STA 3064 Introduction to Statistical Modeling with SAS
Fall 2015 Course Syllabus

Instructor: Dr. Steven Ramsier
Office: 106A OSB
Office hours: 9:30 to 10:30 AM Wednesday and 2:00 to 3:00 PM Thursdays
E-mail: ramsier@stat.fsu.edu
Phone: 644-3218 (Main Statistics office phone – currently no direct line to the instructor)
Fax: 644-5271
Class URL: http://campus.fsu.edu

Grader/TA: Lynn Zhang
Grader E-mail: qzhang@stat.fsu.edu

Class Meeting Times: 12:30 PM - 1:45 PM Tu Th in 208 HCB
No Final Exam

Optional Text: Cannon, A.R., Cobb, G.W., et al., *Stat2: A Second Course in Undergraduate Statistics* (2013), W.H. Freeman and Company.
ISBN-10: 1429258276
ISBN-13: 9781429258272

Other references will be provided during the course of the semester.
Internet: Blackboard access.
Prerequisite: STA3024 or consent of the instructor.
Software: Access to *SAS University Edition* (Recommended), *SAS Studio* (Online, OnDemand version), or *SAS 9.3* (Windows version available on campus computer labs but differs slightly from the other two versions which will be used in class).

Course Description: This course will cover the following topics utilizing the SAS software: ANOVA, linear modeling, logistic regression, bootstrap sampling, simulation using the data step, and some additional analytic topics.

Students will gain experience in fitting statistical models to data in order to extract information, determine significant factors, and make predictions. Students will be exposed to several popular models including both general linear and generalized linear models in order that they will be able to make informed decisions and appropriate model selection in the future.

Course Objectives: This course is a designated as a *Scholarship in Practice* course.

Scholarship in Practice Objectives. By the end of the course, students will demonstrate the ability to:
- Select, critically evaluate, and apply relevant areas of scholarship to produce an original analysis, project, creative work, performance or other scholarly work that reflects a body of knowledge relevant to the course (*SIP1*);
- Articulate the process of producing a work, from initial plan, to critique, revision, and completion (*SIP2*);
- Critique existing applications of scholarship in order to learn from past success and failures (*SIP3*).

Competencies SIP1, SIP2, and SIP3 will be assessed through the assignments and capstone project for STA 3064 for which a standard rubric will be employed to facilitate a written summary of results.

General Course Objectives. Students who complete this course will be able to:
- Choose the appropriate statistical model for given data and situations.
- Analyze differences between population means using the ANOVA and GLM procedures and verify the assumptions.
- Perform pairwise comparisons among groups after finding significant effects in ANOVA.

- Fit a simple linear regression using the REG procedure producing predicted values and confidence intervals.
- Explain the mathematical model for multiple regression.
- Describe model selection options and interpret output to evaluate the fit of several models.
- Perform model diagnostics through residual plots, influential observations identification, and collinearity detection.
- Fit a binary logistic regression model using the LOGISTIC procedure.
- Define and explain the adjusted odds ratio.

Grade Composition (1000 Points Total):

6 Take-Home Assignments (100 pts. each)	600
Case Study A	150
Project B (Presentation Project)	100
Project C (Team Project)	150
Total	1000
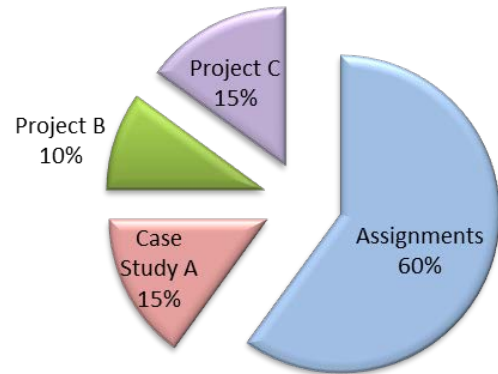
Grade Assignments (Based on total course points earned:

A	930-1000	B-	800-829	D+	670-699
A-	900- 929	C+	770-799	D	630-669
B+	870-899	C	730-769	D-	600-629
B	830-869	C-	700-729	F	0-599

Assignments and Responsibilities

Take-Home Assignments
The assignments will consist of problems that will be solved using SAS. There will be six (6) assignments given and all assignments are to be turned in on the Thursday that they are **due no later than 11:59 PM.** Assignment documents are uploaded via Blackboard and **no emailed assignments** will be **accepted**.

Late, unexcused assignments will be penalized as follows: turned in by 11:59 PM the following Friday – 90% of grade, turned in by 11:59 PM the Saturday after it was due – 75% of grade, thereafter – no credit. Assignments are graded on several components: Correct functions and/or procedures, properly executable, correct results, and correct interpretations. You are free to discuss the assignment with any of your classmates; however, your programming, interpretation, and write-up must be done independently. That is, all code, output, and explanations must be generated by you. Your interpretations must be in your own words. Assignments will be submitted electronically through Blackboard.

> **Warning about Using SAS Studio Online:** Access to SAS Studio is done through a web browser and is mostly reliable. However, the program is run on SAS's servers and SAS allocates the resources in order for the program to run smoothly. In the past students have experienced outages and, although these are generally temporary, these can cause students to take longer to complete tasks than would normally be anticipated. Around assignment due dates and times can be especially problematic as several people are attempting to get on the server at once and therefore experience more outages. Understanding this, **a temporary server outage is not a valid excuse to turning in an assignment late**. Good advice is to allow yourself plenty of time to complete your assignments. Please start assignments early to avoid the frustration that a server outage can cause. Trying to complete an assignment at the last minute is a formula for creating extreme stress and potentially adversely affecting your grade.

Case Study A: Students will work individually on a project-like assignment in which the data is supplied to the student as well as the application scenario. The case study will be based on regression modelling. As with assignments, you are free to discuss the assignment with any of your classmates; however, your programming, interpretation, and write-up must be done independently.

Projects: Teams of approximately 3 students will work on two projects during the course of the term. Each of the projects will focus on a different statistical model. Unlike with the case study, students will be responsible for finding or generating data for which it is appropriate to apply the statistical model for that project.

Project B will consist of an ANOVA model applied to data found by students. Students working in groups of 3 will be responsible for creating and giving a class presentation.

Project C will consist of a logistic regression model applied to data of interest. Students again will work in groups of 3. A written report will be generated.

In general, each project consists of finding a data set of interest, employing graphical methods for presenting the data, fitting and refining the appropriate statistical model, assessing the adequacy of the model, generating and running appropriate SAS code, and interpreting the results. Each project data set, to the best of your knowledge, should not have been previously analyzed in the way you plan to use it for your project.

Tentative Course Outline:

Week of …	Tuesday	Thursday	Assessment
Aug. 25	Intro / Stat. Modeling	Hypothesis Testing (review)	
Sep. 1	Simple Regression	Transformations / Outliers	
Sep. 8	Regression Inference	Multiple Regression	Assignment 1 Due 9/10
Sep. 15	Multicolinearity / Subsets	Predictor Selection	Assignment 2 Due 9/17
Sep. 22	Categorical Coding / Bootstrap	Project A Set-up	
Sep. 29	One-Way ANOVA	Post-Hoc Testing	Case Study A Due 10/1
Oct. 6	Two-Way ANOVA	Multiple Comparisons	Assignment 3 Due 10/8
Oct. 13	Reg w/Indicators	ANCOVA	Assignment 4 Due 10/15
Oct. 20	Project B Set-up	Project Day	
Oct. 27	Proj. B Presentations	Proj. B Presentations	Proj. B Pres. 10/27 & 10/29
Nov. 3	Proj. B Presentations	Logistic Regression	Proj. B Presentation 11/3
Nov. 10	Log. Reg. Inference	Multiple Logistic Reg.	Assignment 5 Due 11/12
Nov. 17	Mult. Log. Reg. Assessment	2-Way Tables / Proj. C Set-up	Assignment 6 Due 11/19
Nov. 24	Project Day	Thanksgiving break	
Dec. 1	Spec. Topic - Clustering	Other selected topics	Project C Due 12/3

Liberal Studies for the 21st Century:
The Liberal Studies for the 21st Century Program at Florida State University builds an educational foundation that will enable FSU graduates to thrive both intellectually and materially and to support themselves, their families, and their communities through a broad and critical engagement with the world in which they live and work. Liberal Studies thus offers a transformative experience. This course has been approved as meeting the requirements for Scholarship in Practice and thus is designed to help you become a flexible thinker; a productive member of society; and an independent learner.

University Attendance Policy:
Excused absences include documented illness, deaths in the family and other documented crises, call to active military duty or jury duty, religious holy days, and official University activities. These absences will be accommodated in a way that does not arbitrarily penalize students who have a valid excuse. Consideration will also be given to students whose dependent children experience serious illness.

Academic Honor System:
The Florida State University Academic Honor Policy outlines the University's expectations for the integrity of students' academic work, the procedures for resolving alleged violations of those expectations, and the rights

and responsibilities of students and faculty members throughout the process. Students are responsible for reading the Academic Honor Policy and for living up to their pledge to ". . . be honest and truthful and . . . [to] strive for personal and institutional integrity at Florida State University." (Florida State University Academic Honor Policy, found at http://dof.fsu.edu/honorpolicy.htm.)

Students with Disabilities:
ADA Policy: Students with disabilities needing academic accommodation should; (1) register with and provide documentation to the Student Disability Resource Center; (2) bring a letter to the instructor indicating the need for accommodation and what type. This should be done during the first week of class. For more information about services available to FSU students with disabilities, contact the:

Student Disability Resource Center, Dean of Students Department
108 Student Services Building
Florida State University
Tallahassee, FL 32306-4167
(850) 644-9566 (voice), (850) 644-8504 (TDD)
SDRC@admin.fsu.edu

Syllabus Change Policy:
This syllabus is a guide for the course and is subject to change with advance notice.