



STAT 3301

Statistical Modeling for Discovery I (25205)

Autumn 2026

Syllabus - Instructor Information

Steephanson Anthonymuthu

Professional Qualifications

Ph.D., Statistics, Kansas State University

Master's, Statistics, Sam Houston State University

Bachelor's, Industrial Mathematics, Rajarata University of Sri Lanka

Syllabus - Required or Recommended Readings

We will use the textbook Applied Linear Regression, Fourth Edition (2014) by Sanford Weisberg. An electronic version of the book can be accessed for free through The Ohio State University Libraries and click [here for e-book](#). The online resource is best suited for screen reading; each individual is allowed to print/e-mail/save/download a limited number of pages.

Syllabus - Course Schedule

Week	Sections
1	Introduction, summarizing data in R
2	Relationships between variables

Week	Sections
3	Intro to simple linear regression (SLR), parameter estimation
4	Inference and prediction under SLR models
5	Sources of variability, coefficient of determination, residuals
6	Transformations of regressors and response variables
7	Multiple linear regression: estimation, inference and prediction
8	Interpreting coefficients, correlated predictors
9	Regression with categorical and continuous regressors
10	Multiple categorical regressors, comparing nested models
11	Nonlinear relationships and polynomial regression
12	Regression model diagnostics
13	Common violations of independence
14	Descriptive versus causal interpretations of regression
15	Approaches to model comparison
16	Approaches to model selection

Course Details - Instructor Contact Details

Instructor:

Instructor: Steephanson Anthonymuthu

Email address: anthonymuthu.1@osu.edu

Course Details - Office Hours

Here are my office and office hours information

Office: CH321

In person Office hours: Monday: 8:30 am – 9:30 am, or by appointment.

Online office hour: Tuesday: 09:00 am – 10:00 am, or by appointment.

Online office hour Zoom link: Use this [Zoom link](#)

Course Details - Additional Instructional Staff

Grader Information:

Grader: Yifei Wang

Email address: wang.21051@osu.edu

Course Details - Class Meeting Details

This course is delivered fully online through an asynchronous mode of learning. Lecture videos will be posted on Carmen on a weekly basis. Students are expected to watch the lectures and participate in class activities. These videos will be utilized to provide an in-depth investigation of the topics for the week. Also, lecture notes will be posted on Carmen with the video lectures.

Additionally, we will hold a fully **optional** synchronous meeting on Mondays from 12:40 PM to 1:35 PM, as listed below. This session is intended for students to ask questions about the video lecture materials posted on Carmen from a student's perspective. Please note that no lectures will be given during this time, as this is an optional Q&A meeting.

Class Meeting Details: 12:40 PM-01:35 PM - Online - M

Course Details - Course Description

Statistical models for data analysis in the linear regression framework. The challenges of developing meaningful models for data are explored, with emphasis on the model building process, the use of numerical and graphical diagnostics for assessing model fit, and interpretation and communication of results. Statistical foundations are introduced along with basic inferential techniques. Prereq: C- or above in 3202; or 4202 and 5732; or permission of instructor. Prereq or concur: Math 2568; or permission of instructor.

Prerequisite(s) / Corequisites: Prereq: C- or above in 3202; or 4202 and 5732; or permission of instructor. Prereq or concur: Math 2568; or permission of instructor.

Course Details - Course Learning Outcomes

Course learning outcomes

By the end of this course, students should successfully be able to:

- Use graphical and numerical summaries of data to describe relationships between variables.
- Formulate, fit, evaluate, and compare regression models that describe relationships between variables.
- Understand and be able to describe the statistical foundations of standard regression models.
- Identify common violations of the assumptions that underly standard regression models.
- Perform a complete regression analysis and communicate the results in both statistical and problem-specific terms.

Distinguish between descriptive and causal interpretations of regression.

Course Details - Course Supplies

Course technology

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available [here](#), and support for urgent issues is available 24x7.

- Self-Service and Chat support: <http://ocio.osu.edu/selfservice>
- Phone: 614-688-HELP (4357)
- Email: 8help@osu.edu
- TDD: 614-688-8743

Technology skills necessary for this specific course

- Navigating Carmen
- Basic computer and web-browsing skills

Necessary software

- This class requires you to use the statistical software package called R (The R Project for Statistical Computing can be found [here](#)). This software package is available as Free Software.
 1. You can download R for Windows, Mac, and Linux, from the CRAN archive which can be found [here](#)
- An easy-to-use interface to R is available in the software package RStudio. This package is available for Windows, Mac, and Linux and can be downloaded for free from [here](#). Note that RStudio requires R to be installed first.
- This class requires the use of the (free) R Markdown authoring framework to complete assignments. Information about R Markdown will be provided in class; an online guide with overview information can be found at [here](#).

Course Details - Detailed Course Schedule

Grades:

Category	Percentage
Quizzes	5
Homework	20
Midterm 1	27.5
Midterm 2	2.75
Data Analysis project	20
Total	100

Course Details - Grading Policy

Quizzes will be given frequently using Carmen, and these short quizzes are meant to motivate you to participate actively in class activities and keep you up with the material introduced during class. These quizzes will not be made up and, you cannot attempt, submit, or receive credit for these assignments.

Homework will be assigned approximately weekly and will be due on Carmen. The due date will be announced with the homework assignments. Homework problems that require R software should be completed in R Markdown and a knitted html file should be uploaded. Homework problems that do not require R may be handwritten (electronically, or on paper and scanned) and uploaded. You are encouraged to work together on homework; however, each student must produce their own assignment to be handed in. Do not copy any part of another student's homework. I will drop your lowest homework score (which could be an assignment that was never turned in) when calculating your final homework grade for the semester.

Data analysis assignment:

- Description: There will be a comprehensive data analysis project that will be completed by the end of the semester. Expect details on the project to be posted in early November. Expect there to be a 4-5 page write up that may be completed in groups and a short individual oral defense (5-10 min) to be completed during finals week.
- Academic integrity and collaboration: The data analysis project should be completed without any unauthorized help or communication. Sharing of code or other unauthorized discussion between students is strictly prohibited.

Exams:

There will be two midterms and one final project administered during the semester to assess your understanding of the course material as the semester progresses. The final project submission will take place at the time and date established by the University. Information about the exams will be posted well in advance on Carmen. Exams must be completed without any external help or communication. The information about the exams given below.

Midterm Exam 1:

Monday October 05, 2026, 5:20pm - 615pm in SOE004 (Scott Laboratory)

Midterm Exam 2:

Monday November 02, 2026, 5:20pm - 615pm in SOE004 (Scott Laboratory)

Generally, make-up exams will not be given. However, make-up exams may be given in case of an emergency or exceptional circumstances (sudden onset of illness, unexpected family situations, etc.) or due to conflicts with other university activities with proper documentation. If for some reason you are unable to make the exams, please contact me as soon as possible. Late requests may be denied, or penalties may be assessed.

If you find a discrepancy in the grading of a midterm exam (e.g., incorrect addition/subtraction, correct answer marked incorrect, etc.) then you must bring

it to my attention (through email) no later than one week from the day the exams are returned. After that grades will typically not be changed.

Grade Disputes

It is extremely important that you pay attention to your grades on a regular basis. If you feel that an assignment has been graded incorrectly or unfairly, you must speak with your instructor within one week of getting your grade on that assignment. We will not re-grade assignments at the end of the semester or offer any extra credit if you are not satisfied at that time with your final course grade, especially since you will have known all semester what is expected of you to earn your desired grade in this course.

We believe strongly that grades are earned, not given. If you need to achieve a certain grade in this course, be careful to complete all assignments, plan appropriate time for studying, come to office hours/tutor room and ask questions, review feedback you receive on graded activities so you can talk to us about any problems you missed, and get help as needed in order to achieve your goal. We hope your grade in the course will be just as important to you on Day 1 as it is at the end of the semester, especially since you will have known the expectations of this course all semester and are in control of deciding what grade to earn. We do not bump grades at the end of the semester, we do not have extra credit and we cannot change grades based on a person's circumstances. Do not expect your exams to be curved; they may or may not depending on how the class does. We do not curve the final total points at the end.

IMPORTANT! Keep track of your grades!!

Course Details - Grading Scale

Letter Grade	Percentage Range
A	100% to 93%
A-	< 93% to 90%
B+	< 90% to 87%
B	< 87% to 83%
B-	< 83% to 80%
C+	< 80% to 77%
C	< 77% to 73%
C-	< 73% to 70%
D+	< 70% to 67%
D	< 67% to 60%
E	< 60% to 0%

Course Details - Instructor Policies

Late Assignments

It is important for you to keep up with the work in this course, both for your own schedule, and so that we can all be on the same page when we're discussing material.

Late assignments (Homework, Quizzes and others) will NOT be accepted. Do not wait until the last moment to begin working on assignments. Please plan your time so that you can complete assignments far enough in advance to avoid any last-minute problems.

If exceptional circumstances (sudden onset of illness, unexpected family situations, etc.) arise, contact the instructor (Dr. Anthony Muthu) to discuss the possibility of an extension.

Course Details - AI Use Policy

Here is a general guidance on AI policy. They address common uses of AI in educational settings that may give you some direction.

Use 1: Study Assistance

GenAI can fabricate information (for example, creating citations to sources that do not exist) or omit key information. You are ultimately responsible for the accuracy and integrity of your submitted work. Unless explicitly permitted below, representing AI-generated content as your own work is a violation of the Code of Student Conduct. Please check with your instructor if you have questions.

These levels may apply to the entire course or specific assignments, as indicated by the instructor:

- Permitted: You may use GenAI as a virtual tutor to explain concepts, quiz you on course topics, or summarize content you have personally authored (e.g., your own class notes).
- Prohibited: The materials in this course may be subject to copyright protection. Do not input or allow AI to access external or instructor-created course materials (e.g., assigned readings, slides) without explicit instructor permission. Do not use GenAI to outline, draft, translate, or write any part of an assignment.

Use 2: Brainstorming and Ideation

GenAI can fabricate information (for example, creating citations to sources that do not exist) or omit key information. You are ultimately responsible for the accuracy and integrity of your submitted work. Unless explicitly permitted below, representing AI-generated content as your own work is a violation of the Code of Student Conduct. Please check with your instructor if you have questions.

These levels may apply to the entire course or specific assignments, as indicated by the instructor:

- Permitted: You may use GenAI to generate topic ideas, suggest search terms, or outline potential arguments.
- Prohibited: The materials in this course may be subject to copyright protection. Do not input or allow AI to access external or instructor-created course materials (e.g., assigned readings, slides) without explicit instructor permission. You must personally author all text/work; no AI-generated sentences, paragraphs, code, etc. may be included in your submission.

Use 3: Feedback on Student-Created Work

GenAI can fabricate information (for example, creating citations to sources that do not exist) or omit key information. You are ultimately responsible for the accuracy and integrity of your submitted work. Unless explicitly permitted below, representing AI-generated content as your own work is a violation of the Code of Student Conduct. Please check with your instructor if you have questions.

These levels may apply to the entire course or specific assignments, as indicated by the instructor:

- Permitted: You must personally author the entire initial draft without AI assistance. Then you may use GenAI to critique your logic, improve grammar, clarity, etc.
- Prohibited: The materials in this course may be subject to copyright protection. Do not input or allow AI to access external or instructor-created course materials (e.g., assigned readings, slides) without explicit instructor permission. When seeking feedback, students may not use AI to generate new content, rewrite whole sections, fill in missing analysis or evidence, or create thesis statements or conclusions.
- Requirement: The core ideas and original text/work must remain yours. You are responsible for the accuracy and appropriateness of any AI-suggested revisions and ensuring that AI does not obscure your individual learning or voice. You should document and critically evaluate AI suggestions before accepting them.

Use 4: Co-Creation and Drafting

GenAI can fabricate information (for example, creating citations to sources that do not exist) or omit key information. You are ultimately responsible for the accuracy and integrity of your submitted work. Unless explicitly permitted below, representing AI-generated content as your own work is a violation of the Code of Student Conduct. Please check with your instructor if you have questions.

These levels may apply to the entire course or specific assignments, as indicated by the instructor:

- Permitted: You may use GenAI to produce initial drafts, refine text, or co-create. You may use GenAI to translate materials.
- Prohibited: The materials in this course may be subject to copyright protection. Do not input or allow AI to access external or instructor-created course materials (e.g., assigned readings, slides) into AI systems without explicit instructor permission.
- Requirement: You must document and critically evaluate the accuracy of AI outputs. You are responsible for authoring the final text/work.

Use 5: Unrestricted Use Permitted

GenAI can fabricate information (for example, creating citations to sources that do not exist) or omit key information. You are ultimately responsible for the accuracy and integrity of your submitted work. Unless explicitly permitted below, representing AI-generated content as your own work is a violation of the Code of Student Conduct. Please check with your instructor if you have questions.

These levels may apply to the entire course or specific assignments, as indicated by the instructor:

- Permitted: You may use GenAI in all stages of the assignment, including the submission of AI-generated text or other content.
- Prohibited: The materials in this course may be subject to copyright protection. Do not input or allow AI to access external

or instructor-created course materials (e.g., assigned readings, slides) into AI systems without explicit instructor permission.

- Requirement: You must verify the accuracy of all claims and citations. Students must cite any GenAI use by attaching a process record to each assignment.

Syllabus - University Policies

Office of Undergraduate Education - Standard Syllabus Statements

- [Academic Misconduct](#)
- [Religious Accommodations](#)
- [Accommodations for Disability and Illness](#)
- [Intellectual Diversity](#)
- [Grievances and Solving Problems](#)
- [Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct](#)
- [Copyrights](#)
- [Content Warnings](#)
- [Mental Health Support](#)
- [Resources for Military-Connected Students](#)
- [Campus-wide Class Cancellations](#)