Course Module
Stephen F. Austin State University
STA 322-001 Statistical Modeling
Math 209 TR 9:30-10:45AM

Instructor
Robert (Bob) Henderson
Department: Mathematics & Statistics; Office: M 344
E-mail: hendersork@sfasu.edu
Phone: Office: (936) 468-1540; Cell: (936) 615-7796
BA in Math & History – Trinity University, San Antonio, TX (1978)
MS in Mathematical Statistics – Southern Methodist University, Dallas, TX (1980)
PhD in Mathematical Statistics – Southern Methodist University, Dallas, TX (1982)
MBA – University of Delaware, Newark, DE (1988)
Worked in industry for 27 years, 6 years with DuPont as internal consultant for a variety of businesses and staff groups, then 21 years in the semiconductor business, most with a supplier of a key enabling material for semiconductor production, and later with Samsung working primarily with engineers in process control efforts. The entire 27 years included many training delivery, as well as course development activities related to basic statistics, experimental design, and process control systems. In addition, worked during spring and summer of 2009 as an adjunct professor at Concordia University in Austin teaching Introduction to Statistics and Finite Mathematics. Started at SFA in Fall 2009.

Teaching Hours – 10-11:50AM MWF; 2:30-6:30PM M; 2:30-3:45PM W, 9:30-10:45AM TR
Office Hours – TR 2:30-5:00PM; W 4-5PM; and by appointment

Course Goals
The title of the text for this course is A Second Course in Statistics: Regression Analysis, and the emphasis in this course will be on the “applied” aspect of regression analysis. However, there will be some attention given to the theoretical underpinnings of regression analysis and related approaches. The desire will be for the student to be comfortable with the use and application of regression analysis methodology, as well as when it might be appropriate to apply it, or some modification or aspect of it in specific situations.

Text

Computer Access/Skills
It will be helpful to have access to a statistical software package, such as JMP, MINITAB, R, or SAS. Many of the analyses discussed in the course can be executed using such software. In addition, it will likely be helpful to have access to Microsoft Office programs – Excel, Word, and Powerpoint. Almost all workplaces expect some skills in working with these packages, and use them for reporting and/or presentation purposes.

Prerequisites
MTH 144 Business Calculus or MTH 233 Calculus I and STA 320 Statistical Methods
Course Rationale
Regression analysis is a frequently utilized tool in the evaluation of specific data sets and associated problems. The goal may be to identify variables associated with specific responses of interest, modeling processes for improved understanding and/or control, and/or prediction of difficult to obtain responses from more easily observed predictor variables.

My experience in industry has suggested that a significant challenge in such endeavors will be the ability of the statistician involved to be able to clearly and concisely summarize such evaluations for the relevant decision-makers. Most of these individuals will be very sharp people, but are very likely to not have much patience for the mathematical details behind a specific analysis.

This course ideally will convey to students the ability to identify when regression analysis might be an appropriate approach to evaluating a specific multivariate data set, the knowledge of how to execute and/or critique such an analysis, and the skills to communicate the salient results to the decision-maker involved. In addition, attention will need to be given to the inherent assumptions behind specific regression analysis approaches, and how these may be evaluated to determine if they are reasonable assumptions to make in the specific analysis of interest.

Course Syllabus
The official course syllabus can be found at: http://www2.sfasu.edu/math/docs/syllabi/STA322Syllabus.pdf

Course Overview
Weeks 1-3: Simple Linear Regression & Inferences in Regression and Correlation
Weeks 3-6: Diagnostics, Remedial Measures, Simultaneous Inferences, and Other Topics
Weeks 7-8: Multiple Regression, including Quantitative and Qualitative Predictors
Weeks 8-10: Building Regression Models
Weeks 11-15: Special Regression Topics

Course Objectives
By completing the assigned work and projects, students will demonstrate their knowledge of and be able to:

1. Use regression analysis methodology to evaluate relationships between specific responses and associated predictor variables
2. Understand the capabilities and limitations of regression analysis methodology
3. Describe the results of computer output from a regression analysis including the variety of summary tables and statistics for goodness of model fit, as well as influential data records
4. Build reasonable regression models over a range of different types of data and underlying data structures
5. Formulate statistical hypotheses in terms of the parameters of regression models and test them using appropriate test statistics
6. Effectively communicate results of regression analyses of multivariate data sets
Grading
Grades will be determined by the following:
Assignments/Presentations 60%
Project (Multiple Regression) 20%
Final Exam 20%

About Assignments/Projects
Most of the problems in the text involve analysis of specific data sets. When problems are assigned, it will be expected that the student either individually or as a member of a group will present solutions to the class. For group projects, each member will be asked to evaluate the contribution of the other members of his/her group to the completion of the project. Minimum adequate material for presentations would include

1. Problem definition/motivation (What is the problem and why might someone care that it be addressed?),
2. An overview/description of the available data and how the data relates to the problem,
3. A summary of the analysis approach/model utilized to describe the data,
4. A conclusion as to how the data/model can be utilized to address the problem of concern,
5. A summary of the limitations of the approach/model used and what might be done to either improve the approach/model used or what alternative approaches/models might be considered in future/additional work.

The project will require the student to find his/her own data and produce a suitable regression analysis of that data. The outline above can also be used for these projects. Additional credit will be given for projects that qualify for presentation at undergraduate research conferences/programs.

Attendance
Since the grade in this class is largely based on student presentations of assignments and the project, attendance will be necessary to do well in the class. If you know you are going to have to miss a specific class, please bring it to my attention prior to the class that you will be absent.

Academic Integrity
It is the responsibility of the student to abstain from cheating. Dishonesty of any kind with respect to examinations, written assignments [completed] in or out of class, alteration of records, or illegal possession of current examinations or keys to examinations shall be considered cheating. Courtesy and honesty require that any ideas or materials borrowed from another must be fully acknowledged. Offering the work of another as one’s own is plagiarism. The subject matter of ideas thus taken from another may range from a few sentences or paragraphs to entire articles copied from books, periodicals, or the writing of other students. The offering of materials assembled or collected by others in the form of projects or collections without acknowledgment is also considered plagiarism. Any student who fails to give credit for ideas or materials taken from another is guilty of plagiarism.
**Definition of Academic Dishonesty**

Academic dishonesty includes both cheating and plagiarism. Cheating includes but is not limited to (1) using or attempting to use unauthorized materials to aid in achieving a better grade on a component of a class; (2) the falsification or invention of any information, including citations, on an assigned exercise; and/or (3) helping or attempting to help another in an act of cheating or plagiarism. Plagiarism is presenting the words or ideas of another person as if they were your own. Examples of plagiarism are (1) submitting an assignment as if it were one's own work when, in fact, it is at least partly the work of another; (2) submitting a work that has been purchased or otherwise obtained from an Internet source or another source; and (3) incorporating the words or ideas of an author into one's paper without giving the author due credit. (from SFA on-line Student Handbook)

A full description of university procedures and penalties in response to cheating and plagiarism can be found in the on-line Student Handbook in the Academic Integrity section at http://www.sfasu.edu/policies/academic_integrity.asp.

All of the above is the official policy of the school; however, the ultimate defender of academic integrity is each individual student. In this class, it might be helpful to work in small groups on the problems. Sharing ideas and helping each other with approaches to understand and solve the problems is not considered cheating or plagiarism. Copying someone else’s homework results 10 minutes before class is considered to be cheating (be warned that these situations are generally easy to identify, and both parties will be subject to the respective penalties). You are encouraged to discuss the problems with others outside the classroom, but are all considered adults, and until you provide evidence to the contrary, will be relied upon to set appropriate boundaries in how you work with others through the duration of this class.

**Withheld Grades**

Ordinarily, at the discretion of the instructor of record and with the approval of the academic chair/director, a grade of WH will be assigned only if the student cannot complete the course work because of unavoidable circumstances. Students must complete the work within one calendar year from the end of the semester in which they receive a WH, or the grade automatically becomes an F. If students register for the same course in future terms, the WH will automatically become an F and will be counted as a repeated course for the purpose of computing the grade point average.

**Students with Disabilities**

In accordance with University policy, students with disabilities who need accommodations are expected to initiate a meeting with the professor immediately upon registering with Disability Services to discuss how accommodations included on the Special Accommodation Request form will be provided. Students with disabilities who may have special needs and have not requested support services should seek assistance through Disability Services. The Office of Disability Services (ODS) is located in the Human Services Building, room 325, and can be contacted by phone at 468-3004 / 468-1004 (TDD). Failure to request services in a timely manner may delay appropriate accommodations. For additional information, go to http://www.sfasu.edu/disabilityservices/.

4
**Acceptable Student Behavior**

Classroom behavior should not interfere with the instructor’s ability to conduct the class or the ability of other students to learn from the instructional program (see the Student Conduct Code, policy D-34.1). Unacceptable or disruptive behavior will not be tolerated. Students who disrupt the learning environment may be asked to leave class and may be subject to judicial, academic or other penalties. This prohibition applies to all instructional forums, including electronic, classroom, labs, discussion groups, field trips, etc. The instructor shall have full discretion over what behavior is appropriate/inappropriate in the classroom. Students who do not attend class regularly or who perform poorly on class projects/exams may be referred to the Early Alert Program. This program provides students with recommendations for resources or other assistance that is available to help SFA students succeed.