

## 293 – Marketing Analytics

Syllabus - Fall 2017

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 Office hours: Davis: Tue 11a-12p / Sac: Wed 9-10p / Bay: Sat 4-5p

### Course Description

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Marketing analytics can extract insight from data, and that insight can inform action. This course is designed to provide you with a solid understanding of the broad array of analytical tools and types of data available to marketers. More importantly, however, it is designed to help you learn how to think about how to use data patterns to answer questions.

Marketing managers are often tasked with making decisions. For example: How much advertising should we conduct? Should we offer a temporary price reduction? Which consumers should we target? These decisions often rely on insights generated from empirical analysis. In many cases, a manager will be tasked with a specific decision, and have available a dataset collected for the task at hand. The first objective of this course is to prepare you to use a wide array of analytical tools to extract insights from data, and use those insights to inform marketing decisions.

Often, however, a marketing manager's job is not that simple. At times, a manager may have decisions to make an insufficient data to make them. In such cases, s/he must know what data to collect. The second objective of this course is therefore to provide you with knowledge of a variety of data types, to prepare you for data collection.

Finally, a manager may have a different problem—they may have a wealth of data available to them, but be uncertain about what value can be extracted from that data. This scenario is becoming more and more common as data collection becomes easier. Firms routinely work with outside sources (consultants, academics) to help them maximally leverage the data they have. The third objective of this course is to train you to identify what insights can (and cannot) be extracted from datasets you have at your disposal. Put another way, you'll learn how to determine what can (and cannot) be logically deduced from the patterns observed in a dataset.

At the end of the day, no one marketing analytics course can provide experience with all analytical tools each student will use at their next job, as each person's work environment will differ. What a course *can* do is train each student how to *think* about marketing problems and data, to facilitate rapid emersion in their post-graduation analytics environment, and provide a foundation for making smart, data-driven decisions. That is the goal of this course.

### Requirements

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Prerequisites: Marketing Core (204), Stats Core (203A); 203B encouraged<sup>1</sup>  
 Required Text: None (*Ch. 16-17 of 203A text Statistics for Management and Economics may be helpful*)  
 Required Software: Microsoft Excel, R + R Studio

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<sup>1</sup> Having a strong understanding of linear regression by the end of week one is necessary. This is easier if you have already taken 203B, but we do review linear regression in the first week (before going into more detail in weeks 2 and 3), so 203B is not a strict prerequisite. If you do not have any experience with linear regression prior to the course, some additional study may be necessary. Reading chapters 16 and 17 in the 203A text before starting this course would be helpful for anyone who has not taken 203B. If you have at least a basic idea of what linear regression is, you should be fine. More concretely, if you see this equation and get what it means and how to interpret each of its components, you're ready:  $Y = \alpha + X\beta + \epsilon$

## Course Topics

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Nine topics will be covered across three modules. The final (tenth) week of the course will consist of group project presentations, which will cover a range of topics. The schedule of these topics is below.

Module	Week	Topics	Davis/Sac	Bay Area
The Basics	1	Analytics basics Linear regression Introduction to R	27-Sep	7-Oct
	2	Causality and experimentation Causality vs correlation A/B testing, multi-armed bandit	4-Oct	7-Oct
	3	Visualization and identification Empirical identification Model-free evidence & data viz	11-Oct	21-Oct
	4	Causal effects with market data Common types of market data Identifying causal effects	18-Oct	21-Oct
Heterogeneity	5	Heterogeneous regression models Introduction to heterogeneity Panel data and fixed effects	25-Oct	4-Nov
	6	Choice models I Binary choice models Database marketing	1-Nov	4-Nov
	7	Choice models II Discrete choice models Online search	8-Nov	18-Nov
Dynamics	8	Intertemporal dynamics Intertemporal substitution Rewards programs	15-Nov	18-Nov
	9	Dynamic pricing The entertainment venue model The Uber model	29-Nov	9-Dec
	10	Final Projects	6-Dec	9-Dec

**Changes from Fall 2016 offering:** A couple of changes are worth noting for students who have asked their classmates about this course. Last year the course was designed to be a rather intense in-class experience and more relaxed out-of-class experience. The classroom was treated like a fast-moving workshop, and there was little in the way of homework. Students recommended moving slower in class and assigning more homework, and I agreed with their recommendation, so the course has been adjusted accordingly. Two weeks of material from the Fall 2016 course have been dropped, since the topics (Segmentation, Targeting, and Positioning) are covered in other courses. The remaining seven weeks of material from the Fall 2016 offering will be spread out over nine weeks, in order to give us more time to cover them in detail. Additionally, in-class presentations and coding exercises have been removed to give us more time to discuss practical applications and cover the math slowly in class. Coding will now be handled through lecture and homework assignments (rather than having students code along with me in class), but I will provide both significant documentation and help via office hours for those who find coding challenging. Finally, the choice modeling material has been condensed and simplified, as it seemed that choice modeling was the most challenging material in the course.

In short: the in-class experience should be a little less stressful, but there will be more homework. All homework, however, will be done in groups.

## Grading and Schedule of Assignments

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**All homework will be done in teams.** Teams should consist of three or four students. E-mail me (with all members CC'd) no later than 10/08 to let me know who you're working with.

**In-class participation and exercises (25%):** Attendance will be worth 10% of your grade, and in-class group exercises will be worth another 15%. You can miss one class without penalty.

**Homework (50%):** There will be six assignments, but you need only do five. If you complete all six, your five highest grades will be used, and your lowest ignored. Each homework assignment will consist of a coding exercise and short-response questions. They will be case-like in nature. You'll always be given "sample code" to modify for your assignments – you won't need to figure out how to code from scratch. No late assignments are accepted. Due dates are below.

**Final Project (25%):** Teams will also work on a semester-long project of the choose-your-own-adventure variety, which will culminate in a 20-minute presentation on the last day of class. You have two options. You will receive guidance from Mike regardless of which option you choose.

**Option 1:** Collect data from a firm (maybe one you are affiliated with) and examine a problem of interest to them. The firm must be willing to let you present your results to the class.

**Option 2:** Research a topic in analytics (see topic list below) and teach the class what you have learned.

Below are a list of topics you may be interested in pursuing for option 2. Some are clearly analytics-based (e.g., missing data). Others are general topics for which you can identify a preferred analytics focus:

- Missing data and data Fusion
- Word of mouth and peer influence
- Freemium products and network effects
- Text mining on social media

You may propose other topics you find interesting as well, so long as you can identify an analytical approach to teach us during your final presentation. The idea behind the final project is to give you time to work on something that is more tailored to your team's interests, so I am open to you proposing alternative topics, or even alternative projects that deviate from options 1 and 2 above. Whatever you choose, it must be communicated to me by 10/08.

You must also write up a two-page preliminary project proposal (worth 5 of the final project's 25%) by 10/15. Examples of previous proposals will be posted online. As long as the proposal is sent on time and reasonably well thought out you'll get full credit. The point of the proposal is just to get the ball rolling. You will receive feedback—mostly recommendations to improve your idea, or guidance about how to achieve your project objectives. Virtually all teams will be asked to modify their proposal at least a little—don't take it personally!

### Assignment Schedule (all sections)

Assignment	Due Date
Read Keller Chapters 16-17*	First class
<b>Form teams, choose project topic</b>	Sunday 10/08**
<b>Preliminary project proposal</b>	Sunday 10/15**
HW 1: Regression	Sunday 10/15**
HW 2: Causality	Sunday 10/22**
HW 3: Data visualization	Sunday 10/29**
HW 4: Market data	Sunday 11/05**
HW 5: Database marketing	Sunday 11/19**
HW 6: Rewards programs	Sunday 12/10**
<b>Final Project Presentation</b>	Tenth Class

\* If you have not taken 203B

\*\* Due at midnight