SIE 536 – Experiment Design and Regression

Fall 2021

Course Description: Statistical modeling of observational data and designs of experiment data, including linear models, regression models, and analysis of variance models.

Time and Location: MWF 12:00-12:50pm   ENGR 301

(Due to the uncertainty of COVID-19 development, teaching mode may change during the semester)

Instructor: Qiang Zhou   zhouq@email.arizona.edu

Office hour: By appointment (video meeting)

Recommended reference books (1) Applied Linear Statistical Models by Kutner, Nachtsheim, Neter, and Li, 5th edition, McGraw Hill

problem datasets available from:

http://www.stat.ufl.edu/~rrandles/sta4210/Rclassnotes/data/text datasets/index.html

(2) Design and analysis of experiments. 8th Ed. Montgomery, Douglas C. John Wiley & Sons, 2017.

Prerequisites: Background in basic statistics and linear algebra.

Required, Elective, or Selected Elective: Elective

Course Objectives: The students will be able to understand and apply the following concepts and methods: basic statistical estimation and hypothesis testing; simple and multiple linear regression models and corresponding inference methods; design and analysis of experiments methods to characterize and improve systems and processes; regression methods and design of experiment

methods to analyze and solve real life problems and applications.

Topics covered:
- Statistical estimation and hypothesis testing
- Regression modeling and analysis
- Analysis of Variance
- Multivariate linear regression
- Factorial designs and analysis
- Robust design and parameter design
- Random effects models
- Response surface methodology

Grading Policy: 40 % Homework; 60% Exams

The total score is 100. The lowest score to pass the course is 60/100. Grades may be curved at the instructor's discretion.

Exam: There are two in-class exams (25% each), each with 50 min. TENTATIVE exam dates are **Oct 25 (Mon)** and **Dec 08 (Wed)**. Online students will take exams using Examity **on the same dates** (a 24 hour window will be given) and must schedule a 50min time slot in advance (details will provided later).

Course Materials: All course materials (HWs and solutions, lecture slides, etc.) and grades will be uploaded to the course D2L site. Class recordings are available through Panopto, accessed via D2L. Students must check D2L site regularly.

Homework Policy:

HW will be assigned throughout the semester, usually following the completion of course chapters. All HWs should be submitted **on D2L by 11:59 PM (midnight) on the due date**. Except for medical reason (doctor's proof needed), penalty for late submission is:
1) Submission on the 1st day after due date: 15%
2) Submission on the 2nd day after due date: 30%
3) Submission on the third day or later: 100%

Code of Academic Integrity:

Graded work must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See: http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity.

There is zero tolerance towards plagiarism and any act of intellectual dishonesty.

Attendance Policy:

Students are required to attend class. If you miss class you are responsible for obtaining the class notes, assignments, and announcements. Phone usage is not allowed during the class; please put your phone into "quiet", or "vibrate" mode prior to start of the class.

Accommodation for Students with Special Needs:
Students with disabilities or special needs for accommodations (including in class meetings and exams) are required to contact both the instructor and the S.A.L.T. Center (www.salt.arizona.edu) or the Disability Resource Center (http://drc.arizona.edu) as early as possible in the semester. They are also required to submit appropriate documentations to the instructor before accommodations could be offered.

Subject to Change Statement:
Information contained in the course syllabus, may be subject to change with advance notice, as deemed appropriate by the instructor. If any change is to be made to the exam date, it will be announced at least two weeks before the scheduled date.