McMaster University

DeGroote SCHOOL OF BUSINESS

Commerce 4MI3
MARKETING ANALYTICS
Winter 2025 Course Outline

Marketing Area
DeGroote School of Business
McMaster University

January 8, 2025

COURSE OBJECTIVE

The objective of the course is to illustrate how to execute a systematic and analytical approach to marketing decision-making that benefits both the seller and buyer. This course will familiarize students with the tools and techniques used to convert raw data into valuable insights that improve the customer experience and company equity.

This course will utilize a hands-on, practical approach, that will *require active participation throughout each class session*. The course will begin analyzing marketing data using R programming. The course will emphasize both inference and prediction and highlight the trade-offs associated with different marketing analytics methods.

INSTRUCTOR AND CONTACT INFORMATION

Dr. Sash Vaid
Assistant Professor, Marketing
Office hours by appointment
Email: vaids1@mcmaster.ca

TBD
Teaching Assistant
Office hours by appointment
Email: TBD

Course Website: http://avenue.mcmaster.ca (Avenue to Learn – A2L)

COURSE ELEMENTS

Credit Value:	3	Leadership:	No	IT skills:	Yes	Global view:	No
A2L:	Yes	Ethics:	No	Numeracy:	Yes	Written skills:	Yes
Participation:	Yes	Innovation:	Yes	Group work:	Yes	Oral skills:	Yes
Evidence-based:	Yes	Experiential:	Yes	Final Exam:	No	Guest speaker(s):	No

COURSE DESCRIPTION

Marketing departments are increasingly utilizing data routinely collected by their organizations to improve marketing decision making and more effectively allocate resources. This course will familiarize students with the tools used to convert raw data into valuable marketing insights. The course offers a hands-on, practical approach, giving students the opportunity to become familiar with data analysis techniques. The course will emphasize both inference and prediction and highlight the trade-offs associated with different marketing analytics methods.

LEARNING OUTCOMES

Upon succeeding in this course, students will:
- Understand main concepts of classic and modern marketing analytics.
- Improve their problem analysis and decision-making skills.
- Be able to manipulate and prepare data for analysis.
- Visually and statistically summarize data.
- Know how to make predictions and present results.
- Execute and interpret multiple regression analysis with application to sales forecasting.
- Understand how choice model analysis can inform customer preferences.
- Execute a segmentation and/or classification analysis.
- Know how to apply and evaluate machine learning techniques.

COURSE MATERIALS AND READINGS

Required:
Data & Course Materials will be Available on Avenue to Learn (A2L)
- http://avenue.mcmaster.ca

Required Software:
- R & RStudio

R for Marketing Research and Analytics, (2nd Edition)
    By Chris Chapman and Elea McDonnell Feit
Marketing Metrics: The Manager's Guide to Measuring Marketing Performance. (3rd Edition)
    By Farris, P., Bendle, N., Pfeifer, P. E., & Reibstein, D.
Marketing Analytics: Based on First Principles. (1st Edition)
    By Robert W. Palmatier, J. Andrew Petersen, and Frank Germann.

EVALUATION

Learning in this course results from understanding textbook content and application of concepts to in-class presentation, hand-in reports, and tests. The balance of the learning results from lectures on strategic concepts. Work will be evaluated on an individual basis as well as in groups, in which case group members will share the same grade *adjusted* by peer evaluation and TA observation. There is a bit of subjectivity in this evaluation as with most evaluations in social sciences; however, our experience indicates that there is a "standard" answer that defines the relevant analytics code, marketing concepts, makes a logical argument, and uses relevant examples where required. *For analytics-based problem solving, the "standard" answer involves identifying the issues, analyzing the using the appropriate marketing analytics (displaying "marketing fit" through use of "code" and facts) and making relevant recommendations.* Generally, this type of submission demonstrates basic understanding of course material and deserves a B-/B. Submissions that demonstrate unique insights and provide a comprehensive understanding of the concepts/issues get rewarded accordingly with a B+, A-, A, A+. In determining the final grades, please keep in mind that submissions are evaluated *absolutely and relatively*. Group work is evaluated according to the requirements. Group work is also evaluated relative to one another to form a ranking from the best to the least good. TA is responsible for ALL grading. You are expected to keep in regular touch in the TA and clarify doubts when they arise, but please be respectful while doing so.

Missed tests/exams will receive a grade of zero unless the student has submitted and been approved for a Notification of Absence or MSAF. If an assignment can be submitted late, it will be penalized at least 10% each day after the deadline. Your final grade will be calculated as follows:

Components and Weights

Mid Term Project Presentation	Group	20%
Mid Term Test	Individual	15%
Synthetic Consumer	Group	10%
Final Project Presentation	Group	40%
Final Test	Individual	15%
	Total	**100%**

NOTE: The use of a McMaster standard calculator is allowed during examinations in this course. See McMaster calculator policy.

Grade Conversion

At the end of the course your overall percentage grade will be converted to your letter grade in accordance with the following conversion scheme.

LETTER GRADE	PERCENT	LETTER GRADE	PERCENT
A+	90 - 100	C+	67 - 69
A	85 - 89	C	63 - 66
A-	80 - 84	C-	60 - 62
B+	77 - 79	D+	57 - 59
B	73 - 76	D	53 - 56
B-	70 - 72	D-	50 - 52
		F	00 - 49

Course Deliverables

Group Project Presentation (Group)

Students must form a group of 6 members and create the group in Avenue to Learn. Each group must identify a Southern Ontario firm and a marketing problem for which RStudio-based analysis will be conducted by applying course learning through the project. Group must identify proxy data from Kaggle which represents the firm identified. The firm selected and the data sourced must be approved by TA in the first week of the course. In the event that students are unable to identify proxy data from Kaggle, student may request the TA to provide with customer data to perform the analysis. Please note this will result in a penalty and may lead to deduction of 5 points from the overall project grading.

Mid Term Group Presentation (20%)

Presentation time limit: 12 minutes with 3 minutes of Q & A (remember to keep backup slides)

Group must prepare a detailed RStudio-based marketing analytics presentation which outlines
- Introduction of the firm
- Industry and internal environment analysis
- Understanding of the firm and its current marketing position (analysis of 4 P's)
- How closely the data sourced from Kaggle represents the firm. Is there a noticeable difference that should be considered while analyzing the data?
- Insights from the data collected
- Which data will be filtered out to perform the analysis
- Reasoning for selecting the firm/Business problem identified for the project

	Assessment Criteria	Points
1. Introduction	1a. Overview of the company	10
	1a. Market/Industry information	
2. Analysis	2a. Key Issue – The marketing problem identified for analysis	15
	2b. Internal and external analysis/ Analysis of 4 P's	
	2c. If you were an analyst, how do you think the analysis on company's data help the marketing strategy	
3. Data sourced	3a. Relevance of data to marketing	45
	3b. Describing customer data (store data in R object, convert to data frame, summary of data frame)	
	3c. Associate and summarize marketing variables using table and plot (usage of density curves)	
	3d. Describe how the data is similar to the firm that you have selected (Provide your inference related to marketing concepts from the data source using your statistical knowledge)	
	3e. If the data is not similar, will the data be simulated? What steps are undertaken to simulate the customer data	
	3f. Filtered data and break out data (if required) by grouping marketing and customer variables on which the analysis will be performed	
	3g. Derive significant marketing variables from tests that will address the marketing problem	
	3h. Marketing component (using existing marketing knowledge) for which the statistical tests will be conducted, and a conclusion will be derived	
4. Use of Learnings	4a. Incorporation of learnings from course lectures, readings, and lab sessions.	20
	4b. R Markdown PDF and .RMD files to be submitted from A2L	
5. Presentation Skills	5a. Professionalism	10
	5b. Clear direction of slides and oral presentation	
	5c. Systematic and efficient coding	
	5d. Error free .RMD and R Markdown PDF file	

Final Group Presentation (40%)

Presentation time limit: 15 minutes with 5 minutes of Q & A

The final component of the project presentation will evaluate
- Summary of marketing problem
- Summary of the data used (data must be cleaned before performing the analysis, represent any correlation between the variables which will help the analysis)
- Analysis performed on the data (identify the most significant variables/parameters)
- Usage of plots/graphs to visualize the findings of the analysis
- Marketing strategies alternatives and recommendations based on the analysis
- Incorporate learning from the lectures and lab sessions

	Assessment Criteria	**Points**
1. Introduction	1a. Introduction to the marketing problem that will be addressed through this presentation	5
2. Data Analysis and visualization	2a. Analysis performed on the customer-related data (identify the most significant marketing variables, correlation tests on variables, transformation of variables if required to produce)	55
	2b. Conducting statistical tests to identify differences in the customer data (chisq /t-test/ANOVA are some of the examples) and producing inferences related to marketing concepts based on the output	
	2c. Check model fit (Is the relationship linear for marketing predictor? Will the model create systematic errors?) ***If the model is not fit, next steps for analysis will not provide appropriate output for analysis**	
	2d. Fitting linear models to selected marketing and customer variables (single/multiple predictors)	
	2e. Data and analysis are represented creatively (visualization of statistical tests using plots/graphs, color coding, density/ablines are included, adding legends to visuals)	
	2f. Using the model, conclusion of the analysis or make a prediction and the impact of the model on marketing variables	
	2g. Limitation of analysis (if any, how can it be improved?)	
	2h. Usage of best fit packages/libraries	
3. Alternatives and recommendations	3a. Marketing strategies alternatives and recommendations based on the analysis (It must contain an analytical approach related to course learnings – Think of yourself as a Marketing Analyst, what would you advice the business?)	5

	3b. Recommendation should be based on one of the marketing elements (Product/Price/Promotion/Place)	
4. Use of Learnings	4a. Incorporation of learnings from course lectures, readings, and lab sessions.	20
	4b. R Markdown PDF and .RMD files to be submitted from A2L	
5. Presentation Skills	5a. Professionalism 5b. Clear direction of slides and oral presentation 5c. Systematic and efficient coding 5d. Error free .RMD and R Markdown PDF file	15

Note:
1. Marketing fit must be explained for each assessment criteria above.
2. Lack of marketing fit will result in deduction of grades.
3. Appropriate column names must be used in the data/summary.
4. All the visualizations **must** be created using R Studio **only.**
5. Produce single graphic that consists of multiple plots wherever possible.
6. Every line of code executed to arrive at a step must be captured in the R Markdown files.
7. Any discrepancy in .RMD and R Markdown file will result in deduction of grades.
8. Highlight key terms/concepts wherever necessary for appropriate grading.
9. Slide deck limit is 40 Slides (Including appendix).
10. The presentation is designed to be content-heavy. The content on the slides along with the R-Markdown files will account for grading.
11. Keep in mind that you will also be graded on "fit," which includes the quality of your data search, data processing and relevance to the lecture/s.

Technical Factors:
• It is your responsibility (not that of the professor's or the TA's) to pre-test the presentation slides BEFORE the case day.
• DO NOT use ANY external storage (including cloud/remote hosting/emails/hard drives/computer etc.) to run your slides at crunch time; you must download your presentation to the head computer through the control panel and use the projector to see that AV run smoothly. Once more, please do so BEFORE that day's case lecture.

Groups must submit R Markdown PDF and .RMD file in Avenue to learn along with the power point presentations. Use of free software like Prezi and other web-based apps that can compromise client confidentiality is NOT PERMITTED. Please ensure that you DO NOT post any client info in social media or in the public domain without prior approval and client permission in writing.

ALL group members must participate equally in delivering the presentation. *ATTENDANCE FOR ALL OTHER GROUP PRESENTATIONS IN YOUR CORE IS MANDATORY*. *You are expected to maintain professional business decorum during presentations.*

In Class Test – Mid Term and Final (Individual) – 15% each

The Test comprises programming and multiple-choice questions. The Test will be conducted in class during which the students will receive a set of programming questions to answer. Students are expected to solve the questions using R-Studio on their laptop and create a R Markdown PDF file which should be uploaded to Avenue to Learn. Multiple choice questions are to be marked on the question papers handed into the class and returned on completion. This is strictly a closed book Test, and students are not allowed to bring notes, textbook or look up answers online during the Test.

Students will be tested on programming questions based on the lab sessions held during the class. Multiple choice questions will test student's knowledge from the textbook:

R for Marketing Research and Analytics, *Second Edition,* 2019
By Chris Chapman and Elea McDonnell Feit

Please bring your MAC ID during the Test for verification. Lectures are designed to only provide an overview and, obviously, cannot cover everything in these readings. Therefore, it is your responsibility to ensure that you go over these readings in detail before the Test. The TA will set and grade the Test. Please be in regular touch with the TA for any clarifications on Test content and delivery. On request, the TA may organize a special session to clarify Test related details.

In Class Activity – Synthetic Consumer (Group) – 10%

Use AI for consumer insight generation. AI firms like Cohere, instead of relying on real consumers and their human-made data, are now generating data from computers to train AI models. This computer-made data is a novel and cost-effective pathway to acquire terabytes of data based on "synthetic consumers". By creating synthetic data customized to specific consumer contexts (e.g., online purchase interactions, product evaluation), firms are drawing on scalable language systems to generate synthetic text that mimics semantic similarities, classification or paraphrasing of text by real consumers.

Synthetic consumer uses synthetic text to mimic semantic similarities, classification or paraphrasing of text by real consumers. Relative to real-world data, such synthetic data can, without getting entangled in privacy and bias problems, simulate a variety of consumer contexts, and do so speedily, in large amounts and at low cost.

Details on class exercise/s will be shared during introduction lecture.

REQUESTING RELIEF FOR MISSED ACADEMIC WORK

In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar "Requests for Relief for Missed Academic Term Work" and the link below;

http://ug.degroote.mcmaster.ca/forms-and-resources/missed-course-work-policy/

ACADEMIC INTEGRITY

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. **It is your responsibility to understand what constitutes academic dishonesty.**

Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: "Grade of F assigned for academic dishonesty"), and/or suspension or expulsion from the university.

For information on the various types of academic dishonesty please refer to the *Academic Integrity Policy,* located at https://secretariat.mcmaster.ca/university-policies-procedures-guidelines/

The following illustrates only three forms of academic dishonesty:
- plagiarism, e.g. the submission of work that is not one's own or for which other credit has been obtained.
- improper collaboration in group work.
- copying or using unauthorized aids in tests and examinations.

COMMUNICATION AND FEEDBACK

Students who wish to correspond with instructors or TAs directly via email must send messages that originate from their official McMaster University email account. This protects the confidentiality and sensitivity of information as well as confirms the identity of the student. Emails regarding course issues should NOT be sent to the Area Administrative Assistants. All students must receive feedback regarding their progress prior to the final date by which a student may cancel the course without failure by default.

- *For Level 1 and Level 2 courses, this feedback must equal a minimum of 20% of the final grade.*
- *For Level 3 courses and above, this feedback must equal a minimum of 10% of the final grade.*

Instructors may solicit feedback via an informal course review with students by Week #4 to allow time for modifications in curriculum delivery.

AUTHENTICITY/PLAGIARISM DETECTION

In this course we will be using a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software.

All submitted work is subject to normal verification that standards of academic integrity have been upheld (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to www.mcmaster.ca/academicintegrity.

ONLINE COURSE COMPONENTS

In this course we will be using several on-line elements including e-mail, Avenue to Learn, webpages, etc. Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, usernames for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course.

The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosures, please discuss them with the course instructor.

ONLINE PROCTORING

This course may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

CONDUCT EXPECTATIONS

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all of our living, learning and working communities. These expectations are described in the *Code of Student Rights & Responsibilities* (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

ACADEMIC ACCOMMODATION OF STUDENTS WITH DISABILITIES

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) at 905-525-9140 ext. 28652 or sas@mcmaster.ca to make arrangements with a Program Coordinator. For further information, consult McMaster University's *Academic Accommodation of Students with Disabilities* policy.

ACADEMIC ACCOMMODATION FOR RELIGIOUS, INDIGENOUS OR SPIRITUAL OBSERVANCES (RISO)

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students should submit their request to their Faculty Office *normally within 10 working days* of the beginning of term in which they anticipate a need for accommodation <u>or</u> to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

COPYRIGHT AND RECORDING

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students may be financially responsible for copyright material that is redistributed without written consent. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

POTENTIAL MODIFICATION TO THE COURSE

There may be changes to the dates and deadlines for any or all courses in exceptional circumstances (e.g., severe weather, labour disruptions, etc.). The instructor reserves the right to modify elements of the course during the term. If either type of modification becomes necessary, reasonable notice and communication with the students will be given.

RESEARCH USING HUMAN SUBJECTS

All researchers conducting research that involves human participants, their records or their biological material are required to receive approval from one of McMaster's Research Ethics Boards before (a) they can recruit participants and (b) collect or access their data. Failure to comply with relevant policies is a research misconduct matter. Contact these boards for further information about your requirements and the application process.

McMaster Research Ethics Board (General board): https://reo.mcmaster.ca/

Hamilton Integrated Research Ethics Board (Medical board): http://www.hireb.ca/

ACKNOWLEDGEMENT OF COURSE POLICIES

Your enrolment in Commerce 4MI3 will be considered an implicit acknowledgement of the course policies outlined above, or of any other that may be announced during lecture and/or on A2L. **It is your responsibility to read this course outline, to familiarize yourself with the course policies and to act accordingly.**

Lack of awareness of the course policies **cannot be invoked** at any point during this course for failure to meet them. It is your responsibility to ask for clarification on any policies that you do not understand.

COURSE SCHEDULE

WEEK	DATE	Prepare to be in _hands-on, workshop_ mode
1	Jan. 9	Introductions, syllabus, class reps, & group formation _Identify Dataset[1] from Kaggle_ _Lab1: Introduction to R – RStudio setup_
2	Jan. 16	Introduction to Marketing Analytics Based on First Principles (Chapter 1) (Palmatier) **Group Dataset presentation: Kickstart "marketing fit"** (_ungraded activity_) _Lab2: RStudio setup (Contd.) & The R Language (Chapter 2)_
3	Jan. 23	_**Lecture 1**: Introduction to Marketing Analytics Based on First Principles (Chapter 2-5) (Palmatier)_ _Lab3: Fundamentals of Data Analysis – Describing Data (Chapman & Feit, Chapter 3)_
4	Jan. 30	_**Lecture 2**: Introduction to Marketing Analytics Based on First Principles (Chapter 2-5) (Palmatier) Contd_ _Lab4: Fundamentals of Data Analysis – Relationships between Continuous Variables (Chapman & Feit, Chapter 4)_
5	Feb. 6	_**Lecture 3**: Statistical Tests For Marketing Strategy_ _Lab5: Comparing Groups – Statistical Tests (Chapman & Feit, Chapter 6)_
6	Feb. 13	_**Group presentation: Mid Term Project**_
	Feb. 20	_Mid Term Recess_
7	Feb. 27	_**Mid Term Test**_
8	Mar. 6	_**Lecture 4**: Marketing Principle 2 All Customers Change (Chapter 6-9) (Palmatier)_ _Lab6: Identifying drivers of outcomes – Linear models (Chapman & Feit, Chapter 7)_
9	Mar. 13	_**Lecture 5**: Explore Synthetic Consumer_
10	Mar. 20	_**Lecture 6**: Re-examine Chapman & Feit_
11	Mar. 27	_**Group presentation: Final Project**_
12	Apr. 3	_**Final Test**_
13	Apr. 10	_Final Test Review_

Students MUST bring a printed MOSAIC name card (4" letters, black print, NOT hand-written), doing so will help you connect better with the TA and professor.

[1] _All datasets MUST be customer-related; that is, datasets must have underline multiple customer-related variables_