Analytics for Marketing Decisions

Updated November 30th 2019

Course No: BUS AN 514 A

Title: Analytics for Marketing Decisions
Instructor: Hema Yoganarasimhan
Email: hemay@uw.edu
Office Location: 481 Paccar Hall
Office Hours: 4.45 to 5.45 pm on Thursdays, or by appointment

Teaching Assistant: Omid Rafieian
Email: rafieian@uw.edu
Office Location: 211 Mackenzie Hall
TA Office Hours: TBD, or by appointment

Course description: Marketing is evolving from an art to a science. Many firms have extensive customer databases, but few firms have the expertise to intelligently act on such information. In this class, you will learn how to be a data-savvy manager. You will learn how firms can use data analytics to optimize their marketing mix decisions or the 4 Ps – Product Design, Pricing, Promotion and Advertising, and Placement. In the process, you will also gain expertise in methodologies for developing statistical models for descriptive, causal, and predictive models for large-scale data. The class will conclude with a discussion of the implications and costs of automating marketing decisions, new developments in analytics, and the privacy concerns in storing and handling data with sensitive consumer information.

Expectation: I expect everyone to have a working knowledge of statistics (e.g., you should know what a t-test is) and a working knowledge of regressions. Students who have never taken a statistics course may find this course challenging. Prior experience with R and/or working with data will help though it is not necessary.

To be clear, this is an applied course where analytics is a means towards the end goal of making better decisions. This is not a statistics class.

Class format: Class sessions are a mix of lectures by the instructor, case discussions, and in-class consulting assignments.

What are "in-class consulting assignments"? These are analytics-based short consulting projects that you will work on during class. They will help you learn how to implement the methods taught in class. These assignments are NOT graded. On days that we do in-class consulting assignments:

- Please bring your laptop (which should have RStudio loaded into it).

- Please ensure that you have Internet access so you can access the datasets and handouts uploaded on Canvas during the session. The handouts will contain a step-by-step plan for the analysis. These are designed such that you can work through the exercises at your own pace.

Course goals: Upon finishing this course, students will be able to make "data-driven" marketing decisions. They should be able to identify important marketing problems that firms in today's data-rich world face, draw from theories of consumer and firm behavior to build models, take these models to data, and execute them in R or another advanced statistical package.

Books: There is no textbook for the course. I have assembled a course packet consisting of recent articles on marketing analytics, excerpts from books, research papers, mini-cases, and datasets. All the course materials will be posted on Canvas.

However, I recommend the following books on analytics and R:

- R for Data Science: Import, Tidy, Transform, Visualize, and Model Data by Hadley Wickham and Garrett Grolemund
- R for Marketing Research and Analytics (Use R!) by Chris Chapman and Elea McDonnell Feit
- Data Mining for Business Analytics: Concepts, Techniques, and Applications in R by Galit Shmueli, Peter C. Bruce, Inbal Yahav, Nitin R. Patel, and Kenneth C. Lichtendahl Jr.

Required readings and to-dos: To prepare each class, you are *required* to:

- Read a set of readings. The readings marked suggested are not required, but highly recommended.
- Do some small exercises/analysis that will help you learn the class materials effectively. You should also familiarize yourself with any data that we will discuss that day.

The list of readings and to-dos for each class will be posted on Canvas and updated through the quarter.

Evaluation:

1. Class and Canvas Board participation: 5%
2. Mini assignments (individual):
    a. Five, each worth 2 points: 5 X 2 = 10%
3. Major Assignments (individual):
    a. Five over the quarter. Four worth 12.5 points, and one worth 15 points: 4 X 12.5 + 15 = 65%
4. Group project: 20%

Class and Canvas Participation

5% of your grade comes from class and canvas board participation. You can substitute between the two as you wish.

1. **Class participation**

- It is recommended that you attend all classes. The materials we cover in class, especially the in-class work, will help you do the assignments and the group project.
- On-time arrival is expected. If you know that you must arrive late or leave early please contact me in advance of class.
- *Attendance policy:* I won't be taking attendance and you do not let me know if you plan to miss a class. However, it is your sole responsibility to make up any materials covered in classes you missed and to ensure that you keep track of assignment deadlines etc.

2. **Canvas Discussion Board**

We will have an active Canvas discussion board for this class. There will be three discussion boards.

- General topics – To share and comment on interesting articles and videos on analytics.
- R Help and Discussion – To ask questions or get help on R. You can also post questions/comments on the in-class consulting projects here.
- Assignments Board – To post and answer clarifying questions on both the mini and major assignments.
- Participation in these discussion boards will count towards class participation points.

Assignments

You will find all the assignments on Canvas where you can also submit your completed assignments. The class has regular assignments that are linked to the lectures and in-class consulting assignments. There are 5 mini assignments and 5 major assignments, all of which are individual.

Here are some notes on assignment submission guidelines

- Mini-assignments are small assignments that are designed to help you prepare for the class that week. Usually, they will consist of a focused task, e.g., learning a functionality in R, which we will use in class that week.
- Major assignments are more in-depth analysis of a specific business problem using data, and will be linked to the concepts learnt in class. You may discuss these assignments with others, but it is expected that you run all the code and write up the results yourself.
- Late submissions are not accepted. We may discuss homework assignments in class the day that they are submitted. So, in fairness to everyone in the class, I cannot accept any late assignments. A late submission will result in a zero for that assignment.
- There is no way to make up for a missed assignment; I do not offer additional assignments or extra work in lieu of a missed assignment. Given this, please

pay close attention to assignment deadlines. These will be announced on Canvas and in class.
- All assignments must be submitted electronically through Canvas. Assignments will be returned electronically via Canvas.

Assignments discussion boards
If you need clarifications on the assignments, please post your questions related to the Assignments discussion board in Canvas.

- Either the TA or I will answer them. Or one of the other students may chime in clarify things too.
- Both I and the TA will check the discussion board at least once a day. On business days, I usually check the discussion boards around 10-11 am in the mornings and TA checks the discussion boards around 5 pm in the evenings. On weekends and holidays, there is no set schedule, but at least one of us will try to check the discussion board once a day. Please keep this schedule in mind as you work on the assignments and/or post question.
- Do not email the TA or me with questions on the assignments unless it relates to a personal matter regarding the assignment submission.

The goal of the assignment discussion boards is to ensure that all the questions and thoughts related to each assignment are collated in one place and available to all students in the class. This serves three purposes:

- Often many students have the same/similar questions regarding an assignment. By keeping all the clarifications in one place, it simplifies the process of getting answers for the entire class. For example, when a student has a question, s/he can simply look up the discussion board to first see if it has been already asked and addressed. This takes out the costs and the time lag of emailing me/TA and waiting for us to respond. If not, s/he posts the questions on the board.
- It ensures that all students are on the same footing when doing the assignment, i.e., there is no likelihood of me/TA providing more or less help to some students.
- It allows students to answer each other's questions and engage in collaborative learning. If you are an active participant on the discussion board and answer other students' questions, it will count towards your class participation credit.

Group Project: There is one group project, which will involve a group of 2-4 students to work on a medium-scale consulting-style project. The instructor will meet with the students regularly through the quarter, and help in defining the objectives of the project, obtaining data, conducting the analysis, and finalizing the conclusions. A final project report is due at the end of the quarter. A document with detailed guidelines and deadlines will be posted on Canvas.

Course Materials: Slides, handouts, and datasets for each lecture will be posted on Canvas. Lectures will be recorded and uploaded automatically on Canvas.

Course Schedule: The following is a high-level course schedule. Note that each module typically covers a substantive topic as well as learn a new method/analytics tool that will help us answer these substantive questions.

Please see Canvas for an up to date, detailed class schedule.

1. **Module 1: Product Design Analytics**

    - How to measure consumers' perceptions of your products?
    - What are the descriptive methods to summarize high velocity, high volume, and high variety data on products?

    Methods: Principal Component Analysis (PCA) and Perceptual maps

2. **Module 2: Demand and Pricing Analytics**

    - How can we model demand and estimate price elasticities from observational data?
    - Using pricing analysis to estimate product line profits

    Methods: Demand models for estimating price elasticity and profits

3. **Module 3: Advertising and Promotion Analytics**

    - How to use data to do targeted bidding and buying in ad auctions?
    - How can be build powerful predictive models to predict clicks and purchases, and use them for maximizing revenues from targeting?

    Methods: Machine learning models (CART and XGBoost) for targeting of advertising and counterfactual revenue analysis