

Stat 597C Spring 2018 Course Syllabus

Instructors:

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Course Description and Objectives

This course is being run in parallel with a course in the Department of Educational Psychology at the University of Minnesota also occurring in spring semester. We will examine the same readings as that course and participate in virtual meetings with them on a regular basis. The goals of the course are to develop an understanding of what makes learning statistics a positive and successful experience for students. Course participants will be introduced to and become knowledgeable about:

- What it means to be an excellent teacher of statistics
- The national and international communities and organizations that support Statistics Education as well as their associated activities, publications, resources, etc.
- The history, development, and controversies regarding introductory statistics at the college level
- Innovative courses, content, materials, and tools for teaching statistics
- Leading thinkers and writers who have influenced the teaching of statistics
- The use of technological tools to help students learn and understand statistics and issues regarding these tools and their uses
- Assessment methods, instruments, and challenges as they relate to evaluating important student outcomes
- Developing and teaching exemplary online and hybrid classes
- Pedagogical methods that engage students and promote the learning of statistics
- Collaboration in learning and teaching
- Research that informs Statistics Education and classroom based research
- Challenges and needs regarding the future of Statistics Education

This course meets once each week and will be a mix of group discussions and virtual meetings with prominent statistics educators. Course readings will be available on the CANVAS site (about 50 pages per week).

The following calendar of course events is an overview of the topics to be covered this semester. **The course calendar may change depending on possible changes in the people being interviewed, but any changes will be announced well ahead of time.** Discussions of the readings will begin at 4:40 p.m. and virtual guests will be available for at least 30 minutes starting at 5:45 p.m.

Date	Topic	Reading Assignments and Activities
Week 1: Jan 16	Introduction to the Course: The World of Statistics Education	<p>Ben-Zvi, D., & Garfield, J. (2008). Introducing the emerging discipline of statistics education. <i>School Science and Mathematics, 108</i>, 355-361.</p> <p>Gould, R. (2010). Statistics and the modern student. <i>International Statistical Review, 78</i>, 297-315.</p>
Week 2: Jan 23	Reform and Changes in Teaching Statistics GUEST: Robin Lock and Patti Frazer Lock	<p>Cobb, G. W. (2007) The introductory statistics course: A ptolemaic curriculum?" <i>Technology Innovations in Statistics Education, 1</i> http://repositories.cdlib.org/uclastat/cts/tise/vol1/iss1/art1</p> <p>GAISE 2016 College Report (only p. 4-24): http://www.amstat.org/asa/files/pdfs/GAISE/GaiseCollege_Full.pdf</p>
Week 3: Jan 30	Pedagogy: Methods to Engage and Motivate Students GUESTS: Michael Bulmer Laura Le and Ann Brearley	<p>Bulmer, M., & Haladyn, J. K. (2011). Life on an Island: A simulated population to support student projects in statistics. <i>Technology Innovations in Statistics Education, 5</i>(1), http://escholarship.org/uc/item/2q0740hv</p> <p>Garfield, J., delMas, R., & Zieffler, A. (2012), “Developing statistical modelers and thinkers in an introductory, tertiary-level statistics course,” <i>ZDM—The International Journal on Mathematics Education, 44</i>(4), 883–898.</p>
Week 4: Feb 6	Assessment of Student Learning Outcomes GUEST: Michael Posner	<p>Garfield, J. & delMas, R. (2010). A website that provides resources for assessing students’ statistical literacy, reasoning, and thinking. <i>Teaching Statistics, 32</i>, 2-7.</p> <p>Garfield, J. and Franklin, C. (2011). Assessment of learning, for learning, and as learning in statistics education. In C. Batanero, G. Burrill, C. Reading, and A. Rossman (eds.). <i>Teaching Statistics in School Mathematics - Challenges for Teaching and Teacher Education: A joint ICMI/IASE Study</i> (pp. 133-145). New York: Springer Publishers.</p> <p>Posner, M. (2011). The impact of a proficiency-based assessment and reassessment of learning outcomes system on student achievement and attitudes. <i>Statistics Education Research Journal 10</i>(1), 3-14. https://iase-web.org/documents/SERJ/SERJ10(1)_Posner.pdf</p>

Week 5: Feb 13	Data and Technology GUEST: Mine Çetinkaya-Rundel	Chance, B., Ben-Zvi, D., Garfield, J., & Medina, E. (2007). The role of technology in improving student learning of statistics. <i>Technology Innovations in Statistics Education, 1</i> , http://repositories.cdlib.org/uclastat/cts/tise/vol1/iss1/art2 Gould, R. et al. (2016). Teaching data science to secondary students: The Mobilize Introduction to Data Science Curriculum. In J. Engel (Ed.), <i>Proceedings of the Roundtable Conference of the International Association of Statistics Education (IASE)</i> . http://iase-web.org/documents/papers/rt2016/Gould.pdf
Week 6: Feb. 20	Research Supporting the Teaching and Learning of Statistics GUEST: Bob delMas	delMas, R., Garfield, J., Ooms, A., & Chance, B. (2007). Assessing students' conceptual understanding after a first course in statistics. <i>Statistics Education Research Journal, 6</i> (2), 28-58. http://www.stat.auckland.ac.nz/~iase/serj/SERJ6(2)_delMas.pdf Tintle, N., Topliff, K., VanderStoep, J., Holmes, V., & Swanson, T. (2012). Retention of statistical concepts in a preliminary randomization-based introductory statistics curriculum. <i>Statistics Education Research Journal, 11</i> , 21-40. Available online at http://iase-web.org/documents/SERJ/SERJ11(1)_Tintle.pdf
Week 7: Feb 27	Connections to K-12 Statistics Education GUESTS: Chris Franklin Mike Huberty and Dan Butler	Franklin, C., Hartlaub, B., Peck, R., Schaeffer, R., Thiel, D., & Freier, K. T. (2011). AP Statistics: Building Bridges Between High School and College Statistics Education. <i>The American Statistician, 65</i> , 177–182. GAISE K-12 (read through the Introduction and Framework): http://www.amstat.org/education/gaise/ Statistical Education of Teachers (read Chapters 2 and 9): http://www.amstat.org/asa/files/pdfs/EDU-SET.pdf
No class on March 6: HAVE A GREAT SPRING BREAK!		
Week 8: Mar 13	Collaboration in Teaching, Learning, and Research No guest this week (spring break at UMN)	Garfield, J., & Ben-Zvi, D. (2009). Helping students develop statistical reasoning: Implementing a statistical reasoning learning environment. <i>Teaching Statistics, 31</i> , 72-77. Roseth, C. J. Garfield, J. B., & Ben-Zvi, D. (2008). Collaboration in learning and teaching statistics. <i>Journal of Statistics Education [Online], 16</i> (1) http://www.amstat.org/publications/jse/v16n1/roseth.html

Week 9: Mar 20	Beyond AP Statistics and First Courses GUEST: Nick Horton	Horton, N. J. (2015). Challenges and Opportunities for Statistics and Statistical Education: Looking Back, Looking Forward. <i>The American Statistician</i> , 69(2), 138-145.
Week 10: Mar 27	Statistics Education: Past, Present, and Future GUEST: TBD	Cobb, G. (2013). What might a twenty-year old conference tell us about the future of our profession? <i>Journal of Statistics Education</i> , 21. Available at http://www.amstat.org/publications/jse/v21n2/cobb.pdf Joan Garfield, J., Andrew Zieffler, A., & Elizabeth Fry, E. (2017). What is Statistics Education? In D. Ben-Zvi, J. Garfield, & K. Makar (Eds.), <i>International Handbook of Research in Statistics Education</i> . Springer.
Week 11: Apr 3	Resources for Students GUEST: TBD	Centinkaya-Rundel, M., Diez, D. M., & Barr, C. D. (2013). OpenIntro Statistics: An Open-source Textbook. <i>Technology Innovations in Statistics Education</i> , 7(3). Available at http://escholarship.org/uc/item/6ms0x5nf Choice: Go to the TISE website at http://escholarship.org/uc/uclastat_cts_tise and select the issue 7:3. From that issue, please choose to read at least <u>one</u> of the comments (written by Utts, Rossman, Chance, Velleman, and Cobb) and read the response provided by C-RDB. I also encourage you to skim through the articles by Zieffler, Isaak, and Garfield, and by West. We will talk about these briefly in class.
Week 12 Apr 10	Topic & Guest TBD	TBD
Week 13: Apr 17	Becoming an Excellent Online Teacher of Statistics GUEST: Megan Mocko	Gundlach, E., Richards, K.A.R., Nelson, D., & Levesque-Bristol, C. (2015). A comparison of student attitudes, statistical reasoning, performance, and perceptions for web-augmented traditional, fully online, and flipped sections of a statistical literacy class. <i>Journal of Statistics Education</i> , 23(1). http://www.amstat.org/publications/jse/v23n1/gundlach.pdf Mills, J. D., & Raju, D. (2011). Teaching statistics online: A decade's review of the literature about what works. <i>Journal of Statistics Education</i> , 19, http://www.amstat.org/publications/jse/v19n2/mills.pdf

		Mocko, M. (2013). Selecting technology to promote learning in an online introductory statistics course. <i>Technology Innovations in Statistics Education</i> , 7(2), http://escholarship.org/uc/item/596195sg
Week 14: Apr 24	Lesson Plan Presentations	Our final class meeting will involve your lesson plan/activity presentations.

Grades will be based on both the weekly work and a Final assignment

Weekly assignments:

1. Read the articles for the upcoming week and write at least one comment about each paper on the CANVAS discussion board (these will seed our conversations in the first hour of class). *Due by noon Tuesday the day of class.*
2. Write at least one suggested question to ask the guest speaker and post your question(s) to the CANVAS assignment *by noon Monday, the day before class.* These will help the people we interview know what kinds of things to think about (of course we can always modify our questions after our own discussion).

Final Assignment:

3. You will be asked to prepare and present a “research-based” lesson plan for an introductory statistics class on April 24. The detailed criteria for these presentations will be provided.