

Spring 2024 MATH 1680.170 Elementary Probability and Statistics

Instructor Information

Name: Marc Grether

Pronouns: He/Him

Office Location: GAB 416

Tutoring/Office Hours: Tues./Thurs. 11-12:15, Wed. 10-11, 1:30-2:30.

I am also often available for appointments at other times. Email me to schedule times.

Email: grether@unt.edu (note: there is no "my" in this email address).

Course meeting location and time: TR 11:00AM-12:20PM in TH 120

Lab meeting locations and times (You must attend your scheduled time):

Section 171 meets in GAB 511 with Addison Freier on Wed. from 5PM to 5:50PM

Section 172 meets in GAB 511 with Addison Freier on Wed. from 6PM to 6:50PM

Section 173 meets in GAB 511 with Addison Freier on Wed. from 4PM to 4:50PM

Communication Expectations: I typically respond in one (1) business day, during business hours. A message received after business hours is considered received the next business day. The best way to reach me is via email. I will work hard to respond as quickly as possible to emails, but it may occasionally take me up to a business day to respond. Though I might reply to an email late at night or on the weekend, you should not expect quick responses outside of the hours of 8am -5pm.

Course Description

Introductory course to serve students of any field who want to apply statistical inference. Descriptive statistics, elementary probability, estimation, hypothesis testing and small samples. **Prerequisites:** TSI Complete. Students should be familiar with high-school algebra, fractions, decimals, and percentages.

This is a 15-week, face-to-face course that will cover most of the material in Chapter 1-11. There will be three exams covering approximately three chapters each, plus a comprehensive final exam. There is also a required lab that meets for one hour per week.

Learning Objectives

By the end of the course, students will be able to:

- Describe the process of conducting a statistical study
- Determine whether a study is observational or experimental and identify appropriate use cases
- Understand confounding
- Recognize different types of data such as qualitative, quantitative, discrete, continuous, and correctly identify the level of measurement
- Understand the pros and cons of different sampling methods
- Explain sources of bias
- Summarize and present data accurately using tables, graphs, and charts
- Calculate appropriate measures of center and dispersion
- Describe distribution shapes
- Standardize data using z-scores
- Recognize linear relationships between two variables
- Make accurate predictions using linear regression

- Calculate the probability of simple and compound events
- Understand disjoint and independent events
- Construct and interpret contingency tables
- Understand discrete and continuous random variables
- Identify the parameters of binomial random variables and compute probabilities, expected value, and standard deviation
- Compute probabilities using uniform and normal random variables
- Understand sampling distributions and the Central Limit Theorem
- Construct confidence intervals for population means and proportions
- Test hypotheses involving population means and proportions
- Distinguish between Type I and Type II errors

Required Materials

This course has digital components. To fully participate in this class, students will need internet access to reference content on the [Canvas Learning Management System](#). Students will also need:

- [Knewton Alta - 1 Term Access ELECTRONIC PRODUCT by Knewton](#). Instead of a traditional textbook, the course material is contained in adaptive online assignments. Students must create a Knewton account as soon as possible in order to complete the first homework assignment. *Students will need to finalize their purchase before the end of the 14-day trial courtesy access period.*
- A scientific or graphing calculator
- [Microsoft Office 365](#)
- Fill-in-the-blank notes (available on Canvas)

If circumstances change, you will be informed of other technical needs to access course content. Information on how to be successful in a digital learning environment can be found at [Learn Anywhere](#).

How to Succeed in this Course

UNT strives to offer you a high-quality education and a supportive environment, so you learn and grow. As a faculty member, I am committed to helping you be successful as a student. To learn more about campus resources and information on how you can be successful at UNT, go to unt.edu/success and explore unt.edu/wellness. To get all your enrollment and student financial-related questions answered, go to scrap-pysays.unt.edu.

There are many academic resources available to help you succeed in this course:

- MATH 1680 Online Helpdesk (more details later on Canvas).
- [Navigate's Study Buddy](#)
- [UNT Learning Center](#)
 - [Supplemental Instruction](#)
 - [Math Lab](#)
 - [Tutoring](#)

ADA Accommodation Statement

The University of North Texas makes reasonable academic accommodation for students with disabilities. Students seeking reasonable accommodation must first register with the Office of Disability Access (ODA) to verify their eligibility. If a disability is verified, the ODA will provide you with a reasonable accommodation letter to be delivered to faculty to begin a private discussion regarding your specific needs in a course. You may request reasonable accommodations at any time; however, ODA notices of reasonable 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, refer to the [Office of Disability Access](https://studentaffairs.unt.edu/office-disability-access) website (<https://studentaffairs.unt.edu/office-disability-access>). You may also contact ODA by phone at (940) 565-4323.

Creating an Inclusive Learning Environment

I value the many perspectives students bring to our campus. Please work with me to create a classroom culture of open communication, mutual respect, and belonging. All discussions should be respectful and civil. Although disagreements and debates are encouraged, personal attacks are unacceptable. Together, we can ensure a safe and welcoming classroom for all. If you ever feel like this is not the case, please stop by my office and let me know. We are all learning together.

Assessing Your Work

Assignment	Percentage
Homework	16%
Lab Projects	16%
Exams (50/3% each)	50%
Final Exam	18%
Review Center (Extra Credit)	4%
Total	104%

Grading Policy

Course letter grades will be determined as follows: **A:** 89.5 or above, **B:** 79.5 to below 89.5, **C:** 69.5 to below 79.5, **D:** 59.5 to below 69.5, **F:** below 59.5.

Grades are based on your performance in the course based on your mastery of the content. As a rule, I do not grade on a “curve” because that is a comparison of your outcomes to others. I do, however, encourage you to find opportunities to learn with and through others. Please take advantage of the academic resources listed above if you find yourself struggling.

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 or sanctions ranging from admonition to expulsion from the University.

Attendance and Participation

Students are required to take exams in the Sage Hall Computer-Based Testing Center (SAGE 331).

Students are expected to attend class regularly and engage with the material. Research has shown that students who attend class are more likely to be successful. If you miss class, you will be responsible for obtaining a copy of the notes and any other information discussed from a classmate. If you expect to miss one week or more due to circumstances beyond your control, please notify me and your lab instructor in advance so that we can help you attain the course learning objectives. You may also provide documentation verifying the reason for your absence to the [Dean of Students](#).

Classroom Etiquette:

Appropriate behavior is expected of all students taking this course. Arrive to class promptly and do not leave until the scheduled ending time of the class. If you must arrive late or leave early, please do so as discreetly as possible and take a seat near the door. Turn off all non-medical electronic devices such as pagers, cell phones, laptops, etc. Take off your headphones. Do not read newspaper or work on unrelated assignments during class. I reserve the right to ask disruptive students (texters, those using a computer for non-class related work, etc.) to leave class. You will be considered absent if you are asked to leave. Again, it is considered a serious violation of your responsibilities as a student to be on a computer or your mobile device during class. It distracts you, lowers your performance in class and does the same for those around you. Please read the New Yorker article I've posted on Canvas for more information about this. See also #8 on the [10 academic rights that is linked here](#).

Homework:

The online homework is worth 20% of your overall course grade. Each assignment is equally weighted. Most homework will use an online software program called Knewton, though some will be directly in Canvas.

What is Knewton? Knewton is a mastery-based adaptive software and is designed to judge your ability to complete your assignments. You will be able to proceed through Knewton much more quickly if you study and review your notes before starting the assignments. For best results, read through "Getting Started with Knewton" located in Canvas before your first assignment.

Why do Homework? A purpose of homework is to provide you with sufficient opportunities to learn and practice the new content you are learning. Knewton is adaptive and mastery based, which means that the software will provide each student with the sufficient number of questions to judge whether each topics learning objectives have been mastered. This means a student who has prepared well before the assignment may have very short assignments, while a less well prepared student may take many more questions on each assignment. Again, the more you prepare before starting to attempt the exercises, the less work you will have. For more tips on how to get the most out of the homework assignments, read through "Getting Started with Knewton"

Get the Most out of Homework

- You should have a dedicated notebook for your math homework. Carefully write out your work, especially noting the questions with which you struggled. This should form a substantial part of your review material prior to the exams.
- Homework is one piece of your learning process in this course, but successful completion of the homework assignments is not sufficient preparation for exams. You must be able to work the exercises on your own, without any aids on exams.

Where is Knewton?

You access your Knewton powered homework in one of two ways through Canvas, they are:

1. At the Syllabus portal. Every assignment for your course is accessible through the Syllabus portal. This portal is very helpful because it lists all assignments in due date order; or
2. At the content module. Select the Modules tab along the left-hand navigation of Canvas. From the Modules select Module 1. The Knewton assignments have a paper and pencil icon to their left.

When are Knewton Homework Assignments due?

Assignment due dates are listed on the calendar and on the syllabus link in Canvas. Knewton assignments are always due at 11:59 PM, usually on Sunday – but you don't have to wait until Sunday to do them. To successfully complete the assignments, you must carefully manage your time. I recommend that you plan to complete them well ahead of the due date. Late homework will not be accepted. At the end of the term, two (2) lowest grades will be dropped from the calculation of the homework average. In Canvas, the two dropped grades will not be correctly calculated until the very end of the semester.

Students may complete homework assignments up to 7 days after the due date. Late homework assignments will incur a 20% penalty. I will also drop the **two** lowest homework scores before computing your average at the end of the semester.

Exam Policy

Students may use a scientific/graphing calculator, the online graphing calculator Desmos, and Microsoft Excel during exams. I will also provide a formula sheet. No other notes or assistance are permitted.

You may request to take an exam early, provided that I receive the request at least one week prior to the day you would like to take the exam.

Your score on the final exam will replace your lowest exam score if the final exam score is higher, unless you received a zero on an exam for academic dishonesty.

Midterm Exams

Three midterm exams are planned for this semester. Students are required to take exams in the Sage Hall Computer-Based Testing Center (SAGE 331). Keep a record of all your scores. Be sure to review your exam upon receiving it. Check your written exam grade with the grade posted online to ensure that they are the same. The midterm exams are worth 50/3% each. Exam dates are listed on the attached calendar. The final exam is comprehensive.

Final Exam

A mandatory and comprehensive final exam will be given on **May 9th @ 10:30 am – 12:30 pm** in the **Sage Hall Computer-Based Testing Center (SAGE 331)** and is worth at least 18% of your course grade.

Lab Projects:

Please review the UGMT syllabus available in Canvas for information about lab.

Syllabus Change Policy

Any changes to the syllabus will be announced in class and/or posted on Canvas.

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 the UNT Learning Management System (LMS) for contingency plans for covering course materials.

Tentative Weekly Calendar

Week 1

Tuesday 1/16/2024 Material to cover: Introduction to class, 1.1 What is Statistics?, 1.2 Variables and Measures of Data

Thursday 1/17/2024 Lab 1-Helicopter Experiment

Friday 1/18/2024 Material to cover: 1.3 Sampling Methods, 1.4 Sampling Methods , 1.5 Sampling Errors, Bias, and Misleading Statistics

Sunday 1/21/2024 Knewton Due: HW 1.1-1.5

Week 2

Tuesday 1/23/2024 Material to cover: 2.1 Frequency Tables, 2.2 Histograms, 2.4 Histograms and Frequency Tables with Excel

Thursday 1/24/2024 Lab 2-Designing a Statistical Study

Friday 1/25/2024 Material to cover: 2.5 Dot Plots and Stem-and-Leaf Plots, 2.6 Line and Bar Graphs, 2.7 Interpreting Graphs

Sunday 1/28/2024 Knewton Due: HW 2.1, 2.2, 2.4, 2.5, 2.6

Week 3

Tuesday 1/30/2024 Material to cover: 3.1 Measures of Central Tendency, 3.2 Which Measure of Central Tendency Should I Use?

Thursday 1/31/2024 Lab 3-Graphic Displays of Data

Friday 2/1/2024 Material to cover: 3.3 Quartiles and Box Plots, 3.4 Standard Deviation

Sunday 2/4/2024 Knewton Due: HW 2.7, 3.1, 3.2, 3.3

Week 4

Tuesday 2/6/2024 Material to cover: 3.5 The Empirical Rule, 3.8 Measures of Central Tendency with Excel, Measures of Spread with Excel

Thursday 2/7/2024 Lab 4-Measures of Center and Position

Friday 2/8/2024 Material to cover: 4.1 Scatter Plots and Correlation, 4.2 Linear Regression Equations

Sunday 2/11/2024 Knewton Due: HW 3.4, 3.5, 3.8, 3.10

Week 5

Tuesday 2/13/2024 Material to cover: 4.3 Least Squares and Outliers, 4.5 Coefficient of Determination

Thursday 2/14/2024 Lab 5-Measures of Dispersion

Friday 2/15/2024 Material to cover: Review

Sunday 2/18/2024

Week 6

Tuesday 2/20/2024 Exam 1 in Sage 331

Thursday 2/21/2024 Lab 6-Correlation & Regression

Friday 2/22/2024 Material to cover: 4.7 Linear Regression with Excel, 5.1 Probability Terminology and Notation

Sunday 2/25/2024 Knewton Due: HW 4.1, 4.2, 4.3, 4.5, 4.7

Week 7

Tuesday 2/27/2024 Material to cover: 5.2 Basic Probability, 5.3 Independent and Mutually Exclusive Events

Thursday 2/28/2024 Lab 7-Probability

Friday 2/29/2024 Material to cover: 5.5 Addition and Multiplication Rule

Sunday 3/3/2024 Knewton Due: HW 5.1, 5.2, 5.3, 5.5

Week 8

Tuesday 3/5/2024 Material to cover: 5.6 Contingency Tables, 6.1 Introduction to Discrete Probability Distributions

Thursday 3/6/2024 Lab 8-Contingency Tables

Friday 3/7/2024 Material to cover: 6.1 Introduction to Discrete Probability Distributions cont., 6.2 The Binomial Distribution

Sunday 3/10/2024 Knewton Due: HW 5.6, 6.1, 6.2

No Classes from 3/11-3/15 due to Spring Break

Week 9

Tuesday 3/19/2024 Material to cover: 6.6 Discrete Random Variables with Excel, 7.1 The Uniform Distribution

Thursday 3/20/2024 Lab 9-Discrete Random Variable

Friday 3/21/2024 Material to cover: 8.1 The Normal Distribution: Parameters, 8.2 The Normal Distribution: Probability

Sunday 3/24/2024 Knewton Due: HW 6.6, 7.1, 8.1

Week 10

Tuesday 3/26/2024 Material to cover: 8.3 Normal Distribution: With Desmos, 8.4 The Normal Distribution with Excel

Thursday 3/27/2024 Lab 10-Binomial Distribution

Friday 3/28/2024 Material to cover: Review

Sunday 3/31/2024 Knewton Due: HW 8.2, 8.4

Week 11

Tuesday 4/2/2024 Exam 2 in Sage 331

Thursday 4/3/2024 Lab 11-Normal Distribution

Friday 4/4/2024 Material to cover: 9.3 Central Limit Theorem for Means, 9.4 Central Limit Theorem for Proportions

Sunday 4/7/2024 Knewton Due: HW 9.3

Week 12

Tuesday 4/9/2024 Material to cover: 10.4 Confidence Interval for a Population Proportion, 10.8 Confidence Intervals with Excel

Thursday 4/10/2024 Lab 12-Sampling Distributions

Friday 4/11/2024 Material to cover: 10.2 Confidence Interval for a Mean (Population Standard Deviation Known)

Sunday 4/14/2024 Knewton Due: HW 9.4, 10.2, 10.3

Week 13

Tuesday 4/16/2024 Material to cover: 10.3 Confidence Interval for a Mean (Population Standard Deviation Unknown)

Thursday 4/17/2024 Lab 13-Confidence Intervals

Friday 4/18/2024 Material to cover: 11.1 Introduction to Hypothesis Testing, 11.2 Hypothesis Test for a Mean's Population Standard Deviation Known, 11.3 Hypothesis Test for a Mean's Population Standard Deviation Known (P-value)

Sunday 4/21/2024 Knewton Due: HW 10.4, 10.8

Week 14

Tuesday 4/23/2024 Material to cover: Review

Thursday 4/24/2024 Final Review

Friday 4/25/2024 Exam 3 in Sage 331

Sunday 4/28/2024 Knewton Due: HW 11.1, 11.2, 11.3

Week 15

Tuesday 4/30/2024 Material to cover: 11.4 Hypothesis Test for Mean-Population Standard Deviation Unknown, 11.6 Hypothesis Test for Proportion

Thursday 5/1/2024

Friday 5/2/2024 Material to cover: Lab 14-Hypothesis Testing

Sunday 5/5/2024 Knewton Due: HW 11.4, 11.6

Your Final Exam is on **May 9th at 10:30AM**. It is required, comprehensive and worth at least 20% of your overall grade.