

INFO 5960.009
Fundamentals for Data Science

Class Meeting Time: Tuesdays and Thursdays 1 pm – 2:20 pm
Location: NTDP B157

Contact Information

Instructors: Dr. Guonan Wang
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Course Description:

This course introduces student basic mathematical knowledge for doing Data Science. It reviews and teaches essential concepts and skills in calculus, statistics, probability, and linear algebra that data science is built upon. These knowledge and skills enable students to understand data science literature and principles behind data analytics tools and algorithms. Students will also learn to write computer programs to implement some of the mathematical concepts and models.

Course Objectives:

This course was created for learners who have math knowledge above algebra II, say of Pre-calculus, but may not have taken calculus. Learners who complete this course will master the core math concepts and obtain the basic math skills that data scientists must have before moving on to study more advanced or practical courses.

Topics include:

Basic functions, graphs,
Introduction to differential calculus,
Introduction to integral calculus
Vectors and vector operation, vector projection
Matrices and matrix operation, linear transformations,
Descriptive statistics, linear correlation and regression
Probability theory
probability distribution, central limit theorem
Estimation

Class Meetings, Website, and Office Hours

This is a face-to-face class that meets twice a week on **Tuesday and Thursdays 1:00 pm – 2:20 pm. Classroom NTDP B157.**

This course will have a website in Blackboard Learn (<http://learn.unt.edu>) for online discussion, assignment submissions, and sharing of reading materials.

Students are welcome to make an appointment with instructors at any time to discuss course-related questions. If you need to schedule an individual meeting with the instructors, please send an email via the course website in Blackboard Course Messages to make appointment.

Recommended Textbooks:

Calculus, by Briggs, Cochran, and Gillett; Second Edition
Linear Algebra and Its Applications, by David Lay, Edition 5
Elementary Statistics by R. Johnson and P. Kuby, 11th edition,
Intro. To Probability and its Application, By Scheaffer & Young, 3rd edition.

Other Resources:

Wikibooks
Wikipedia / Wikiversity
Stat Trek
Khan Academy

Assignments and Assessments

The contents of the course are organized into **16 weeks. There will be Five Assignments, two quizzes, and one exam**

A student's grade is composed of the following:

Quiz 1 20%
Quiz 2 20%
Final exam 20%
Assignments (40%)

The UNT scale for **grading** is as follows:

A = 90-100
B = 80-89
C = 70-79
D = 60-69
F = 59 and below

Class Attendance and Participation. Students are encouraged to attend each class meeting. Prior to the meeting, please preview the readings for the class and prepare your questions for discussion. You will miss in-class exercises and activities if you do not attend the class.

Incomplete

An Incomplete Grade ("I") is a non-punitive grade given only during the last quarter of a term/semester and only if a student (1) is passing the course and (2) has a justifiable and documented reason, beyond the control of the student (e.g., serious illness or military service), for not completing the work on schedule. The student must arrange with the instructor to finish the course later by completing specific requirements. Please refer to <http://registrar.unt.edu/grades/incompletes> for more information. If an incomplete is not removed within the time frame agreed to by instructor and student, the instructor may assign a grade of F.

Withdrawal

The UNT Graduate Catalog (<http://catalog.unt.edu/index.php?catoid=16>) describes and explains withdrawal policies and deadlines. The UNT semester course schedule lists specific deadlines regarding withdrawal. A grade of Withdraw (W) or Withdraw-Failing (WF) will be given depending on a student's attendance record and grade earned. Please note that a student who simply stops attending class and does not file a withdrawal form may receive an F

Late Submission

Students are expected to submit assignments on time. If an extenuating circumstance such as a medically diagnosed illness or family emergency arises, which prevents you from submitting your assignments; you should contact the instructor and the TA as soon as possible before the due date. **Late work without the permission of the instructor will receive a grade with a 10% penalty (or 10 points out of 100) per day after the due date.** A student who is having trouble with assignments is strongly encouraged to contact the instructor and the TA as early as possible for personal advising.

Academic Integrity

UNT has established a new policy on academic integrity, which can be found at the Provost office website: <http://vpaa.unt.edu/academic-integrity.htm>. Specifically, UNT policy 18.1.16 (http://policy.unt.edu/sites/default/files/untpolicy/pdf/7-Student_Affairs-Academic_Integrity.pdf) defines the different categories of academic dishonesty, including cheating, plagiarism, forgery, fabrication facilitating academic dishonesty, and sabotage. Also, it authorizes the instructor to determine if academic dishonesty has occurred: "A finding by an instructor that academic dishonesty occurred may be considered grounds for more serious academic penalties, up to and including failure in the course."

Penalties for Academic Dishonesty

- **First Time Violation.** The instructor will follow UNT procedure (http://facultysuccess.unt.edu/sites/default/files/u6/single-violation-procedure-flowchart_9_25_13.pdf) and report the case to UNT Office for Academic Integrity (AIO). Student will receive "0" for the assignment/project that he/she performs academic dishonesty;

- **Second Time Violation.** The instructor will follow UNT procedure on multiple violation (http://facultysuccess.unt.edu/sites/default/files/u6/multiple-violations-procedure-flowchart_edits_9-19-13.pdf) and report the case to UNT AIO. Student will receive an “F” for this course.

Americans with Disabilities Act Compliance Statement

The Department of Information Science at the University of North Texas is committed to full academic access for all qualified students, including those with disabilities. In keeping with this commitment and in order to facilitate equality of educational access, faculty members in the Department will make reasonable accommodations for qualified students with a disability, such as appropriate adjustments to the classroom environment and the teaching, testing, or learning methodologies when doing so does not fundamentally alter the course.

If you have a disability, it is your responsibility to obtain verifying information from the Office of Disability Accommodation (ODA) and to inform me of your need for an accommodation. Requests for accommodation must be given to me no later than the first week of classes for students registered with the ODA as of the beginning of the current semester. If you register with the ODA after the first week of classes, your accommodation requests will be considered after this deadline.

Grades assigned before an accommodation is provided will not be changed. Information about how to obtain academic accommodations can be found in UNT Policy 18.1.14, at <http://disability.unt.edu/>, and by visiting the ODA in Room 321 of the University Union. You also may call the ODA at 940.565.4323.

Table 1. Lessons

Lessons	Topics
1	A Review of Math Notations and Basic Functions
2	Introduction to Differential Calculus
3	Introduction to Integral Calculus
4	Linear Algebra - Vectors
5	Linear Algebra – Matrix
6	Statistics, correlation and regression
7	Probability Theory
8	Probability Distribution
9	Sampling distribution, estimation

Table 2. Study Schedule and Assignment Due Dates

Week	Duration of the Week	Meeting Date Tuesday, Thursday	Content/Topic	Assignment (Due Thursday Midnight of next week)
1	8/28 – 9/1	8/29, 8/31	Syllabus, Lecture on Academic Integrity Lesson 1	
2	9/4-8	9/5, 9/7	Lesson 1	
3	9/11-15	9/12, 9/14	Lesson 2	Assignment One
4	9/18 -22	9/19,9/21	Lesson 3	
5	9/25-29	9/26,9/28	Lesson 4	Assignment Two
6	10/2-6	10/3,10/5	Review, Quiz 1	
7	10/9-13	10/10,10/12	Lesson 5	
8	10/16-20	10/17,10/19	Lesson 6	Assignment Three
9	10/23-27	10/24,10/26	Lesson 7	
10	10/30 – 11/3	10/31,11/2	Review, Quiz 2	
11	11/6-10	11/7,11/9	Lesson 8	Assignment Four
12	11/13-17	11/14,11/16	Lesson 9	
13	11/20-22	11/21	Lesson 10	
14	11/27 – 12/1	11/28,11/30	Lesson 10	Assignment Five
15	12/4-8	12/5,12/7	Class Summary/ Review	
16	12/11-15	12/11	Final Exam	