MATH 3302: Multivariate Statistical Methods

Spring 2018

Instructor: Dr. Suvra Pal

Office: PKH 442

Telephone: 817-272-3597

Email: suvra.pal@uta.edu

Office Hours: Monday and Wednesday from 4:15 pm - 5:15 pm or by appointment

Section Information: MATH 3302, 001

Time and Place of Class Meetings: The lectures are on Mondays and Wednesdays from 5:30 pm to 6:50 pm in PKH (Pickard Hall) 302

Prerequisites

MATH 3313 or MATH 3316 or consent of the instructor

Description of Course Content

Organization of multivariate data and some basic descriptive statistics; Elements of matrix theory; Random vectors and matrices; Multivariate normal distribution; Inferences about a mean vector; Comparisons of several multivariate means; Multiple regression; Non-linear regression; Applications of multivariate data analysis in other areas of interest; Use of R statistical software

Student Learning Outcomes

This course provides a coherent introduction to applied multivariate analysis with applications in various areas of interest, including multiple regression and non-linear regression. The students should be able to apply the concepts to solve real life problems using a statistical software, for instance, R

Required Text book and Software

- The textbooks we are going to refer are

  1. Applied Multivariate Statistical Analysis (Sixth Edition) by R. A. Johnson and D. W. Wichern

  2. An Introduction to Applied Multivariate Analysis with R by Brian Everitt and Torsten Hothorn

  3. An Introduction to Applied Multivariate Analysis by Tenko Raykov and George Marcoulides (optional)

- Apart from the theoretical concepts taught in class, a lot of emphasis will be given on the use of R statistical software to solve problems of our interest. R is an open source statistical programing language which can be downloaded free from

  `http://www.r-project.org`

  Another powerful user interface for R is RStudio, which can be downloaded from

  `http://www.rstudio.com`

  Note that you must have both R and RStudio downloaded to use RStudio.

Some Useful Links for R materials

- The R manual can be downloaded from `https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf`
- An introduction to R for beginners can be downloaded from `https://cran.r-project.org/doc/contrib/Paradis-rdebuts_en.pdf`

Descriptions of Major Assignments and Examinations

The different components of the course are 5-8 assignments, one mid-term take home exam (March 05), and one final exam (May 07). The number of assignments will depend on the pace of lectures. Every assignment will have its own due date and no late assignments will be graded. When solving assignments, students are allowed to discuss with each other, however, the solution should be ones own. No forms of cheating or copying will be accepted (see the section on Academic Integrity). The final exam can be either a take home project or an in class presentation. Details will be announced well in advance.

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 have decided that attendance at class meetings is **not** required but STRONGLY ENCOURAGED for better understanding of the subject area. I will be using both the white board and handouts/lecture slides. Only the handouts/lecture slides will be posted online and students are expected to take down notes in class.

Grading

The final mark for this course will be calculated as follows:

Component	Weight
Assignments	50%
Mid-term (March 05)	25%
Final Exam (May 07)	25%

Grading Scale

Score	Grade
90%+	A
80% - 89%	B
70% - 79%	C
60% - 69%	D
59% and below	F

Note that the above cutoffs are strict

Expectations for Out-of-Class Study

Beyond the time required to attend each class meeting, students enrolled in this course should expect to spend at least an additional nine hours per week of their own time in course-related activities, including reading required materials, solving problems, completing assignments, etc

Grade Grievances

Any appeal of a grade in this course must follow the procedures and deadlines for grade-related grievances as published in the current University Catalog. See `http://catalog.uta.edu/academicregulations/grades/#graduatetext`

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). 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) `www.uta.edu/disability` or calling 817-272-3364 Counseling and Psychological Services, (CAPS) `www.uta.edu/caps/` or calling 817-272-3671

Only those students who have officially documented a need for an accommodation will have their request honored. Information regarding diagnostic criteria and policies for obtaining disability-based academic accommodations can be found at `www.uta.edu/disability` or by calling the Office for Students with Disabilities at (817) 272-3364

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 `uta.edu/eos`

Title IX

The University of Texas at Arlington 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 `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 at UT Arlington courses are expected to adhere to the UT Arlington Honor Code:

I pledge, on my honor, to uphold UT Arlingtons 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, Section 2.2, suspected violations of universitys 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 students suspension or expulsion from the University. This course includes a zero tolerance policy for academic dishonesty. Students found guilty of cheating will receive a grade of F for the course. "Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts" (Regents Rules and Regulations, Series 50101, Section 2.2)

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 students feedback enters the SFS database anonymously and is aggregated with that of other students enrolled in the course. UT Arlingtons 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 move toward the nearest exit. 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 handicapped individuals

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/universitycollege/resources/index.php`

Course Schedule

Week	Topics Covered
1	Organization of data
2, 3	Descriptive statistics, Elements of Matrix theory, Random vectors and matrices
4	Multivariate normal distribution, Testing for a mean vector
5	Simultaneous confidence statements
6, 7	Testing for multivariate means of two groups
8	**Mid-term exam**, MANOVA
9	Spring vacation (no lectures)
10, 11	Principal component analysis
12, 13	Classification problem
14, 15	Multiple regression
16	Non-linear regression

Note: As the instructor for this course, I reserve the right to adjust this schedule in any way that serves the educational needs of the students enrolled in this course - *Suvra Pal*

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