Master Course Syllabus

For additional course information, including prerequisites, corequisites, and course fees, please refer to the Catalog: https://catalog.uvu.edu/

Semester: Spring
Year: 2025
Course Prefix: STAT
Course and Section #: 4000 - 001
Course Title: Applied Regression and Time Series
Credits: 3

Course Description

Provides students in non-mathematical disciplines the ability to answer typical research questions for their senior projects or graduate-level research. Includes linear regression, transformations, variable selection techniques, logistic regression, indicator variables, multicollinearity, and ARIMA time series. Satisfies the VEE statistics requirement for the Society of Actuaries. Introduces standard software as a tool for statistical analysis

Course Attributes

This course has the following attributes:

☐ General Education Requirements
☐ Global/Intercultural Graduation Requirements
☒ Writing Enriched Graduation Requirements
☒ Discipline Core Requirements in Program
☐ Elective Core Requirements in Program
☐ Open Elective

Other: *Click here to enter text.*

Instructor Information

Instructor Name: Dr. Erik Heiny

Student Learning Outcomes

Upon successful completion of this course, students will be able to able to understand and answer qualitative and quantitative questions in the following topics:

1. Explain the basic theory, assumptions, and equations of multiple regression and time series.
2. Use statistical software to analyze data sets, including use of categorical variables for comparisons, and to perform time series analysis tests.
3. Calculate regression and correlation coefficients.
4. Use statistical software to decide which variables should be included in a regression equation.
5. Determine whether assumptions of regression models have been met including nonlinearity, multicollinearity, autocorrelation, and error variance.
6. Use logistic regression to analyze categorical data.
7. Use weighted least squares to adjust for heteroscedasticity.
8. Write effective mathematical content following the current best practices of the mathematical

community for proofs and articles.

Course Materials and Texts

- *Regression Analysis by Example (5th edition)* by Chatterjee and Hadi
- Laptop with R Studio
- Internet access

Course Requirements

Course Assignments, Assessments, and Grading Policy

- Weekly chapter homework assignments from the textbook (5%)
- Problem Sets requiring statistical analysis in R Studio with a written report (40%)
- Exams – 3 midterm exams in class (35%)
- Final Exam (20%)
    - In-class cumulative final exam (10%)
    - Final Project (10%)

Required or Recommended Reading Assignments

- *Regression Analysis by Example (5th edition)* by Chatterjee and Hadi – chapters 1 – 9, 11 12

General Description of the Subject Matter of Each Lecture or Discussion

- Chapter 1: Introduction
- Chapter 2: Simple Linear Regression
- Chapter 3: Multiple Linear Regression
- Exam 1: Chapters 1 – 3
- Chapter 4: Regression Diagnostics, Detection of Model Violations
- Chapter 5: Qualitative Variables as Predictors
- Chapter 6: Transformation of Variables
- Chapter 7: Weighted Least Squares
- Exam 2: Chapters 4 – 7
- Chapter 8: Autocorrelated Errors
- Chapter 9: Analysis of Collinear Data
- Chapter 11: Variable Selection Procedures
- Chapter 12: Logistic Regression
- Exam 3: Chapters 8, 9, 11, 12
- Final Exam: Chapters 1 – 9, 11, 12

The Final grade percentage is rounded to the nearest percent and assigned the corresponding letter grade:

A	93-100%
A-	90-92%
B+	87-89%
B	83-86%
B-	80-82%

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C+	77-79%
C	73-76%
C-	70-72%
D+	67-69%
D	63-66%
D-	60-62%
F	below 60%

Required Course Syllabus Statements

Generative AI
You may use AI as a supplemental resource for R coding, not as a crutch. If you use it, you must cite it at the top of your R code. You are responsible for making sure that any code or content does what it is supposed to do. Don't accept anything it generates at face value without checking it critically. These days potential employers may expect you to know how to use AI tools to generate code, so it could prove to be a useful skill for you. I would encourage you to try and develop your own R coding from examples and programs used in class, and any AI tools are used as a supplemental resource only.

STAT 4000 is also a writing enriched course, and you will have several assignments that include a write-up for the course. **AI TOOLS ARE NOT PERMITTED FOR WRITTEN REPORTS AND ARE CONSIDERED CHEATING!** You need to learn how to summarize your statistical analysis in your own words and communicate the results effectively to a non-statistical audience. You are not permitted to let a machine do this for you!

In summary, **AI is permitted as a supplemental resource for R coding only** and must be cited if it is used. AI will not be permitted for any other parts of assignments or exams in this class.

Using Remote Testing Software
☒ This course does not use remote testing software.

☐ This course uses remote testing software. Remote test-takers may choose their remote testing locations. Please note, however, that the testing software used for this may conduct a brief scan of remote test-takers' immediate surroundings, may require use of a webcam while taking an exam, may require the microphone be on while taking an exam, or may require other practices to confirm academic honesty. Test-takers therefore shall have no expectation of privacy in their test-taking location during, or immediately preceding, remote testing. If a student strongly objects to using test-taking software, the student should contact the instructor at the beginning of the semester to determine whether alternative testing arrangements are feasible. Alternatives are not guaranteed.

Required University Syllabus Statements

Accommodations/Students with Disabilities
Students needing accommodations due to a permanent or temporary disability, pregnancy or pregnancy-related conditions may contact UVU Accessibility Services at accessibilityservices@uvu.edu or 801-863-8747.

Accessibility Services is located on the Orem Campus in BA 110.

Deaf/Hard of Hearing students requesting ASL interpreters or transcribers can contact Accessibility Services to set up accommodations. Deaf/Hard of Hearing services can be contacted at DHHservices@uvu.edu

DHH is located on the Orem Campus in BA 112.

Academic Integrity

At Utah Valley University, faculty and students operate in an atmosphere of mutual trust. Maintaining an atmosphere of academic integrity allows for free exchange of ideas and enables all members of the community to achieve their highest potential. Our goal is to foster an intellectual atmosphere that produces scholars of integrity and imaginative thought. In all academic work, the ideas and contributions of others must be appropriately acknowledged and UVU students are expected to produce their own original academic work.

Faculty and students share the responsibility of ensuring the honesty and fairness of the intellectual environment at UVU. Students have a responsibility to promote academic integrity at the university by not participating in or facilitating others' participation in any act of academic dishonesty. As members of the academic community, students must become familiar with their rights and responsibilities. In each course, they are responsible for knowing the requirements and restrictions regarding research and writing, assessments, collaborative work, the use of study aids, the appropriateness of assistance, and other issues. Likewise, instructors are responsible to clearly state expectations and model best practices.

Further information on what constitutes academic dishonesty is detailed in UVU Policy 541: *Student Code of Conduct*.

Equity and Title IX

Utah Valley University does not discriminate on the basis of race, color, religion, national origin, sex, sexual orientation, gender identity, gender expression, age (40 and over), disability, veteran status, pregnancy, childbirth, or pregnancy-related conditions, citizenship, genetic information, or other basis protected by applicable law, including Title IX and 34 C.F.R. Part 106, in employment, treatment, admission, access to educational programs and activities, or other University benefits or services. Inquiries about nondiscrimination at UVU may be directed to the U.S. Department of Education's Office for Civil Rights or UVU's Title IX Coordinator at 801-863-7999 – TitleIX@uvu.edu – 800 W University Pkwy, Orem, 84058, Suite BA 203.

Religious Accommodation

UVU values and acknowledges the array of worldviews, faiths, and religions represented in our student body, and as such provides supportive accommodations for students. Religious belief or conscience broadly includes religious, non-religious, theistic, or non-theistic moral or ethical beliefs as well as participation in religious holidays, observances, or activities. Accommodations may include scheduling or due-date modifications or make-up assignments for missed class work.

To seek a religious accommodation, a student must provide written notice to the instructor and the Director of Accessibility Services at accessibilityservices@uvu.edu. If the accommodation relates to a scheduling conflict, the notice should include the date, time, and brief description of the difficulty posed by the conflict. Such requests should be made as soon as the student is aware of the prospective scheduling conflict.

While religious expression is welcome throughout campus, UVU also has a specially dedicated space for meditation, prayer, reflection, or other forms of religious expression.