Marketing Analytics: Syllabus

J.M.T. Roos

Last updated: 2017-01-23 22:44:54

"Marketing Analytics" refers to a broad range of activities that rely on data to improve marketing decisions. As the amount of data available to even the smallest companies continues to increase, companies of all types will continue to embrace this exciting and growing field.

Marketing analysts need to possess a diverse skill set. Although experience with programming and statistics is important, technical skills alone are typically not sufficient for success. Analysts must understand the business context they work in so that they can sensibly interpret results. Furthermore, marketing analysts must be able to clearly and persuasively communicate their insights to managers.

This course provides hands-on opportunities for you to develop and integrate these diverse skills. In the first half of the course, we emphasize the technical—reinforcing skills obtained from previous courses (e.g., statistical analysis of data, multiple regression) and developing new ones (e.g., advanced data visualization, demand estimation). In the second half of the course, we emphasize the application of these skills to solve managerial problems and communicate a recommended course of action.

Learning objectives

- Understand and explain the intuition behind statistical concepts used by marketing analysts
- Manipulate and summarize data using the R programming language
- Draw inferences from data to answer questions relevant to marketing managers
- Use R to graphically represent data and inferences; recognize and evaluate alternative presentation strategies
- Explain and justify managerial recommendations to non-technical audiences through written reports

It is not possible to train you to become a marketing analyst in six weeks, however it is possible to train you to become an analytics-savvy marketer. Having said that, some (former) students have used this course as a starting point for careers as marketing analysts.

Course materials

The following materials will be used throughout this course:

Cases and teaching notes You must purchase the cases and teaching notes online by visiting the following link: `https://goo.gl/ygSHzP` (you can then download the materials in PDF format). Supplementary materials for some cases (i.e. Excel spreadsheets) will be posted to Blackboard.

Articles Available via the EUR library (links provided in this document)

Assignments and lecture notes Posted to Blackboard

R and RStudio Free software for statistical analysis and data visualization (download instructions available in Assignment 1)

Note that there is no course text. While most of the course material can be downloaded for free from the internet (or via EUR's library), there are two exceptions: 1) the cases and teaching notes, which can be purchased from The Case Centre by visiting `https://goo.gl/ygSHzP` (or otherwise obtained from some other source of your choosing), and 2) my assignments and notes, which will be posted to Blackboard. Do not share my course materials with anybody outside the course without first obtaining my permission. Sharing reproductions of the cases and teaching notes is, of course, against the law. All reading assignments and written course work is mandatory unless otherwise indicated in this syllabus.

Software

Throughout this course, we will use R, an open-source statistical programming and graphics program. Why are we not using SPSS? Since most of you will have had experience with SPSS in your previous courses, I feel I should justify the decision to build the course material around what will be, at least for most of you, a new statistical program.

1. You can do more with R than with SPSS. There are thousands of free "packages" available for R, each of which provides a number of tools useful to very specific (or general) problems.
2. Once you go beyond the basics of data analysis (as we do in this course), you will need to write computer code (or scripts). At its core, R is a programming language, and one that is remarkably straightforward to learn and use. SPSS's scripting language, on the other hand, is a disaster.
3. R is free, and one can download and install it in a few minutes. This means: a) you won't need to ask your boss to pay thousands of euros for an SPSS license, and b) you can run it on your computer at home (e.g., to improve your skills while looking for a job after graduating).
4. R's popularity seems to have taken off in recent years, and there is an active community of users on the Internet. When you can't figure out how to do something in R, a Google search will turn up the answer very quickly. The same is not true for SPSS.
5. Both SPSS and R make it possible to produce high-quality graphics using "the grammar of graphics" (which we will learn more about later in the course). Thus much of what you learn about producing graphics in R will be transferable back to SPSS, should you continue to use it in the future.

6. Learning to write code in any programming language is a unique experience, one that provides many benefits outside the realm of programming or data analysis.

7. By adding R to your CV, you send a better signal to potential employers than you do if list only SPSS.

Requirements & grading

The following table lists the graded coursework and each assignment's contribution to your final grade.

Assignment	Basis	Weight
Assignment 1	Individual	1
Assignment 2	Individual	8
Assignment 3	Individual	8
Assignment 4	Individual	8
Case write-up 1	Group	10
Case write-up 2	Group	10
Case write-up 3	Group	10
Project 1	Individual	20
Project 2	Group	20
Project 3	Individual	5

Note. Assignment 1 is graded on a complete/incomplete basis, but with the proviso that you cannot pass the course unless you complete Assignment 1.

Regrading

If you believe a mistake was made when assessing your work, you can ask me to grade it again. In such a case, please submit your request in writing (e.g. via email). I will reassess your work and assign a new grade, but note there is no guarantee the new grade will be higher than the old grade.

Group assignments

At the start of the course, you will form teams of five students each. I will allow teams four students only if we do not have a round number of students enrolled. You must enroll your team on Blackboard prior to the end of the first week. All group assignments will be completed with the same team members. When forming teams, I suggest you aim to maximize team diversity such that as many of the following skills are represented in your team as possible:

Technical skills Prior experience (and comfort) writing Excel equations or creating computed columns in SPSS, or even prior experience writing software code or scripts.

Inferential skills Prior experience (and comfort) looking at numbers (e.g. output from a regression) and considering what those numbers might imply about the real world.

Organizational skills Ability to generate consensus among team members, keep track of and coordinate contributions to assignments, upload items to Blackboard before deadlines.

Communication skills Ability to communicate ideas clearly in English or with graphics (e.g., prior experience with and comfort using the plotting tools in Excel or SPSS).

Background RSM has a diverse student body, and that diversity can provide a wealth of new and interesting perspectives—don't fall into the habit of only working with people who come from your home country or who speak your mother tongue.

Technical vs. inferential performance

For many of you, the technical aspects of the course will be the most difficult. Perhaps this is even a source of anxiety, leading you to worry about your overall performance in the course. To allay such concerns, let me say once again that I have tried to design the course in such a way that your grade on the technical aspects of the assignments (i.e., programming and math) will be, to the greatest extent possible, based on your effort, and not on finding the correct answer (if there even is one). For example, in order to obtain full points on Assignment 1, you need to follow a step-by-step tutorial teaching you the basics of the R programming language, and sign and date a declaration to that effect on Blackboard. Furthermore, there are four sessions planned for the computer lab, during which time I am available to answer questions.

In counterbalance to my leniency with respect to the technical aspects of the assignments, I will place greater weight on the quality of your inferences. In general, I am looking for analysis that is coherent—i.e., logical, consistent, and clear. You will not be penalized very much for making small programming or mathematical errors, provided your analysis is still logical, consistent, and grounded in reality. If, however, such errors lead to inferences that are unrealistic, or inconsistent with the remainder of your analysis, then we have a problem. In these situations, there are many possible outcomes:

1. You do not detect the problem and proceed with analysis that is unrealistic or illogical (bad)
2. After realizing your analysis is unrealistic or illogical (good), you search for the mistake, and
   (a) You identify and correct the mistake and move on (best)
   (b) You cannot identify where you went wrong, and
      i. Your analysis remains unrealistic or illogical (bad)
      ii. You admit to the impasse, discuss the inconsistent or unrealistic results, and do your best to reconcile them with the rest of your analysis (best)

Notice that outcome 2(b)(ii) is perfectly acceptable, whereas outcomes 1 and 2(b)(i) are not. This will be reflected in my grading.

Communication

One of the aims of this course is to help you improve in your ability to communicate technical concepts to non-technical audiences. Accordingly, one of the criteria by which I will judge your work is its ability to communicate ideas clearly and concisely. In some cases, I will provide guidelines as to the length of your submission. Please pay attention to these! Finally, all assignments are to be completed in English using periods to indicate decimal places (i.e., write 10.5 and not 10,5).

Handing in assignments

Assignments are due at 09:00 on the day indicated in this syllabus. Please upload your assignments via Blackboard. If you believe your assignment did not upload correctly, you can email me a copy as a safeguard. You may also bring a copy to class to give to me in person. I strongly prefer you use Blackboard, however.

Please make a PDF of your submission (this goes for everything). I really dislike opening MS Word and PowerPoint files. Submissions that are not in PDF format will have points deducted. If you anticipate having trouble creating a PDF file, please talk to me so we can work out alternatives.

Late assignments will typically be accepted, but with a grade penalty of my choosing. If students have a legitimate reason for completing an assignment late, they must either make arrangements with me in advance, or present valid, official proof of such a reason (to be accepted at my discretion). No other excuses will be accepted.

Assignments

R tutorials These step-by-step tutorials are intended to help you learn the basics of programming in R. You are encouraged to experiment with R outside of the assignments. There are many good tutorials available online if you would like more practice with the language.

Case write-ups The three case write-ups are group assignments. All are to be handed in before we discuss the case in class (retain a copy so you can refer to it during the discussion). The point of these write-ups is to help you focus on the important aspects of the case, and to challenge you. The case discussions are scheduled to take place before I lecture on a particular topic, so if you find you are struggling, you are probably doing it right.

Projects 1 and 2 In Project 1, you will work individually to analyze and present the results of a conjoint experiment. Project 2 is an extension of and elaboration upon the work performed for Project 1: you will work in teams to develop and communicate recommendations for launching a new product line.

Project 3 Project 3 is meant to really challenge your ability to work through technical problems and communicate managerial insights. Success on Project 3 depends on your ability to work independently and learn on your own. For example, to complete Project 3, you must learn how to create and compile an RMarkdown file. If you choose not to complete Project 3, your maximum score in the course will be 9.5.

Lectures, lecture notes, and concept checks I have developed a set of lecture notes which are to be read prior to certain lectures. These notes present in detail the course material that I will cover in the lecture. During the lecture, I will introduce the material (but in less detail than you will find in the notes), and then I will stop for a concept check. Concept checks are short problems that you will work on with your neighbors. After a few minutes working on the concept check problem, we will discuss the solution(s) as a group. This exercise will signal to me whether the majority understands the material at a level that we can move on to other topics, or whether I need to spend more time on it. Based on feedback from previous students, this also makes the course more engaging and interesting for you!

Assigned reading Articles listed in the syllabus will be discussed in class (with time permitting) and are meant to round out your understanding of that day's topic. You are encouraged to refer to these articles during the lectures and class discussion, if appropriate. Please read all articles before the course for which they are listed. Note that I will not grade you based on your

participation, but I expect you to read the articles nonetheless. Any reading that is optional will be marked as such; all other readings are to be considered mandatory.

Attendance Attendance is strongly encouraged, but will not factor directly into your grade. If you must miss class for some reason, please send me an email, before the absence if that is possible. If you do not send me an email, I will simply assume you have decided not to attend. If you choose not to attend a lecture, do not email me asking what was covered. My time is a limited resource while teaching, and when responding to student requests for help, I give higher priority to students who choose to attend and participate.

Norms

As a member of this course, you agree to the following norms:

- Listen actively and attentively
- Ask for clarification if you are confused
- Treat each other with respect
- Try not to interrupt one another (if you must, be respectful)
- Challenge one another, but do so respectfully
- Critique ideas, not people
- Avoid speaking badly of others (even in a humorous way)
- Take responsibility for the quality of the discussion
- Build on one another's comments; work toward shared understanding
- Do not monopolize discussion
- If you are offended by anything said during discussion, acknowledge it immediately if you are comfortable doing so; otherwise speak with me privately
- Arrive on time
- Turn your cell phone off
- Try not to distract or annoy your classmates
- Do not use your laptop or table or phone in class, except on the (rare) occasions when you need to google something related to the lecture (evidence is accumulating that these devices hinder learning in classroom settings)
- Speak loudly and clearly, and let me know if you cannot hear well
- Accept that there may be more than one right answer
- Come to class prepared, having read assigned materials, prepared cases, and completed assignments

Course schedule

Week	Date	Day	Time	Room	Activity	Topic(s)	Reading	Deadline
1	31 Jan	Tue	9.00–11.45	G3-21	Lecture	Course introduction	[1: §1; 2] Optional: [3]	
						Review: Probability / statistics	Optional: [4: §1 §2.1 §2.2]	
	1 Feb	Wed	9.00–11.45	T3-57	Lab	Using R	Optional: [5: §2; 6: §1.1]	
	3 Feb	Fri	9.00–11.45	G3-21	Lecture	Review: OLS regression	[1: §2] Optional: [4: §3.1 §3.2 §3.3.1 §3.4]	Assignment 1
						Logistic regression	[1: §3]	
2	7 Feb	Tue	9.00–11.45	G3-21	Discussion	Portland Trailblazers case	[7; 8]	Case write-up 1
					Lecture	Preferences I (utility / conjoint)	[1: §4] Optional: [9]	
	8 Feb	Wed	9.00–11.45	T3-57	Lab	Regression in R		
	10 Feb	Fri	9.00–11.45	G3-21	Lecture	Preferences II (choice models)	[1: §5] Optional: [10]	Assignment 2
3	14 Feb	Tue	9.00–11.45	G3-21	Lecture	Data visualization I	[11: §3]	
	15 Feb	Wed	9.00–11.45	T3-57	Lab	Choice models in R		
						Data visualization in R		
	17 Feb	Fri	9.00–11.45	G3-21	Lecture	Data visualization II	[12] Optional: [13: pp 5–22]	Assignment 3
4	21 Feb	Tue	9.00–11.45	G3-21	Discussion	E-books case	[14; 15]	Case write-up 2
					Lecture	Market sizing	[1: §6]	
	22 Feb	Wed	9.00–11.45	T3-57	Lab	Data management in R		
						Data visualization in R		
	24 Feb	Fri	9.00–11.45	G3-21	Lecture	Preferences III (aggregate demand)	[1: §7] Optional: [16]	Assignment 4
5	28 Feb	Tue	9.00–11.45	G3-21	Lecture	Market segmentation	[1: §8; 17]	
	1 Mar	Wed	23.59					Project 1
	3 Mar	Fri	9.00–11.45	G3-21	Discussion	Maru Batting Center case	[17; 18]	Case write-up 3
					Lecture	Targeting and CLV	Optional: [19; 20]	
6	7 Mar	Tue	9.00–11.45	G3-21	Lecture	Machine learning	[1: §9]	
						Forecasting		
	10 Mar	Fri	9.00–11.45	G3-21	Lecture	Sentiment analysis		
						Data mining		
7	14 Mar	Tue	23.59					Project 2
			23.59					Project 3

Reading list

[1] Jason M.T. Roos. *Course Notes for Marketing Analytics*. 2017.

[2] Cynthia Koo. *What you get when you learn to code*. 2014. URL: http://goo.gl/utde4A.

[3] Robert H Hayes. "Qualitative insights from quantitative methods". In: *Harvard Business Review* 47.4 (July 1969), pp. 108–117. URL: http://goo.gl/BUjSG.

[4] Michael Lavine. *Introduction to Statistical Thought*. Nov. 2010. URL: http://goo.gl/Z9xzd.

[5] Nicola Sturaro. *Rabbit*. Quantide, 2015. URL: https://goo.gl/INVm67.

[6] Google Developers. *Intro to R*. 2013. URL: http://goo.gl/Oclymw.

[7] Ronald T. Wilcox. *A Practical Guide to Conjoint Analysis*. Note UV0406. Darden Business Publishing, 2003.

[8] Ronald T. Wilcox. *Portland Trailblazers*. Case UV2971. Darden Business Publishing, Feb. 2010.

[9] Thomas H. Davenport and Jeanne G. Harris. "The prediction lover's handbook". In: *MIT Sloan Management Review* 50.2 (Winter 2009), pp. 32–34. URL: http://goo.gl/TxrnR.

[10] Oded Netzer et al. "Beyond conjoint analysis: Advances in preference measurement". In: *Marketing Letters* 19.3 (2008), pp. 337–354. URL: http://goo.gl/fPfGM.

[11] Hadley Wickham. *Practical tools for exploring data and models*. 2015. URL: http://goo.gl/UCGC3Z.

[12] Jeffrey Heer, Michael Bostock, and Vadim Ogievetsky. "A tour through the visualization zoo". In: *Communications of the ACM* 53.6 (2010), pp. 59–67. URL: http://goo.gl/CSGFI.

[13] Rafe M. J. Donahue. *Fundamental Statistical Concepts in Presenting Data*. July 2011. URL: http://goo.gl/0g1PL.

[14] Elie Ofek. *Forecasting the Adoption of a New Product*. Note 9-505-062. Harvard Business School Publishing, Dec. 2009.

[15] Elie Ofek. *Forecasting the Adoption of E-Books*. Case 9-505-063. Harvard Business School Publishing, Dec. 2005.

[16] Thomas H. Davenport and Jeanne G. Harris. "What people want (and how to predict it)". In: *MIT Sloan Management Review* 50.2 (Winter 2009), pp. 22–31. URL: http://goo.gl/86kbx.

[17] Julie Hennessy and Evan Meagher. *Using Customer Relationship Management to Analyze the Lifetime Value of a Customer*. Note KEL695. Kellogg Case Publishing, 2012.

[18] Julie Hennessy and Evan Meagher. *Maru Batting Center: Customer Lifetime Value*. Case KEL688. Kellogg Case Publishing, 2012.

[19] "Which Customers Are Worth Keeping and Which Ones Aren't? Managerial Uses of CLV". In: *Knowledge@Wharton*. Knowledge@Wharton (July 2003). URL: http://goo.gl/pbUEx.

[20] Thomas H. Davenport, Leandro Dalle Mule, and John Lucker. "Know what your customers want before they do". In: *Harvard Business Review* 89.12 (Dec. 2011), pp. 84–92. URL: http://goo.gl/Kntq65.