



**THE UNIVERSITY OF TEXAS AT EL PASO**  
**COLLEGE OF SCIENCE**  
**DEPARTMENT OF MATHEMATICAL SCIENCES**  
*¡BIENVENIDOS (WELCOME)!*

*note:* From the top of <http://www.math.utep.edu/Faculty/lesser/schedule.html> or our Bb course shell, you can access this syllabus if you misplace yours, want to explore its many links or see any addendums. Syllabus is subject to change by the instructor to meet course needs, especially for unexpected school disruptions or big changes in class size, resources, etc.

**Course Number:** STAT 1380-001 (CRN# 22841)

**Course Title:** Basics of Descriptive and Inferential Statistics

**Credit Hours:** 3

**Term:** Spring 2017

**Prerequisite:** adequate score on a placement examination or MATH 0311. (see <http://catalog.utep.edu/search/?P=STAT+1380>)

**Course Fee:** none

**Course Meetings & Location:** MW 1:30-2:50 (except March 13&15) in LART 103. In a major disruption (e.g., H1N1 epidemic, subzero weather, etc.), be prepared to maintain course progress via alternative means (e.g., Internet, our Blackboard course shell, etc.) and check email (especially your UTEP account) regularly. UTEP set our final exam on May 10, 4-6:45pm.

**Instructor:** Dr. Larry Lesser (rhymes with 'Professor', spelled like < ).

See background on my homepage <http://www.math.utep.edu/Faculty/lesser/> or hear my introductory rap at <https://www.youtube.com/watch?v=sFizdFK09I8>

**Office Location:** Bell Hall 213

**Contact Info:** Phone: (915) 747-6845

Email **Lesser (at) utep.edu** (please include **1380** in the subject line)

also, emailing me from your [miners.utep.edu](mailto:miners.utep.edu) address is best because it provides more security and minimizes the chance the UTEP server rejects it

Homepage: <http://www.math.utep.edu/Faculty/lesser/>

Fax: (915) 747-6502 (note: this is a departmental fax, so be sure to have my name clearly on it; be aware that staff are not available to relay faxes to me outside the math dept's hours of M-F 8-12, 1-5

Emergency Contact: (915) 747-5761 (during math dept office hours)

**Office hours:** the half-hour after each class and by appointment; additional office hours or changes will be announced or posted later; you are also welcome to try emailing or stopping by anytime for easy questions; for questions requiring live conversation, just email me several possible times that would work and I will reply with which option works in my schedule; I expect to be assigned a graduate TA who can offer some office hours at yet additional times; also there is support at <http://math.utep.edu/marcs>

## Textbook(s), Materials:

**Required textbook:** Jessica Utts' *Seeing through Statistics* (4<sup>th</sup> ed; 2015). Cengage Learning. (She's a past-president of the American Statistical Association!) The textbook has a supporting website at: [http://www.cengage.com/cgi-wadsworth/course\\_products\\_wp.pl?fid=M20b&product\\_isbn\\_issn=1285050886&discipline\\_number=17](http://www.cengage.com/cgi-wadsworth/course_products_wp.pl?fid=M20b&product_isbn_issn=1285050886&discipline_number=17)

Subject to change based on timing, resources and interest, here's the main material we plan to (un)cover: **chapters 1-11** (in order) **then 14**, including supplementary probability material from the handout [http://www.math.utep.edu/Faculty/lesser/probabilitysupplement\(forUtts\).pdf](http://www.math.utep.edu/Faculty/lesser/probabilitysupplement(forUtts).pdf) on topics such as simulation, sample space, counting rules, the binomial distribution, and the geometric distribution. Then there will be exposure to concepts from a couple of remaining chapters as announced.

You are expected to read each chapter and try the selected HW problems for that chapter (see below) before the class meeting we discuss that chapter (so that you are able to understand more and offer more) and to **bring your book to each class**. I will usually assess your keeping up with reading/exercises by giving a quiz (with or without further notice) on the same topic, and I give at least one class period's advance notice for any chapters where I collect written homework.

Ch. 1 (1,3,4,5,8,10,18,19,21); Ch. 2 (3,5,6,10,14,15,18); Ch. 3 (1,2,6,8,9,13,18,21-26,32,33,36); Ch. 4 (1-3, 6, 10-12, 17-19, 21,26,28,33); Ch. 5 (1,4-6,9,19,24,27,30,35-37,39,42); Ch. 6(TBA); Ch. 7 (1-3,6d,9-16,18,21,24,27,29-31,34,36,38); Ch. 8 (1,3,79b,10,13,15,18,20,24,25) Ch. 9 (1,3,6,8,9b,11,14,17-19,21,27); Ch. 10 (2-4,7-11,13-15,18,20,21,24,29) Ch. 11 (1,3-7,10-12,15,16,18,21,23,30,31); Ch. 14 (1,3,6,9-14, 16a,17,19-22,24,28d,34); a few additional exercises will be announced later

## Required technology:

- **“low-tech” clicker (ABCD Card), brought to each class, starting Jan. 23:** <http://www.math.utep.edu/Faculty/lesser/ABCDclassResponseCard.pdf> (if you don't have a color printer, print the card from the URL above in **black-and-white and color it in with the same color scheme as the URL above**) see the “Participation” section in this syllabus for more information
- **calculator (with square root key) brought to each class:** You'll be allowed to use it on virtually all activities and assessments (but it really has to be a separate calculator, because you aren't allowed to use devices such as a laptop or cell phone on tests). You still must show enough work so I can follow your process. Example: to find mean of {3, 4, 5, 5, 8}, don't just say “5”, but write out  $(3 + 4 + 5 + 5 + 8) / 5 = 5$ . A few calculations will be easier with a graphing calculator (you can use Google to find many resources on how to do statistics with your calculator; I will sometimes demonstrate things with a **TI-73/83/84** -- their Guidebooks are under the Downloads pulldown menu at the above link; also see [http://www.prenhall.com/esm/app/calc\\_v2/](http://www.prenhall.com/esm/app/calc_v2/)) but if you don't already own one, you can manage with a scientific calculator or even a simple calculator that can do basic arithmetic such as square roots. As logistics and interest allow, I'll also expose you to how stats are computed with applets and software (Excel, Minitab). While Minitab is in some on-campus labs (e.g., <http://utep.edu/chs/ilc>), you can actually access it anytime

anywhere (even at home!) using UTEP MY.APPS (see <http://admin.utep.edu/Default.aspx?tabid=74328> and <http://admin.utep.edu/Default.aspx?tabid=74340>) and its Calc, Stat, and Graph pull-down menus have about all you'd need (and more)!

**(other technology resources you may want to explore on your own include:**

<http://codap.concord.org>, <https://www.jake4maths.com/grapher/>, <https://www.stat.auckland.ac.nz/~wild/iNZight/index.php>, <https://tuvalabs.com/>; also, students can get free time-limited licenses of <http://fathom.concord.org/> or <https://www.tinkerplots.com/>)

**Course Objectives (Learning Outcomes):** Students will be able to....

**apply arithmetic, algebraic, geometric, higher-order thinking, and statistical methods to modeling and solving real-world situations.**

Numerical and graphical summaries of one-variable and two-variable datasets are interpreted, produced, and described verbally. We assess the reasonableness of linear models to data sets. We assess the reasonableness of a study's conclusions based on that study's qualities (e.g., was randomization used?).

**represent & evaluate basic mathematical information verbally/numerically/graphically/symbolically**

Numerical and graphical summaries of one-variable and two-variable datasets are interpreted, produced, and described verbally.

**expand mathematical reasoning skills & formal logic to develop convincing mathematical arguments.**

Reasoning used to apply probability rules and to critique statistical studies (and to assess whether a claim of significance is warranted).

**use appropriate technology to enhance mathematical thinking and understanding and to solve mathematical problems and judge the reasonableness of the results.**

technology incorporated such as spreadsheet software, internet applets/simulations, or graphing calculators.

**interpret mathematical models (formulas/graphs/tables/schematics) and draw inferences from them.**

Histograms, scatterplots, boxplots, tables, regression lines, etc. are interpreted.

**recognize the limitations of mathematical and statistical models.**

Studies done without random selection and/or random assignment are recognized as limited. Pitfalls and limitations of experiments (e.g., ecological validity), observational studies (e.g., no random assignment), and surveys are discussed. Formulas such as margin of error are recognized not to apply for a volunteer sample, for example.

**develop the view that mathematics is an evolving discipline, interrelated with human culture, and understand its connections to other disciplines.**

Because statistics can be applied to data from virtually all disciplines, it is natural to make clear interdisciplinary connections. Statistics and its tools are much newer field than the mathematics in "other math core classes". The connection to human culture comes into play with the human judgments that go into writing "the best" survey question, or deciding how to handle an outlier value, etc.

This course will expose you to typical intro topics but with particular emphasis on and grounding in conceptual understanding and statistical literacy in real life. You deserve, need and will be offered more than a plug-and-chug, memorize-the-recipes experience! You'll be able to critically evaluate statistics commonly found in the media and in your major field. You'll become acquainted with what is involved in the collection, interpretation, and communication of real-world data to explore questions of interest.

Also, **future teachers** will have the chance to gain background to handle probability and statistics questions on the TExES/ExCET (<http://cms.texas-ets.org/prepmaterials/>), teach related TEKS (<http://ritter.tea.state.tx.us/rules/tac/chapter111/index.html>), and make appropriate connections to the NCTM Standards (<http://www.nctm.org/standards/content.aspx?id=16909>), the GAISE PreK-12 Curriculum Framework (<http://www.amstat.org/Education/gaise/>), and the Common Core State Standards [http://www.corestandards.org/assets/CCSSI\\_Math%20Standards.pdf](http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf). Your instructor has even taught some statistics on a children's educational TV show to local first and second graders: <https://youtu.be/iVeCN6dTvzo>). Also, see <http://www.amstat.org/ASA/Education/K-12-Educators.aspx#classroom?hkey=09d2addb-f9d1-42a8-bb71-3f395265b531>

**Course Activities/Assignments:** Students will participate in in-class activities, demonstrations, discussions, readings, and assessments. Assigned homework exercises from the textbook are listed previously on this syllabus where the textbook is stated.

**Assessment of Course Objectives:** Assessments include written reflections, quizzes, exams, and a final project.

**Course Schedule:** Census Day: Feb. 1 for UTEP  
Midterm Exam: scheduled for March 1, but subject to change  
Turn in Data Analysis Project Proposal on or before Feb. 27  
(<http://www.math.utep.edu/Faculty/lesser/1380proposal.html>)  
or <http://www.math.utep.edu/Faculty/lesser/1380proposal.pdf>)  
Freshmen midterm grades due: March 23  
Deadline to Drop with a “W”: March 30  
Presentation of Data Collection Projects: to be announced (but it will be during the last 2 regular weeks of the course)  
Last Regular Class Meeting: Wed., May 3 (note: it may be appropriate to also meet on May 6, which UTEP added to replace Feb. 17)  
Finals Week Exam: Wed., May 10, 4-6:45 (as set by UTEP registrar; focusing on material AFTER the material covered by the midterm)

**Grading Policy:** after any rescaling needed for all components to be on the 0-100 scale, the grade is determined by the usual cutoffs of 90-80-70-60 based on these 3 parts:

\* **Midterm Exam (23%)** at least a week or two in advance, I’ll confirm the exact material covered, the date, and the major tables and unannotated formulas from the textbook that will be provided on each of the 2 tests; you must bring your own calculators (see p. 2 of the syllabus) and #2 pencils; the main emphasis of the exam is not on memorization or rote procedures, but on being able to recognize, apply, critique, and interpret concepts in context (e.g., in newspaper articles or graphs), even if the questions have a multiple-choice format; it is recommended that you study with a partner your class notes, the textbook chapters, homework, and quizzes.

\* **Finals Week Exam (23%)** – focusing on material AFTER the material covered by the midterm

\* **Quizzes/HW/Reflections (23%)**: some of these will be with a partner, some will be “solo”; some may be in class, some “take home”; **no more than the top 8 scores will count.** To be sure you get credit for your written work, you need to use your full name since there are usually students in the class who have identical or similar first or last names.

\* **Team Project (31%)** – for requirements, resources, deadlines, etc., see

<http://www.math.utep.edu/Faculty/lesser/Stat1380DataProject.html>

**Makeup Policy:** A makeup exam is possible only if you take the initiative to send me an email or voicemail within 24 hours (or the earliest medically possible opportunity) that tells me: (1) why missing the scheduled class exam date was unavoidable for a serious reason, and (2) gives me multiple days/times within the next few days when you would be available to take a makeup exam. If it takes more than 72 hours after an exam to receive such an email from you, I would consider a makeup only in extreme circumstances with written documentation.

With a missed in-class quiz, you have two choices: (1) don’t worry about it because only the top 8 quizzes count (and we’ll have close to twice that many), so missing a quiz doesn’t give you a 0, that quiz just simply won’t be a score in your top 8; or (2) if the missed quiz is for a serious reason for which you email me or hand me written documentation (e.g., a

doctor's note) within 3 calendar days, then the missed quiz will not count against the number you are allowed to "drop."

If a written assignment is due in class and you are not able to get to UTEP, you are still responsible for emailing or faxing the assignment by the start of that day's class. In general (out of fairness and logistics), late work will not be accepted, and may be subject to a penalty in the rare borderline cases that it is accepted at the instructor's discretion.

**Attendance Policy: Attendance is required** and here's why: Much of this course involves beyond-the-book group activities, experiences or discussions that are virtually impossible to recreate or "make up." Successful completion of this course is intended not only to imply you have demonstrated sufficient knowledge acquisition, but also that you have been exposed to key processes, modeling, and experiences (which are especially important for future teachers, for example). Therefore, if you are now in a situation where you expect to have frequent absences, you might consider taking this class in another section or another semester. Attendance is generally taken each meeting using a sign-in sheet and it's your responsibility to sign it each day you attend *before the end* when I am busy packing up materials. Late arrival, early departure, or blatant nonparticipation may be counted as a half-absence or even a full absence, depending on what is missed.

As the UTEP *Catalog* says, "When in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor may drop the student from the class with a grade of "W" before the course drop deadline [March 30] and with a grade of "F" after the course drop deadline." In practical terms, this means a student is **subject to being dropped for 6 or more absences** (unless you have given me a written or emailed reason I have approved). If you choose to withdraw, I ask that you submit the formal paperwork and send me an email to let me know rather than just stop attending class and assume you will be withdrawn automatically. On a positive note, a strong record of attendance will be taken into account if your final average is a point below a letter grade cutoff.

It's **your responsibility** to....

- (1) give me a written note or email by the 15<sup>th</sup> day of the semester [Feb. 6] if you will have absence for religious holy days (which are excused, of course).
- (2) give me an email or written documentation as soon as possible if you anticipate the possibility of missing large parts of class due to exceptional circumstances such as military service/training, childbirth, or competing on official UTEP athletic teams.
- (3) let me know by email (**Lesser (at) utep.edu**) or voicemail (747-6845) or daytime math dept. fax (747-6502) at the *earliest opportunity* if you have a serious situation which may affect a test, major assessment deadline, the final exam week meeting, or a large number of "regular" class days. If you miss a "regular class meeting," you don't need to contact me, but you do need to get notes and announcements from a classmate: **be sure you have contact information for at least 3 classmates** for this purpose

**Academic Integrity Policy:** It's UTEP's policy (and mine) for all suspected violations to be referred to the Dean of Students for investigation and disposition (see the Handbook of Operating Procedures, <http://admin.utep.edu/Default.aspx?tabid=73922>). Cheating, plagiarism and collusion in dishonest activities are serious acts which erode the university's purpose and integrity and cheapen the learning experience for us all. Don't resubmit work completed for other classes without specific acknowledgment and permission from me. It is expected that work you submit represents your own effort (or your own group's effort, if it is a



group project), will not involve copying from or accessing unauthorized resources or people (e.g., from a previous year's class). You must cite references that you do consult, using **APA style** with complete citations even for websites and people you consult.

**For Group Work:** Within a group, members are allowed to divide up subsets of the project for which individuals will take the initial responsibility for coordinating efforts, but it is assumed that by the time a group turns in a writeup that all members have read, discussed, contributed to, and understand what is being turned in. Group members may even discuss general ideas and strategies with members of other groups, but NOT share parts of actual written work. At a minimum, to be safe, put away all written notes and writing materials and recording devices before having any intergroup conversations. And if you still see a "gray area," play it safe and ask the instructor! Conversations between teams are not allowed during in-class quizzes taken as teams.

**Civility Statement:** You are expected to follow basic standards of courtesy (<http://admin.utep.edu/Default.aspx?tabid=73922>) and may be dismissed from class for blatant or sustained disruptive behavior. Your comments during classroom discussions need to focus constructively and respectfully on the intellectual merit of a position, *not* critiquing the person expressing it. You should avoid side conversations when one person (me, or another student) is talking to the whole class. If you need to have a laptop open (for taking notes during lectures or appropriately accessing an electronic copy of our textbook), please minimize distractions to other students by sitting against a back wall or side wall. Whether the "weapon of math disruption" is a phone or laptop, engaging in activities such as texting, Facebook, YouTube, phone conversations, or emailing are inappropriate because they distract and impact class participation. If you are expecting an urgent call on your cell phone, ***please keep your phone on vibrate*** instead of anything loud, let me know and sit near the door to minimize disruption, and have the phone handy so you don't have to dig around for it. Or you might give your family member or childcare provider the phone number for an office (e.g., LACIT 747-5375) near our classroom so you can rest assured that staff can quickly let you know if there is an emergency.

**Student Accommodations Statement:** If you have or believe you have a disability requiring accommodations, you may wish to self-identify by contacting the Center for Accommodations and Support Services (CASS; 747-5148; East Union Building 106; [cass@utep.edu](mailto:cass@utep.edu); <http://sa.utep.edu/cass/>) to show documentation or register for testing and services. CASS will ask you to discuss needed accommodations with me within the first 2 weeks of the semester or as soon as disability is known, and at least 5 working days before an exam. You are responsible to make sure I receive any CASS instructions and accommodation letters. CASS provides note taking, sign language, interpreter, reader and/or scribe services, priority registration, adaptive technology, diagnostic testing for learning disabilities, assistance with learning strategies/tutoring, alternative testing location and format, and advocacy.

**Military Statement:** Give me an email or written documentation as soon as possible if you anticipate the possibility of missing large parts of class due to military service.

#### ADDITIONAL INFORMATION

**Catalog Description:** "A course in **statistical literacy**. Emphasis will be on standard

descriptive measures of location, spread, and association. Regression, probability and sampling, and binomial distribution. **Interpretation** of data which occur in **daily life** (polls, weather forecasting, surveys, quality control, etc.) will be stressed.”

**Professionalism Statement:** Beyond the previously mentioned Civility Statement, students in this course are expected to exhibit professionalism that goes beyond avoiding negative behaviors. This includes making a good faith effort in preparation for and participation in individual and collaborative class activities. A classroom culture must be actively supported that understands that “incorrect answers” are usually correct answers to a different question or valuable learning opportunities to address an important distinction or common misconception. Also, be open to local opportunities for professional growth or service. For example, future teachers may consider encouraging K-12 students to enter an **ASA Project or Poster** (due April 1) or joining (at cheaper student rates!) professional organizations -- local (GEPCTM), state (**TCTM**), or national (**NCTM**, **TODOS**, or **ASA**). You can also get a taste of student research by attending (and one day presenting at) events on campus such as the COURI symposium for free on April 22 (<http://couri.utep.edu/index.php/symposia/upcoming>) and the strongest student project authors in our class might consider entering a national contest (<https://www.causeweb.org/usproc/USCLAP%20Competition>).

Finally, start to be aware of statistics in the mass media around you, in places such as: <http://www.gallup.com/home.aspx>, <https://www.statslife.org.uk/significance>, [https://www.causeweb.org/wiki/chance/index.php/Main\\_Page](https://www.causeweb.org/wiki/chance/index.php/Main_Page), <http://stats.org>, <http://usatoday30.usatoday.com/snapshot/news/snapindex.htm>, <http://nieonline.com/coloradonie/downloads/minipage/MiniPage8.10.16.pdf>, etc.

**Participation:** Part of your daily class participation involves answering questions posed by the instructor. These questions are ongoing assessment designed to give feedback to you as well as to the instructor. Some questions will be answered “simultaneously and anonymously” using the research-backed, classroom-tested Ed Prather ABCD Class Response Card. **Each student is responsible for bringing to each class the ABCD Card** that has the same color scheme as the one located at the following URL: <http://www.math.utep.edu/Faculty/lessor/ABCDclassResponseCard.pdf>.

**Confidentiality:** UTEP policy requires that inquiries about confidential information such as grades cannot be done over the phone, but must be from your miners.utep.edu account and accompanied by your 800 number. If time permits between when I submit course grades and UTEP puts them online, I will post them in our course Blackboard shell so that you can see only yours.

**English Language Learner (ELL) Awareness:** Development of this class was supported in part by the US DOE grant **Project LEAP-UP**. Many of you are/were ELLs or may soon teach them. I will model strategies that help ELLs (and others, too!) and incorporate awareness of ELL issues and resources in probability/statistics (e.g., **my 2011 paper in Statistics Teacher Network**, resources at <http://www.tsusmell.org/>, and <http://isi.cbs.nl/glossary/index.htm>. The **English Language Proficiency Standards** require language acquisition and academic success in all content areas for students at all 4

levels (beg., int., adv., adv. high) in all 4 domains (listening, speaking, reading, writing). Finally, consider that the grade level readability of *any* subject's text is from a *statistical* model based on average number of syllables per word, average number of words per sentence, etc. (e.g., see "readability" in MSWord Help).

Development of this class was also supported in part by US DOE grant Project ACE (ACtion for Equity) and some statistics examples we discuss involve or apply to equity, such as gender equity. Check out the cool poster at <http://www.cdc.gov/nchs/about/poster.htm> and some resources at <http://www.math.utep.edu/Faculty/lesser/equity.html>.

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**Other Resources:** For those who may be helped by consulting statistics books for additional mathematical theory, conceptual intuition, or real-world connections, go to the UTEP library circulation desk and ask them to look under "STAT 1380"). Also, know that there are free statistics textbooks online (e.g., <https://openstaxcollege.org/textbooks/introductory-statistics/get> or <http://onlinestatbook.com/>) that can be consulted as references as well. I compiled <http://www.math.utep.edu/Faculty/lesser/StatEdIntro.html> to share applets and other resources that not only can help your own understanding in this course, but also offer further context and connections with some topics. Please let me know of other resources you find helpful that I may not know about.

Calculation pages: <http://statpages.org/> (includes much beyond our course)

Classroom connections (interesting for all, especially future teachers):

<http://ww2.amstat.org/education/stn/> (e.g., browse issue #64)

<http://www.wiley.com/bw/journal.asp?ref=0141-982X&site=1> (UTEP students have access through the UTEP library webpage)

<https://www.causeweb.org/cause/resources/>

<http://www.amstat.org/asa/education/K-12-Statistics-Education-Webinars.aspx>

UTEP Library: Also, I've put some statistics books with other conceptual intuition or real-world connections on reserve at the circulation desk under "Lesser" or "Stat 1380." On the 2nd floor, [free walk-in tutoring](#) is available for this course (<http://marcs.utep.edu>; Library 218; 747-5366) as well as [free help with writing papers](#) (Library 227; 747-5112; Writing Center (Library 227, 747-5112, <http://academics.utep.edu/Default.aspx?tabid=47508>).

General study tips: <http://www.math.utep.edu/Faculty/lesser/mathtips.html>

Campus Concealed Carry: <http://sa.utep.edu/campuscarry/>

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**Student Support:** My training is limited to academic resources (e.g., my chapter on statistics anxiety on (e)reserve in the UTEP library under "MATH 5364"), but I want anyone who feels overwhelming stress/crisis to know about these broader resources:

- UTEP's Counseling Center (free counseling to all students): 747-5302, which after-hours goes to a crisis line
- Mental Health Crisis Line: 779-1800
- National Suicide Prevention Hotline: 1-800-273-8255
- Veterans Crisis Line: 1-800-273-8255
- NAMI (National Alliance Against Mental Illness) of El Paso: 534-5478
- <http://caringeducators.tumblr.com/survival>