

**SIE 430/530 ENGINEERING STATISTICS - Fall 2018**  
**(Tuesday and Thursday 8:00 – 9:15am, AME S212)**

**Instructor:** Jian Liu  
Office: ENGR 221  
Hours: Tue 9:30 – 10:30am  
Or by appointment

**Online Office Hours:**  
Tue 8:00-9:00 pm  
Email: jianliu@email.arizona.edu

**TA:** Bijoy Chowdhury  
Office: ENGR 258  
Hours: Mon 3:00 – 4:00 pm  
Wed 11:00 am – 12:00 pm  
Or by appointment

**Online Office Hours:**  
Mon/Wed 6:00-7:00 pm  
Email: bijoy@email.arizona.edu

**Skype account for online office hours :** [530siesie@gmail.com](mailto:530siesie@gmail.com)

**Prerequisites:** Calculus + SIE 305: Introduction to Engineering Probability and Statistics

**Textbook:** G. Casella and R.L. Berger, *Statistical Inference*, 2<sup>nd</sup> ed., Duxbury Thomson Learning, Pacific Grove, CA, 2002.

**Course Website:** We will be using the D2L system. (<http://d2l.arizona.edu/>). All class materials, including HW, handouts, etc. will be distributed from D2L. I will also be sending emails to the whole class throughout the semester using the class list on D2L. Please make sure you forward your D2L email to an email account that you frequently use.

**Lecture videos** will be available after each lecture on D2L → UA Tools → Panopto.

**References:**

- D. Wackerly, W. Mendenhall and R.L. Scheaffer, *Mathematical Statistics with Applications*, 7<sup>th</sup> ed., Duxbury Press, Belmont, California, 2008.
- A. Gut, *An Intermediate Course in Probability*, Springer, New York, 1995.
- W.W. Hines, D. C. Montgomery, D. M. Goldsman and C.M. Borror, *Probability and Statistics in Engineering*, 4<sup>th</sup> ed., Wiley, Hoboken, New Jersey, 2003.
- R.V. Hogg, J.W. McKean and A.T. Craig, *Introduction to Mathematical Statistics*, 6<sup>th</sup> ed., Pearson Prentice Hall, Upper Saddle River, New Jersey, 2005.
- S. M. Ross, *First Course in Probability*, 6<sup>th</sup> ed., Prentice Hall, Upper Saddle River, New Jersey, 2001.

**Homework:** The homework will be assigned on Thursdays and due on the following Thursday, *before the end of the class*. NO late submission is allowed unless it is requested and approved by the instructor in advance (e-mail or phone-call received *before* the day the assignment is due). Distance-learning students may submit pdf copies of their homeworks to a dropbox on D2L.

**Examinations:**

Exam I: October 11, Thursday, 8:00-9:15AM,

Exam II: December 13, Thursday, 8:00-9:30AM

*Online students will take the exams on the same days via **examity** (detailed arrangement will be announced in September, 2018.)*

Makeup examinations MUST be requested at least one week prior to the date the exam is held. In case of medical or other personal/family emergencies, a formal excuse (doctor's note, etc.) is required.

<b>Grading:</b>	Homework	20%
	Exam I	35%
	Exam II	45%

**Academic Integrity Policy:** Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, homework, and exams must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity: <http://dos.web.arizona.edu/uapolicies/>. Any violation of the academic integrity code will be dealt with using the procedures detailed in the code.

### Course Outline:

- Review of Probability Theory
  - Probability Set Function
  - Conditional Probability and Independence
  - Random variables, common distributions
  - Expectation (including Moment Generating Functions)
- Properties of a Random Sample
  - Order Statistics
  - Asymptotic Properties of the Sample Mean
  - Sampling from a Normal Distribution
- Point Estimation
  - Method of Moments
  - Maximum Likelihood Estimation
  - Bias, Efficiency and Consistency of Point Estimators
  - Best Minimum Variance Unbiased Estimator
- Hypothesis Testing I
  - Elements of a Statistical Test
  - Some Common Tests (concerning means, variances, etc.)
  - Goodness-of-Fit
- Hypothesis Testing II
  - Likelihood Ratio Tests
  - Optimal Tests and the Neyman-Pearson Lemma
- Confidence Interval Estimation
  - Inverting a Test Statistic
  - Asymptotic Confidence Intervals
  - Size and Coverage Probability

### Inclusive Excellence Statements

This course supports elective gender pronoun use and self-identification; rosters indicating such choices will be updated throughout the semester, upon student request. As the course includes group work and in-class discussion, it is vitally important for us

to create an educational environment of inclusion and mutual respect. (NOTE: You can download your class roster from UAccess)

Inclusive Excellence is a fundamental part of the University of Arizona's strategic plan and culture. As part of this initiative, the institution embraces and practices diversity and inclusiveness. These values are expected, respected and welcomed in this course.