SYLLABUS

SMB-A 7247

Analytics for Macro Marketing Data
Summer 2023

COURSE OVERVIEW

Instructor and Class

Instructor: Dong Soo Kim
Email address: kim.5042@osu.edu
Phone number: (614) 247-8845
Office hours: by appointment (via Zoom)
Class time: 1:30pm – 3:15pm, Saturday
Classroom: Gerlach 265

Course description

This course is an elective course that focuses on the analytics for aggregate-level marketing data. Firms make managerial decisions for a customer pool – for example, pricing and ad planning – by maximizing their goal function – generally, aggregate revenue or profit – from the pool. Accurate causal prediction of demand – i.e., counterfactual – is the key to decision-making. The course covers advanced causal analysis and predictive techniques based on regression and machine learning methods. Students will have hands-on experience of demand predictions with useful predictors collected from real-life cases.

Course learning outcomes

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

- Understand basic concepts for causal prediction of demand, including:
  - The role of demand predictions in firms' decision-making process
  - Elasticities, seasonality, and carry-over effect
  - Linear regression and log-log demand models
  - Demand curves and profit maximization
  - Neyman-Rubin causal models and average treatment effect (ATE)
  - Unconfoundedness assumption
- Perform causal demand predictions using R, including:

    - Data aggregation
    - Conducting regression analysis to estimate a log-log demand model
    - Generating fixed/lagged effect variables for seasonality and carry-over effect
    - Using advanced techniques for causal demand predictions: RD, DiD and SCM
- Interpret results and draw marketing implications, including:
    - Interpreting the results from various perspectives
    - Delivering research outcomes to marketing managers

HOW THIS COURSE WORKS

Mode of delivery: This course is a blending of online lectures and discussion with in-person meeting on every other Saturday.
Pace of online activities: This course is divided into **weekly modules** that are released one week ahead of time. Students are expected to keep pace with weekly deadlines but may schedule their efforts freely within that time frame.
Credit hours and work expectations: This is a **1.5-credit-hour course**. According to Ohio State policy, students should expect around 1.5 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 3 hours of homework (reading and assignment preparation, for example) to receive a grade of average.
Attendance and participation requirements: Because this is a hybrid course, your attendance is based on both on- and off-line activities and participation. The following is a summary of everyone's expected participation:

- **Participating in online activities for attendance**: **AT LEAST ONCE PER WEEK**
  You are expected to log in to the course in Carmen every week. (During most weeks you will probably log in many times.) If you have a situation that might cause you to miss an entire week of class, discuss it with me *as soon as possible.*
- **In-person class sessions**: **3 MEETINGS**
  You are expected to attend all 3 class sessions.

COURSE MATERIALS AND TECHNOLOGIES

Required course materials

There are no required textbooks in this course. All required materials are available at Carmen and the CoursePack.

- **CoursePack**: Several articles (mostly, case studies) are available at HBP (Harvard Business Publishing). To download the articles, you may need to register and purchase the access to the articles (Please understand that I cannot distribute those articles in class due to the copyright). For your convenience, the “CoursePack” (an online package of the articles) for this course will be provided.

- **Other required readings**: Other materials are available in the module of each week in Carmen.

Optional materials

There is an additional material recommended to read/take:

- *Mostly Harmless Econometrics: An Empiricist's Companion* (2009) by Joshua D. Angrist and Jörn-Steffen Pischke
- *Causal Inference: the Mixtape* (2021) by Scott Cunningham
  (A "free" online version is available – https://mixtape.scunning.com.)
- *R for Data Science* (2017) by Hadley Wickham & Garrett Grolemund
  (A "free" online version is available – https://r4ds.had.co.nz.)

Course technology

For help with your password, university email, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at https://ocio.osu.edu/help/hours, and support for urgent issues is available 24/7.

- **Self-Service and Chat support:** http://ocio.osu.edu/selfservice
- **Phone:** 614-688-HELP (4357)
- **Email:** 8help@osu.edu
- **TDD:** 614-688-8743

BASELINE TECHNICAL SKILLS FOR ONLINE COURSES

- Basic computer and web-browsing skills
- Navigating Carmen: for questions about specific functionality, see the Canvas Student Guide.

REQUIRED TECHNOLOGY SKILLS SPECIFIC TO THIS COURSE

- CarmenConnect text, audio, and video chat
- Recording a slide presentation with audio narration
- Recording, editing, and uploading video

REQUIRED EQUIPMENT

- Computer: current Mac (OS X) or PC (Windows 7+) with high-speed internet connection
- Webcam: built-in or external webcam, fully installed and tested
- Microphone: built-in laptop or tablet mic or external microphone
- Other: a mobile device (smartphone or tablet) or landline to use for BuckeyePass authentication

REQUIRED SOFTWARE

- Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365 ProPlus through Microsoft's Student Advantage program. Full instructions for downloading and installation can be found at http://go.osu.edu/office365help.

- R: R is a free statistical programming software that can be downloaded from http://www.r-project.org/.
- RStudio: RStudio is a third-party free code-editing environment with intuitive and convenient features for R code development. Installers can be found at https://rstudio.com.
- Detailed Installation guide for R and RStudio (*Application installation guide for BUSML7247.pdf*) is available in Carmen.

CARMEN ACCESS

You will need to use BuckeyePass multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you take the following steps:

- Register multiple devices in case something happens to your primary device. Visit the BuckeyePass - Adding a Device help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click "Enter a Passcode" and then click the "Text me new codes" button that appears. This will text you ten passcodes good for 365 days that can each be used once.
- Download the Duo Mobile application to all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at 614-688-4357 (HELP) and the IT support staff will work out a solution with you.

GRADING AND FACULTY RESPONSE

How your grade is calculated

There are three grading components in this course. Detailed descriptions are as follows:

ASSIGNMENT CATEGORY	POINTS
Online quizzes: *every week* There will be an online quiz in each week. The quiz covers all lectures and required readings in the week. It contains several True/False, multiple-choice, and short-answer questions.	20
Hands-on exercise assignments: *every week* There will be one or two hands-on exercise(s) in R in each week. Each exercise will be provided as an online quiz format in Carmen: watching and/or reading an instruction, analyzing data and interpreting results according to the instruction, and answering several questions based on the results.	40
Group research project A group of 3-5 students will work on a research project on demand prediction with real data using the techniques they learn in the course. The dataset will	30

be provided in the first in-person meeting. Students will briefly present their analysis results in the third in-person meeting and turn in the final report at the end of the term.	
Attendance and participation: If you successfully attend and participate all online activities and in-person classes, you will receive full credits of attendance and participation. If you miss an activity or a class, there will be a proportional deduction in your grade.	10
Total	**100**

Late submissions

Late submissions will be accepted but there will be a 10% penalty per day after the due date. The due date for each quiz/assignment will be announced with the quiz/assignment instruction in Carmen.

Grading scale

93–100: A		90–92.9: A-
87–89.9: B+	83–86.9: B	80–82.9: B-
77–79.9: C+	73–76.9: C	70 –72.9: C-
67 –69.9: D+	60 –66.9: D	
Below 60: E		

Faculty feedback and response time

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call **614-688-HELP** at any time if you have a technical problem.)

- **Office hours:** There will be no regular office hours. Instead, you can make an online-meeting (via Zoom) appointment. If you need a meeting with me, please email me.
- **Grading and feedback:** For large weekly assignments, you can generally expect feedback within **7 days**.
- **Email:** I, as the instructor, respond to your emails **Monday through Friday.** If you email me during these days I will respond to you on **that day or within 24 hours from the time you sent the email.** *If you send an email during the weekend (Saturday and Sunday) and national holidays (Memorial Day, for example), please do not expect a response from me until the following Monday/business day.*

OTHER COURSE POLICIES

Discussion and communication guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style**: While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. A more conversational tone is fine for non-academic topics.
- **Tone and civility**: Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online.
- **Citing your sources**: When we have academic discussions, please cite your sources to back up what you say. (For the textbook or other course materials, list at least the title and page numbers. For online sources, include a link.)
- **Backing up your work**: Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Academic integrity policy

POLICIES FOR THIS ONLINE COURSE

- **Quizzes**: You must complete the quizzes yourself, without any external help or communication.
- **Written assignments**: Your written assignments, including discussion posts, should be your own original work. In formal assignments, you should follow APA style to cite the ideas and words of your research sources. You are encouraged to ask a trusted person to proofread your assignments before you turn them in—but no one else should revise or rewrite your work.
- **Reusing past work**: In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with me.
- **Falsifying research or results**: All research you will conduct in this course is intended to be a learning experience; you should never feel tempted to make your results or your library research look more successful than it was.
- **Collaboration and informal peer-review**: The course includes many opportunities for formal collaboration with your classmates. While study groups and peer-review of major written projects is encouraged, remember that comparing answers on a quiz or assignment is not permitted. If you're unsure about a particular situation, please feel free just to ask ahead of time.
- **Group projects**: This course includes group projects, which can be stressful for students when it comes to dividing work, taking credit, and receiving grades and feedback. I have attempted to make the guidelines for group work as clear as possible for each activity and assignment, but please let me know if you have any questions.

OHIO STATE'S ACADEMIC INTEGRITY POLICY

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the University's *Code of Student Conduct*, and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the University's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the University, or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the University's *Code of Student Conduct* is never considered an excuse for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by University Rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the University's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the University.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- The Committee on Academic Misconduct web pages (COAM Home)
- *Ten Suggestions for Preserving Academic Integrity (Ten Suggestions)*
- *Eight Cardinal Rules of Academic Integrity* (www.northwestern.edu/uacc/8cards.htm)

Copyright disclaimer

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Statement on Title IX

Title IX makes it clear that violence and harassment based on sex and gender are Civil Rights offenses subject to the same kinds of accountability and the same kinds of support applied to offenses against other protected categories (e.g., race). If you or someone you know has been

sexually harassed or assaulted, you may find the appropriate resources at http://titleix.osu.edu or by contacting the Ohio State Title IX Coordinator, Kellie Brennan, at titleix@osu.edu.

Your mental health

A recent American College Health Survey found stress, sleep problems, anxiety, depression, interpersonal concerns, death of a significant other, and alcohol use among the top ten health impediments to academic performance. Students experiencing personal problems or situational crises during the quarter are encouraged to contact Ohio State University Counseling and Consultation Service (614-292-5766; www.ccs.osu.edu) for assistance, support and advocacy. This service is free and confidential.

ACCESSIBILITY ACCOMMODATIONS FOR STUDENTS WITH DISABILITIES

Requesting accommodations

If you would like to request academic accommodations based on the impact of a disability qualified under the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973, contact your instructor privately as soon as possible to discuss your specific needs. Discussions are confidential.
In addition to contacting the instructor, please contact the Student Life Disability Services at 614-292-3307 or ods@osu.edu to register for services and/or to coordinate any accommodations you might need in your courses at The Ohio State University.
Go to http://ods.osu.edu for more information.

Accessibility of course technology

This online course requires use of Carmen (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations with your instructor.

- Carmen (Canvas) accessibility
- Streaming audio and video
- Synchronous course tools

COURSE SCHEDULE (subject to change if necessary)

Week	Dates	Topics, Readings, Assignments
1	May 10 (T) – May 16 (M)	**Macro-marketing data** • Course Introduction • Lecture 1: Marketing research & decision-making • Reading 1: TBA • Lecture 2: Macro-marketing data vs. micro-marketing data • Reading 2: "Forecasting the Adoption of a New Product" by E. Ofek (2005) • Lecture 3: Linear regression & meaning of coefficients • Reading 3: "GoodBelly: Using Statistics to Justify the Marketing Expense" by H.-S. Ahn and C. Dickerson (2012) • Online quiz for week 1
In-person meeting #1 on May 14 (Sa) • **In-class activity 1: Bass diffusion model exercise** • **In-class activity 2: Linear regression exercise** • **Group research project introduction: Effects of COVID-19 on demands**		
2	May 17 (T) – May 23 (M)	**Demand models: Log-log demand models** • Lecture 4: Log-log demand models, price elasticities, and profit maximization • Reading 4: TBA • Hands-on exercise assignment 1: Log-log demand model and price elasticities • Online quiz for week 2
3	May 24 (T) – May 30 (M)	**Demand models: Market share models** • Lecture 5: Market share models • Reading 5: TBA • Hands-on exercise assignment 2: Market share models for the ready-to-eat cereal market **Basic concepts of data: Effect, variation, and identification** • Lecture 6: Effect, variation, and identification • Reading 6: TBA • Online quiz for week 3
In-person meeting #2 on May 28 (Sa) • **In-class activity 3: Optimal pricing exercise** • **In-class activity 4: Mr. Mistake vs. Ms. Perfect exercise** • **Q&A session for the assignments**		
4	May 31 (T) – June 6 (M)	**Basic concepts of data: Data aggregation, Seasonality, and carry-over** • Lecture 7: Data aggregation • Reading 7: "Does TV Advertising Really Affect Sales? The Role of Measures, Models, and Data Aggregation" by G. J. Tellis and D. L. Weiss (1995) • Lecture 8: Seasonality & carry-over effects • Reading 8: TBA • Hands-on exercise assignment 3: Data aggregation, seasonality, and carry-over effects • Online quiz for week 4
5	June 7 (T) – June 13 (M)	**Causality – review** • Lecture 9: Causality • Reading 9: TBA **Endogeneity** • Lecture 10: Endogeneity and instrument variables • Reading 10: "The Fulton Fish Market" by K. Graddy (2006)

Week	Dates	Topics, Readings, Assignments
		• Hands-on exercise assignment 4: IV regressions • Online quiz for week 5
In-person meeting #3 on June 11 (Sa) • **Q&A session for the assignments** • **Group research project presentation**		
6	June 14 (T) – June 20 (M)	**Big data and machine learning** • Lecture 11: Big data and machine learning in Marketing • Reading 11-1: "Detecting influenza epidemics using search engine query data" by Ginsberg et al. (2009) • Reading 11-2: "The Parable of Google Flu: Traps in Big Data Analysis" by Lazer et al. (2014) **Group research project** • Final report: Effects of COVID-19 on demands **Advanced identification methodologies (OPTIONAL w/ extra credits)** • Optional Lecture 1: Panel data and Difference-in-Differences (DiD) • Optional hands-on exercise assignment 1: Difference-in-Differences • Optional Lecture 2: Regression discontinuity (RD) • Optional hands-on exercise assignment 2: Regression discontinuity • Optional Lecture 3: Synthetic control method (SCM) • Optional hands-on exercise assignment 3: Synthetic control method