Instructor Information

Michael R. Wagner is an Associate Professor of Operations Management. He can be reached at mrwagner@uw.edu (please use this email rather than messaging me via Canvas). Office hours are TTh 1:00-2:00 in Paccar 442.

Course Description and Objectives

Business analytics are techniques that enterprises use to gain insight from their data and make better decisions. Many firms in a variety of industries use these techniques: Google, Amazon, Target, Coca-Cola, WalMart. These techniques are applicable to the many functional areas of business, such as operations, marketing, accounting, finance, etc. Furthermore, the modern abundance of data, “Big Data,” underscores the value that analytics can provide a firm, be it non-profit, for-profit, or government.

In this course we will employ quantitative tools and sophisticated software (Tableau and R) to learn analytics. This course does not aim to produce experts in statistical analysis; rather, the aim is to provide students competency to interact with and manage a team of analytics professionals. Furthermore, this is not a technical or theoretical course; we will instead focus on the application of analytics techniques to real business situations, with the aim of creating insight and value.

The course goals are as follows:
1. Students should be able to think critically about business analytics, which includes selecting the right type of analysis for a given task.
2. Students should be able to identify opportunities for applying business analytics, in real business settings.
3. Students should be well equipped to become data-savvy managers.

To achieve the above goals, lectures will cover the major concepts and analytical tools. Case assignments will allow you to analyze different industry settings, analyze different company strategic problems, and identify key issues related to data and modeling.

Textbooks

2. An Introduction to Statistical Learning: with Applications in R, James, Witten, Hastie, Tibshirani. Springer, 2017. (Optional)

Computer Software

We will be using Tableau and R in this class. These software packages are both available in the computer labs in Paccar 190. Student licenses to Tableau will be provided; R is free.

- Tableau can be downloaded at http://www.tableau.com/products/trial
- R can be downloaded at https://cran.fhcrc.org
  - R Studio (a graphical user interface) can be downloaded at https://www.rstudio.com/products/rstudio/download/ (get the free desktop version)

It will be assumed that students are proficient with using Microsoft Excel (e.g., modules 1-3 on the Foster Excel for Business online course, available on Canvas); in particular, it will be assumed that students know how to use functions in Excel, as well as basic pivot table functionality (useful concepts for both Tableau and R).
Assignments

There will be 5 case assignments – see Canvas for assignment details and due dates. Students are expected to work either individually or in groups on the cases. However, each student must submit his/her own solution. These assignments are due by the beginning of class on their posted due date and must be electronically submitted through the class website on Canvas. Late assignments will not be accepted.

Group Project

The final assignment of this course will consist of a group project where teams (of 4-5 students) will apply the techniques of the course to real data. There are four sets of deliverables:

1. 3 progress reports, due October 23, November 8, and November 27.
2. A 15-20 minute presentation to the class on December 4 or 6 (randomly assigned)
3. A 5-10 page writeup, due December 4.
4. Peer evaluations of your group members.

Further details will be discussed in class.

Participation

There will be numerous in-class activities, typically involving Tableau and R; it is expected that students will participate in these activities. It is also expected that you will arrive to class on time – late arrivals disrupt both the instructor and students. Finally, our class will be held in the computer lab, so please do not write emails, surf the web, or perform any other non-class activity – it is noticeable and distracting to both the instructor and nearby students. If you must miss class, or know you will be late, please email me letting me know.

Grading

Student numerical grades will be calculated applying the following allocation in a simple weighted average:

1. Case Analyses 50%
2. Project 50%

The (required) target median GPA in this class is 3.4 – 3.6, and I will curve to this requirement.

Course Website

All course materials will be distributed electronically through the Canvas website. Case assignments are to be submitted electronically through this website (by their due dates!).
CLASS SCHEDULE AND TOPICS
(subject to revision)

Thursday, September 27, 2018
• Lecture 1: Introduction to Business Analytics: Tools for Big Data

Tuesday, October 2, 2018
• Lecture 2: Data Visualization
  o Topics: types of visualizations, best practices, lying with visualizations, historical visualizations

Thursday, October 4, 2018
• Lecture 3: Tableau 1/3
  o Topics: connecting to data, introductory visualizations, maps, dashboards, stories

Tuesday, October 9, 2018
• Lecture 4: Tableau 2/3
  o Topics: calculated fields, table calculations, and other analyses

Thursday, October 11, 2018
• Lecture 5: Tableau 3/3
  o Topics: data interpreter, pivot, (custom) split, nulls

Tuesday, October 16, 2018
• Lecture 6: Introduction to R
  o Topics: elementary calculations, reading data into R, table, tapply
  • Tableau Assignment Due

Thursday, October 18, 2018
• Lecture 7: The Statistical Sommelier
  o Topics: linear regression, training versus testing data
• Reading Assignment: Chapter 1, Section 1.1 and Chapter 21, Section 21.1

Tuesday, October 23, 2018
• Lecture 8: Moneyball
  o Topics: linear regression, training versus testing data
• Reading Assignment: Chapter 4, Section 4.1
  • Project Progress Report #1 Due

Thursday, October 25, 2018
• Lecture 9: Modeling the Expert
  o Topics: logistic regression, confusion matrix, ROC curve
• Reading Assignment: Chapter 1, Section 1.2 and Chapter 21, Section 21.2
  • Climate Change Assignment Due

Tuesday, October 30, 2018
• Lecture 10: The Framingham Heart Study
  o Topics: Logistic Regression
• Reading Assignment: Chapter 7 (all)
Thursday, November 1, 2018
- Lecture 11: Predicting Supreme Court Decisions
  - Topics: classification trees
- Reading Assignment: Chapter 1, Section 1.3 and Chapter 21, Section 21.3
- Lending Club Assignment Due

Tuesday, November 6, 2018
No class – I will be away at a conference

Thursday, November 8, 2018
- Lecture 12: Movie Recommendations at Netflix
  - Topics: hierarchical clustering, dendrogram
- Reading Assignment: Chapter 13 (all) and Chapter 21, Section 21.4
- Project Progress Report #2 Due

Tuesday, November 13, 2018
- Lecture 13: Wine Market Segmentation
  - Topics: k-means clustering
- Vandalism on Wikipedia Assignment Due

Thursday, November 15, 2018
- Lectures 14: Blackjack
  - Topics: simulation
- Reading Assignment: Chapter 6 (all)

Tuesday, November 20, 2018
- Lecture 15: Google Search
  - Topics: markov chains
- Reading Assignment: Chapter 11 (all)
- Market Segmentation for Hubway Assignment Due

Thursday, November 22, 2018
No class - Thanksgiving

Tuesday, November 27, 2018
- Lecture 16: Google AdWords
  - Topics: integer programming
- Reading Assignment: Chapter 12 (all)
- Project Progress Report #3 Due

Thursday, November 29, 2018
- Lecture 17: IBM’s Watson
  - Topics: various
- Reading Assignment: Chapter 3 (all)

Tuesday, December 4, 2018
- Project Presentations
- All Project Writeups Due

Thursday, December 6, 2018
- Project Presentations