Course Syllabus

Advanced Business Analytics (95-866 Z2, Fall 2021)

Instructor

Ronald Stone

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Course Description:

In this course, we will be studying useful probability/statistical models that can be applied in business practice to perform consumer behavior analysis. In particular, we will focus on two key aspects of user (or product) behavior: timing process and counting process. The former will focus on the timing of a user doing something (when will a user churn from a firm, when will a product drop out of bestseller list, when will a user adopt a new product, and so on). The latter will focus on how many items are purchased or how many users are adopting and so on. Time permitting, we will also introduce choice process (out of a number of choices, which product is chosen). We will also examine issues of sales concentration and models of long tail using these processes.

With each lecture, we will be using real world datasets to apply the learning in lectures to a practical problem facing a manager. In some cases, students will store datasets and retrieve the relevant information before any analysis can be performed. In other cases, students may have to collect the data themselves.

By the end of course, students are expected to be able to

1. build a "model" of consumer behavior,
2. apply the model to data to test the accuracy and perform necessary tweaks, and
3. based on the model constructed, predict outcome change in response to firm strategy

Textbook: No required textbook for this course. Lecture slides and reading materials will be posted along the line.

Course Website: We will be using Canvas to post lecture videos, slides, reading materials, assignments, and grades. Please check the update on Canvas periodically.

Lecture Format:

We will be using a flipped class model for this class.

Part I: First, we will post lecturer videos and slides beforehand. Lecture videos are usually uploaded by the end of Tuesdays and Thursdays. Video links will be posted under each lecture module.

You will need your Andrew ID and Password to log onto the system to watch the videos. Along with each video, I will also provide a short documentation to help you better catch the key points of the lecture. You are required to watch the lecture videos before each recitation.

Part II: I will conduct weekly recitations to review the important points covered in the lecture videos, go through practice problems, and answer your questions. The focus will be on the application. It is required that you watch the lecture videos and read the lecture slides beforehand. I highly encourage you to send any of your questions/suggestions before the recitation so that I can tailor the recitation better to your needs. Attendance and participation of recitation are highly encouraged.

Software: We will rely mostly on Microsoft Excel for model estimation in this course.

Prerequisites: Basic probability and statistics. Knowledges of regression analysis (especially maximum likelihood estimation) is preferred, but not required.

Course Outline:

Basic regressions model and beyond . . . . Week 1-2

Modeling "timing" or "when" decision . . . . Week 3-4

Modeling "how many" decision . . . . Week 5-6

Modeling "choice" decision . . . . Week 7-8

Grading: Grades will be based entirely on three deliverables:

1. Homework - 45 points
2. Quizzes   - 10 points
3. Final exam - 45 points

Homework- We will have three assignments in total. Each assignment will carry the same weight. A lot of the problem solving will rely on Excel. You are required to submit

your answer along with your Excel worksheets for your homework. You will be graded based on the accuracy of your answer and completeness of your steps.

Quizzes- We will have three quizzes in total. Quizzes will usually be conducted during the weekend. You can choose your time to finish the quiz, and the quiz will be timed once you start. Quiz will be posted on Canvas and will be announced two days before. All your quizzes will be graded, but only highest two will be counted towards your final grade.

Final Exam- More details of the exams will be announced later.

The instructor will apply a curve when deciding on the final assignment of letter grades based on the numeric grades, in order to meet Heinz College standards for mean student GPA in advanced/concentration courses.

Late Homework: Each student has 48 hours total of leeway in late homework submission. You may choose to allocate them as you wish among the three homework assignments. Once the 48 hours are used up, no late assignments will further be accepted.

Regrading Policy: If there is any question regarding the grading of homework, please contact the instructor within **seven** days after receiving your grades and comments. Since I will be posting solution to the homework, you are expected to compare the solution with your own write-up before sending the request.

Academic Integrity: Group study is encouraged. However, the homework assignments MUST entirely be your own work. The derivations, estimation results, and descriptions cannot be copied from another person or from any other source. Submissions where these details are identical or nearly identical, either among peers or with another source, will be regarded as cheating. The minimum sanction for copying or other forms of cheating on a homework assignment is the loss of credit equal to two assignments, and sanctions may range up to the termination of your enrollment at CMU. All suspected incidents will be recorded with Heinz College administration at the same time the student is notified.

Accommodations: Carnegie Mellon University is dedicated to providing accessible resources for all students. The Office of Disability Resources website may be found via the following link: [Carnegie Mellon Office of Disability Resources](https://www.cmu.edu/disability-resources/index.html) (https://www.cmu.edu/disability-resources/index.html)

Course Summary:

Date	Details	
Sun Oct 31, 2021	Assignment 1	due by 11:59pm
Sun Nov 7, 2021	Quiz 1	due by 1:10am
Thu Nov 14, 2021	Assignment 2	due by 11:59pm
Sun Nov 21, 2021	Quiz 2	due by 1:10am
Sun Nov 28, 2021	Quiz 3	due by 1:10am
Sun Nov 28, 2021	Assignment 3	due by 11:59pm
TBD, most likely Dec 4 or Dec 5, 2021	Final Exam	due by 1am