

Stat5385
Statistics for Engineers and Scientists II
Spring 2009

Course Web site:

http://webpages.acs.ttu.edu/homansou/Stat_5385.htm

- Instructor: *Dr. Hossein Mansouri, hossein.mansouri@ttu.edu*
- Office Hours: 8-9 M, W, F.
- Office: MATH 247 (during office hours) and Holden Hall 202 (by appointment only, 742-3833)

Textbook:

- *Introduction to Probability and Statistics: Principles and Applications for Engineering and the Computing Sciences*, by: Milton and Arnold, Fourth Edition.

Technology: Many of the applied problems will require the use of a statistical software. My preferred software is SAS and I will provide and discuss sample programs in the class. The students are encouraged to take the SAS short courses offered at ATLC. The minimum requirement is training in *BASE SAS* and *SAS Analyst*. Information for enrollment can be obtained at www.itts.ttu.edu/training/shortcourses

Course Description: Statistics is the scientific method of extracting information from properly collected data. The information available is often in the form of a sample which provides partial information from the population. One of the main objectives of statistics is to draw conclusions about a population based on information contained in the sample. This course deals with statistical inference about one and two population parameters, analysis of variance, multiple comparisons, analysis of data from factorial designs, single and multiple regression models, analysis of categorical data, and finally the course deals with some basic methods of statistical quality control.

Expected Learning Outcomes After completing this course the student should be able to:

- Find point and interval estimates of parameters such as the population mean, variance, and proportion for one and two populations
- Test hypotheses about one and two population parameters such as mean, variance, and proportion
- Test hypotheses and conduct multiple comparisons for the means of more than two populations from normal populations
- Test hypotheses concerning one, two, and several populations using nonparametric procedures
- Fit a simple and multiple linear regression to a set of data by estimating the parameters and interpreting the model and the parameters involved
- Test for lack of fit
- Test for the significance of the regression coefficients and find interval estimates for the parameters
- Conduct residual analysis to examine the aptness of the model
- Use model selection techniques to reduce the number of explanatory variables in the model when there are too many candidate covariates
- Analyze categorical data by comparing proportions in one-way and multi-way contingency tables and test for the independence of factors

- Explain the principles of the statistical quality control by constructing and interpreting different types of control charts.

Methods of Assessing the Expected Learning Outcome This will be done through class discussion and graded homework assignments and tests. The amount of homework assigned will be substantial since these will involve every topic covered in the course.

Course Content:

Ch.8. Inference on the mean and variance of a distribution (a review)

Ch.9. Comparing two means and two variances

Ch.10. inference on proportions

Ch.11. Simple linear regression and correlation

Ch.12. Multiple linear regression models

Ch.13. Analysis of Variance

Ch.14. Factorial experiments

Ch.15. Categorical data

Ch.16. Statistical quality control

* *This is a very ambitious syllabus; although the focus will be to cover all of the materials, I will be pleased to be able to cover through chapter 14.*

Course Work:

- Selected homework problems will be graded (15%). Homework assignments should be neatly written and organized and preferably typed.
- Two midterm exams (each 30%) and a final exam (25%).
Dates: *First test* Friday February 6; *Second test* Friday March 6; *Final exam* Saturday May 2, 10:30 AM-1:00 PM.
- Grade assignment: 90% - 100% = A, 75% - 89% = B, 65% - 74% = C, 50% - 64% = D, Below 49% = F

** **Penalties** for late assignments: -5%, few hours late. -10%, 24 hours late. -20%, 48 hours late. After 48 hours of delay no assignment will be accepted.

Any student who, because of a disability, may require special arrangements in order to meet the course requirements should contact the instructor as soon as possible to make any necessary arrangements. Students should present appropriate verification from Student Disability Services during the instructors office hours. Please note instructors are not allowed to provide classroom accommodations to a student until appropriate verification from Student Disability Services has been provided. For additional information, you may contact the Student Disability Services office at 335 West Hall or 806-742-2405.

Student Integrity: 'It is the aim of the faculty of Texas Tech University to foster a spirit of complete honesty and high standard of integrity,'

{<http://www.depts.ttu.edu/opmanual/OP34.12.pdf>}.

Academic dishonesty will be dealt with seriously and may result in suspension. All students are expected to be familiar with the university policy regarding academic integrity. The policy can be found on page 51 of undergraduate/graduate catalog 2008-2009.

Observance of religious holy days 'A student who intends to observe a religious holy day should make that intention known in writing to the instructor prior to the absence. A student who is absent from classes for the observance of a religious holy day shall be allowed to take an examination or complete an assignment scheduled for that day within a reasonable time after the absence.'

{<http://www.depts.ttu.edu/opmanual/OP34.19.pdf>}