**Course Outline – Fall 2014**
STAT-UB.0103 – Statistics for Business Control and Regression Models

## Meeting Time & Place

Lectures: Monday, Wednesday, and Thursday: 9:30 AM – 10:45 AM
Final Exam: Monday, December 15, 8:00 AM – 9:50 AM
Class Room: KMC 3–65

## Course Staff

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| Instructor: | Prof. Patrick Perry |
| E-mail: | pperry@stern.nyu.edu |
| Office: | KMC 8-63 |
| Office Hours: | Monday and Thursday 11:00 AM – 12:30 PM |
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| Teaching Fellow: | Adarsh Gupta |
| E-mail: | amg836@stern.nyu.edu |
| Office: | TBA |
| Office Hours: | Tuesday and Wednesday 1:00 PM – 2:00 PM |

## Course Objectives

The basic objective of this course is to provide the business student with a strong fundamental understanding of statistics and its applications. Students will learn statistical applications utilizing real world examples and exercises from various fields. This course will survey the topics of descriptive statistics, inferential statistics, linear regression and their applications.

## Course Organization

You will be responsible for the material contained in course lectures, handouts, and homework assignments. The lectures will follow the notes that will be handed out posted on NYU Classes. However, the lectures will often contain more information than what is on the handouts. The textbook should be considered as supplementary reading for this material.

The course materials can be found on the NYU Classes site for this course. This will be the primary way that we will correspond with each other outside the classroom. However, the course staff will be available for office hours as well.

## Required Texts and Materials

1. McClave, Benson, and Sincich, Statistics for Business and Economics, Third Custom Edition for New York University, Prentice Hall. *The twelfth edition is also acceptable.*
2. Minitab 17 or Minitab student version. *Minitab will only run on a Windows PC. If you do not have a Windows PC, then you can run Minitab in the student computer labs or online via* `http://apps.stern.nyu.edu`.
3. Boudreau, Student's Solutions Manual, Prentice Hall (Optional).

## Class Attendance And Participation

Participation is an essential part of learning in this course. Students are expected to participate in all facets of classroom learning. I expect you to take an active role in learning Statistics. I may call on you, and I want you to ask questions. There's no such thing as a "bad" question or comment, so don't be afraid to speak up (in an orderly fashion). This helps me to identify points that I need to explain further. If you demonstrate that you are actively and consistently participating and involving yourself in the learning process (this obviously includes attending class), I may boost your final grade by up to one point, for example, from a B+ to an A-.

## Classroom Norms

Cell phones, smartphones and similar electronic devices are a disturbance to both students and professors. All such electronic devices must be turned off prior to the start of each class meeting. Laptops are not permitted in class.

## Regrading

If you find what you believe to be a grading error on an assignment or exam, you must bring the matter to the attention of the course staff no later than 7 days after the assignment was handed back. *Requests for grading adjustments after this will not be considered.* This includes cases when the written grade does not match the recorded grade on the course website. Discuss homework grading issues with the teaching fellow, and discuss midterm grading issues with the instructor. You must discuss all grading issues in person, during office hours.

If you erase anything, change any answers, or add any notes after your assignment or exam has been graded, you may not submit the assignment or exam for regrading. If you modify an assignment or exam in any way after it gets returned, and then you submit that assignment or exam for regrading, this will be considered to be a violation of the academic integrity policy.

## Grading Policy

We will have homework, two midterms, a final exam, and a project. Your grade will be based on these, as well as class participation.

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| Midterm 1 | 25% |
| Midterm 2 | 25% |
| Homework | 10% |
| Project | 10% |
| Final | 30% |

## Exams

There are two midterms and one final exam. If you have a potential conflict during one of the exams, you must discuss the matter with the instructor during the first week of class. You should check the final exam schedule before you buy any plane tickets or make any other travel plans.

If you miss an exam, you will not be given the opportunity to make up the test except in cases of a documented medical illness. You must have a dated, signed note from a doctor, explicitly saying that you were unable to take the exam due to medical illness (not just a note saying that you had an appointment). In extreme cases when you miss an exam due to *documented medical illness*, at the instructor's discretion you may have the opportunity to take a make-up exam. Make-up exams have a different format than regular exams; they are much more difficult than regular exams, and they typically involve an oral component.

## Homework

Homework counts for 10% of your grade. Students are expected to come to class prepared having read text and assigned readings prior to class. It is suggested that students keep a copy of their homework to study from (in case it is not returned before an exam).

## Project

There will be a project, which counts for 10% of the grade. In the project, you will analyze a data set of your choice, using methods you have learned in the course. The project is a group project. Groups must be at least two students and no more than four students. The project will be broken down into short modules, spread over the entire semester. For each module, the group should submit just one report, with all names on it. **Modules handed in late will not be accepted.** When each module is handed in, the previous modules should be attached, but these will not be re-graded. More details on the project are available on the Blackboard course site.

## Late Policy

Assignments are due at the beginning of class on the day specified, and late assignments are strongly discouraged. That said, there are unforeseen emergencies (illness, etc.) that cannot always be planned for in advance. Instead of having to ask for special allowances on an individual basis, I give each of you the privilege of granting yourself a small extension in case of crisis. You have two self-granted extensions or "late days" which you may use to extend the due dates of any assignments without penalty. A "day" is defined as a day on which class meets. Thus, if your assignment was due at the start of Thursday's lecture, if you turn it in at the start of Monday's lecture, then that assignment is one day late.

Although late days are not intended to cover poor planning or procrastination, I won't ask for justification and will assume you will use your self-granted extensions fairly and wisely. Late days are valuable, and it pays to keep some around for the harder assignments toward the end of the semester. Further extensions are not even considered until you have exhausted your own late days for legitimate needs. They are rarely granted and then only for extraordinary circumstances (such as extended medical problems or other emergencies). In such a situation, send e-mail to me no later than 24 hours before the assignment is due.

## Ethical Guidelines: Student Code of Conduct

All students are expected to follow the Stern Code of Conduct `http://www.stern.nyu.edu/uc/codeofconduct`. A students responsibilities include, but are not limited to, the following:

- A duty to acknowledge the work and efforts of others when submitting work as ones own. Ideas, data, direct quotations, paraphrasing, creative expression, or any other incorporation of the work of others must be clearly referenced.
- A duty to exercise the utmost integrity when preparing for and completing examinations, including an obligation to report any observed violations.

To minimize the temptation for copying or sharing during an exam, there will be multiple versions of every exam, and the seating order will be randomly assigned.

## Students with Disabilities

Students whose class performance may be affected due to a disability should notify the professor immediately so that arrangements can be made in consultation with the Henry and Lucy Moses Center for Students with Disabilities (`http://www.nyu.edu/csd/`) to accommodate their needs.

## Tentative Calendar

| Date | Topics | Textbook Sections | HW Due |
|---|---|---|---|
| 9/3 | Populations and samples; Bias | 1.1–1.7 | |
| 9/4 | Qualitative data; Histogram; Mean; Median; Percentiles | 2.1–2.3, 2.6 | S |
| 9/8 | Boxplots; Notation; Standard deviation; Empirical rule; $z$-scores | 2.4–2.7 | |
| 9/10 | Transformations | | |
| 9/11 | Sample spaces; events; probability; Compound events; Additive rule; Complement rule | 3.1–3.4 | 1 |
| 9/15 | Permutations and combinations | Appendix A | |
| 9/17 | Conditional probability; Multiplicative rule | 3.5, 3.6 | 2 |
| 9/18 | Independence; Bayes' rule | 3.6, 3.7 | |
| 9/22 | Discrete random variables; PDF; Expectation; Variance | 4.1, 4.2 | |
| 9/24 | Linear transformations; Bernoulli and Binomial random variables | 4.3 | P1 |
| 9/25 | Poisson and Hypergeometric random variables | 4.4 | |
| 9/29 | Continuous random variables; The normal distribution | 4.5, 4.6 | |
| 10/1 | Review | | 3 |
| 10/2 | Midterm 1 | | |
| 10/6 | Normal CDF and Inverse CDF; Assessing normality | 4.6, 4.7 | |
| 10/8 | Sampling distributions | 5.1 | |
| 10/9 | The Central limit theorem | 5.3 | |
| 10/13 | Fall Recess | | |
| 10/15 | Confidence interval for population mean (known population variance) | 6.1, 6.2 | 4 |
| 10/16 | Confidence interval for population mean (unknown population variance) | 6.3 | |
| 10/20 | Confidence interval for population proportion; Standard error; Sample size determination | 6.4, 6.5 | |
| 10/22 | Null and alternative hypotheses; Type I and Type II errors; Two-tailed tests on the population mean (known population variance) | 7.1, 7.2, 7.4 | 5 |
| 10/23 | One-tailed tests on the population mean (known population variance); $p$-values | 7.3–7.4 | |
| 10/27 | Test on population mean (unknown population variance); test on population proportion | 7.5–7.6 | |

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| 10/29 | Comparing population means: unpaired | 8.1, 8.2 | 6 |
| 10/30 | Comparing population means: paired | 8.3 | |
| 11/3 | Comparing population proportions; Sample size determination | 8.4, 8.5 | |
| 11/5 | Review | | 7 |
| 11/6 | Midterm 2 | | |
| 11/10 | Association, causation, and correlation | | |
| 11/12 | Covariance and correlation of random variables | | P2 |
| 11/13 | Intro to regression modeling; Least squares | 11.1, 11.2 | |
| 11/17 | Model assumptions; Residuals; ANOVA | 11.3, 11.5 | |
| 11/19 | Residual analysis, Inference about $\beta_1$ | 12.11, 11.4 | 8 |
| 11/20 | Outliers, Leverage points, and Influential points | | |
| 11/24 | Forecasting | 11.6 | |
| 11/25 | Multiple regression; $F$ tests | 12.1–12.4 | 9 |
| 11/27 | Thanksgiving Break | | |
| 12/1 | Models with qualitative predictors | 12.7 | |
| 12/3 | Models with both qualitative and quantitative predictors | 12.8 | 10 |
| 12/4 | Interactions; Higher order models | 12.5, 12.6 | |
| 12/8 | Comparing nested models | 12.9 | |
| 12/10 | Model selection | 12.10 | |
| 12/11 | Review | | |
| 12/15 | Final 8:00 AM – 9:50 AM | | P3 |

S: fill out online survey at `http://goo.gl/bvGCL0`
P1, P2, P3: project modules