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

note: From top of **http://www.math.utep.edu/Faculty/lesser/schedule.html** and/or Blackboard, you can access this syllabus if you misplace yours, want to explore its links, or see any updates to it. Syllabus is subject to modification by instructor to meet course needs, especially if there are unexpected major disruptions or changes in class size, resources, student backgrounds, etc.

Course Number: MATH 5360-001 (CRN#14373)
Course Title: Introduction to Research in Mathematics Education ("part one")
Credit Hours: 3
Term: Fall 2012
Prerequisite: Departmental Approval
Course Fee: none

Course Meetings & Location: Bell 130A, MW 6:30-7:50pm, except Sept. 3.
The instructor will announce which meetings may be held in a lab or library area for hands-on explorations of research tools. Be sure to check your email (especially your UTEP miners address) regularly for course announcements in between meetings. In the event of a major disruption (e.g., H1N1 epidemic, subzero weather), be prepared to maintain course progress via alternative means such as Blackboard (we have a shell for our course already), Elluminate, etc.

Instructor: Professor **Dr. Larry Lesser** (rhymes with "professor", spelled like "<").
I've been at UTEP since 2004 and began teaching university classes in 1988. I am Editor of *Teaching for Excellence and Equity in Mathematics* and I've also served on other national journal editorial boards and research advisory boards and published in selective research journals (e.g., *Statistics Education Research Journal*). I've also been a full-time high school teacher and more background is at **www.math.utep.edu/Faculty/lesser/**.

Office Location: Bell Hall 213
Contact Info: Phone: (915) 747-6845
Email **Lesser (at) utep.edu** (include "5360" as part of the subject line)
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: initial office hours include Mon 5:40-6:20pm, Wed 7:50-8:15pm and my appointment; additional office hours and any changes will be announced/posted later; students are also welcome to try stopping by at other times for short questions or to send me an email requesting an appointment for longer questions

Textbook, Materials:

- **Required textbook:** Hendricks, Cher (2013). *Improving Schools through Action Research: A Reflective Practice Approach* (**3rd ed**.). Boston, MA: Pearson. Because no single book completely covers all goals of the course, we supplement this book with handouts, individual articles, online resources and demonstrations, taking into account class backgrounds, interests, and time available.
- **Additional readings** will be assigned and required and made available to you in one of the following ways (depending on logistics and copyright issues):
  - on the Internet (e.g., certain open-access journal articles and websites like **http://www.math.utep.edu/Faculty/lesser/ResearchResources.html**).
  - sent by email to the email address that UTEP has on file for you.
  - at UTEP library hardcopy reserve at the Circulation Desk
  - on UTEP library electronic reserve via library homepage (choose: Services →course reserves→type "Math 5360"→Lesser→Readings).
  - from a UTEP library database (go to the UTEP library home page, and type the exact name of the journal's title into the "search Encore" window at the top left corner. This usually results in your being able to access the journal from one or more sources. Be aware that sometimes the listing suggests that fewer years are available than actually are, so always click as far as you can.)
  - to our class Blackboard shell
- Bring the official class "low-tech" clicker (i.e., ABCD Card), brought to each class, starting August 29, 2012; if you don't have a color printer, print in black-and-white and color it in using the same color scheme as: **http://www.math.utep.edu/Faculty/lesser/ABCDclassResponseCard.pdf**

Course Objectives (Learning Outcomes): Students will….

- Learn how to formulate appropriately a research question of interest in mathematics education (which in this syllabus is assumed to include statistics education)
- Increase ability to navigate and synthesize the research literature in mathematics education
- Increase ability to critique a mathematics education research paper and make connections between theory and practice
- Gain further insight into methodology options and choosing methodology with a research question
- Understand pitfalls and ethical principles of research and how to fulfill compliance requirements with your school district and the UTEP Institutional Review Board (IRB)
- Write and present a mathematics education research paper that uses current edition of APA style, includes (1) an introduction to the motivation behind and importance of the research question, (2) a solid review of the literature for the research question of interest, and (3) a description of methodology with at least an introductory level of detail (that demonstrates alignment with research question and framework of study).
- Learn how to contribute to and benefit from being part of a community of (emerging) scholars

Course Activities/Assignments: Students will participate in in-class activities, read assigned articles and chapters, facilitate/participate in discussions, take exam/quizzes, write reflections, do homework exercises, and submit a written research paper (and give a short oral presentation of it). Assignment and assessments are to be done individually unless the instructor has specifically announced an option or requirement to work in pairs or small groups.

Assessment of Course Objectives: Assessments include written reflections, exam, quizzes, class discussions, written research paper, oral presentation of research paper.

Course Schedule: Census Day: Wed. Sept. 12
Test: currently set for Wed. Oct. 17, but subject to change by instructor
Deadline to Drop with a "W": Fri., Nov. 2
Last Regular Class Meeting: Wed., Dec. 5
Final Exam Week Meeting: Wed., Dec.12, 7-9:45pm, as scheduled by UTEP registrar; the final exam week meeting will not be a final exam, but a time available for oral presentations of the research papers; if you have a pre-approved reason not to be able to present during this time, you need to arrange with me as soon as possible to turn in and present your paper *earlier*)

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:

Written Research Paper: 40% (details will be given early in the semester)
Midterm Exam: 30% (currently scheduled for Wed. Oct. 17)
Quizzes, Short Reflections, Homework Assignments: 20%
Oral Presentation of Research Paper: 10%
Attendance: Subject to change if required by UTEP policy, your final course average will have $2 - 3U - E$ points added to it, where U = number of unexcused absences and E = number of excused absences. This reflects how crucial participation is for a course with "beyond-the-book" discussion, but without penalizing someone with ≤ 2 (excused) absences.

Makeup Policy: In general (out of fairness and logistics), **late work will not be accepted**, and would generally be subject to a penalty in the rare borderline cases that it is accepted at the instructor's discretion. A makeup exam is possible only if: (1) the student emails (or leaves me a voicemail, if email is down) to me within 24 hours (or the earliest physically possible opportunity) a verbal explanation of the serious reason why missing the scheduled class exam date was unavoidable, and hand me or email me a copy of appropriate supporting documentation (e.g., doctor's note) within 7 calendar days of the exam, and (2) the student takes the initiative to contact me by email with several available days/times for a makeup exam as soon as possible (if it takes more than a few days to get an appropriate email response from the student, I would consider a makeup only for *documented extreme circumstances*).

Attendance Policy: **Attendance is <u>required</u>** because 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 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. <u>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</u>. Late arrival, early departure, or blatant nonparticipation may be

counted as a half-absence or even a full absence, depending on what is missed. In any case, it is always better to come to part of a class than completely miss it.

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 [Nov. 2] and with a grade of "F" after the course drop deadline." In practical terms, this means a student is **subject to being dropped for 4 or more absences** (unless you have given me a 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 can help you if your final average is very close to a letter grade cutoff.

It's **your responsibility** to….

(1) give me a written note or email by the 15th day of the semester [Sept. 17] 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, competing on official UTEP athletic teams, etc.
(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 copies of notes and announcements from a classmate if you miss a class; **be sure you have contact information for at least 3 classmates** for this purpose

Academic Integrity Policy: By UTEP policy, all suspected violations must be referred to the Dean of Students for investigation and disposition (Section 1.3.1 of the Handbook for Operating Procedures; **http://admin.utep.edu/Default.aspx?PageContentID=2083&tabid=30292**) 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! Intergroup conversations are not allowed during in-class quizzes taken as teams.

Civility Statement: You are expected to follow basic standards of courtesy (e.g., **"Student Conduct" and "Disruptive Acts Policy" in the UTEP *Catalog***) and may be dismissed from class for blatant or sustained disruptive behavior. Your comments during classroom discussions should 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 disrupt class participation.

If you truly are expecting an urgent call on your cell phone or pager, please let me know and sit near the door to minimize disruption (and have your phone on vibrate/silent instead of anything loud), and have it handy so you don't have to dig through a backpack for it. Otherwise, please keep your phone/pager off during class. You may give your family member or childcare provider the phone number for an academic office or lab (e.g., Bell Hall ACES lab 747-8814) that may be open near our classroom so you can rest assured that staff can quickly let you know if there is a true emergency.

Disability Statement: If you have or believe you have a disability requiring accommodations, you may wish to self-identify by contacting the Disabled Student Services Office (DSSO; 747-5148; East Union Building 106; **dss@utep.edu**; **www.utep.edu/dsso/**) to show documentation or register for testing and services. DSSO 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 DSSO instructions and accommodation letters. DSSO 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

Professionalism Statement: Beyond the previously mentioned Civility Statement, students in this course are required 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 "wrong answers" are usually correct answers to a different question or valuable learning opportunities to address a common misconception. Finally, be open to local opportunities for professional growth or service, and consider attending conferences to see other's work or present your own work (even if still "in progress"). Upcoming nearby options include the UTEP student research expo (April 2013?), the **SUN** conference (Feb. 28 - March 1, 2013), the COE **CIRCLE conference** (June 2013?), Greater El Paso Council of Teachers of Mathematics (October 2012?), the **Rocky Mountain Educational Research Association** (http://rmera.net; November 2-3, 2012 in Las Cruces!), and the Southwest Educational Research Association (Feb. 6-9, 2013 in San Antonio). You may even look for ways that the profession can support your

classroom research with a grant (**http://www.nctm.org/resources/content.aspx?id=198, http://education.ti.com/sites/US/downloads/pdf/FundingoppsTX.pdf, etc.).**

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 you want your course grade during the few days before UTEP puts grades online, you will have a chance in the last week of class to give me a "secret code word" that I will post your course grade by if time permits (or, alternatively, I may post grades in the Blackboard course shell).

PAPERS ASSIGNED FOR READING AND DISCUSSION OFTEN COME FROM THIS LIST
(see techniques for accessing them listed on p. 2)

1.) American Statistical Association (2007). *Using statistics effectively in mathematics education research.* Washington, DC: ASA. [informally referred to as "the SMER report"]
http://www.amstat.org/education/pdfs/UsingStatisticsEffectivelyinMathEdResearch.pdf

2.) Brase, G. L. (2008). Pictorial representations in statistical reasoning. *Applied Cognitive Psychology*, *23*(3), 369-381.

3.) Carpenter, T. P., Dossey, J. A., & Koehler, J. L. (2004). *Classics in mathematics education research*. Reston, VA: National Council of Teachers of Mathematics.

4.) Chval, K. B., & Pinnow, R. J. (2010). Pre-service teachers' assumptions about Latino/a English language learners in mathematics. *Teaching for Excellence and Equity in Mathematics*, *2*(1), 6-13.
http://www.todos-math.org/assets/documents/TEEM2010v2n1.pdf

5.) delMas, R. C., Garfield, J., & Chance, B. (1999). A model of classroom research in action: Developing simulation activities to improve students' statistical reasoning. *Journal of Statistics Education, 7*(3),
http://www.amstat.org/publications/jse/secure/v7n3/delmas.cfm

6.) Dolan, E. L. (2007). Grappling with the literature of education research and practice. *CBE—Life Sciences Education, 6*(4), 289-296. **http://www.lifescied.org/cgi/reprint/6/4/289**

7.) Garfield, J., & Ahlgren, A. (1988). Difficulties in learning basic concepts in probability and statistics: Implications for research. *Journal for Research in Mathematics Education*, *19*(1), 44-63.

8.) Garner, R. L. (2006). Humor in pedagogy: How ha-ha can lead to aha!, *College Teaching*, *54*(1), 177-180.

9.) Green, J. L. (2010). Highs and lows: Exploring university teaching assistants' experiences. *Statistics Education Research Journal, 9*(2), 108-122.
http://www.stat.auckland.ac.nz/~iase/serj/SERJ9(2)_Green.pdf

10.) Gutstein, E. (2006). Driving while black or brown: The mathematics of racial profiling. In Joanna O. Masingila (Ed.), *Teachers Engaged in Research Inquiry into Mathematics Classrooms, Grades 6-8* (pp. 99-118). Charlotte, NC: Information Age Publishing.

11.) Hoffman, L.R., & Brahier, D. J. (2008). Improving the planning and teaching of mathematics by reflecting on research. *Mathematics Teaching in the Middle School, 13*(7), 412-417.

12.) Holcomb, J. (2002). The ethics of comparison: A statistician wrestles with the orthodoxy of a control group, with response by Corrada, R., Garfield, J., and Persell, C., in Pat Hutchings (Ed.), *Ethics of Inquiry:*

Issues in the Scholarship of Teaching and Learning (pp. 19-26). Menlo Park, CA: Carnegie Foundation for the Advancement of Teaching.

13.) Kotsopoulos, D. (2008). Beyond teachers' sight lines: Using video modeling to examine peer discourse. *Mathematics Teacher, 101*(6), 468-472.

14.) Lesser, L. (1998). Countering indifference using counterintuitive examples. *Teaching Statistics*, *20*(1), 10-12. **http://www.rsscse.org.uk/ts/gtb/lesser.pdf**

15.) Lesser, L., & Melgoza, L. (2007). Simple numbers: ANOVA example of facilitating student learning in statistics. *Teaching Statistics*, *29*(3), 102-105.

16.) Lesser, L., & Winsor, M. (2009). English language learners in introductory statistics: Lessons learned from an exploratory case study of two pre-service teachers. *Statistics Education Research Journal*, *8*(2), 5-32. **http://www.stat.auckland.ac.nz/~iase/serj/SERJ8(2)_Lesser_Winsor.pdf**

17.) Lesser, L. (2001). Representations of Reversal: An exploration of Simpson's paradox. In Albert A. Cuoco and Frances R. Curcio (Eds.), *The roles of representation in school mathematics* (pp. 129-145). Reston, VA: National Council of Teachers of Mathematics.
http://www.statlit.org/pdf/2001LesserNCTM.pdf

18.) Lesser, L., & Tchoshanov, M. (2006). Selecting representations. *Texas Mathematics Teacher*, *53*(2), 20-26. The issue is at **http://tctmonline.org/downloads/TMT_Journal/TMT_Fall_06.pdf**

19.) Lesser, L., & Tchoshanov, M. (2005). The effect of representation and representational sequence on students' understanding. In G. M. Lloyd, M.R. Wilson, J.L.M. Wilkins, & S.L. Behm (Eds.), *Proceedings of the 27th annual meeting of the North American Chapter of the International Group for the Psychology of Mathematics Education*. **http://www.math.utep.edu/Faculty/lesser/pmena05.pdf**

20.) Mettetal, G. (2001). The what, why, and how of classroom action research. *Journal of Scholarship of Teaching and Learning, 2*(1), 6-13. **https://www.iupui.edu/~josotl/archive/vol_2/no_1/v2n1mettetal.pdf**

21.) National Council of Teachers of Mathematics (2010). How can teachers and schools use data effectively? **http://www.nctm.org/news/content.aspx?id=27192**

22.) Nolen, A. L., & Vander Putten, J. (2007). Action research in education: Addressing gaps in ethical principles and practices. *Educational Researcher*, *36*(7), 401-407.

23.) Ozmantar, M. F., Akkoc, H., Bingolbali, E., Demir, S., & Ergene, B. (2010). Pre-service mathematics teachers' use of multiple representations in technology-rich environments. *Eurasia Journal of Mathematics, Science and Technology Education*, *6*(1), 19-36.
http://www.ejmste.com/v6n1/EURASIA_v6n1_Ozmantar.pdf

24.) Pan, M. L. (2008). *Preparing Literature Reviews* (3rd ed.). Glendale, CA: Pyrczak.

25.) Reid, D. K., Robinson, S. J., & Bunsen, T. D. (1995). Empiricism and beyond: Expanding the boundaries of special education. *Remedial and Special Education, 16*(3), 131-141.

26.) Ryan, G. W. (n.d.) What are standards of rigor for qualitative research?
http://www.wjh.harvard.edu/nsfqual/Ryan%20Paper.pdf

27.) Schoenfeld, A. H. (2000). Purposes and methods of research in mathematics education. *Notices of the American Mathematical Society, 47*(6), 641-649. **http://www.ams.org/notices/200006/fea-schoenfeld.pdf**

28.) Shaughnessy, J. M. (2007). Research on statistics learning and reasoning. In Frank K. Lester, Jr. (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 957-1009). Reston, VA: National Council of Teachers of Mathematics.

29.) Shaughnessy, J. M. (1977). Misconceptions of probability: An experiment with a small-group, activity-based, model building approach to introductory probability at the college level. *Educational Studies in Mathematics*, *8*(3), 295-316. **http://www.springerlink.com/content/?Author=J.+Michael+Shaughnessy**

30.) Sorto, M. A., & Lesser, L. M. (2010). Towards Measuring Technological Pedagogical Content Knowledge in Statistics: Middle School Teachers Using Graphing Calculators. *Proceedings of the 2009 IASE Satellite Conference on Next Steps in Statistics Education* (8 pp.). Durban, South Africa. **http://www.stat.auckland.ac.nz/~iase/publications/sat09/5_1.pdf**

31.) Sowder, J., & Schappelle, B. (Eds.) (2002). *Lessons learned from research*. Reston, VA: National Council of Teachers of Mathematics.

32.) Tchoshanov, M., Lesser, L., & Salazar, J. (2008). Teacher knowledge and student achievement: Revealing patterns. *Journal of Mathematics Education Leadership*, *10*(2), 38-48.

33.) Tinto, P.P., Shelly, B.A., & Zarach, N. J. (1994). Classroom research and classroom practice: Blurring the boundaries. *Mathematics Teacher, 87*(8), 644-648.

34.) Wentzel, K. R. (2005). Developing and nurturing interesting and researchable ideas. In Clifton F. Conrad and Ronald C. Serlin (Eds.), *Sage handbook for research in education: Engaging ideas and enriching inquiry* (pp. 315-330). Thousand Oaks, CA: Sage.

35.) Wills, D. (2004). Teaching the unteachable: Helping students make sense of the web. *College Teaching, 52*(1), 2-5.