

### **MKTG 7120: Data and Analysis for Marketing Decisions**

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<i>Office Hours</i>	By appointment and 2:00 pm on Wednesdays. I am available most days in-person, by phone, or by video conference. Book appointments on Cal.com: <a href="https://cal.com/ProfessorE">https://cal.com/ProfessorE</a>		
<i>Textbook</i>	No required textbook. Optional textbooks: <i>Marketing Research</i> by Kumar, Leone, Aaker, and Day		
	<i>Books below only if you are trying to learn/improve your coding-based analytics skills (all optional):</i>		
	<ol style="list-style-type: none"><li>1. <i>Python for Data Science</i>, available free at <a href="https://wesmckinney.com/book/">https://wesmckinney.com/book/</a> as a web book</li><li>2. <i>Python Data Science Handbook</i>: <a href="https://jakevdp.github.io/PythonDataScienceHandbook/">https://jakevdp.github.io/PythonDataScienceHandbook/</a></li><li>3. <i>R for Marketing Research and Analytics</i> by Chapman and Feit (CF on syllabus) → Only necessary if you are trying to improve your R skills.</li></ol>		
<i>Technology Requirements</i>	<b>Excel:</b> Excel latest version. All MS Office products are available <u>free</u> on TUPortal. The link on the left is Microsoft Downloads. <b>JMP statistical software:</b> free download from Canvas site; see Canvas for additional detail. <b>Zoom:</b> You must have a working webcam and microphone. <b>If desired, R, Python, or other statistical software:</b> These are optional. If you wish to use them, it would behoove you to install them and at least be familiar with the environment before class.		
<i>Prerequisites</i>	Introductory Statistics and Core Marketing classes. Intermediate Excel will be very helpful.		
<i>Admin</i>	If you feel that you may need an accommodation based on the impact of a disability, you must have an official accommodation from Disability Services. Within the first two weeks of class, contact me privately to discuss your specific needs. Penn's Office of Disability Services is part of The Weingarten Center (contact via phone(!): 215-573-9235. Because it is critical to coordinate accommodations, please contact Weingarten as soon as possible.		
<i>Questions</i>	All questions about the assignments, exams, and lecture content should be posted on Ed Discussion, rather than emailing the professor or the TAs. If you have a question, chances are others do too, and we can help everyone by addressing questions online. For the fastest reply to any other questions, please use Ed Discussion to send a "Private" message to the whole teaching staff, which will send your message to the professor and all the TAs.		

## Course Objectives

This course introduces students to the fundamentals of data-driven marketing, including topics from marketing research and analytics. It examines the many different sources of data available to marketers, including data from customer transactions, surveys, pricing, advertising, and A/B testing, and how to use those data to guide decision-making. Through real-world applications from various industries, including hands-on analyses using modern data analysis tools, students will learn how to formulate marketing problems as testable hypotheses, systematically gather data, and apply statistical tools to yield actionable marketing insights.

By the end of this course, you should be able to:

- Ask quantifiable questions about marketing decisions
- Know what data exist or can be gathered to answer marketing questions, and understand which kinds of questions these sources can answer
- Understand and apply statistical tools for answering many marketing questions
- Create experiments and statistical models for marketing analytics
- Intelligently discuss recent advances in marketing research and analytics, including machine learning, recommendations, and personalization

## Course Materials and Approach

My overall philosophy is there is no better way of developing an understanding of marketing analytics than “learning by doing”. In the course we will use a variety of readings and exercises. Lecture notes and any additional handouts will be made available through Canvas. The assigned reading will complement the class videos.

### *Comparison with Marketing Analytics (7520)*

Marketing Analytics differs from Data and Analysis for Marketing Decisions in the breadth and depth of coverage in three main areas (1) data collection, (2) predictive data analysis, and (3) stated choice experimentation / conjoint analysis.

- Data collection:** MKTG 7120 (D&A for Marketing Decisions) devotes a significant amount of time to primary data collection (surveys, focus groups). It also includes review of more topics, including sessions on basic hypothesis testing. In contrast, Marketing Analytics focuses on quantitative analysis after data is collected, especially detailed customer-level transaction data and marketing mix data to which the firm already has access. Thus, MKTG 7120 provides students with a broad perspective on the many venues for data collection using traditional marketing research methods; whereas MKTG 7520 focuses on data analysis, especially of transaction data.
- Data Analysis:** MKTG 7120 covers descriptive multivariate methods like clustering and factor analysis. It focuses less on predicting outcomes. In contrast, MKTG 7520 (Marketing Analytics) goes much deeper into predictive analytics, for example, using machine learning models.
- Stated choice experimentation / Conjoint analysis:** MKTG 7120 (D&A for Marketing Decisions) covers conjoint analysis from the perspective of a manager using the results. MKTG 7520 (Marketing Analytics), in contrast, covers these methods in more depth, from the perspective of a data analyst.

## Assessment

Your final grade will be based on class participation (case preparation and general contribution), written assignments, and a final examination. The evaluation is as follows:

<input type="checkbox"/> Exams (2 in-class exams, equal weight)	40%
<input type="checkbox"/> Assignments (4 group assignments, equal weight)	40%
<input type="checkbox"/> Canvas quizzes (miss 1 with no penalty)	10%
<input type="checkbox"/> Course participation (in class, online discussions, attendance)	10%

All written work is due on the specified date. The due dates for the assignments can be found on Canvas.

### Exams

There will be two in-class exams that test your comprehension of course concepts. Only SDS-approved exam accommodations will be accepted, **no exceptions**.

### Group Assignments

There will be four assignments which will focus on applying the ideas and methods learned in class. Often, these assignments will involve working with real company data. As mentioned above, you may use whatever tool you like to do these assignments (including Excel, JMP, R, or Python). However, if you use something other than Excel or JMP, we cannot provide.

The assignments will be completed in randomly assigned groups (this is the most fair way to do it). Groups can be found on Canvas > People.

### Quizzes

These will be given most weeks on Canvas. The questions are based on the content of that week's lectures. **They are always due on Sunday at 11:59 PM on Canvas.** These quizzes are designed to help you keep up to date, prepare for the exams, and review what was covered the week before. They will also help me assess whether everyone is comfortable with that week's lecture content.

### Course Participation

To earn full points for participation, students must do two things:

1. Stay up-to-date with the class by coming to class. If you cannot come to class in-person, you should watch the recording. You may miss up to 2 classes for any reason with no penalty. After that, missing class will affect your grade.
2. Engage with the class on the discussion board. By engage, I mean both asking *and thoughtfully answering* other students' questions. You do not need to be 100% correct in your responses, but you should make an effort to help.

**Important:** to receive any participation points, you must show up to at least 50% of the classes and post publicly on the Discussion Board at least once. If you do not meet both of these criteria, you will receive a 0 for your course participation grade.

## Policies & Administration

### Academic Integrity

Every student is expected to exercise integrity in all academic undertakings. By submitting work for academic credit, you are affirming that that the work is your own, and that you have abided by the explicit and implicit instructions regarding allowable sources of assistance in its preparation. You are responsible for adhering both to the principles *and to the spirit* of Penn's Code of Academic Integrity (full text available here: [Academic Integrity](#)). The essence of academic integrity can be summarized in one sentence:

*Any activity that has the effect or intent of interfering with the fair evaluation of a student's performance is prohibited.*

Thus, any activity that is designed to give a false impression of your contribution to graded work, or to assist another in doing so, violates the code. Potential violations of the University's Code of Integrity will be fully investigated (*n.b.*, penalties range from failing the assignment to expulsion).

### Electronic Device Policy

The Wharton School discourages the use of Electronic Devices in class, unless specifically permitted. Please see the [electronics in the classroom policy](#). Although this is an UG class, I adhere to that general policy. Consequently, please make sure any electronics (e.g., phone, laptop, or tablet) are shut off and put away, unless explicitly instructed otherwise.

### Final Course Letter Grades

Letter grades will be assigned at the end of the course using the standard MBA curve.<sup>1</sup> You can read more about the policy here: <https://mba-inside.wharton.upenn.edu/wharton-mbaacademic-policies/> The percentages in the table below represent the mapping between your total weighted percentile score and a letter grade. However, grades may be curved or otherwise equated at the instructor's discretion. You may be asked to provide feedback about the relative contribution of your teammates to group work. Deviations from equal contribution to group assignments can substantially affect your grade (both positively and negatively), in proportion to the deviation (including bumping up/down near a grade boundary, +/- a half letter grade, +/- full letter grade, etc).

100 – 93	A	92 – 90	A–	89 – 87	B+
86 – 83	B	82 – 80	B–	79 – 77	C+
76 – 73	C	72 – 70	C–	69 – 67	D+
66 – 63	D	62 – 60	D–	59 – 0	F

### Regrades

All regrade requests must be submitted in writing. You must cogently explain why you believe that your answer was incorrectly graded. NB: The entire assignment submitted for regrade will be reexamined, not just selected parts. This means that it is possible to end up with a lower grade than you began with, if greater scrutiny reveals additional errors, omissions, or less effective analysis than was originally thought.

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<sup>1</sup> Note: an A+ will be awarded only at the discretion of the instructor. In the past, A+ has been given for achieving a high total score (>97%) combined with actively attending and participating in class.

## Schedule of Class Meetings

Class #	Class Title	Date	Readings
1	Intro to the Course and Effective Research	17-Jan-24	None
2	Qualitative Methods	22-Jan-24	<p>BBC Future: Why Cake Mix Lacks One Essential Ingredient: <a href="https://www.bbc.com/future/article/20171027-the-magic-cakes-that-come-from-a-packet">https://www.bbc.com/future/article/20171027-the-magic-cakes-that-come-from-a-packet</a> [Required: Web]</p> <p>Planet Money Podcast: Modal American (read or listen): <a href="https://www.npr.org/transcripts/755191639">https://www.npr.org/transcripts/755191639</a> [Required: Web]</p> <p>Vox: Focus Groups shape what we buy, but how much do they tell us about us?: <a href="https://www.vox.com/the-goods/2019/1/22/18187443/focus-groups-brand-market-research">https://www.vox.com/the-goods/2019/1/22/18187443/focus-groups-brand-market-research</a> [Required: Web]</p> <p>Kumar, Leone, Aaker, Day: Ch. 8-10 [Optional: KLAD]</p> <p>The Guardian: Talk is Cheap: the Myth of the Focus Group: <a href="https://www.theguardian.com/news/2018/feb/06/talk-is-cheap-the-myth-of-the-focus-group">https://www.theguardian.com/news/2018/feb/06/talk-is-cheap-the-myth-of-the-focus-group</a> [Optional: Web]</p>
3	Survey Design	24-Jan-24	<p>Kumar, Leone, Aaker, Day: Chapters 11-12, 14-15 [Optional: KLAD]</p> <p>How Companies Learn Your Secrets (New York Times, old, but still relevant): <a href="https://www.nytimes.com/2012/02/19/magazine/shopping-habits.html">https://www.nytimes.com/2012/02/19/magazine/shopping-habits.html</a> [Optional: Web]</p>
4	Secondary Data	29-Jan-24	Kumar, Leone, Aaker, Day: Ch. 5-7 [Optional: KLAD]
5	Experimentation and A/B Testing	31-Jan-24	<p>Obama's \$60 million dollar experiment: <a href="https://www.optimizely.com/insights/blog/how-obama-raised-60-million-by-running-a-simple-experiment/">https://www.optimizely.com/insights/blog/how-obama-raised-60-million-by-running-a-simple-experiment/</a> [Required: Web]</p> <p>Run Field Experiments to Make Sense of Your Big Data (HBR) [Required: Canvas Study.net]</p> <p>Kumar, Leone, Aaker, Day: Ch. 13 [Optional: KLAD]</p>
6	Tools of Data Analysis	5-Feb-24	<p>David McCandless' TED talk: <a href="https://www.ted.com/talks/david_mccandless_the_beauty_of_data_visualization">https://www.ted.com/talks/david_mccandless_the_beauty_of_data_visualization</a> [Required: Web]</p> <p>Introduction to Data Science: Visualizations, and click through to follow-up pages as well: <a href="http://rafalab.dfci.harvard.edu/dsbook-part-1/dataviz/intro-dataviz.html">http://rafalab.dfci.harvard.edu/dsbook-part-1/dataviz/intro-dataviz.html</a> [Optional: Web]</p> <p>Storytelling with Data Website &amp; Chart Recommendations (very good reference site): <a href="https://www.storytellingwithdata.com/chart-guide">https://www.storytellingwithdata.com/chart-guide</a> [Optional: Web]</p>
7	Hypothesis Testing	7-Feb-24	<p>JMP Exploratory Data Analysis Course, Module 4.3: Revisiting Statistical vs. Practical Significance - (click through to Module 4): <a href="https://www.jmp.com/en_us/online-statistics-course/exploratory-data-analysis.html">https://www.jmp.com/en_us/online-statistics-course/exploratory-data-analysis.html</a> [Required: Web]</p> <p>Kumar, Leone, Aaker, Day: Ch. 17-18 [Optional: KLAD]</p> <p>Chapman &amp; Feit: Chapter 6 [Optional: Canvas]</p>

Class #	Class Title	Date	Readings
8	Applications: Hypothesis Testing	12-Feb-24	Same as last class [Required: Assorted]
9	Regression Analysis	14-Feb-24	Kumar, Leone, Aaker, Day: Ch. 19 [Optional: KLAD] Chapman & Feit: Chapter 7 [Optional: Canvas] Review notes or other materials from intro Stat / other classes [Optional: Notes]
<b>Assignment 1</b>		<b>18-Feb-24</b>	<b>Assignment 1 Due 11:59 pm</b>
10	Marketing Mix Models	19-Feb-24	Rethinking The 4 P's In The Digital Marketing Mix: <a href="https://www.forbes.com/sites/forbesagencycouncil/2023/04/24/rethinking-the-4-ps-in-the-digital-marketing-mix/?sh=2896f5c35989">https://www.forbes.com/sites/forbesagencycouncil/2023/04/24/rethinking-the-4-ps-in-the-digital-marketing-mix/?sh=2896f5c35989</a> [Required: Web]
11	Pricing Analysis	21-Feb-24	Amazon's \$23,698,655.93 book about flies: <a href="https://www.michaelleisen.org/blog/?p=358">https://www.michaelleisen.org/blog/?p=358</a> [Required: Web] On Orbitz, Mac Users Steered to Pricier Hotels (old, but still relevant): <a href="https://www.wsj.com/articles/SB10001424052702304458604577488822667325882">https://www.wsj.com/articles/SB10001424052702304458604577488822667325882</a> [Required: Web] Seeking Perfect Prices, CEO Tears Up the Rules (read or skim for understanding): <a href="https://www.wsj.com/articles/SB117496231213149938">https://www.wsj.com/articles/SB117496231213149938</a> [Optional: Web] Starbucks Economics: Solving the mystery of the elusive "short" cappuccino: <a href="https://slate.com/culture/2006/01/the-mystery-of-the-short-cappuccino.html">https://slate.com/culture/2006/01/the-mystery-of-the-short-cappuccino.html</a> [Optional: Web]
12	<b>Exam 1 First half of class</b>	<b>26-Feb-24</b>	<b>*** Assignment: Exam #1 ***</b>
<b>SPRING BREAK</b>			<b>ENJOY!</b>
13	CRM and Logistic Regression	11-Mar-24	Chapman & Feit: Chapter 9, 13 [Optional: Canvas]
14	Introduction to Conjoint	13-Mar-24	Kumar, Leone, Aaker, Day: Ch. 21 [Optional: KLAD]
<b>Assignment 2</b>		<b>17-Mar-24</b>	<b>Assignment 2 Due 11:59 pm</b>
15	Ratings-based Conjoint	18-Mar-24	What is conjoint?: <a href="https://conjointly.com/guides/what-is-conjoint-analysis/">https://conjointly.com/guides/what-is-conjoint-analysis/</a> [Required: Web]
16	Choice-based Conjoint	20-Mar-24	Classification of Conjoint: <a href="https://conjointly.com/guides/classification-of-conjoint-analysis/">https://conjointly.com/guides/classification-of-conjoint-analysis/</a> [Required: Web] Chapman & Feit: Chapter 13 [Optional: Canvas]
17	Cluster Analysis	25-Mar-24	Kumar, Leone, Aaker, Day: Ch. 20 (to Cluster Analysis) [Optional: KLAD] Chapman & Feit: Chapter 11 [Optional: Canvas]

Class #	Class Title	Date	Readings
18	Factor Analysis	27-Mar-24	Kumar, Leone, Aaker, Day: Ch. 20 (to Factor Analysis) [Optional: KLAD] Chapman & Feit: Chapter 8 [Optional: Canvas]
	<b>Assignment 3</b>	<b>31-Mar-24</b>	<b>Assignment 3 Due 11:59 pm</b>
19	Applications of Cluster and Factor Analysis	1-Apr-24	None
20	Customer Lifetime Value (CLV)	3-Apr-24	JMR: The Perils of Proactive Churn Prevention...Field Experiment (at least skim): <a href="https://journals-sagepub-com.proxy.library.upenn.edu/doi/epub/10.1509/jmr.13.0483">https://journals-sagepub-com.proxy.library.upenn.edu/doi/epub/10.1509/jmr.13.0483</a> [Required: Web] Planet Money: Your Customer Lifetime Value Score (read or listen): <a href="https://www.npr.org/transcripts/665390299">https://www.npr.org/transcripts/665390299</a> [Required: Web]
21	Digital Marketing and Attribution	8-Apr-24	Competition and Crowd-Out for Brand Keywords in Sponsored Search (at least skim): <a href="https://pubsonline-informs-org.proxy.library.upenn.edu/doi/epdf/10.1287/mksc.2017.1065">https://pubsonline-informs-org.proxy.library.upenn.edu/doi/epdf/10.1287/mksc.2017.1065</a> [Required: Web]
22	Predictive Analytics 1: Machine Learning	10-Apr-24	A Comparison of Approaches to Advertising Measurement [experiment vs. observational]: <a href="https://pubsonline-informs-org.proxy.library.upenn.edu/doi/epdf/10.1287/mksc.2018.1135">https://pubsonline-informs-org.proxy.library.upenn.edu/doi/epdf/10.1287/mksc.2018.1135</a> [Required: Web]
	<b>Assignment 4</b>	<b>14-Apr-24</b>	<b>Assignment 4 Due 11:59 pm</b>
23	Predictive Analytics 2: Building Models	15-Apr-24	Predictive Modeling Guidelines & Best Practices: <a href="https://medium.com/dowjones/predictive-modeling-guidelines-best-practices-e99111c5588">https://medium.com/dowjones/predictive-modeling-guidelines-best-practices-e99111c5588</a> [Required: Web]
24	<b>In-class Exam 2 Second Half of Class</b>	<b>17-Apr-24</b>	<b>*** Assignment: Exam #2 ***</b>