JOHNS HOPKINS
CAREY BUSINESS SCHOOL

Customer Analytics
2 credits

BU.450.760.K1: Wed, 8:30-11:30am EST Jan 24, 2024 – Mar 13, 2024
BU.450.760.K2: Wed, 1:30- 4:30pm EST Jan 24, 2024 – Mar 13, 2024
BU.450.760.K3: Th, 8:30-11:30am EST Jan 25, 2024 – Mar 14, 2024

Classroom
K1, K3: HE 215
K2: HE 230

Instructor
Prof. Z. Jessie Liu

Contact Information
jzliu@jhu.edu

Office Hours
To be announced

Teaching Assistants
Mark Bentley (mbentle6@jhu.edu)
Taijasi Sharma (tsharm16@jhu.edu)

Required Texts & Learning Materials

[Legend]: Article (A), Podcast (P), Technical Documents (T), Script (S), Dataset (D), Codebook (C), Spreadsheet (E)

Week 1: Introduction

[T1.1, S1.1] R installation and essentials
[T1.2, S1.2] Prediction and model selection in R
[D1.1, C1.1] Promotional Bank Calls
(Optional) "R for marketing research and analytics," Chapters 1-3 & 7
https://catalyst.library.jhu.edu/catalog/bib_7647127

Week 2: **Targeting and Consumer Lifetime Value**

[D2.1, C2.1] L.L. Bean catalog targeting
[D2.2, C2.2] Verizon CLV
[T2.1, E2.1] CLV-based targeting
(Optional) "The Case for Customer Lifetime Value with Dr. Peter Fader"
http://www.analyticshour.io/2017/08/29/070-case-customer-lifetime-value-dr-peter-fader/

Week 3: Text Mining

[D3.1, C3.1] Airbnb Reviews
[T3.1, S3.1] Prediction with a bag of words in R
(Optional) "Analyzing customer reviews using text mining to predict their behavior"
https://medium.com/analytics-vidhya/customer-review-analytics-using-text-mining-cd1e17d6ee4e

Week 4: Randomized Controlled Experiments

[A4.1] “A Refresher on A/B Testing”
https://hbr.org/2017/06/a-refresher-on-ab-testing
“Rocket Fuel: Measuring the effectiveness of online advertising” (HBSP online course packet)
https://hbsp.harvard.edu/import/1135873

Week 5: Matching

[T5.1, S5.1] Propensity score matching in R
(Optional) “Estimating the causal effects of marketing interventions using propensity score methodology”
https://arxiv.org/abs/math/0609201
(Optional) “Machine learning goes causal II: meet the random forest’s causal brother”
https://www.statworx.com/en/blog/machine-learning-goes-causal-ii-meet-the-random-forests-causal-brother/

Week 6: Natural Experiments

[D6.1, C6.1] News Aggregators and website traffic
[T6.1, S6.1] Diff-in-Diff Analysis in R
(Optional) “Your Tweets Might Be the Key to Game of Thrones’ Success,” by Xavier
https://www.gsb.stanford.edu/insights/your-tweets-might-be-key-game-thrones-success

Week 7: Recommender System

[D7.1,C7.1] Movie Ratings
[T7.1,S7.1] R Implementation of a Movie RecSys
(Optional) “Netflix analyzes a lot of data of your viewing habits” by Harris
https://gigaom.com/2012/06/14/netflix-analyzes-a-lot-of-data-about-your-viewing-habits/

Tentative Course Calendar
Instructors reserve the right to alter course content and/or adjust the pace to accommodate class progress. Students are responsible for keeping up with all adjustments to the course calendar.

Week	Topic	Submission (Before class, via Canvas)
1	Introduction	
2	Targeting & Customer Lifetime Value	Assignment 1 Due
3	Text Mining	Assignment 2 Due
4	Randomized Controlled Experiments	
5	Matching Analysis	Assignment 3 Due
6	Natural Experiments	Assignment 4 Due
7	Recommender Systems	
8	Final Exam	

Technology Requirements

- We will use Microsoft Excel and R software.
- R is a powerful statistical software. Examples in class will be presented using Rstudio, a program that simplifies writing and running code on R. Download R version 3.4 or newer for free at http://www.cran.r-project.org/. Download RStudio for free at http://www.rstudio.org/.
- This is not a class about R. Other than examples used in class, there will be limited R instruction. To fully grasp the meaning and operation of R codes used in class, you need to rely on your peers and self-instruction. There are outstanding free tutorials on YouTube and LinkedIn Learning, and oftentimes you can get answers by simple looking up your questions online.
- Provided R codes are meant to be as simple as they possibly can for an R novice. There will often exist alternative codes that implement any given analysis.

Course Description
This course introduces students to the modern practice of customer analytics. Its main goal is to illustrate how marketing practitioners can improve decision-making by leveraging scientific approaches in the analysis of big data. Leading analytical techniques and data structures are illustrated in the context of their most prominent applications. The class has a strong "hands on" component, enabled by several in-class examples and assignments (implemented on Microsoft Excel and the statistical language "R"). Students are not expected to become expert programmers or statisticians, but to acquire basic skills and knowledge to orchestrate an effective analytics strategy given the firm's goals.

Prerequisite(s)
BU.410.620 Marketing Management or BU.911.610 Marketing Management
BU.510.601 Statistical Analysis or BU.914.610 Business Statistics
BU.510.650 Data Analytics

Learning Objectives
By the end of this course, students are expected to:

1. understand key concepts and constructs in the practice of customer analytics
   - common data structures
   - common analytical, statistical, and computational frameworks
   - basic statistical and data mining coding skills
2. develop a managerial-minded approach to the practice of customer analytics
   - overview possibilities and limitations
   - avoid inferential and decision-making errors
   - be familiar with real-life examples of analysis

To view the complete list of the Carey Business School's general learning goals and objectives, visit the Carey website.

Assessment
The total grade is composed based on the total number of points accumulated from the following items:

Assignments*	Due date**	Weight	Learning Objectives
Assignment 1	1/31/24, Wed @ 9 PM EST	15%	1, 2
Assignment 2	2/7/24, Wed @ 9 PM EST	15%	1, 2
Assignment 3	2/21/24, Wed @ 9 PM EST	15%	1, 2
Assignment 4	2/28/24, Wed @ 9 PM EST	15%	1, 2
Final Exam	3/13/24, In class	40%	1, 2
Total		100%	

* More details are provided on Canvas.
** Due dates for Thursday sections are @ 9 PM EST on the day of the class.

Assignments (60%, 15% each)

There will be a total of four assignments. Assignments are intended to provide students with an opportunity to put into practice the concepts and methods covered in class. Importantly, assignments are not graded solely on numerical results, but on the procedure used to arrive to them. For this reason, it is highly recommended that each step in the analysis and used codes are clearly explained. While students are encouraged to work in small groups, each student must write up and submit their own assignment written in their own words (no copies).

Final Exam (40%)
The final exam will be open book and cover all topics discussed in class and covered by non-optional learning materials. Topics from optional material will not be covered by the exam unless they are discussed in class.

Attendance
Students are expected to attend each class. Students who experience Covid symptoms may request at zoom link for passive online attendance. This request must be made via email at least 24 hours prior to the start of the class.

Discussion Board on Canvas
I strongly encourage students to ask questions in class or on Canvas under the "Discussion Board" module. Canvas is where we will make course announcements and answer questions about course material and logistics. By asking your question and getting an answer on Canvas, you create a positive externality: other students benefit from your questions and you benefit from theirs. The instructor and teaching assistants will actively moderate the Discussion Board both to answer questions and approve (or correct) answers written by your fellow students. Students who actively participate in Discussion Board (by asking questions, answering questions, posting content relevant to the course, etc.) may earn extra credit equivalent to up to 5%.

Grading
The grade of A is reserved for those who demonstrate extraordinary performance as determined by the instructor. The grade of A- is awarded only for excellent performance. The grades of B+ and B are awarded for good performance. The grades of B-, C+, C, and C- are awarded for adequate but substandard performance. The grades of D+, D, and D- are not awarded at the graduate level. The grade of F indicates the student's failure to satisfactorily complete the course work.

Please note that for **Core** and **Foundation** courses, a maximum of 25% of students may be awarded an A or A-; the grade point average of the class should not exceed 3.35. For **Elective** courses, a maximum of 35% of students may be awarded an A or A-; the grade point average of the class should not exceed 3.45.

Policy on Generative AI
Academic integrity is a cornerstone of the Carey Business School. Generative artificial intelligence (AI) tools such as ChatGPT are widely available, and these technologies present a number of exciting opportunities in the classroom. In this course, you may use generative AI tools on all take-home assignments. You may not use generative AI tools for the final exam. Use of AI must be cited. For guidance with referencing AI-generated content, please use the following:
MLA Style Center
The Chicago Manual of Style Online
APA Style

Regrade Requests
Assignment and Exam regrade requests must be made in writing within a week of receiving your graded assignment/exam. All regrade requests should be made to the course instructor. Note that as we re-grade the entire assignment/exam, your score could rise or fall.

Carey Business School Policies and General Information

Please note that failure to become acquainted with Carey policies will not excuse any student from adhering to these policies.

Canvas Site
A Canvas course site is set up for this course. Each student is expected to check the site throughout the semester as Canvas will be the primary venue for outside classroom communications between the instructor and students. Students can access the course site at https://canvas.jhu.edu/.

Technical Support
24/7 technical support for questions regarding Canvas, Zoom, and other technical issues is available. Please refer to Carey's Academic Resources webpage for contact information and other details.

Students with Disabilities - Accommodations and Accessibility
Johns Hopkins University values diversity and inclusion. We are committed to providing welcoming, equitable, and accessible educational experiences for all students. Students with disabilities (including those with psychological conditions, medical conditions, and temporary disabilities) can request accommodations for this course by providing an Accommodation Letter issued by Student Disability Services. Please request accommodations for this course as early as possible to provide time for effective communication and arrangements. For further information or to start the process of requesting accommodations, please contact Student Disability Services at the Carey Business School.

Academic Ethics Policy
Carey expects graduates to be exemplary global citizens in addition to innovative business leaders. The Carey community believes that honesty, integrity, and community responsibility are qualities inherent in an exemplary citizen. The objective of the Academic Ethics Policy (AEP) is to create an environment of trust and respect among all members of the Carey academic community and hold Carey students accountable to the highest standards of academic integrity and excellence.

It is the responsibility of every Carey student, faculty member, and staff member to familiarize themselves with the AEP and its procedures. Failure to become acquainted with this information will not excuse any student, faculty, or staff member from the responsibility to abide by the AEP. Please contact the Office of Student Affairs if you have any questions. For the full policy, please visit the Academic Ethics Policy webpage.

Student Conduct Code
The fundamental purpose of the Johns Hopkins University's regulation of student conduct is to promote and to protect the health, safety, welfare, property, and rights of all members of the University community as well as to promote the orderly operation of the University and to safeguard its property and facilities. Please contact the Office of Student Affairs if you have any questions regarding this policy. For the full policy, please visit the Student Conduct Code webpage.

Commitment to Respect
Respectful behavior creates an environment within the Carey Business School where all are valued and can be productive. Carey defines respectful behavior as conduct that, at a minimum, demonstrates consistent courtesy for others, including an effort to understand differences. As such, all in the community agree to the Carey Commitment to Respect, which states that we all strive to show that we value each other's human dignity and our differences, and to choose behavior and language that demonstrates mutual respect. Please visit the Commitment to Respect webpage to learn more about the expectations and resources available.

Classroom Policies for All On-Site and Remote-Live Classes
Carey is committed to maintaining the highest standards of excellence in all forms of instruction. To that end, we have developed policies and procedures for all classes offered in on-site and remote-live formats. These policies will govern all courses occurring in these formats, and all students are expected to familiarize themselves with and adhere to these policies.

Student Success Center
The Student Success Center offers assistance in core writing and quantitative courses. For more information, visit the Student Success Center webpage.

Other Important Policies and Services
Students are encouraged to consult the Student Handbook and Academic Catalog and Student Services and Resources for information regarding other policies and services. For your convenience, there is a singular website students can visit to learn about all JHU and Carey policies.

Copyright Statement
Unless explicitly allowed by the instructor, course materials, class discussions, and examinations are created for and expected to be used by class participants only. The recording and rebroadcasting of such material, by any means, is forbidden. Violations are subject to sanctions under the Academic Ethics Policy.