

**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 links](#), or see any updates to it. Syllabus is subject to change by instructor to meet course needs, especially if there are unexpected disruptions or changes in class size, resources, etc.

**Course Number:** MATM 5364-001 (CRN **18357**)

**Course Title:** Quantitative Methods in Mathematics Education Research

**Credit Hours:** 3

**Term:** **Fall 2019**

**Prerequisite:** Departmental Approval

**Course Fee:** none

**Course Meetings & Location:** **TTh 5-6:20pm in Bell Hall 130** (the “computer lab classroom”). In a major disruption (e.g., H1N1 epidemic, subzero weather), be prepared to maintain course progress via other means (e.g., Internet, our Blackboard shell, etc.) and check email (especially your UTEP miners account) regularly. UTEP set our final on **Tuesday, Dec. 10, 4-6:45pm (with consensus, we usually find a way to move the time a bit later to accommodate working teachers).**

**Instructor:** Dr. Larry Lesser (rhymes with “professor”, spelled like “<”). I began teaching (especially statistics!) university classes in 1988, and I’ve also worked in Texas as a state agency statistician (see Oct. 2012 *Mathematics Teacher*) and as a full-time high school teacher. I’ve served on national statistics education journal editorial and research advisory boards and have published in selective research journals such as *Statistics Education Research Journal* and *Journal of Statistics Education* as well as in teacher-oriented outlets such as *Teaching Statistics*, *Mathematics Teacher*, *Statistics Teacher Network*, and *STEW: Online Journal of K-12 Statistics Lesson Plans*. See background on my homepage <http://www.math.utep.edu/Faculty/lesser/> or hear my introductory rap at <https://www.youtube.com/watch?v=sFizdFK0918>

**Office Location:** Bell Hall 213

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

Email **Lesser (at) utep.edu** (please include **5364** in the subject line so it is easy to see and easy to search for later; also, emailing me from your [miners.utep.edu](mailto:miners.utep.edu) address provides more security and reduces the chance of UTEP’s server rejecting it)

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

Fax: (915) 747-6502 (note: this is a math department 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:** Tues 3-3:30, Thurs 12-12:30 and by appointment by Bell 213, and additional hours or changes will be announced or posted later; you are welcome to try emailing, calling, or stopping by without an appointment for readily answered questions;

for questions requiring longer live conversation, just email me several possible times that would work for an appointment and I will reply with which option works in my schedule for a meeting whether it would be in-person, by phone, or via Blackboard Collaborate Ultra (instructions are in Bb course shell Announcements)

**Textbook:** Vogt, W. P. (2007). *Quantitative Research Methods for Professionals*. Boston: Pearson.

The book is available to this class this semester in our Bb shell. Chapters will be covered in an order (1-11, 17, 16, then 15 & 12-14) and with relative emphases to support the goals of preparing you to interpret and conduct education research. This outline is subject to modification by the instructor to take into account interests, backgrounds, resource availability, logistics, scheduling/sequencing issues, and balance between depth and breadth. I may provide supplementary material for which you will also be responsible. Since you know the order of chapters now, you are expected to read each chapter (and assess your understanding by taking that chapter's Self-Test and checking your answers in the Appendix) before the class meeting it will be discussed, and bring your book (in some form) to each class.

### Required technology:

\* **graphing calculator brought to each class.** Because the TI-83/84+ calculator is the one most commonly used in secondary school classes like AP statistics, etc., this is the one I will use when demonstrating many basic procedures. If you use a different calculator, you will need to take responsibility for learning how it does the things we will be using it for. You'll be allowed to use your calculator on virtually all assessments and activities (but it really has to be a separate calculator, because you aren't allowed to use devices such as a laptop, smartwatch or cell phone on tests). You still need to be able to show enough work so I can follow your process. A simple example: to find mean of {3, 4, 5, 5, 8}, you wouldn't just say "5", but you would write out  $(3 + 4 + 5 + 5 + 8) / 5 = 5$ .

Of course, not everything can be readily done on just a calculator, and we will also dive in and compute statistics using tools such as applets, spreadsheet (Excel), or software (**Minitab**). On Minitab, the Calc, Stat, and Graph pulldown menus have about everything you'd need (and then some)! Minitab is in some on-campus labs (e.g., <http://utep.edu/chs/ilc>) and should be in our classroom (Bell 130), and you can actually access it anytime *anywhere* (even at home!) using UTEP MY.APPS (see [https://www.utep.edu/technologysupport/ServiceCatalog/INST\\_MyAppsInfo.html](https://www.utep.edu/technologysupport/ServiceCatalog/INST_MyAppsInfo.html)) and its Calc, Stat, and Graph pulldown menus have about all you'd need (and more)!

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

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

**Course Objectives (Learning Outcomes):** Students will...

- Gain an overview of quantitative research methods in mathematics education research, including: descriptive and inferential statistics, surveys, experiments, psychometrics, simple and multiple regression, ANOVA, chi-squared, logistic regression.
- Improve critical thinking and conceptual understanding of these methodologies.

- Learn better how to generate and interpret technology output in the context of reporting the results of mathematics education research, including  $p$ -values and effect sizes.
- Learn how to align methods with research question in mathematics education and to investigate the assumptions of the statistical models.
- Gain ability to better understand statistical information commonly encountered by working classroom teachers

**Course Activities/Assignments:** Students will participate in in-class activities, read assigned articles and chapters, facilitate/participate in discussions, take exam/quizzes, and do homework exercises/projects. The instructor will make clear which assignments or assessments may be done in small groups and which must be done individually.

**Assessment of Course Objectives:** Assessments include written reflections, exam, individual or team write-ups, quizzes, class discussions, oral presentations.

**Course Schedule:**    **Census Day: Sept. 11 for UTEP**  
                                  **Deadline to Drop with a “W”: Nov. 1**  
                                  **Last Regular Class Meeting: Dec. 5**  
                                  **Final Exam: as scheduled by UTEP registrar (Tues, Dec. 10, 4-6:45pm Wed., May 10); with consensus, we can usually move the time a bit later that evening to accommodate working teachers**

**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 parts:

Projects/Homework (68%): these include labs, papers, reflections, article reviews, or chapter presentations (see **resources for giving oral presentations**). All assignments must be word processed with double-spacing and a standard 12-point font (e.g., Times New Roman), checked for spelling and grammar, and have any appropriate output/graphics electronically pasted into the document. Exercises/sections should be clearly marked, assembled in order, and stapled (*not* put into a folder or sleeve) with a meaningfully-titled identification coversheet on top. Some assignments will be assigned to be done in teams, and some as individuals.

Final (30%): you’ll be allowed your calculator and provided appropriate tables and formulas as announced

Attendance (2%): This is a “free” 2% for all students who have no more than 3 absences and no more than 1 unexcused absence.

Quizzes: occasional unannounced quizzes will be taken into account only if your final average falls a point below a letter grade cutoff (i.e., they can only help)

**Makeup Policy:** If a written assignment is due in class and you are not able to get to UTEP, you can still get full credit by emailing or faxing the assignment that night. A makeup exam is possible 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 and unforeseen (even if it takes another few days to relay to me written documentation such as a doctor’s note, jury summons, letter from an employer/athletic/military

supervisor, etc.) for a serious reason, and (2) states multiple specific days and times within the next few days when you would be available to take a makeup exam.

**Attendance Policy:** I view attendance as **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 researchers and 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, possibly using a sign-in sheet (depending on the size of the class). If you think you might arrive late due to traffic or a meeting, keep in mind that I believe **it's always better to attend some of a class than none of a class.**

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 [Fri., Nov. 1] 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; **don't just stop attending class and assume I will automatically withdraw you.** 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 [Mon., Sept. 16] 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," remember to get notes and announcements from a classmate and 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, <https://www.utep.edu/vpba/hoop/>). Cheating, plagiarism and collusion 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:** We should all strive to follow basic standards of courtesy. Our comments during classroom discussions should focus constructively and respectfully on the intellectual merit of a position, *not* critiquing the person expressing it. Please avoid side conversations when one person (me, or another student) is address the class. Engaging in activities such as texting, Facebook, YouTube, phone conversations, or emailing are inappropriate because they distract and impact class participation by you and others. If you are expecting an urgent call, *please keep your phone on vibrate* instead of anything loud, 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 childcare provider or family member the phone number for the campus police (747-5611) so you can rest assured that someone will let you know if there is an emergency. Finally, know that free speech has limits and that the *UTEP Handbook of Operating Procedures* prohibits communication that is harassing, disruptive, or that incites imminent violations of law. Violations may be referred to the Dean of Students or Campus Police.

**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); <https://www.utep.edu/student-affairs/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. At the start of a term, CASS sometimes has processing delays, and you are responsible to contact (and follow up with) CASS promptly so that I receive the CASS accommodation letter as soon as possible. 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. Depending on the specifics of your accommodations, I may need to email you to set up a live conversation with you about the best approach, so please be responsive.

**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

campus carry: <https://www.utep.edu/campuscarry/>

campus safety: <https://www.utep.edu/police/UTEP-Emergency-Action-Guide.pdf>

**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. This also includes supporting a classroom culture respecting “incorrect answers” as usually correct answers to a different question or valuable opportunities to address an important distinction or common misconception. (*Fun Fact*: “mistakes” led to inventing sticky notes, penicillin, rubber tires, etc.)

**Confidentiality:** UTEP policy requires that inquiries about confidential information such as grades cannot be done over the audio phone, but can be from your miners.utep.edu account and accompanied by your 800 number. Some grade information will be posted in our Bb course shell.

**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 “MATH/MATM 5364” (or, for even less mathematical versions, what I put under “STAT 1380”). Also, be aware that there are lots of free statistics textbooks online that can be consulted as references as well (in GOOGLE, type: online statistics textbooks) and there are various resources at [www.math.utep.edu/Faculty/lesser/STATResources.html](http://www.math.utep.edu/Faculty/lesser/STATResources.html).

My “welcome to the wonderful world of STAT ED website” (<http://www.math.utep.edu/Faculty/lesser/StatEdIntro.html>) has resources that not only will help your own understanding in this course, but also offer further context and connections with some topics you might teach (at a more basic level). Speaking of teaching, here are standards and guidelines for teaching statistics to high school students:

TEKS: <http://ritter.tea.state.tx.us/rules/tac/chapter111/>,

ASA: [http://www.amstat.org/education/gaise/GAISEPreK-12\\_Full.pdf](http://www.amstat.org/education/gaise/GAISEPreK-12_Full.pdf),

NCTM: [http://www.nctm.org/uploadedFiles/Standards\\_and\\_Positions/PSSM\\_ExecutiveSummary.pdf](http://www.nctm.org/uploadedFiles/Standards_and_Positions/PSSM_ExecutiveSummary.pdf)

COMMON CORE: <http://www.corestandards.org/Math>,

[http://www.corestandards.org/assets/CCSSI\\_Math%20Standards.pdf](http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf)

Please let me know of any other resources you find helpful that I may not know about. As a K-12 teacher, you get a FREE trial ASA membership:

<https://ww2.amstat.org/membership/k12teachers/index.cfm>

Also, on the 2nd floor, there is free help with writing papers (Library 227; 747-5112; Writing Center (Library 227, 747-5112, <http://uwc.utep.edu/>).

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

- **UTEP’s Counseling Center** (free counseling to all students): 202 Union West, 747-5302 (which after-hours goes to a crisis line)
- El Paso’s Mental Health Crisis Line: 779-1800 (24 hours)
- **National Suicide Prevention Hotline** or **Veterans Crisis Line**: 1-800-273-8255
- **NAMI (National Alliance Against Mental Illness) of El Paso**: 534-5478
- <http://caringeducators.tumblr.com/survival>
- International Border Crossing Resources (see our Bb course shell)