

EDP 380C
Fundamental Statistics
Fall, 2017

Course Syllabus

Course Description:

This graduate course is designed to help students master the introductory descriptive and inferential statistical procedures that are used in educational, behavioral and social science research studies. Students will learn the assumptions and concepts underlying, the hypotheses being tested by, and the inferences that can be made with the use of the relevant statistics and procedures. These skills will provide the student with a basis to conduct their own such analyses and to evaluate critically others' uses of statistics.

Pre-requisites

Mathematical skills: While this course is not completely mathematical, it is founded upon the use of mathematical tools. Thus, some fundamental mathematical skills are essential for successful mastery of the material. Students are expected to have basic algebra skills including the ability to solve single variable equations. Students should have a basic understanding of exponents and square roots, as well as the order of operations, proportions, fractions, decimals, percentage, and negative numbers. Appendix A of the textbook contains a review of the basic math skills needed for this course. Please be sure to review and check with the instructor or teaching assistants if you have any concerns.

Calculator: Students are required to bring a scientific calculator to class that can be used to sum, multiply, square and take the square root of numbers. Calculators are recommended for use during class time, homework assignments as well as during exams.

Computer software: The material covered in this course does not require the use of statistical software. Instead, students are expected to calculate the relevant statistics using the formulas provided by hand/calculator. The formulas are simple enough that their use should reinforce students' understanding of the relevant concepts. Jumping straight to using statistical software instead of working on problems by hand tends to reduce the depth of students' understanding. In higher level statistics courses, use of Excel, SPSS, SAS, R, etc. is introduced but it is not deemed necessary for this basic material.

Meeting Time and Location

Day: Tuesday and Thursdays

Time: 8:00am – 9:30am*

Place: SZB 435

Instructor

Name: Dr. Tasha Beretvas

Office: SZB 538E

Office Hours: Mondays, Noon – 1:30pm, and by appointment.

Email: tberetvas@austin.utexas.edu

*Due to prior professional commitments, there are a few class and formal office hour times when I will be out of town and thus unavailable. For missed formal office hours, do contact me and the TA in advance to set up an additional appointment. For missed class times, I will post a video of the missed lecture and any activities for you to observe and in which to engage during my absence.

Missed office hours will include: Labor Day (9/4 ☺), 10/16
Missed face-to-face classes will include: 9/7, 10/5, 10/12

I have a prior professional obligation which means that I will unfortunately not be able to teach class in person on several class days including September 7th, October 5th, and October 12th. However, I have arranged to teach in the Distance learning lab (**SZB 323**) classroom on the following dates and times:

9/5 2pm – 3:30pm (Instead of class on 9/7)
10/4 8:30am – 10am (Instead of class on 10/5)
10/10 2pm – 3:30pm (instead of class on 10/12)

The SZB 323 classroom cannot hold all students in both sections of this course. Therefore, the first 25 students to arrive can stay to listen in on the live lecture. For those of you unable to attend on the rescheduled days and times, I will be recording the lectures and make the recordings available.

In addition, the TA, will offer office hours during the regular class time (8am-9:15am) on 9/7, 10/5 and 10/12 in SZB 435.

Course Materials and Resources

Required: *Statistics for the Behavioral Sciences, 10th Edition* by F. J. Gravetter and L. B. Wallnau. This textbook **will be** available at the Co-op. Homework problems are taken from this book. It also provides a good resource in that it presents the material in a slightly different way than the instructor presents the material during class time. You are welcome to use a different edition but then you are responsible for making sure that you read corresponding material (as page numbers likely differ), figuring out errors that might have been fixed in the later edition and aligning homework problems. You are only responsible for the material in the textbook that is actually covered during class.

Optional: Class handouts matching the overheads used by the instructor will be available on **CANVAS** (<http://canvas.utexas.edu>) under **Fundamental Statistics**.

Reading the handouts does not provide the student with the learning experiences nor the complete material equivalent to that obtained by attending class. The handouts provide a skeleton of what is being covered each day and will thus be an incomplete version of the material actually covered. They contain spaces for the student to fill in the additional material and practice provided in class.

Assignments - *UNGRADED*

Homework

Reading about statistics does not ensure mastery. As with many other skills, the best way to master statistics is through practice. There will be homework problems

associated with each class topic (see List of Topics). Once a topic has been covered in class, the homework should be completed.

The majority of the homework assignments are even-numbered problems from the textbook. Because answers to odd-numbered problems are available at the back of the text, students are also strongly encouraged to try odd-numbered problems on their own. The more practice, the better!

The answers to each assigned even-numbered homework problem will be made available in the Homework Answers folder on Canvas. It is the student's responsibility to check their work and ensure their mastery of the relevant material. Do come to office hours with the teaching assistants and the instructor if you have any questions.

In addition, any analyses demonstrated or worked through in class provide students with another opportunity for guided practice so do use this opportunity!

Review Problems Online

This assignment is another ungraded assignment offering additional opportunities for *practice*. This assignment will be designed to encourage students to keep up with material covered in class while offering them the opportunity to test their mastery of concepts and to try out additional computational exercises. It also exposes students to some of the kinds of questions they should be considering when reviewing material. We are attempting to construct online learning modules that include review problems. We will share these with you as they become available. Multiple-choice problems assessing mastery of recent material will be shared.

Assignments - Graded

Exams

Exams tend to “**motivate**” students to thoroughly review course material and provide students with additional practice. The three in-class exams (***Tuesday, October 3rd, Thursday, November 2nd, and Thursday, December 7th***) will consist of conceptual, computational and application questions. The exams will focus on the material covered during the most recent class segment. More detail will be provided about the material assessed by each exam closer in time to the actual exams. It should be noted that most of the statistical skills acquired during this class are constantly building upon earlier learning. This means that even though each exam will focus on the preceding section of the course, students might need to recall skills learned in earlier sections!

To relieve test anxiety and approximate a more authentic environment in which researchers have access to reference materials, students will be given a formula sheet for use during exams. And the format of the formula sheet will be shared the week before each exam. The exams are not open-book because summary of learning should be accomplished *before not during* the exam. The dates of these exams will not change. Time permitting, **Exam Review** sessions will be offered during the immediately preceding class period.

Format: Exams will consist of true-false, multiple-choice and short-answer questions including both conceptual and computational problems. Partial credit is awarded where possible. Students will be given one class period to complete each exam.

Materials: Students will be given a formula sheet and necessary tables for each exam. Students MUST bring a calculator. Cell phones cannot be used and must be turned off during exams.

Proportion of final grade: Exams are worth a total of **80%**. The first two exams are worth 25% each and the last exam is worth 30% of the final grade.

Portfolio of Research Questions

As consumers of this course, each student inevitably brings their own unique applied, substantive area of interest. Application of the techniques mastered in this class to students' specific substantive research area should prove useful to students' understanding of the relevance and importance of these techniques and should help students master the material far more than watching the instructor's demonstrations using possibly irrelevant examples.

For almost every statistic covered in this course, students will construct a portfolio entry. This assignment is designed for the student to practice composing their own research questions using data they have obtained or have made up that can be assessed using almost every one of the hypothesis testing statistics that are covered in this course. For each portfolio entry, a rubric detailing what is required and a worked example will be provided. Basically, for each concept, the assignment will involve students constructing research questions in their own area of research interest that can be "answered" using the statistic of interest. Students will name and briefly describe the variables of interest, detail the relevant relationship of interest, the statistical analysis to be conducted, make up (or use actual) data, calculate statistics that would result and interpret the resulting values. Portfolio entry assignments and due dates are given out during class. Dates for the entries are selected based on class progress.

Portfolio entries will be due at the beginning of the class period a week after completion of the relevant topic. There will be about seven required portfolio entries. The lowest portfolio entry score for a student will be dropped from the student's overall portfolio entries' score. Assignment dates will be given out **during class time**.

Proportion of final grade: Portfolio entries will be worth a total of **20%**.

We will not accept emailed portfolio assignments. A paper copy must be handed in at the start of class on the day that it is due.

Makeup assignments

Only in exceptional circumstances (which does **NOT** include family vacations/weddings, routine doctor's appointments, job interviews, etc.) and only with **prior** permission from the instructor, or with a verifiable medical excuse, will students be able to take a makeup exam. The student must provide medical proof of illness. The student is responsible for notifying the teaching assistants and the instructor by the day of the exam that they cannot attend the exam.

If a student becomes ill (supported with a doctor's note) on the day that a portfolio entry is due and the assignment is not complete, then the student will receive credit only for what was attempted. It is the student's responsibility to notify the teaching assistants and the instructor before class starts that they cannot attend class. It is also their responsibility to ensure that the work is handed in that day (by the start of class) or that

an alternative time is arranged with the instructor. It is important to complete portfolio assignments **before** the day that they are due.

Without permission or a medical excuse, the student will receive a zero for the missed portfolio entry or exam. Students will be penalized if a portfolio entry is handed in after the start of class on the date that it is due. For each 24-hour period that the assignment is delayed, 10% will be deducted from the assignment's score. Because assignments are due at the beginning of class, each 24 hour period will start coincident with the class's beginning. Thus if an assignment is due, for example, at 4pm on Wed, 10/8 but is handed in at 3:59pm on Fri, 10/10, then 20% will automatically be deducted from the student's score on the assignment. There will be no exceptions to this penalty.

Grading system

Exams =	80%
Research Questions Portfolio =	20%

Grades are assigned based on the percentage of accumulated points as follows:

<i>A</i> : 93-100;	<i>B+</i> : 86-89;	<i>C+</i> : 76-79;	<i>D+</i> : 66-69;	<i>F</i> : 0-<60
<i>A-</i> : 90-92;	<i>B</i> : 83-86;	<i>C</i> : 73-76;	<i>D</i> : 63-66;	
	<i>B-</i> : 80-82;	<i>C-</i> : 70-72;	<i>D-</i> : 60-62;	

Attendance policy

Students are responsible for all material presented in lectures. (This material includes course material and due dates for portfolio entry assignments). It is expected that students will attend lectures although attendance will not be taken. The class is designed this way because it is felt that the guided practice obtained during class time provides one of the best opportunities for learning. While exam dates will not change, due dates for portfolio entries are assigned during class time because they will be based on when the coverage of the relevant material is complete.

Exams are held during class time and can only be re-scheduled for individual students under exceptional circumstances (see Makeup Assignments section for details). Portfolio entries will be collected at the beginning of class on the days that they are due. Scores on assignments not turned in when gathered at the beginning of class will be penalized as described in the Makeup Assignments section).

Students are expected to arrive **on time** for the beginning of class. Students anticipating late arrival should notify the instructor before class. A pattern of tardiness can **negatively affect** your grade.

Cell phones and pagers **must** have the sound turned off when in the classroom and are not allowed to be visible or on students' desks during exams.

Religious Holy Days

Religious holy days sometimes conflict with class and examination schedules. Section 51.911 of the *Texas Education Code* addresses absences by students for observance of religious holy days. The policy states that a student shall be excused from attending classes or other required activities, including examinations, for the observance of a religious holy day, including travel for that purpose. A student whose absence is excused under this subsection may not be penalized for that absence and shall be allowed to take an

examination or complete an assignment from which the student is excused within a reasonable time after the absence. University policy requires students to **notify** each of their instructors as far in advance of the absence as possible so that arrangements can be made.

If you must miss a class, an examination, or a portfolio entry assignment in order to observe a religious holy day, you will be given an opportunity to complete the missed work within a reasonable time after the absence but you must have arranged the new deadline with me (the instructor) in advance. The same applies for portfolio entry assignments. If you will have to miss the deadline for submission of a portfolio entry, due to the observance of a religious holy day, then it is your responsibility to schedule a time with me in advance of the deadline for the assignment.

Scholastic dishonesty policy

The University defines academic dishonesty as cheating, plagiarism, unauthorized collaboration, falsifying academic records, and any act designed to avoid participating honestly in the learning process. Scholastic dishonesty also includes, but is not limited to, providing false or misleading information to receive a postponement or an extension on a test or other class assignment, and submission of essentially the same written assignment for two courses without the prior permission of faculty members. (Please refer to the University of Texas' Honor Code that can be found at the following website:

<http://catalog.utexas.edu/general-information/the-university/#universitycodeofconduct>)

By accepting this syllabus and participating in this course, you have agreed to these guidelines and must adhere to them. This means (specifically for this class) that any work that you hand in for a grade **MUST** be your own work. This also means that you may **NOT** use or review the assignments or exams of students of this class from **previous semesters**.

Violation of this agreement and of any of the University rules on scholastic dishonesty will result in the student being awarded an **F for the final course grade**, being referred to the appropriate university officials, and may result in suspension or expulsion from the University.

Disability Accommodation

Students with disabilities may request appropriate academic accommodations from the Division of Diversity and Community Engagement, Services for Students with Disabilities (SSD), 512-471-6259. (See the following website for more information: <http://www.utexas.edu/diversity/ddce/ssd/>). If a student requires special accommodations, they should show the instructor the official letter from the SSD outlining the necessary accommodations as soon as possible. That way, the instructor and student can work together to make sure that the necessary accommodations will be available.

Communication

In this course e-mail will be used as a means of communication between instructor, teaching assistants and students. Students are responsible for checking their e-mail regularly for class work, deadlines, changes and announcements.

Do **NOT** leave me (the instructor) a **phone** message in my office because I do NOT check my voicemail at all regularly. I do, however, check email several times each weekday (between 9am and 5pm).

You will also be responsible for checking the **CANVAS** course site regularly for class work, announcements, and copies of my overheads. As with all computer systems, there are occasional scheduled downtimes as well as unanticipated disruptions.

Hints for success

Practice: Practice will facilitate successful mastery of the skills to be learned from this class. During class periods, guided practice will be offered in the form of sample problems. The ungraded homework and portfolio entries will also provide opportunities for practice. It is hoped that studying for and completion of exams will provide additional such opportunities!

Practice II: Watching the instructor work through examples might (hopefully) make it appear simple. However, I will not be at your side when you are working problems out in the real world (or, say) on exams. I strongly recommend that you practice what you see me doing.

Practice III: You know the topic you are covering when doing a homework or portfolio assignment or listening to my working through an example in class. In the real world (or, in, say, an exam), you will not have these contextual clues (such as chapter headings!). Make sure you understand **when** to use the statistics we cover, not just how to do so. (The portfolio entries are designed to help you think about when to use the statistics as well as how to do so).

Homework I: The homework problems provide you with mostly computational practice. However, I expect you to grasp more than just the steps required to solve problems. I would strongly recommend that you also focus on **mastering the concepts** covered during class time. Their mastery will provide you with a strong foundation for understanding the statistics covered in this and later statistics courses.

Homework II: By the same token, while some of the homework problems appear to entail purely computational practice, some of them are trying to demonstrate statistical concepts (such as comparing factors that might impact statistical conclusions) using numbers. Instead of whipping through the computations, do try to take some time to think through why the questions might ask you to compare outcomes. What factor is being manipulated and what is the impact of the manipulation?

Textbook: You are responsible for whatever topics are covered in class. We do not necessarily cover all the material in the textbook. The terminology in the textbook sometimes differs from what we use in class. Use the terminology and symbols that I use in class. For class assignments, you must use the terminology and symbols that I use in class. However, it is helpful to realize that there are multiple ways that disciplines present statistical concepts and for you to be flexible for scenarios outside of this class.

Study groups: It is highly recommended that you form study groups to master the material in this class. If you understand a concept, teaching it to your fellow students will help you solidify that learning. If you do not understand a concept, it might help to have it presented to you by someone who has more recently mastered it rather than by the TA or instructor. It can help to have a concept presented by several people in different ways.

BUT any of the work handed in for assessment (portfolio entries, and exams) **must be** the work of the individual student. If it is not, you will receive an ***F*** for the course.

Office hours: Use them – our job is to help you learn! If you cannot make our office hours due to scheduling conflicts with work or courses, ask me or the teaching assistants via email to schedule another time to meet.

Email I: Check your email messages from me and the TA.

Email II: Use email to schedule appointments **NOT to ask conceptual** or computational questions. We will not answer those questions online because hand-feeding you the answer(s) does not help your learning as much as our prompting **you** (face-to-face) to come up with the answer.

Email III: (and most important) If you email one of us (professor or teaching assistants), please ***copy both of us on the email***. That ensures a speedier response.

Class notes: If a student misses class, it is his/her responsibility to obtain any missed information from a classmate – ***not*** from the instructor, ***nor*** from the teaching assistants.

Keep up: The skills to be mastered for statistical analyses keep building upon themselves. If you fall behind, it will not only affect the topic in which you are behind but will affect your learning of a later topic.

Classroom Guidelines

1. If you miss a class, then **you** are responsible for obtaining both the course material you have missed as well as any class announcements from your **classmates**. If, once you have gone through the notes you have missed, you have any questions about the lecture, please feel free to come to office hours or schedule an appointment with the instructor or teaching assistants.
2. Do **not arrive late** to class. Class begins at **8am**. A pattern of tardiness can negatively affect your grade.
3. Cell phones and pagers **must** have the sound turned off when in the classroom. If you need one on due to a family or personal emergency, please notify the instructor before class begins.
4. **Classroom participation** is strongly encouraged. Questions and incorrect responses provide an opportunity for learning and I guarantee that other classmates have similar misconceptions!

Assignment Guidelines

1. Portfolio entry due dates are assigned during class time.
2. Portfolio entries are gathered at the **beginning** of the class on which they are due (noted on the associated Portfolio rubric).
3. **Late** portfolio entries are **not** accepted except under exceptional circumstances (see syllabus). Emailed portfolio entries are **not** accepted unless a prior arrangement has been agreed upon by the instructor.
4. **No make-up** exams will be scheduled. If an exam is missed – without prior arrangement with the instructor – then a zero will automatically be assigned.
5. Ensure that your name is on **each page** of your portfolio entries.
6. If your work consists of more than one page, all pages **must be stapled**. No staple, no grade! (Folding down the corner is not a replacement for a staple).
7. Do **not email** the instructor or the teaching assistants with questions concerning the **content** of a homework question or portfolio entry. Please feel free to email to request an **appointment**, or attend office hours to discuss assignments. The reason for this is that you will learn more by meeting with the instructor and/or TA and having them prompt you so that you are the one coming up with the answer – not them.
8. Do **not** leave assignments until the **last minute**. You do not have many last minutes!
9. Answers to homework problems will be posted on-line.
10. All assignments **must** be done by the individual student. Any indication of cheating will be reported to the Dean of Students and will result in a course grade of “**F**” and possible expulsion / suspension from the University.
11. If you need a calculator to assist with calculations during in-class exams, you must use a calculator that does not have the capacity to connect to email (use of cell phones is completely **forbidden** during exams).

EDP 380C
Fundamental Statistics, Fall, 2017
Tentative Schedule of Topics

Date:	Topic	Reading	Homework
Thu 8/31 & Tue 9/5 ⁺	Syllabus, course requirements, course content, etc. <i>Introduction:</i> <ul style="list-style-type: none"> Vocabulary 4 scales of measurement Statistical notation 	Chapter 1	<u>Chapter 1</u> 10, 12, 20, 22
Tue, 9/5 2:00-3:30pm; SZB 323	<i>Replacement lecture for 9/7</i>		
Thu 9/7	<i>Frequency distributions of scores:</i> <ul style="list-style-type: none"> Tables Graphs Shape Percentiles 	Chapter 2	<u>Chapter 2</u> 4, 6, 10, 22
Tue 9/12	<i>Measures of central tendency</i> <ul style="list-style-type: none"> Mean Median Mode Characteristics of Mean 	Chapter 3	<u>Chapter 3</u> 4, 6, 10, 22, 24
Thu 9/14	<i>Measures of variability:</i> <ul style="list-style-type: none"> Range IQ & SIQ Range Variance & standard deviation 	Chapter 4	<u>Chapter 4</u> 2, 4, 7, 8, 14, 15, 18, 19
Tue 9/19	<i>Z-scores:</i> <ul style="list-style-type: none"> Raw scores⇒Z-scores Z-scores⇒Raw scores Transforming scales Normal distribution 	Chapter 5 Chapter 6: p.163-184, p.189-on	<u>Chapter 5</u> 1, 6, 22, 24, 25 <u>Chapter 6</u> 6, 10, 18, 20
Thu 9/21 & Tue 9/26	<i>Sampling distributions of sample means:</i> <ul style="list-style-type: none"> Shape Mean Variability 	Chapter 7	<u>Chapter 7</u> 1, 4, 8, 10, 13, 16, 20
Thu 9/28	<u><i>Review</i></u>		
Tue 10/3	<u>EXAM 1</u>		

⁺Office hours held in SZB 435; online lecture will be posted

Date:	Topic	Reading	Homework
Wed, 10/4 8:30am – 10am SZB 323		<i>Replacement lecture for 10/5</i>	
Thu 10/5 ⁺ & Tue 10/10	<i>One-sample Hypothesis Testing</i> ▪ Assumptions The Four Steps and the “logic” of Hypothesis testing	Chapter 8	Chapter 8 4, 6, 8, 15, 16, 20, 21
Tue, 10/10 2:00pm – 3:30pm SZB 323		<i>Replacement lecture for 10/12</i>	
Thu 10/12 ⁺	<i>The one-sample t-statistic</i>	Chapter 9	Chapter 9 1, 2, 5, 6, 8, 12a), 12b), 18, 22, 23
Tue 10/17	<i>Confidence intervals</i>	Chapter 9	12c), 13, 15b)
Thu 10/19 & Tue 10/24	<i>Independent samples Hyp. Testing</i> ▪ Sampling dist’n of differences between sample means ▪ F-Max statistic	Chapter 10	Chapter 10 3, 4, 6, 10, 14a), 14c), 18a), 22a)
Thu 10/26	<i>Related samples</i> Sampling dist’n of mean differences	Chapter 11	Chapter 11 1, 2, 3, 10a), 20a), 24a), 24c)
Tue 10/31	<u>Review</u>		
Thu 11/2	<u>EXAM 2</u>		

⁺Office hours held in SZB 435; online lecture will be posted

Date:	Topic	Reading	Homework
Tue 11/7	<i>Analysis of Variance (ANOVA)</i>	Chapter 12 p.385-415	Chapter 12 1, 3, 4, 9, 10, 12, 20, 21a), 21b), 21c)
Thu 11/9	<i>Multiple comparisons</i> Tukey's HSD	Chapter 12 p.415-on	Chapter 12 5, 21d), 23
Tue 11/14	<i>Multiple comparisons (cont'd)</i> ▪ Scheffé's	Chapter 12 p.415-on	Chapter 12 21d) and 23 w/same comparisons w/Scheffé,
Thu 11/16	<i>Correlation</i> ▪ Hypothesis testing	Chapter 15 p.509-530	Chapter 15 1, 2, 5, 8, 9, 12, 14
Tue 11/21	Simple Regression	Chapter 16 p.557-569	Chapter 16 2, 4, 6, 8, 10, 14 and calculate standard error of estimate for 10 and 14
Thu 11/23	Thanksgiving		
Tue 11/28	<i>Chi-squared test of</i> Goodness of Fit	Chapter 17 p.591-603	Chapter 17 2, 4, 8, 11
Thu 11/30	χ^2 test of ▪ Independence	Chapter 17 p.604-613, p.615-616, p. 620-on	Chapter 17 12, 20, 25
Tue 12/5	Review		
Thu 12/7	EXAM 3		

Summary:

Exams: 10/3, 11/2 and 12/7. Exam dates and times are not negotiable and will not change.

Please note that the **homework** due dates will **most likely change** based on the class's response to the material covered (i.e., based on the class's pace).

Deadlines for **portfolio entries** will be given **during class time** and will appear on each entry's example and rubric. You are responsible for hearing about these changes **in class**. More detail will be provided about the portfolio assignment after the relevant material has been covered (around 10/1). There will be approximately one entry due for each test kind of hypothesis testing covered (usually about seven are assigned).