Course Information
IS 95-870: Managing Analytics Projects
Fall 2014
6 Units
Class sessions: Wednesdays, 6:00 pm – 8:50 pm, Room TBD
Instructor:
Dr. David Steier, Director, Deloitte Consulting
Contact info: 408-704-2575, Steier@andrew.cmu.edu
Office hours: Wednesday 2-4 PM, location TBD
Teaching Assistant:
Kinnari Shah, MISM 16-month track
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Office Hours: Monday: 3-5 pm, Location: 3rd Floor Red Chairs

Prerequisites
Students should have completed a statistics course and have completed or be enrolled in a data mining course. Ability to use at least one analysis tool (e.g. R, MATLAB, SAS, or SPSS) required.

Description
With the growing demand for analytics skills in business and government, there are many options for students to learn fundamentals of data and analytics modeling. There are fewer opportunities to learn how to manage analytics projects, which often involve leading teams with diverse skills and interacting with stakeholders in a variety of roles. This course is designed to offer students practical guidance and experience around the process of initiating, delivering, and evaluating analytics projects. It will draw on experience from a consulting perspective, talking about analytics with clients and delivering analytics-related engagements.

The course will cover the following topics:
- Starting the analytics conversation: Identifying needs, understanding constraints
- Planning and executing analytics projects: Sizing, staffing, communication
- Making choices around data: Sourcing, standards, licensing and privacy
- Making choices around analytic techniques and technologies, integration and visualization

Course Materials
The primary textbook for this class will be *Practical Data Science with R*, written by Nina Zumel and John Mount, Manning Publications, 2014, available in the bookstore or directly from the publisher. We will use four chapters from this text, and supplement it with articles which will be available electronically.

Evaluation Method
The grade will be based on four homework assignments, two quizzes, active participation in class discussions including in-class group exercises, a midterm, and the completion and presentation of an analytical project management case study. The in-class exercises will refine the student skills over time on a variety of case studies taken from analytics practice. The homework assignments, based on the analytics problem chosen for the final project, will cover problem framing, project planning, data, analytic, and visualization techniques. Completion of each assignment contributes towards the completion of the final project case study.

- Homework (4 times 5%) 20%
- Midterm 10%
- Quizzes (2 times 5%) 10%
- Class participation 20%
- Final paper 20%
- Final presentation 20%

Learning/Course Objectives

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<tr>
<th>Learning Objective</th>
<th>How Assessed</th>
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<tr>
<td>Recognize analytics opportunities and converse with stakeholders to elicit project requirements</td>
<td>Class participation, problem sets, presentation</td>
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<tr>
<td>Identify data sources, analytics and visualization techniques relevant to an analytics problem</td>
<td>Quizzes, Problem sets, class participation, projects and presentations, midterm</td>
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<td>Create and evaluate analytics project plans</td>
<td>Class participation, projects and presentation</td>
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<tr>
<td>Anticipate and address common challenges in analytics projects</td>
<td>Class participation, projects and presentation</td>
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### Course/Topical Outline:

#### Class 1 – October 22, 2014

**Topic** Motivation and overview of managing analytics projects
- Why are analytics projects different?
- Managing analytics projects illustrated by attrition analytics case study
  - Starting the analytics conversation
  - Making choices around data
  - Making choices around analytics
  - Communicating and acting on results
- Introduction to final project

**Required Readings**
N. Zumel and J. Mount, *Practical Data Science with R*, Manning Publications, 2014, Chapter 1: The data science process (p. 3-17)

**Deliverable**
In-class group exercise: Customer attrition case

#### Class 2 – October 29, 2014

**Topic** Starting the analytics conversation
- Detecting cognitive biases in decision-making
- Identifying organizational needs addressable by analytics
- Refining those needs into “crunchy questions” suitable for driving analytics projects
- Understanding decision-maker needs and project constraints (e.g. timeliness, accuracy, and budget)
- Tailoring communications to various analytics audiences

**Required Readings**

**Deliverable**
Problem Set #1: Opportunities for Analytics

#### Class 3 – November 5, 2014

**Topic** Planning analytics projects
- Assessing an organization’s analytics maturity
- Sizing an analytics project in terms of time, resources, infrastructure, expenses
- Assembling (and retaining) an analytics team
- Anticipating and reacting to early warning signs in analytics projects
- Evaluating impacts from analytics projects; identifying future opportunities
- Calibrating and tuning analytics models to accommodate learnings and requirements changes

**Required Readings**

**Deliverable**
Quiz #1
Problem set #2: Creating a Project Plan

#### Class 4 – November 12, 2014

**Topic** Making choices around data
- Understanding available internally and externally sourced data
- Profiling to assess data quality
- Data warehouses and data mining
- Managing Big Data
- Data standards, interoperability, governance, licensing models, pricing
- Privacy: ethics and social norms, laws, cross-border considerations, anonymization, data vaults and privacy-preserving data mining

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<td>Deliverable</td>
<td>Midterm Problem set #3: Sourcing Data for Analytics</td>
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**Class 5 – November 19, 2014**

**Topic**
Making choices around analytics and visualization techniques and technologies, various case studies
- Understanding analytics problem types and tool/technology options, including the emerging big data and data science landscape
- Choosing analytic and visualization techniques and corresponding infrastructure and skills needed
- Designing and evaluating usable interfaces/visualizations to analytic systems
- Integrating analytics technology into existing infrastructure

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<tr>
<td>Deliverable</td>
<td>Quiz #2 Problem set #4: Choosing Analytic and Visualization Techniques</td>
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**Class 6 – December 3, 2014**

**Topic**
Final project presentations and class discussion

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<td>Deliverable</td>
<td>Final project presentations Final project papers due</td>
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**Plagiarism and cheating notice**
The students are expected to strictly follow Carnegie Mellon University rules of academic integrity in this course. This means in particular that examinations, case and homework are to be the work of the individual student using only permitted material and without any cooperation of other students or third parties. It also means that usage of work by others is only permitted in the form of quotations and any such quotation must be distinctively marked to enable identification of the student’s own work and own ideas. All external sources used must be properly cited, including author name(s), publication title, year of publication, and a complete reference needed for retrieval. Violations will be penalized to the full extent mandated by the CMU policies. There will be no exceptions.

**Course Policies & Expectations**
Class participation, especially in the group exercises and in the presentations is mandatory; missing more than two sessions will result in a failing grade for the course. Homework assignments will often cover material before it has been covered in class, with the goal of motivating students to use the readings and other resources and bring their questions to class. The homework assignments are a chance to apply best efforts to the problem at hand, and feedback from the class discussion can be incorporated into the final project paper and presentation. In many instances, especially on the case studies, there may not be a single right answer: students are encouraged to explore a topic from a variety of perspectives and techniques and engage in respectful and open-minded discussion of alternatives.