, letter from court, etc.). Also, please follow Academic Affairs Manual, ACD 304-04, for appropriate University policies about requesting an accommodation for religious practices, in case you have to miss an assignment due to religious practice.

## Cell phones and Electronic Devices

Picture taking, talking or texting on your cell phone or any electronic device during class is prohibited. If you bring a cell phone and/or any other electronic equipment to the class, make sure they are turned off before class begins. Any sounds produced by such devices are disruptive to the class and, as such, will not be tolerated and may be reported to the Office of the Dean of Students.

## Academic Honesty

ASU expects and requires all its students to act with honesty and integrity, and respect the rights of others in carrying out all academic assignments. For more information on academic integrity, including the policy and appeal procedures, please visit <http://provost.asu.edu/academicintegrity>.

## Inclusion

The School of Mathematical and Statistical Sciences encourages faculty to address and refer to students by their preferred name and gender pronoun. If your preferred name is different than what appears on the class roster, or you would like to be addressed using a specific pronoun, please let me know.

## Sexual Violence and Harassment

Both Title IX federal law and university policy make clear that sexual violence and harassment based on sex is prohibited. An individual who believes they have been subjected to sexual violence or harassed on the basis of sex can seek support, including counseling and academic support, from the university. If you or someone you know has been harassed on the basis of sex or sexually assaulted, you can find information and resources at <https://sexualviolenceprevention.asu.edu/faqs>. As a mandated reporter, I am obligated to report any information I become aware of regarding alleged acts of sexual discrimination, including sexual violence and dating violence. ASU Counseling Services, <https://eoss.asu.edu/counseling>, is available if you wish to discuss any concerns confidentially and privately. ASU online students may access 360 Life Services, <https://goto.asuonline.asu.edu/success/online-resources.html>.

## Syllabus Disclaimer

This syllabus is tentative and should not be considered definitive. The instructor reserves the right to modify it (including the dates of the tests) to meet the needs of the class. Every effort will be made to avoid changing the course schedule but the possibility exists that unforeseen events will make syllabus changes necessary. It is the student responsibility to attend class regularly and make note of any change.

## Class Schedule (tentative)

Week	Date	Topic	Assignments
1	01/09 - 01/11	Course orientation (R introduction)	
2	01/16 - 01/18	Prerequisite knowledge review	
3	01/23 - 01/25	Simple to linear regression (Ch. 1)	
4	01/30 - 02/01	Inferences (Ch.2)	Homework 1
5	02/06 - 02/08	Basic diagnostics and remedial measures (Ch.3)	Homework 2
6	02/13 - 02/15	Multiple regression I with matrix (Ch.5 & 6)	Homework 3
7	02/20 - 02/22	Multiple regression II (Ch.7)	Homework 4
8	02/27 - 03/01	Polynomial regression models (8.1)	Homework 5
9	03/03 - 03/10	Spring Break (no class)	Homework 6
10	03/12 - 03/14	Categorical predictors (8.3, 8.6)	Homework 7 project proposal: due 03/15/2024
11	03/19 - 03/21	Interaction regression models (8.2, 8.5, 8.7)	Homework 8
12	03/26 - 03/28	Advanced diagnostics (Ch.10)	Homework 9
13	04/02- 04/04	Multicollinearity (7.6)	Homework 10
14	04/09 - 04/11	Logistics regression and GLM (Ch.14)	
15	04/16 - 04/18	Model selection and validation (Ch.9)	Homework 11
16	04/23 - 04/25	Final project presentations	
Final	04/29 - 05/04	Final Project (report)	project report: due 04/30/2024