



Brandeis University
INTERNATIONAL BUSINESS SCHOOL



BUS 256a: Marketing Analytics
Course Syllabus (Draft – Subject to change)
Fall 2018

Course Instructor

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Course Logistics

Timing: Thursday, 6:30 PM – 9:20 PM
Class Location: Lemberg 054
Office Location: Sachar 214A
Office Hours: Tue 2:15 PM – 4:45 PM, and by appointment
TA Office Hours: Tue 1 PM – 2PM

Course Information

We are now in an era of voluminous real-time data, fast affordable computing, and a data-driven decision making. Firms across the spectrum are gathering detailed real-world data on their customers, competitors and marketplace. This vast volume of information will provide significant competitive advantage to companies and managers who can leverage these data and derive meaningful managerial insights. It has been designed for managers who will be using data analytics, and so is intended for students wanting to go into marketing, finance, consulting, entrepreneurship, business strategy and operations management. Students who take this class will learn about the sorts of business decision problems in which research information is most useful, including problems related to pricing, target market selection, and new product introduction.

More specifically, the course provides experience with applications of data analytics specifically to business decisions. The learning objectives for the course are to learn how to:

- Define the decision problem and determine what information is needed
- Acquire trustworthy and relevant data and judge its quality. This includes-
 - An introduction to the data analysis process

- The role of the data analyst, the value of big data, and the fundamental relationships between data and models
- The R programming language so that students will have the tools needed to work complex data sets
- Analyze data to make strategic and tactical business decisions using statistical models
 - The data generating process, what regression does and its limitations, and the impact that data has on the findings of a regression
 - The goals, challenges, and metrics to use in explanatory and predictive analyses

Course Format

The course meets once weekly and will rely on a blend of required readings, lectures, business cases, homework assignments and a course project to master the material. There is an assumption that students are aware of standard statistical techniques as covered in an introductory statistics course, and more technical material will be reviewed as needed.

Course Pre-Requisites

Students should have –

1. A background in statistics, such as ECON210 or equivalent.
2. Completed or be concurrently enrolled in BUS211f and BUS212f (Analyzing Big Data I and II).
3. Basic knowledge of statistical software such as Stata, SPSS, or R (preferred)

Students not satisfying these requirements should contact the instructor.

Learning Goals

- Defining the Problem- On the first of these points, the organizing theme of the course is “backward market research.” This is a process of starting at the end of the process, envisioning decisions that will be taken based on research. Beginning at the end of the process highlights the importance of identifying the information that is instrumental to making the decision.
- Getting Data & Judging its Quality- On the second point, after we know what information is needed, two questions arise: how to get the necessary data and how to judge its quality. We will cover data gathering methods in sufficient detail that you can have confidence in using qualitative methods for idea-generation and in making decisions based on the data that come from quantitative studies.
- Data Analysis- On the third point, once trustworthy data have been acquired, we must analyze it to make the business decision. There are certain state-of-the art tools (such as logit, cluster, discriminant and factor analysis, forecasting models) for crunching the numbers and drawing the right conclusion about what price to set, which product

concept to develop or launch, how to segment the market, etc. In this class, you will learn enough about these tools to understand when and where specific tools are appropriate. You will also consider and discuss ethical dimensions of a particular study, project, or application.

- Communication- Framing and analysis is great, but without effective communication market research gets rejected, ignored, or simply never done. Communicating market research, like most business contexts, involves both clearly articulating the points and selling those ideas. In this course I orient the communication through the practice of disciplined data-driven story-telling in course projects and group presentations.

Course Materials

Required

1. Chapman, C. and Feit, E.M. (2015), *R for Marketing Research and Analytics*, New York: Springer
2. Harvard Business Publishing course: articles and cases
<https://hbsp.harvard.edu/import/565044>

Recommended but Optional

1. Golemund, G. and Wickham, H. *R for Data Science* (2017). online at <http://r4ds.had.co.nz/>
2. Chang, W. *Cookbook for R*. Online at <http://www.cookbook-r.com/>
3. UCLA Institute for Digital Research and Education Webpage:
<https://stats.idre.ucla.edu/r/>
4. R Programming Tutorial: There are numerous R-tutorials available online. One I recommend is <http://www.cyclismo.org/tutorial/R/> sections 1-10, 13 and 14.
5. Statistics Tutorials: QuickR at <http://www.statmethods.net/>
6. Experimental Ideal & Causality Reference: Mostly Harmless Econometrics: Chapters 1, 2, and 3
7. An Introduction to Statistical Learning, with Applications in R: Chapters 1-3. Available online here: <http://www-bcf.usc.edu/~gareth/ISL/ISLR%20Seventh%20Printing.pdf>
8. Statistics/Predictive Reference: Elements of Statistical Learning: Chapters 1-4. Available online here:
https://web.stanford.edu/~hastie/ElemStatLearn/printings/ESLII_print12.pdf

Course technology

All of the software we will use in this course can be accessed on the public computer clusters at IBS and/or on your personal laptops. We'll continue to use some of the tools used in other IBS analytical courses (Stata, SPSS, R etc.).

Of particular importance are R, Github and DataCamp:

- **R:** R is a free software environment for statistical computing and graphics, and is widely used by both academia and industry. The advantage of the R software is that it can work on both Windows and Mac-OS. It is ranked no. 1 in the KDnuggets 2015 poll on top languages for analytics, data mining, and data science. **RStudio** is a user friendly environment for R that has become popular. **Each student should download these two programs:** Please note: even if you already have them, please check for updates.

R Software: <http://www.r-project.org/index.html>.

RStudio: <http://www.rstudio.com/products/RStudio/#Desk>

- **Github** is also a free environment that facilitates (a) collaborative work and (b) version control for software projects that are under development. It is very widely used by data scientists to manage and share their work.
- **DataCamp** is an online resource that offers interactive R and Python courses on topics in data science, statistics and machine learning (www.datacamp.com). During this course, you would be automatically enrolled in DataCamp (for the duration of the course) and would learn in the comfort of your browser with video lessons and coding challenges.

Course Evaluation

Your final course grade will be computed on the following criteria:

Factor	% weight
Class contributions	10
Quizzes (4)	20
DataCamp Assignments (4)	18
Computational Assignments & Case Analyses (3)	22
Team Project Assignment	30
TOTAL	100

Class contributions. Class participation is important in this course both as a means of developing understanding and as an indicator of student progress. Participation can take many forms, and each student is expected to contribute actively, freely, and effectively to the classroom experience by raising questions, demonstrating preparedness and proficiency in the

analysis of problems and cases, and explaining the implications of particular analyses in context. Homework-based discussion and presentations are an important part of participation. To this end, regular class attendance is required.

With assistance from the TA, I will evaluate the quality of your classroom contributions each class, as well as the quality of your contributions via email, LATTE discussion, etc. These will all be factored together in determining your ultimate contributions grade. I will allow up to two class absences without a penalty to the contribution grade.

Absences. The text and course video captures cannot replace what you miss if you are absent, particularly when a session is devoted to case analysis. In addition we will cover important material not covered in the text. It is your responsibility to catch up on any material you miss by reading the textbook and borrowing class-notes from others in the class. Please let me know in advance by email if you need to miss a class.

Quizzes (4): There are 4 in-class short quizzes (see class schedule below) of 30 minutes each, given either at the start or end of class. These quizzes are designed to test your knowledge of data analysis and programming, and their applicability in real-world situations.

I will be available to assist with quiz preparation in office hours, by appointment or on email. No make-up quizzes will be provided.

DataCamp Assignments (4): There are 4 short DataCamp Assignments (total of 18 chapters) intended to familiarize you with R and data manipulation techniques. These assignments would illustrate how you can use R for data analytics exercises and also help as additional practice material outside of class.

Computational assignments and Case Analyses (3): There are three assignments and illustrative cases intended to test computational and/or statistical skills. These assignments will be computational in nature, and equal weight will be given to the correctness of the analysis/code *and* to your interpretation and explanation of results. The computational and case study assignments may be performed in groups of 2.

Team project: The team project consists of a large dataset, which will be analyzed by multiple teams of three-to-four students. The team project will combine both statistical and computational techniques learnt, as well as managerially relevant analysis. To ensure that teams consistently work on the project through the semester, the team project consists of 3 reports –

Factor	% weight
Interim Report I	5
Interim Report II	5
Final Team Project Report & Presentation	20
TOTAL	30

The Interim Reports are designed to monitor on-going progress in the project data analysis, as well as an application of the concepts learnt in class till that point. For the Final Project report, teams will prepare a brief technical report explaining their methods and findings, as well as a PowerPoint presentation of their work. At the end of the course, we will devote one class to team presentations of results and recommendations. A detailed project assignment will be distributed early in the semester.

Each student will participate in a team, and all group members will receive the same grade for the project. At a minimum, all group members must participate fully in the project, including attending group meetings, preparing an analysis plan, conducting analyses, and writing up and presenting the project report.

Class Conduct

Use of technology in the classroom. You are allowed to use laptops and tablets during some lectures, which will be specified by the instructor. When allowed, they should only be used for coursework related activities and not for email, social media, or other activities not directly related to the course. Cell phones must be turned off or silenced during class. No photography or recording of any kind is allowed without explicit permission from the instructor.

Respect during class discussions: On some days we will discuss assigned cases. We have a shared responsibility to create a classroom environment where all voices and ideas can be expressed and different viewpoints can be exchanged. This often calls for active listening and for simply waiting to be recognized before you speak. Individuals vary widely in their willingness and desire to speak, as well as in their confidence with the English language. I will insist that everyone participate at some level—which means you should expect to be called upon, and no one will be allowed to dominate or monopolize class discussion.

Late assignments. Late assignments will not be accepted without my prior permission, and will incur a penalty unless the circumstances are exceptional.

Academic Honesty: You are expected to be honest in all of your academic work. Please consult Brandeis University [Rights and Responsibilities](#) for all policies and procedures related to academic integrity. Students may be required to submit work to TurnItIn.com software to verify originality. Allegations of alleged academic dishonesty will be forwarded to the Director of Academic Integrity. Sanctions for academic dishonesty can include failing grades and/or suspension from the university. Citation and research assistance can be found at [LTS - Library guides](#).

Disabilities: If you are a student with a documented disability on record at Brandeis and wish to have a reasonable accommodation made for you in this class, please see me immediately.

Workload Expectation

As this is a four-credit course, you are expected to spend a minimum of 9 hours of study time per week in preparation for class (readings, exercises, assignments, preparation for exams, research, etc.).

Communications and Getting Help

We'll make regular use of LATTE. All lecture notes, handouts, assignments, and supporting materials will be available via LATTE, and any late-breaking news will reach you via email. Please check your Brandeis email and the LATTE site regularly to keep apprised of important course-related announcements.

If you are hesitant to participate for any reason or if you have questions about anything, please come and see me. I am happy to help. Please contact me for assistance for any reason, or if you have questions, comments, or concerns about the course. All of my contact information is on the cover page of this syllabus.

Course Plan

Session	Date	Topic and Readings	Assignments (Due before class)
1	08/30	Introduction to Marketing Analytics and R <u>READING:</u> <ol style="list-style-type: none"> 1. CF Chapter 2 2. "3 Myths of Learning Programming Languages" http://www.sitepoint.com/the-3-myths-of-learning-programming-languages/ 	<i>Install R and RStudio before Class</i>

		<p>3. “Why I want to write nice R code” http://nicercode.github.io/blog/2013-04-05-why-nice-code/</p> <p>4. <i>Keep Up with your Quants</i> by Thomas H. Davenport (HBP)</p> <p><u>REFERENCES:</u> Grolemond & Wickham, Chang</p> <p><u>REQUIRED:</u> Install R and RStudio before Class</p> <p>DataCamp: Begin 6-chapter course Introduction to R (complete by Sep 13)</p>	
<p>Sept 6 – No class, Brandeis Monday</p>			
2	09/13	<p>Data Measurement, Interpreting Data Patterns using R & Visualization Techniques</p> <p><u>READING:</u></p> <ol style="list-style-type: none"> 1. CF Chapters 3, 4, 5 2. <i>You have the Numbers, But What Does It Mean?</i> By Andrew O’Connell and Walter Frick (HBP) <p>DataCamp: Begin 4-chapter course Introduction to Tidyverse (complete by Sep 20)</p>	<p>DataCamp Assignment 1, Install RMarkdown before class</p>
3	09/20	<p>Sampling, Confidence Intervals & Hypothesis Testing – Why does it matter?</p> <p><u>READING:</u></p> <ol style="list-style-type: none"> 1. CF Chapter 6 2. <i>A Refresher on Statistical Significance, Harvard Business Review</i> (HBP) 3. <i>Pilgrim Bank A</i> (HBP) <p>DataCamp: Begin 4-chapter course Categorical Data in the Tidyverse (complete by Oct 4)</p> <p>QUIZ 1</p>	<p>DataCamp Assignment 2</p>
4	09/27	<p>Identifying Linear Drivers in Marketing problems</p> <p><u>READING:</u></p> <ol style="list-style-type: none"> 1. CF Chapter 7 	
5	10/04	<p>Identifying Linear Drivers – Logistic Regression</p> <p><u>READING:</u></p> <ol style="list-style-type: none"> 1. CF Chapter 9.1-9.2 	<p>Pilgrim Bank A Case Study</p>
6	10/11	<p>GUEST SPEAKER</p> <p>David Bairstow, Senior VP, Product Management, Skyhook</p> <p>https://www.linkedin.com/in/dbairstow/</p> <p>QUIZ 2</p>	<p>Interim Report I</p>

7	10/18	<p>Understanding Customers: Market Segmentation</p> <p><u>READING:</u></p> <ol style="list-style-type: none"> 1. CF Chapter 11 2. Marketing Reading: Segmentation & Targeting (HBP) <p>DataCamp: Begin 4-chapter course Marketing Analytics in R: Statistical Modelling (complete by Nov 8)</p>	
8	10/25	<p>Understanding Customers – Preferences, Lifetime Value and Churn</p> <p><u>READING:</u></p> <ol style="list-style-type: none"> 1. Pilgrim Bank (A) (revisited) 2. Predicting Churn at QWE Inc. (HBP) 	eBay Data Assignment, DataCamp Assignment 3
9	11/01	<p>Predictive Analysis using R</p> <p><u>READING:</u></p> <ol style="list-style-type: none"> 1. <i>Predicting Churn at QWE Inc. (revisited)</i> 2. <i>Pilgrim Bank B & C (HBP)</i> <p>QUIZ 3</p>	Predicting Churn at QWE Inc. Case Study
10	11/08	<p>Forecasting Models</p> <p><u>READING:</u></p> <ol style="list-style-type: none"> 1. <i>Pilgrim Bank B & C (HBP)</i> 2. <i>Predicting Churn at QWE Inc. (revisited)</i> 	DataCamp Assignment 4
11	11/15	<p>GUEST SPEAKER (TBA)</p> <p>Price & Promotion Analytics</p> <p><u>READING:</u> <i>Eco7: Launching a New Motor Oil (HBP)</i></p>	Interim Report II
<i>Nov 22 – No class, Thanksgiving Break</i>			
12	11/29	<p>Experimental Design in Business</p> <p><u>READING:</u></p> <ol style="list-style-type: none"> 1. <i>How to Design and Analyze a Business Experiment (HBP)</i> 2. <i>The Path to Prescription: Closing the Gap Between Promise and Reality of Big Data (HBP)</i> 3. <i>The Surprising Power of Online Experiments (HBP)</i> <p>QUIZ 4</p>	Final Project Reports due
13	12/06	Student Team Presentations	