DTSC4050.501 Spring 2026

Course Information

In this course, we will explore the role of statistics in data science. We will not only introduce a broad range of statistical terms but also apply them to typical data science projects. Statistics involves the collection, organization, analysis, interpretation, and presentation of data. Through hands-on tools, we will practice these skills and expand our data science toolkit.

Instructor
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Course Description
This course introduces students to both theories and applications of statistical methods. Students will learn the core conceptsof statistical learning for data analysis while working hands-on with real data using Python and interactive notebooks. The topics taken from a data science lifecycle include data ingestion and manipulation, basic descriptive statistics, standard parametric statistical models, linear regression, classification, and tree-based models.

Course Objectives
Upon completion of this course, students should be able to:
- Talk comfortably about data science and model-building
- Understand the core concepts of statistical learning related to regression, classification, and tree-based models
- Evaluate various data models, their use, their strengths, and their weaknesses
- Design solutions and use software to build, train, and test models
- Present data analysis results

Course Prerequisites
This class is an entry-level class. There is no formal course prerequisite for this class.

Class Location & Time:
This class is scheduled for **Tuesdays, 6.30 to 9.20 pm at FRLD 346**. Supporting material will be offered in Canvas at https://unt.instructure.com

Office Hours

Both the TA and the instructor will conduct office hours via Zoom. Please refer to this syllabus for the relevant Zoom link and time.

To facilitate rapid communication among students, the instructor, and the TA, we will use a **Microsoft Teams**

channel for general discussions and the sharing of additional resources.

Students are also welcome to schedule an appointment with the instructor at any time to discuss course-related questions viaavailable communication channels (Email, Zoom, etc.).

Teaching Philosophy

Data Science, while inherently fascinating, demands a significant investment of time and experience to achieve true mastery. This course endeavors to maintain an approachable atmosphere in which concepts and techniques are presented through practical, step-by-step instructions. While the final project invites your creativity and independence, for most of the class, it is advisable to follow the guidelines closely. The intent here is not to turn you into an expert overnight, but rather to immerse you in foundational ideas and methodologies, fostering curiosity rather than immediate proficiency.

Textbook

- **An Introduction to Statistical Learning 2nd Edition by Gareth James, Daniela Witten, Trevor Hastie, and Robert Tibshirani.** The book is available for free download at https://statlearning.com/

Software/Hardware Requirements

We will use the following applications:

- Python 3+
- Jupyter Notebook
- Anaconda

Course Modules

This course consists of **16 Weeks**. This is a hands-on course, and we will be working on most of each assignment in class. There are assignments, Quizzes, in-class activities, Group Projects and one exam.

We will be using Anaconda and the Python programming language for analysis and statistical methods related to data science. This is an entry-level course, so no prior experience is required. Additionally, please note that this course provides an overview of statistical learning and introduces many topics. Mastery is not expected; the goal is for you to enjoy learning something exciting.

Tentative Schedule (Subject to change):

Week 1: Introduction

Week 2-3: Understanding the Problem and Getting the Data

Week 4: Data Prep and Exploratory Data Analysis (EDA)

Week 5: Probability

Week 6: Distributions

Week 7: Feature Engineering

Week 8: Feature Selection

Week 9: Hypothesis Testing, Test of Means, and ANOVA

Week 10-11: Supervised Learning: Classification

Week 12: Supervised Learning: Linear Regression

Week 13: Unsupervised Learning

Week 14: AB Testing

Week 16: Final Presentations

Turn in your assignments by submitting them to the submission tools in Canvas by the date specified in the **UNT canvas portal**. If an emergency arises that prevents you from submitting your assignments, you shouldcontact the instructor as soon as possible before the due date.

Projects

The projects consist of real-world data science problems and include Exploratory Data Analysis, Feature Selection, Model Comparison, Cross-Validation, Grid Search, and Visualizations, distributed throughout the project. You will share your projectswith your peers.

Grading

Grades are determined by a simple points system, with a total of *at least* 100 points given, though more than 100 points are likely. The expected distribution of points is given below, with the exact scale determined by point values given for each assignment, project, or exam - this is subject to minor modification based on actual points given. Note that, due to the nature of the course, assignments are a significant component of your final grade; please complete the assignments in a timely manner and study appropriately prior to each exam.

Activities	Points Possible	Percentage of Final Grade
Assignments	*50 points*	*50%*
Group Project ● **Proposal** ● **Presentation & Report**	*15 points* *25 points*	*40%*
Exams ● **1 exams @ 10 points**	*10 points*	*10%*
Total Points	*100 points*	*100%*

Grading Scale: A>=90, B=80-89.9, C=70-79.9, D=60-69.9, F=0-59.9 pts. No exceptions. If class grades are low (e.g. I expect the vast majority of students will end with A's and B's), extra points will be added to all the students in the class (we do not assign extra work or extra points for individuals).

Note: All questions about grades must be brought up within a week after the grades are released. No grade change can be made afterward.

Policy About Incomplete Grades:
Per UNT policy, a grade of Incomplete can only be awarded to a student who is 1) passing the course and 2) has a justifiableand documented reason, beyond the control of the student, for not completing the course work on schedule. Notification and submission of documentation must be provided to the instructor at the time of the emergency. Please see http://essc.unt.edu/registrar/academic-record-incomplete.html (Links to an external site.) for information.

Course Evaluation
UNT will make available evaluations near the end of the semester.

Course Policies

Assignment Policies

Please become familiar with the due dates. Sometimes technology doesn't cooperate. Communication is key to a successful online experience. Please be patient if something unavoidable happens and we will work something out. The University is committed to providing a reliable online course system to all users. However, in the event of any unexpected server outage or anyunusual technical difficulty that 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. The instructor and the UNT Student Help Desk will work with the student to resolve any issues at the earliest possible time.

Examination Policy

All quizzes are closed-book exams. Web searching and the use of AI are strictly prohibited. Students are expected to complete the exam individually, with no discussions allowed during the exam. Failure to follow these rules will result in an 'F' grade for the course.

Instructor Responsibilities and Feedback

I will do everything I can to help you succeed in this class. Communication is important. Contact me if you have any concerns.

Late Work
- Assignments submitted within 1 day after the due date will receive a 20% deduction.
- Assignments submitted within 2 days after the due date will receive a 50% deduction.
- Assignments submitted 3 or more days late will not be accepted.

If you need an extension, please communicate with the instructor and TA before the deadline.

Attendance Policy

Students are encouraged to attend every class. Attendance is mandatory. You can miss 3 out of 16 classes. The UNT Attendance Policy may be found at: http://policy.unt.edu/policy/15-2-5.

Class Participation

In-class activities are essential for succeeding in this class, as they provide practical exposure to the concepts.

Syllabus Change Policy

There may be occasions when adjustments to assignments, grading criteria, or due dates listed in this syllabus are necessary. If any changes occur, you will be notified immediately.

Academic Dishonesty – Plagiarism (taken from the UNT Student Code of Conduct)

The term "plagiarism" includes, but is not limited to (a) the knowing or negligent use by paraphrase or direct quotation of the published or unpublished work of another person without full and clear acknowledgment and (b) the knowing or negligent unacknowledged use of materials prepared by another person or by an agency engaged in the selling of term papers or otheracademic materials.

Plagiarism is copying by retyping, cutting and pasting, or paraphrasing. In this course, beware of the following:

- Do not quote or paraphrase published sources without explicit reference to the original work. Information used or quotedfrom other sources must contain a citation, whether the source is a print or electronic source.
- APA Style: http://www.apastyle.org/learn/tutorials/basics --tutorial.aspx
- Citation Machine: http://citationmachine.net/index2.php?reqstyleid=1
- EasyBib: http://www.easybib.com/
- Owl Purdue: http://owl.english.purdue.edu/owl/resource/560/01/
- Do not insert parts of another student's work into your work. That student trusts you to respect his/her intellectualproduct.
- Do not copy and paste parts of the course material into your work.

Penalties for Plagiarism
Plagiarism is illegal, unethical, and unacceptable. Any instances of plagiarism in student work will result in the following penalties:First offense: Grade of zero for the assignment. Second offense: Final course grade reduced by one complete grade. Third offense: Assignment of F (Fail) for final course grade.

UNT Policies
Academic Integrity Standards and Consequences. 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, and sabotage. A finding of academic dishonesty may result in a range of academic penalties orsanctions ranging from admonition to expulsion from the University. [Insert specific sanction or academic penalty for specific academic integrity violation.

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 astudent 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 accommodation for every semester and must meet with each faculty member prior to implementation in each class. For additional information see the ODA website at disability.unt.edu.

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., severeweather, campus closing, and health and public safety emergencies like chemical spills, fires, or violence). In the event of a university closure, please refer to Blackboard for contingency plans for covering course materials.

Acceptable Student Behavior
Student behavior that interferes with an instructor's ability to conduct a class or other students' opportunity to learn is unacceptable and disruptive and will not be tolerated in any instructional forum at UNT. Students engaging in unacceptable behavior will be directed to leave the classroom and the instructor may refer the student to the Dean of Students to consider whether the student's conduct violated the Code of Student Conduct. The University's expectations for student conduct apply toall instructional forums, including University and electronic classroom, labs, discussion groups, field trips, etc. The Code of Student Conduct can be found at deanofstudents.unt.edu/conduct.

Student Evaluation Administration Dates
Student feedback is important and an essential part of participation in this course. The student evaluation of instruction is arequirement for all organized classes at UNT. The survey will be made available during weeks 13, 14 and 15 [insert administration dates] of the long semesters to provide students with an opportunity to evaluate how this course is taught.
Students will receive an email from "UNT SPOT Course Evaluations via IASystem Notification" (no-

reply@iasystem.org) with thesurvey link. Students should look for the email in their UNT email inbox. Simply click on the link and complete the survey. Once students complete the survey they will receive a confirmation email that the survey has been submitted. For additional information, please visit the SPOT website at http://spot.unt.edu/ or email spot@unt.edu.

Sexual Assault Prevention

UNT is committed to providing a safe learning environment free of all forms of sexual misconduct, including sexual harassment sexual assault, domestic violence, dating violence, and stalking. Federal laws (Title IX and the Violence Against Women Act) andUNT policies prohibit discrimination on the basis of sex, and therefore prohibit sexual misconduct. If you or someone you know is experiencing sexual harassment, relationship violence, stalking, and/or sexual assault, there are campus resources available to provide support and assistance. UNT's Survivor Advocates can assist a student who has been impacted by violence by filing protective orders, completing crime victim's compensation applications, contacting professors for absences related to an assault, working with housing to facilitate a room change where appropriate, and connecting students to other resources available both onand off campus. The Survivor Advocates can be reached at SurvivorAdvocate@unt.edu or by calling the Dean of Students Officeat 940-565- 2648. Additionally, alleged sexual misconduct can be non-confidentially reported to the Title IX Coordinator at oeo@unt.edu or at (940) 565 2759.

Services Mental Health

UNT provides mental health resources to students to help ensure there are numerous outlets to turn to that wholeheartedly carefor and are there for students in need, regardless of the nature of an issue or its severity. Listed below are several resources on campus that can support your academic success and mental well-being:

- Student Health and Wellness Center (https://studentaffairs.unt.edu/student-health-andwellness-center)
- Counseling and Testing Services (https://studentaffairs.unt.edu/counseling-and-testing-services) • UNT Care Team(https://studentaffairs.unt.edu/care)
- UNT Psychiatric Services (https://studentaffairs.unt.edu/student-health-and-wellnesscenter/services/psychiatry)
- Individual Counseling (https://studentaffairs.unt.edu/counseling-and-testingservices/services/individual-counseling)