

MATH 5358: Regression analysis

Spring 2018

Course Information

- Instructor: Jonghyun Yun
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- Email Address: "j" dot "yun" at-sign "uta" dot "edu"
- Course Webpage: <https://jyun.rbind.io/courses/math5358-sp19/math5358-sp19.html>
- Office Hours: PKH 446, Mo/We 4:30-5:30 pm or by appointment
- Section Information: MATH 5358: Regression analysis
- Time and Place of Class Meetings: Mo/We 5:30-6:50 pm, Room 107
- Prerequisite: MATH 5312/STATS 5312 or MATH 5305/STATS 5305 with a B or better or permission of the instructor. Basic programming skills are preferred, but not required.
- Required Textbooks
 - Sheather, S. (2009). *A Modern Approach to Regression with R*. Springer.
 - Other Recommended Textbooks and Resources
 - * Chatterjee, S. and Hadi, A. S. (2012). *Regression Analysis by Example*. John Wiley & Sons.
 - * Weisberg, S. (2013). *Applied Linear Regression*. Wiley.
 - * James, G., Witten, D., Hastie, T., and Tibshirani, R. (2013). *An Introduction to Statistical Learning with Applications in R*. Springer.
 - * Gelman, A. and Hill, J. (2007). *Data Analysis Using Regression and Multilevel/Hierarchical Models*. Cambridge University Press.

Course Content

A comprehensive course including multiple linear regression, non-linear regression and logistic regression. Emphasis is on modeling, inference, diagnostics and application to real data sets. The course begins by developing a toolbox of methods via a sequence of guided homework assignments. It culminates with projects based on consulting-level data analysis problems involving stratification, covariate adjustment and messy data sets.

The course will use R in order to demonstrate the implementation of statistical methods. In the first week, we will have a refresher on the commands in R which you will need to use in the following weeks, but this is not a comprehensive R course, and we will not go in depth on R syntax. Please see online R resources listed in the course website.

Student Learning Outcomes

Upon successful completion of the requirements for this course, students should have the knowledge and skills to:

1. Calculate/interpret summary and inferential statistics
2. Infer appropriate conclusions about populations based on data
3. Combine concepts in new ways to solve a practical problem
4. Compare and contrast various models
5. Be proficient with statistical software such as the R language.
6. Understand how to create reproducible research documents using the R Markdown syntax.

Important dates

- 1/31: Census date
- 2/28: Midterm 1
- 3/30: Last day to drop classes; submit requests to advisor prior to 4:00 pm
- 4/4: Midterm 2
- TBD: Final project submission deadline

Grading

The final grade is based on a scale no stricter than the following:

A	B	C	D	F
100-90	89-80	79-70	69-60	below 60

Grade Distribution

- 35% Homework assignments
- 40% Midterm exams (20% each - 2 exams)
- 25% Final project

Homework

The homework problems will be assigned weekly on the course webpage. A single homework assignment may be mixed with two types of assignments: 1) Theoretical assignments will be tagged with (*Written*), and 2) R assignments will require the use of statistical software (R). Statistical software instructions will be provided as needed. Late coursework will not be accepted without a university approved excuse. It is imperative that you show all your work; simply stating an answer will result in no credit for the problem. You are encouraged to work with each other on the homework problems, but you must turn in your own work. There will be 9 homework assignments (30 points each) and a final homework assignment (50 points). Students shall get 100% for homework if they earn no less than 90% of homework. Suppose your total is x points, then your final score for homework will be calculated as

$$100 \times \min\left(\frac{x}{0.9 \times 320}, 1\right)$$

Document Formatting

The R assignments must be turned in electronically, through Blackboard. These assignment will involve writing a combination of code and actual prose. You must submit your assignment in a format which allows for the combination of the two, and the automatic execution of all your code. The easiest way to do this is to use R Markdown. Exceptions may be made, with prior permission, for those who want to use other reproducible dynamic documents. Work should be submitted as R markdown **and** rendered PDF documents. Every files you submit should have a file name in the following format: `WorkType#.FirstName.LastName`.

For the theoretical assignments, you have two options: 1) Submitting the assignments to the instructor in class, and 2) Scan them and turn in electronically, through Blackboard. However, it is highly recommended to provide your answers in R markdown format along with the R assignments.

Exam

The 1st midterm exam is a in-class exam. A single page (on US letter size paper), **hand-written** cheat-sheet is permitted. The 2nd midterm is a take-home exam. Students will have 48 hours to finish. You **cannot** discuss the take-home exam with anyone except the instructor. Unacknowledged copying or unauthorized collaboration will be considered as cheating, and will lead to severe disciplinary action. Make-up exams will only be given in rare cases.

Final project

The instructions for the final project will be announced in class.

Lecture Attendance

At the University of Texas at Arlington, taking attendance is not required. Rather, each faculty member is free to develop his or her own methods of evaluating students' academic performance, which includes establishing course-specific policies on attendance. As the instructor of this section, I strongly encourage you to attend all lectures. You are responsible for any and all announcements made in class. You are also responsible for any material missed during class.

Drop Policy

Students may drop or swap (adding and dropping a class concurrently) classes through self-service in MyMav from the beginning of the registration period through the late registration period. After the late registration period, students must see their academic advisor to drop a class or withdraw. Undeclared students must see an advisor in the University Advising Center. Drops can continue through a point two-thirds of the way through the term or session. It is the student's responsibility to officially withdraw if they do not plan to attend after registering. Students will not be automatically dropped for non-attendance. Repayment of certain types of financial aid administered through the University may be required as the result of dropping classes or withdrawing. For more information, contact the Office of Financial Aid and Scholarships (<http://wweb.uta.edu/aao/fao/>).

Disability Accommodations

UT Arlington is on record as being committed to both the spirit and letter of all federal equal opportunity legislation, including The Americans with Disabilities Act (ADA), The Americans with Disabilities Amendments Act (ADAAA), and Section 504 of the Rehabilitation Act. All instructors at UT Arlington are required by law to provide "reasonable accommodations" to students with disabilities, so as not to discriminate on the basis of disability. Students are responsible for providing the instructor with official notification in the form of a letter certified by the Office for Students with Disabilities (OSD). Only those students who have officially documented a need for an accommodation will have their request honored. Students experiencing a range of conditions (Physical, Learning, Chronic Health,

Mental Health, and Sensory) that may cause diminished academic performance or other barriers to learning may seek services and/or accommodations by contacting: The Office for Students with Disabilities, (OSD) <http://www.uta.edu/disability> or calling 817-272-3364. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at <http://www.uta.edu/disability>.

Counseling and Psychological Services (CAPS) <http://www.uta.edu/caps/> or calling 817-272-3671 is also available to all students to help increase their understanding of personal issues, address mental and behavioral health problems and make positive changes in their lives.

Non-Discrimination Policy

The University of Texas at Arlington does not discriminate on the basis of race, color, national origin, religion, age, gender, sexual orientation, disabilities, genetic information, and/or veteran status in its educational programs or activities it operates. For more information, visit <http://uta.edu/eos>.

Title IX Policy

The University of Texas at Arlington ("University") is committed to maintaining a learning and working environment that is free from discrimination based on sex in accordance with Title IX of the Higher Education Amendments of 1972 (Title IX), which prohibits discrimination on the basis of sex in educational programs or activities; Title VII of the Civil Rights Act of 1964 (Title VII), which prohibits sex discrimination in employment; and the Campus Sexual Violence Elimination Act (SaVE Act). Sexual misconduct is a form of sex discrimination and will not be tolerated. For information regarding Title IX, visit <http://www.uta.edu/titleIX> or contact Ms. Jean Hood, Vice President and Title IX Coordinator at (817) 272-7091 or jmhood@uta.edu.

Academic Integrity

Students enrolled in this course are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlington's tradition of academic integrity, a tradition that values hard work and honest effort in the pursuit of academic excellence.

I promise that I will submit only work that I personally create or contribute to group collaborations, and I will appropriately reference any work from other sources. I will follow the highest standards of integrity and uphold the spirit of the Honor Code.

UT Arlington faculty members may employ the Honor Code as they see fit in their courses, including (but not limited to) having students acknowledge the honor code as part of an examination or requiring students to incorporate the honor code into any work submitted. Per UT System Regents' Rule 50101, §2.2, suspected violations of university's standards for academic integrity (including the Honor Code) will be referred to the Office of Student Conduct. Violators will be disciplined in accordance with University policy, which may result in the student's suspension or expulsion from the University.

Electronic Communication

UT Arlington has adopted MavMail as its official means to communicate with students about important deadlines and events, as well as to transact university-related business regarding financial aid, tuition, grades, graduation, etc. All students are assigned a MavMail account and are responsible for checking the inbox regularly. There is no additional charge to students for using this account, which remains active even after graduation. Information about activating and using MavMail is available at <http://www.uta.edu/oit/cs/email/mavmail.php>.

Campus Carry

Effective August 1, 2016, the Campus Carry law (Senate Bill 11) allows those licensed individuals to carry a concealed handgun in buildings on public university campuses, except in locations the University establishes as prohibited. Under the new law, openly carrying handguns is not allowed on college campuses. For more information, visit <http://www.uta.edu/news/info/campus-carry/>

Student Feedback Survey

At the end of each term, students enrolled in classes categorized as “lecture,” “seminar,” or “laboratory” shall be directed to complete an online Student Feedback Survey (SFS). Instructions on how to access the SFS for this course will be sent directly to each student through MavMail approximately 10 days before the end of the term. Each student’s feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlington’s effort to solicit, gather, tabulate, and publish student feedback is required by state law; students are strongly urged to participate. For more information, visit <http://www.uta.edu/sfs>.

Final Review Week

A period of five class days prior to the first day of final examinations in the long sessions shall be designated as Final Review Week. The purpose of this week is to allow students sufficient time to prepare for final examinations. During this week, there shall be no scheduled activities such as required field trips or performances; and no instructor shall assign any themes, research problems or exercises of similar scope that have a completion date during or following this week unless specified in the class syllabus. During Final Review Week, an instructor shall not give any examinations constituting 10% or more of the final grade, except makeup tests and laboratory examinations. In addition, no instructor shall give any portion of the final examination during Final Review Week. During this week, classes are held as scheduled. In addition, instructors are not required to limit content to topics that have been previously covered; they may introduce new concepts as appropriate.

Emergency Exit Procedures

Should we experience an emergency event that requires us to vacate the building, students should exit the room and take an immediate right or left, and walk toward the corner of the building. When exiting the building during an emergency, one should never take an elevator but should use the stairwells. Faculty members and instructional staff will assist students in selecting the safest route for evacuation and will make arrangements to assist individuals with disabilities. (<https://www.uta.edu/policy/procedure/7-6>).

Students are encouraged to subscribe to the MavAlert system that will send information in case of an emergency to their cell phones or email accounts. Anyone can subscribe at <https://mavalert.uta.edu/> or <https://mavalert.uta.edu/register.php>

Student Support Services

UT Arlington provides a variety of resources and programs designed to help students develop academic skills, deal with personal situations, and better understand concepts and information related to their courses. Resources include tutoring, major-based learning centers, developmental education, advising and mentoring, personal counseling, and federally funded programs. For individualized referrals, students may visit the reception desk at University College (Ransom Hall), call the Maverick Resource Hotline at (817) 272-6107, send a message to resources@uta.edu, or view the information at <http://www.uta.edu/resources>.

Emergency Phone Numbers

In case of an on-campus emergency, call the UT Arlington Police Department at 817-272-3003 (non-campus phone), 2-3003 (campus phone). You may also dial 911. Non-emergency number 817-272-3381