91-729: Business Analytics for Managers
Spring 2016
Mini 4

Instructor:
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Teaching Assistants:
(TAs, office hours & location will be posted on Blackboard for each TA by end of first week)

Class Meeting Times and Locations:
    Thursday, 6:00 – 8:50 PM, Room HBH 239

Class Web Site: http://www.cmu.edu/blackboard

Course Description
Business analytics is defined by Thomas Davenport as “the broad use of data and quantitative analysis for decision making within organizations.” Business analytics encompasses both the reporting of performance and the attempt to understand and predict it, emphasizing statistically and mathematically-derived insights. This course will cover the underlying fundamental concepts and principles behind business analytics, focusing on those the manager needs to understand to both envision opportunities, and work effectively with data scientists to realize those opportunities. In addition, the course will provide students skill development in the use of data visualization tools and techniques, and some Excel-based analytic methods.
Prerequisite

Successful completion of the core MPM statistics course, 91-801, Data Analysis for Managers, comparable Heinz course, or exemption.

Course Texts

Required


Suggested


Additional readings and cases will be made available throughout the course. For some of these, there will be a charge for the student.

Course Software

The class will make use of two software packages: Tableau Desktop and XLMiner.

XLMiner: When you purchase your required text book, included will be an account number that will allow you trial license for downloading and using XLMiner. This is an add-on for Excel.

Tableau Desktop: Later in the course you will be provided an academic license and a means to download and use Tableau Desktop during the course.

NOTE – You must have access to a computer that you can use with this software.

Neither of these software packages are available in any computer cluster on campus.

Course Rationale

There is growing evidence that business managers need an understanding of the fundamental concepts and frameworks behind data analytics to achieve the business benefits of data analytic projects.
McKinsey and Company estimate “there will be a shortage of talent necessary for organizations
to take advantage of big data. By 2018, the Unites States alone could face a shortage 140,000
to 190,000 people with deep analytical skills as well as 1.5 million managers and analysts
with the know-how to use the analysis of big data to make effective decisions.” (Big data: The
next frontier for innovation, competition, and productivity”, McKinsey Global Institute Report,
May 2011)

Research sited in a recent article in MIT Sloan Management Review revealed that with more
access to useful data, companies are increasingly using sophisticated analytical methods. This
often results in a gap between an organization’s capacity to produce analytic results and its
ability to apply them effectively to business issues. Increasingly, business managers must
make decisions based on the results of analytic methods they do not completely comprehend.
(“Minding the Analytics Gap”, Ransbotham, Sam, David Kiron, Pamela Kirk Prentice, Spring
2015).

This gap is particularly problematic given many data science projects are undertaken to improve
managerial decision making. Foster Provost and Tom Fawcett in their book “Data Science for
Business” state “Data analytic projects require a close interaction between the data scientist and
business people. Firms where the business people do not understand what the data scientists
are doing are at a substantial disadvantage, because they waste time and effort, or worse,
because they ultimately make wrong decisions.” (O’Reilly,2013)

The course Business Analytics for Managers is designed for managers, not data scientists.
This business analytics course is designed to provide the knowledge and skills that enable
managers to become more intelligent consumers of data analytics.

Course Objectives

Upon completion of this course, students will be able to:

- Apply data visualization principles to create effective data visualizations for
  communicating, monitoring, and data exploration.
- Contrast various data analytic tasks (classification, prediction, association rules, and
  cluster analysis) in terms of the type and structure of the data, purpose, expected output,
  underlying algorithms, and common business and public sector applications.
- Translate a business problem into an analytic task, determine the needed data, build a
  model using XLMiner, evaluate the model’s performance, and identify deployment
  concerns.
- Interpret the results of a variety of predictive analytic models.
- Explain the value of each stage defined by the Cross Industry Standard Process for Data
  Mining (CRISP-DM) and how to use this framework to structure a data analytic problem.
• Understand various data management challenges including data availability, data bias, data integration, and data governance. Describe common approaches (technical and organizational) for addressing those challenges.
• Evaluate proposals for data mining projects (spot obvious flaws, unrealistic assumptions, missing pieces) and assess the business value and business risk of the proposal.

Course Structure

The class meetings consists of lectures and discussions. The labs are completed outside of class. The course content is structured as follows:

I. Understanding Business Analytics – Methods and Concepts (4 weeks)
   ➢ Predictive analytics, Optimization, Forecasting

II. Addressing Managerial Challenges with Data Analytics (1.5 weeks)

III. Using Data Visualization for Data Communication and Exploration. (1.5 weeks)

Course Schedule

Please refer to the separate document titled Course Schedule (posted to Blackboard) for a listing of weekly lecture topics, labs and assignments. Assignment due dates are also posted in the Course Schedule.
Student Evaluation

Your work will be evaluated on a combination of individual homework assignments, preparatory assignments, quizzes, and a final exam.

Final grades are based on the following weights:

- **Assignments**
  - Individual Assignments 20%
  - Prep Work Assignments 20%
- **Quizzes (4)**
  - 20%
- **Final exam**
  - 40% - 60%
  - Total 100%

*Only factored if score is higher than final exam*

Final letter grades are assigned to your body of work in this course according to the following scale:

- A+ 97% to 100% Exceptional
- A 93% to 96% Excellent
- A- 90% to 92% Very Good
- B+ 87% to 89% Good
- B 83% to 86% Acceptable
- B- 80% to 82% Fair
- C+ 77% to 79% Poor
- C 73% to 76% Very Poor
- C- 70% to 72% Minimal Passing
- R less than 70% Failing

The average grade in a required Heinz course is expected to be 3.33-3.4, equivalent to a B+. This expected average reflects the degree of difficulty and/or breadth of coverage for a core course.
Late Homework Policy and Make-up Exams

Assignments

Normally, late homework is not accepted without prior approval. If you have an extenuating circumstance (illness, accident, unexpected family matter, etc.), notify me as early as possible and I will take that into consideration.

You will have ONE late pass you can use on an individual assignment (not the prep work). The late pass allows you to submit the assignment work 48 hours (2 days) after the due date and still receive full credit.

Exam Date

You are expected to take the final exam at the time indicated on the Course Schedule. If you need to take the final exam at a different time, you should bring this request to me as soon as possible, and at least one week before the scheduled exam. Please be aware that I may not be able to grant your request.

Policy on Collaboration and Cheating

Excluding assignments that are assigned as group work, the work you submit should reflect individual effort. You are encouraged to discuss assignments with fellow students, but the final work product must reflect your knowledge and effort, not your classmates’.

Cheating includes but is not necessarily limited to:

1. Submission of work that is not your own for papers, assignments, lab exercises, or exams.
2. Submission or use of falsified data.
3. Theft of or unauthorized access to an exam, current or previous.
4. Use of an alternate, stand-in or proxy during an examination.
5. Use of unauthorized material including textbooks, internet material, notes, or computer programs in the preparation of an assignment or during an examination, unless otherwise indicated.
6. Supplying or communicating in any way unauthorized information to another student for the preparation of an assignment or during an examination.
7. Collaboration in the preparation of a solution to a problem unless expressly allowed by the instructor.
8. Plagiarism which includes, but is not limited to, failure to indicate the source with quotation marks or footnotes where appropriate if any of the following are reproduced in the work submitted by a student:
   a. A graphic element.
   b. A proof.
   c. A phrase, written or musical
   d. Specific language.
   e. An idea derived from the work, published or unpublished, of another person.
   f. Program code or algorithms.

If you are unsure about what is acceptable collaboration, you should consult with me.

**Penalties for Cheating**

Penalties imposed are at the instructor’s discretion. In this class, the penalty imposed can be any of the following depending on the violation:

- zero on the assignment
- a letter reduction on final grade (final grade of A- becomes B-)
- a failing grade in the course

*Regardless of the penalty imposed, all incidents of cheating are reported to the Associate Dean. Additional penalties may be imposed.*

**Classroom Etiquette**

As research on learning shows, unexpected noises and movement automatically divert and capture people’s attention, which means you are affecting everyone’s learning experience if your cell phone, pager, laptop, etc. makes noise or is visually distracting during class. For this reason, your mobile devices should be silenced and not used during class.

You are not permitted to use your laptop or other electronic computing devices during class. Desktop computers in the classroom may only be used for in-class exercises.

Please limit your peer conversations during class. If you must chat with your neighbor, please sit at the far corners of the room to be less distracting. I may ask you to leave class if I find your repeated conversations distracting.

You may record classroom activities ONLY for personal, educational use or for the educational use of another student currently enrolled in the class. You must first obtain my permission prior to recording any lecture. The recording may not be further copied, distributed, published or otherwise used for any other purpose without my express written consent. All students are advised that classroom activities may be taped by students for this purpose.

I appreciate you arriving on time for class, but recognize this may not always be possible.