Instructor Contact

Name: Yixun Xing, PhD
Office Location: GAB 110D
Office Hours: Tu 5-5:50pm (FRLD 238);
              Th 5-5:50pm (GAB 110D);
              Fri 2-4pm (GAB 110D);
              you may reserve a time slot to meet with me online on https://calendly.com/yxing/office-hour ;
              other time by appointment via email (also available on most weekends).
Email: yixun.xing@unt.edu
Communication Expectations: The best way to contact me is via UNT email (not the Canvas email tool). Emails will be answered in timely manner, usually within 24 hours. Many part-time students work on assignments during weekends, so I also answer emails on weekends. Please include your course and section number in the email as I teach several courses/sections. Please send emails via your UNT account because external emails may be routed to the junk folder and emails are expected to follow professional etiquette standards as these are formal communications.
About the Professor: Dr. Xing earned a Ph.D. degree in Statistical Science from SMU and had been a post-doctoral researcher at UTSW. She also had been adjunct faculty and a full-time assistant professor teaching data science and statistics for years. Besides academia, she has variety of working experience in pharmaceutical, financial services, and asset management companies.

Course Description

This course extends the concepts developed in Data Analytics I to multivariate and unstructured data analysis. Modern techniques of multivariate analysis, including association rules, classification methods, time series and text analysis are explored and implemented with real-world business and industry data. Provides a hands-on introduction to state-of-practice technology and tools. Focus is on the application and interpretation of the methods discussed.

Course Structure

This is an 16-week course. We will meet on Denton campus every Thursday 6-7:50pm CT. Besides attending the class meetings, students are also expected to participate in various online activities such as reading papers, watching videos, and asynchronous discussions. Also, if there is any additional online meeting, the participation is optional, but you are required to watch the recordings if you couldn't attend.

Course Prerequisites or Other Restrictions

This course requires that the student has successfully completed ADTA 5130, DSCI 3710, or equivalent college statistics course prior to enrollment.

Course Objectives

By the end of the course, students will be able to:
1. Apply, assess, and interpret a variety of multivariate data analysis techniques
2. Predict or classify the data as appropriate and explain results
3. Select the appropriate model in a real-world setting
4. Explain model overfitting and underfitting
5. Perform data reduction and segmentation

Course topics include:

1. Multivariate linear regression
2. Classification and prediction
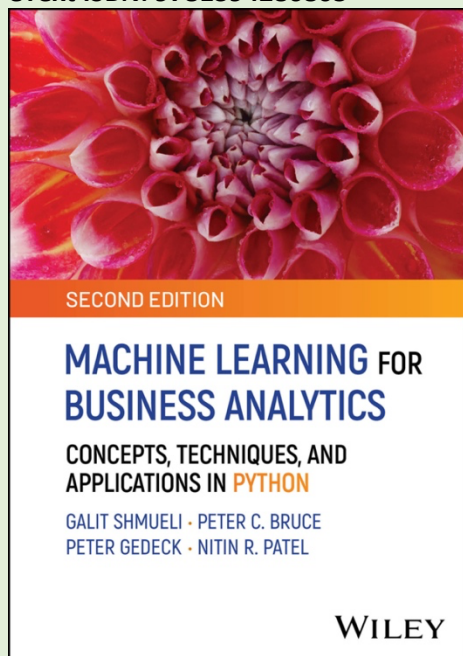3. Cluster analysis and dimension reduction

Materials

Required: **Machine learning for business analytics: concepts, techniques, and applications in Python 2nd Edition by Shmueli, G., Bruce, P., Gedeck, P., and Patel, N.** **Published by Wiley-Blackwell 2025** **Print ISBN: 9781394286799** **eText ISBN: 9781394286805** 	**Other supplemental materials:** **UNT Canvas** **UNT Willis Library**

Technical Assistance

Part of working in the online environment involves dealing with the inconveniences and frustration that can arise when technology breaks down or does not perform as expected. Here at UNT we have a Student Help Desk that you can contact for help with Canvas or other technology issues.

UIT Help Desk:
Website: https://aits.unt.edu/support/
Below hours are subject to the Current Hours on their website.
Walk-In (Sage Hall 330): 8am-5pm
Call/Chat/Email: • Monday-Thursday: 8am-9pm • Friday: 8am-5pm • Saturday-Sunday: 11am-3pm
Laptop Checkout: 8am-7pm

Course Requirements and Grading

Your final grade will be determined based on the assignments noted in the table below. The total number of points received will be divided by the total possible number of points.

Assignments	Points	Percentage of Final Grade

Quizzes Random in-class quizzes @ 42 points total; 12 quizzes @ 18 points each (lowest one dropped)	240 points	24%
Homework 6 homework assignments @ 60 points each (lowest one dropped)	300 points	30%
Software Setup	20 points	2%
Discussion Introduce yourself discussion	20 points	2%
Group Project Reports @ 270 points Peer Review @ 0 point	270 points	27%
Final Exam	150 points	15%
Total Points Possible	1000 points	100%

Final Grade	A	B	C	D	F
Final Percentage	89.5-100%	79.5-89.4%	69.5-79.4%	59.5-69.4%	Below 59.5%

Quizzes
Quizzes will not be timed, and you can save answers and revisit any time until the due date. Quiz may be taken twice (unlimited attempts for the syllabus quiz) with the highest score counted toward the grade. The lowest will be dropped.

There will also be random in-class quizzes. They will not be announced in advance but provided based on the day's lecture progress. These quizzes are designed to reinforce the materials covered and ensure the students are following along actively.

Homework
The homework (HW) may include conceptual questions, analysis using provided datasets, interpretation of the analysis results, or questions related to the course material and how it was used or misused in a recent news story.

Software Setup
The students must set up the required software. A screenshot of the installed local software or the account setup on the server must be submitted in Canvas.

Final Exam
There will be one comprehensive, closed-book final exam covering all topics discussed throughout the semester. The exam is designed to assess students' understanding and application of key concepts, methods, and analytical techniques introduced in the course.

Discussion
There is one introduce yourself discussion where you can share information about yourself with the class.

Group Project
In real life, it is essential to collaborate with various colleagues, arrange meetings to plan the execution of the project, collect and analyze the data, and present your findings to different levels of the organization. Groups of students will be formed on Canvas to complete a project of applying data analysis methods to a real data provided by the instructor. Please start communicating with your team members ASAP. More details including a rubric will be posted in Module: Final Project on Canvas.

- **Midterm report** Midway through the semester, each group will submit a one-page midterm report on their project's progress. The report should briefly summarize the current stage, outline completed and pending tasks, and identify anticipated challenges with proposed strategies to address them.
- **Final report** At the end of the course, each group will submit one project report (.doc or .docx). No abstract section is needed but it should include a separate cover page that includes the title and every team member's full name. The paper should be 12-16 pages (excluding the cover page), double-spaced, 1-inch margins, free from grammatical errors, in Times Roman 12-point font, and appropriately using APA style for citations and reference list, if any. The paper will be submitted for grading via software that checks for plagiarism so do **not** submit your files as a compressed file. Plagiarism is a violation of the Student Code of Conduct and will be handled per university policy. One student from the group will submit the project delivery and all group members must verify the submitted work by the due dates noted in the Syllabus. Team members are jointly responsible for the team's work, including academic integrity violations. Late papers will not be accepted.
- **Peer review** Each student will provide a peer review on team members' contribution to the final product, and your group project grade will be determined by the quality of the product and your contribution. If everyone contributes equally, all members will receive the same credit. Team members who contribute insufficiently will be deducted points. The professor reserves the right to adjust the team's recommended contribution.

Module	LECT Date	Topic / Learning activities	Assignments (Due date)	Text Chapter
		Schedule: All due time is 11:59pm CT of the designated date unless otherwise noted (It is your responsibility to check for changes in the schedule and/or important information in the posted Announcement in Canvas.**)**		
1	01/15	Introduction, data visualization, and model performance evaluation	• Discussion: Introduce yourself (01/21) • Software setup (01/21) • Syllabus quiz (01/21) • Quiz EDA (02/04) • Quiz Model Assessment (02/04) • HW 1 (02/04)	MLBA 1,2,3,5
	01/22			
	01/29			
2	02/05	Linear and logistic regression	• Quiz MLR (02/18) • HW 2 (02/18) • Quiz Logistic Regression (02/25) • HW 3 (02/25)	MLBA 6,10
	02/12			
	02/19			
3	02/26	KNN and Naïve Bayes classifier	• Quiz KNN (03/11) • Quiz Naïve Bayes (03/11) • HW 4 (03/11) • Midterm project report (03/11)	MLBA 7,8
	03/05			
	03/12 (Spring Break)	No class		
4	03/19	Decision Trees	• Quiz Decision Tree (04/01) • Quiz Decision Tree Ensembles (04/01) • HW 5 (04/01)	MLBA 9
	03/26			
5	04/02	Neural nets	• Quiz ANN (04/08)	MLBA 11
6	04/09	Cluster analysis and dimension reduction	• Quiz Clustering (04/22) • Quiz Dimension Reduction (04/22) • HW 6 (04/22)	MLBA 4, 16
	04/16			
7	04/23	Association Rule		MLBA 15
8	04/30	Final Project	• Group project report (05/05) • Group project peer review (05/05)	
	May 2, 8-10pm (subject to registrar)	**Final Exam**		

Course Policies

Late Work
The students are expected try best to submit assignments on time and will be responsible for the consequence if they start the assignments late at a time approaching the deadline. Unless pre-approved by the instructor, any assignment submitted after that time will receive a highest possible score of 80% through one (1) day past the deadline and no points will be awarded after that. Additional points may be deducted based on the quality of the submission. However, no late submission of the final project will be accepted, and the final exam cannot be rescheduled or made up, except in cases of a university-excused absence as defined in UNT Policy 06.039.

AI Tools Policy

Students may use AI tools such as ChatGPT to support the final project and designated portions of homework assignments, specifically for coding, code annotation, and summarization. Students must take responsibility for reviewing and editing all AI-generated content to ensure accuracy and quality of the final product. Limited use of unedited AI-generated statements is permitted, but such statements must be clearly identified using quotation marks and attributed to the source (e.g., ChatGPT). Excessive dependence on AI tools is not permitted. Use of AI tools for quizzes or discussion assignments is prohibited unless explicitly allowed. Misuse of AI tools will be considered a violation of academic integrity policy.

Attendance Policy

The student is responsible for regular and punctual attendance and is expected to participate in all courses in which the student is enrolled. It is important that you communicate with the professor and the instructional team prior to being absent, so you, the professor, and the instructional team can discuss and mitigate the impact of the absence on your attainment of course learning goals. Please inform the professor and instructional team if you are unable to attend class meetings because you are ill, in mindfulness of the health and safety of everyone in our community. You are responsible for reading course announcements and keeping up with assignments as posted in the course syllabus.

Class Participation
Students should login regularly to the online class site. The instructor can use the tracking feature in Canvas to monitor student activity. Students are also expected to participate in all learning activities such as discussion board and projects.

Group Project Policy
Group projects are an essential part of this course. These projects help you develop collaboration skills that are essential in the workplace. Group projects also contribute to learning and retention of class content. Other benefits include practice with time management and communication skills, giving and receiving constructive feedback, sharing perspectives in a respectful manner, and developing conflict management skills.

Ground rules: • Start the project early. Begin by discussing and defining project goals, group leadership, time schedule, and preferred means of communication • Respect each group member, attend group meetings prepared and on time • Each group member should complete a fair share of the work • Contact your instructor (sooner rather than later) If there is an issue or group dynamic that cannot be resolved in a timely manner.

You are expected to follow UNT's Code of Student Conduct which is intended to "foster a safe environment conducive to learning and development. Students and student groups are expected to conduct themselves in a manner that demonstrates respect for the rights and property of others and upholds the integrity and values of the University community." The Code of Student Conduct can be found at https://policy.unt.edu/policy/07-012 . You are also expected to follow UNT's Student Academic Integrity Policy.

Examination Policy

Exams must be completed independently. Students that engage in academic dishonesty will suffer the consequences per department guidelines. If you lose your internet connection during an exam, contact the help desk immediately and notify me as well. If necessary, I can reset your exam.

Assignment Policy

Assignment due time (all in Central Time) and dates are in the syllabus and on Canvas. Any changes to due dates will be updated on Canvas and communicated in an announcement. TurnitIn will be utilized to address plagiarism issues in all formal scholarly writing. All works submitted for credit must be original works created by the scholar uniquely for the class. It is considered inappropriate and unethical, particularly at an advanced undergraduate/graduate level, to make duplicate submissions of a single work for credit in multiple classes, unless specifically requested by the instructor. It is also considered inappropriate and unethical to work together on individual assignments or share work that is to be created on an individual level. Work submitted at the senior/graduate level is expected to demonstrate higher-order thinking skills and be of significantly higher quality than work produced at the lower undergraduate levels.

The University is committed to providing a reliable online course system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will extend the time windows and provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and contact the UNT Student Help Desk: helpdesk@unt.edu or 940.565.2324 and obtain a ticket number. The instructor and the UNT Student Help Desk will work with the student to resolve any issues at the earliest possible time.

Turnitin Notice

Turnitin is used as a tool to assist students in their scholarly writing to address plagiarism issues. It is recommended that students use TurnitIn to ensure their work is free of copyright issues prior to final submission of their projects.

Syllabus Change Policy

While the plan is to follow this syllabus as written, adjustments may be made when necessary or due to events outside of control. Any change will be announced in advance.

UNT Policies

Academic Integrity Policy

The University of North Texas promotes the integrity of learning and embraces the core values of trust and honesty. Academic integrity is based on educational principles and procedures that protect the rights of all participants in the educational process and validate the legitimacy of degrees awarded by the University. In the investigation and resolution of allegations of student academic dishonesty, the University's actions are intended to be corrective, educationally sound, fundamentally fair, and based on reliable evidence. According to UNT Policy 06.003, Student Academic Integrity, academic dishonesty occurs when students engage in behaviors including, but not limited to cheating, fabrication, facilitating academic dishonesty, forgery, plagiarism (including violating course policies on AI usage), and sabotage. A finding of academic dishonesty will result in a range of academic penalties or sanctions ranging from admonition to expulsion from the University. ADTA students must read and adhere to the university, department, and course Academic Integrity expectations. The consequences of any academic misconduct, including the first-time violation, are outlined below.

	Penalty	Other

1st Academic Integrity Offense	The minimum penalty is a 0 for the assignment AND a deduction of one letter grade from the final grade for the course. Other penalties may be assessed by the course instructor up to course failure, depending on the severity of the offense.	All Academic Integrity offenses will be reported to the UNT Academic Integrity Office following the UNT policy process.
2nd Academic Integrity Offense	Suspension from the ADTA program.	A second offense is defined as a separately reported offense either in the same class as the 1st offense or in a different course. Students suspended for a second Academic Integrity violation will not be allowed to enroll in ADTA courses for 1 calendar year. For students who had a single Academic Integrity violation prior to this current semester, a second violation will result in suspension from the ADTA program.
3rd Academic Integrity Offense	Dismissal from the ADTA program.	Students committing a 3rd Academic Integrity offense will be dismissed from the program. For students who had multiple Academic Integrity violations prior to this current semester, any additional violation will result in dismissal from the ADTA program.

ADA Policy

UNT makes reasonable academic accommodation for students with disabilities. Students seeking accommodation must first register with the Office of Disability Accommodation (ODA) to verify their eligibility. If a disability is verified, the ODA will provide a student with an accommodation letter to be delivered to faculty to begin a private discussion regarding one's specific course needs. Students may request accommodations at any time, however, ODA notices of accommodation should be provided as early as possible in the semester to avoid any delay in implementation. Note that students must obtain a new letter of reasonable accommodation for every semester and must meet with each faculty member prior to implementation in each class. Students are strongly encouraged to deliver letters of reasonable accommodation during faculty office hours or by appointment. Faculty members have the authority to ask students to discuss such letters during their designated office hours to protect the privacy of the student. For additional information see the ODA website (https://disability.unt.edu/).

Prohibition of Discrimination, Harassment, and Retaliation (Policy 16.004)

The University of North Texas (UNT) prohibits discrimination and harassment because of race, color, national origin, religion, sex, sexual orientation, gender identity, gender expression, age, disability, genetic information, veteran status, or any other characteristic protected under applicable federal or state law in its application and admission processes; educational programs and activities; employment policies, procedures, and processes; and university facilities. The University takes active measures to prevent such conduct and investigates and takes remedial action when appropriate.

Emergency Notification & Procedures

UNT uses a system called Eagle Alert to quickly notify students with critical information in the event of an emergency (i.e., severe weather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Canvas for contingency plans for covering course materials.