



## DEPARTMENT OF STATISTICS

STAT 621

Fall 2018

# Accelerated Regression Analysis for Business Syllabus

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### Source material

#### *Required*

- Class Notes. These can be downloaded from the STAT 621 Canvas website. It is recommended that you use these to take notes on in class.
- JMP 14 (software), SAS Institute, downloadable from [upenn.onthehub.com](http://upenn.onthehub.com)
- Stine and Foster, *Statistics for Business*, Third Edition, Pearson.<sup>1</sup> References throughout are to the third edition, though the second edition is very similar.

#### *Optional* (on reserve at Lippincott Library)

- Sall, Creighton, Lehman, *JMP Start Statistics*, 5<sup>th</sup> Edition, SAS Institute.
- Freedman, Pisani and Purves, *Statistics*, 4th edition, Norton.
- Keller, *Statistics for Management and Economics*, 8th edition, South-Western Cengage Learning.

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<sup>1</sup> Various purchase options are available at <http://www.mypearsonstore.com/bookstore/statistics-for-business-decision-making-and-analysis-9780134763736>. If your textbook purchase from this site includes MyStatlab access, you will be able work the homework exercises online (which is strictly optional and available simply as a convenience). To do this, follow the registration instructions at <https://portal.mypearson.com/course-home/handout/george81339/registration-instruction.pdf>. You can alternatively purchase MyStatlab access (which includes ebook access) directly from the indicated registration site.

The fundamental material for the class is contained in the Class Notes, which will be discussed and elaborated in the class lectures. The Stine and Foster (SF) textbook elaborates on most (but not all) of the Class Notes. Links to the relevant readings in SF appear throughout the Class Notes. For those who would like further background materials, we recommend Sall, Creighton and Lehman (SHL), Freedman, Pisani and Purves (FPP) and Keller (K). SHL is an example-rich guide to statistical analysis with the statistics package JMP. FPP is a highly verbal and conceptual book - an excellent introduction both for “poets” who are unfamiliar with technical readings and for “quants” who would like a better sense of the reasoning behind statistics. K is in the style of a traditional “reference manual” and explains details and provides many formulas for statistical procedures that are not covered in class.

JMP is the computer package we’ll use extensively for statistical calculations and graphics. In particular, an essential component of 621 will be project work requiring substantial use of JMP. Although JMP is merely a tool and not the central point of the course, it is sufficiently useful that you will need it.

## Course Overview

The Class Notes are organized into 13 modules that will be covered in order.

Module	Title	Readings (SF)	Data Analysis Exercises
0	<i>Getting Started</i>	Review Background Notes Stat 613 <sup>2</sup>	
1	<i>Fitting Linear Equations to Data</i>	19	19: 39, 41, 43, 47
2	<i>Fitting Nonlinear Equations to Data</i>	20 (skip 20.3)	20: 33, 35, 37
3	<i>The Simple Regression Model</i>	21.1-2	21: 23,25,27
4	<i>Inference with the Simple Regression Model</i>	21.3-4	21: 39, 41, 43, 47, 49
5	<i>Detecting and Dealing with SRM Violations</i>	22	22: 37, 39, 45, 49
6	<i>Multiple Regression</i>	23.1-2	23: 25, 32
7	<i>The Multiple Regression Model</i>	20.3, 23.3-5	23: 39, 41, 43, 47
8	<i>Collinearity in Multiple Regression</i>	24	24: 33, 35, 37, 41
9	<i>Categorical Explanatory Variables</i>	25.1-4	25: 39, 41, 43, 47
10	<i>Comparing Several Groups</i>	25.5	25: 46
11	<i>Building Regression Models</i>	SIA p 815-820	
12	<i>Time Series Modeling</i>	27	27: 37, 39, 43

The course assumes that you *know* the material covered in the first half of Stat 613, namely basic descriptive and inferential statistics.<sup>3</sup> With this material as a foundation, the course critically explores the use of the key statistical methodology known as regression analysis for solving business problems. These methods and their application will reappear in many other MBA classes and are part of the basic “tool kit” expected of all MBAs in their careers.

<sup>2</sup> This folder on the Canvas website contains the first half of the Stat 613 lectures.

<sup>3</sup> Without this background, you are strongly advised to enroll in Stat 613 rather than Stat 621.

## **Class Preparation, Review and Exercises**

As soon as possible, you should obtain and install JMP. Before each class, you should review the material from the previous class and skim the Class Notes that will be covered. This is a course that builds upon itself and it is crucial to not fall behind. The classes focus on critical interpretation of results and analysis of assumptions. We use JMP to carry out the computations, although the software itself is not the main focus of the course.

You should also read the relevant sections of the SF textbook as annotated throughout the Notes and listed above. We strongly recommend that you review the exercises that conclude each chapter. The exercises in each chapter of the SF textbook begin with matching, true/false, and conceptual questions. You should routinely skim these exercises in every chapter; they review notation and basic properties of the methods covered in class. In addition, the course outline above identifies additional “you do it” exercises that require data analysis or computation related to the examples and topics in the lecture notes. These exercises will not be collected, but they are essential for the learning process. The textbook supplies brief answers to these questions and office hours are available for further questions.

## **Quizzes and Final Exam**

- There will be three short 10 minute in-class quizzes on Sep 12, Sept 26 and Oct 3.
- There will be a two-hour final exam from 6-8PM on Monday, October 15.

## **Learning Team Project**

A project will be assigned to each learning team during the course. It will entail the statistical analysis of data for a business application that your team will report on in two installments. Installment 1 is due on Sep 26. Installment 2 is due on Oct 15.

This project must reflect the work of only your learning team. You are strictly forbidden from discussing this project with anyone outside your learning team.

## **Office Hours**

Ed George (Instructor):        Mondays 3-4:30 pm in JMHH 446.

Gemma Moran (TA):            Mondays 5-6 pm in JMHH F96.

## **Classroom Expectations - Concert Rules**

- Class starts and ends on time.
- Sit according to the seating chart (posted on line in Canvas).
- Late entry or reentry only under exceptional circumstances.
- Name tents displayed.
- Phones, laptops and other electronic devices turned off. Tablets (e.g., an iPad, Surface, etc.) can be used to take notes in class.

## Grading

Grades for the course will be based on the following components

Final Examination	60%
In-class Quizzes (3)	18% (6% each)
Project Installments (2)	18% (8% and 10%)
Concert rules, including attendance	4%

## Attendance

Attendance is an important aspect of the Wharton commitment. Wharton students are admitted in part because of the experiences they bring to the community that they can add to class discussions. Without attending, learning as a collaborative process cannot exist. Accordingly, absences are only appropriate in cases of personal emergency. In addition, late arrival is disruptive to the learning environment and promptness is expected. Please make note of the start of the term and the time of deliverables and exams as you make travel plans. In case of illness, we require a letter of confirmation from Student Health Services. If you find yourself in a conflict due to your career search or recruiting activity, you should work with the MBA Career Management Office to find a resolution. Absences due to recruiting are not excused. Employers are prohibited from requiring recruiting-related activities (e.g., interviews, events or travel) that conflict with a student's academic commitments. An employer's inflexibility on this issue is a violation of Wharton's recruiting policies.

Attendance is required. One unexcused absence is allowed during the quarter without penalty; beyond that, each unexcused absence removes a ½ percentage point from your total grade.