MIS5401.401 – Data Analytics for Management (PMBA)

Fall 2014 (CRN 25275)

About the Instructor:

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Office hours: 3:00-5:00pm, Tuesdays

Class Location and Time:

TUCC 320 Mondays, 6:00-8:30

On the web: <http://community.mis.temple.edu/mis5401sec401f14>

Course Description:

Organizations rely on data to make effective decisions, and managers must create a data-driven mindset that uses analytics to drive strategy. In this course, students learn how data is used to support organizational decision-making and solve business problems. Students learn the tools and techniques organizations use to assess, prepare, and analyze data. Students gain hands-on experience with these concepts through case studies and exercises.

Co-requisites:

Business Statistics

Course Objectives:

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| Course Learning Objective | Program Goal/Competency | Key Skills |
| Evaluate the tradeoffs required in selecting data for analysis, and recommend a course of action. | Implementation Management | Develop heuristic to weigh access versus accuracy in a given scenario.  |
| Develop and assess key performance indicators and metrics for evaluation. | Business Reasoning | Formulate KPIs relevant to a business scenario. |
| Apply data mining and analysis techniques to identify associations and trends among data. | Identify and Evaluate Business Opportunities | Perform data analysis using pivot tables in Excel.Perform decision tree induction and association rule mining using R.Perform sentiment analysis using Excel. |
| Course Learning Objective | Program Goal/Competency | Key Skills |
| Identify ways in which data quality can be compromised and apply remedies.Integrate data across multiple sources, transforming it into a single, analysis-ready view. | Business Reasoning | Use Microsoft Excel to combine several data sets into an analysis-ready format. |
| Communicate analysis results back to management for ongoing quality assurance and process improvement. Understand and select appropriate data visualization techniques to effectively communicate results. | Influential Communication | Create a visualization using Tableau that uses best practices for the visual representation of data. |

Required Text and Readings:

There is no required textbook for this course. Most readings and course material is available online through the Temple Library.

You will need to purchase two case studies and one book chapter. See the “Purchasing Course Materials” section of the syllabus for more information.

Evaluation and Grading

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| Item | Weight |
| Participation (including online discussion)  | 15% |
| Assignments (3) | 15% |
| Case Analyses (2) | 10% |
| Final Project | 15% |
| Final Exam | 45% |

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|  Scale |
| 94 – 100 | A | 73 – 76 | C |
| 90 – 93 | A- | 70 – 72 | C- |
| 87 – 89 | B+ | 67 – 69 | D+ |
| 83 – 86 | B | 63 – 66 | D |
| 80 – 82 | B- | 60 – 62 | D- |
| 77 – 79 | C+ | Below 60 | F |

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Participation

Much of your learning will occur as you prepare for and participate in discussions about the course material. The assignments, cases, and readings have has been carefully chosen to bring the real world into class discussion while also illustrating fundamental concepts.

To encourage participation, 15% of the course grade is earned through preparation before class, and participation during and between classes. Assessment is based on what you contribute, not simply what you know.

1. Preparation before class – On weeks where there are assigned readings, you will submit a brief summary of those readings (see the course schedule). This includes the cases. Submit a copy via email to me (sunil.wattal@temple.edu) in Microsoft Word format. Bring a copy for your reference during the discussion.

Your weekly summary should include the following:

	* + One key point you took from each assigned reading, including the case. (One or two sentences per reading)
		+ One key point you learned from the readings as a whole. (One or two sentences maximum)
		+ One discussion question that you would ask your fellow classmates.

This assignment is graded pass/fail. If you do not fully complete the assignment, you will not receive credit for the writeup that week.

1. Participation during class – We will discuss the readings and the cases as a group, focusing on the key ideas in each reading and how they tie with the theme of the session. You will drive the discussion. I may ask for volunteers, or I may call on you. You should be prepared to articulate key ideas in the material and reflect on these ideas as they relate to your own experience.

Another important aspect of in-class participation is completion of in-class assignments and contribution to in-class group exercises.

1. Participation between classes – To facilitate ongoing learning of the course material, we will also discuss course material on the Community Site between sessions.

I will post a discussion question on the class blog 24-48 hours after each class meeting. The question will relate to the assigned reading, a topic discussed in class, or a relevant current event. Every student is expected to read and contribute to the online class discussion each week.

The criteria for participation includes attendance, punctuality, level of preparation, professionalism, answering questions, discussing readings, discussing case studies, contributing to group activities, and contributing to a positive learning environment.

Case Study Analyses

There are a set of questions for each case. You will prepare an analysis of each case as a slide deck in Microsoft PowerPoint. You should address all case questions in your analysis.

Your slide deck must contain no more than 7 slides:

* The first slide should have your name and the title of your presentation.
* Slides 2 through 5 will contain your analysis. You can allocate a slide for each question.
* Slide 6 should contain a bottom-line wrap up, highlighted lessons learned and recommendations.
* Slide 7 will contain a reference list.

Regarding style:

* Your slides should use the minimum amount of text required to convey your message.
* You should make use of visuals to convey your point.
* You can use the notes section in PowerPoint to provide additional details, but this is not required and should be kept to a minimum (no more than 2-3 sentences per slide).

Regarding content, a good case analysis includes the following:

* Respond to all the questions and make sure you tie your answers together into a cohesive story.
* Answer the questions with definitive, clear statements backed up by evidence.
* Avoid general observations that could apply to virtually any problem.
* Draw broader lessons based on your answers to the questions. What you can learn from the case study that can be applied to other situations?
* Make concrete recommendations. Explain your rationale, supported by evidence.

For a more detailed description of the evaluation criteria for cases, see the Case Analysis Evaluation Criteria posted to the Community Site.

Your must email the slide deck containing your analysis to me no later than the start of class the day the case is discussed. Late submissions will result in no credit earned for this assignment. If I cannot open the file, you won’t receive credit for the assignment.

Exam

### The final exam will be held during our usual class time on December 15, 2014. A missed exam can only be made up in the case of documented and verifiable extreme emergency situations.

Purchasing Materials

Case Studies

You will need to purchase the two case studies online from Harvard Business School (HBS) Publishing. Most of the case studies cost $3.95 each. A custom URL for this course on Harvard Publishing Site will be posted to the Community Site. Make sure you use this URL (don’t just search for my name or the case!) and double-check to make sure you are ordering the correct case. You will need to register in order to purchase the case.

Once you purchase the cases through the site, you can immediately download an electronic copy. If you lose your copy, you can download additional copies until the end of the semester.

The case studies used in the course are:

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| Week | Number | Name |
| 2 | 603066-PDF-ENG | Intermountain Health Care |
| 5 | KEL473-PDF-ENG | Netflix Leading with Data |

You will also need to purchase a book chapter, “Advanced Business Analysis,” from the book Business Intelligence: Making Decisions through Data Analytics by Jerzy Surma.

You can purchase the chapter on the same course page you’ll use to purchase the cases.

Assignments

There will be three assignments in the course in addition to the case analyses.

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| Assignment | Session Due | Description |
| Visualization Assignment | 3 | Create a clear, insightful graphic showing insight into a data set. The data set and scenario may come either from a program-wide challenge or from a course-specific problem. |
| Analytics Assignment | 6 | Perform an association rule analysis on a data set to discover products which are purchased together.Perform a decision tree analysis on a data set to discover likelihood that a customer event will occur. |
| Final Project | 7 | Perform an analysis on an original data set using two analytics techniques. Present findings through a brief presentation.  |

Late Assignment Policy

An assignment is considered late if it is turned in after the assignment deadlines stated above. No late assignments will be accepted without penalty. All assignments will be assessed a 20% penalty (subtracted from that assignment’s score) each day they are late. No credit will be given for assignments turned in more than three days past the due date. However, you must submit all assignments, even if no credit is given. If you skip an assignment, an additional 10 points will be subtracted from your final grade in the course.

The exception to this is the case analyses and the participation. Because we are discussing the material in class, those assignments must be completed on time in order to receive credit.

Plan ahead and backup your work. Equipment failure is not an acceptable reason for turning in an assignment late.

Classroom Etiquette

The environment you and your fellow students create in class directly impacts the value that is gained from the course. To that end, the following are my expectation of your conduct in this class:

* Arrive on time and stay until the end of class.
* Turn off cell phones while in class.
* Limit use of electronic devices (e.g., laptop, tablet computer) to class-related activities.
* During class time speak to the entire class (or breakout group) and let each person “take their turn.”
* Be fully present and remain present for the entirety of each class meeting.

Citation Guidelines

If you use text, figures, and data in reports that was created by others you must identify the source and clearly differentiate your work from the material that you are referencing. If you fail to do so you are plagiarizing. There are many different acceptable formats that you can use to cite the work of others (see some of the resources below). The formats are not as important as the intent. You must clearly show the reader what is your work and what is a reference to someone else’s work.

Plagiarism and Academic Dishonesty

Plagiarism and academic dishonesty can take many forms. The most obvious is copying from another student’s exam, but the following are also forms of this:

* Copying material directly, word-for-word, from a source (including the Internet)
* Using material from a source without a proper citation
* Turning in an assignment from a previous semester as if it were your own
* Having someone else complete your homework or project and submitting it as if it were your own
* Using material from another student’s assignment in your own assignment

Plagiarism and cheating are serious offenses, and behavior like this will not be tolerated in this class. In cases of cheating, both parties will be held equally responsible, i.e. both the student who shares the work and the student who copies the work. Penalties for such actions are given at my discretion, and can range from a failing grade for the individual assignment, to a failing grade for the entire course, to expulsion from the program.

Student and Faculty Academic Rights and Responsibilities

The University has adopted a policy on Student and Faculty Academic Rights and Responsibilities (Policy # 03.70.02) which can be accessed through the following link:
<http://policies.temple.edu/getdoc.asp?policy_no=03.70.02>

Schedule

Review the assigned readings and PowerPoint slides before each class. Consult the reading list for each week’s readings.

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| Session/Topic | Before Class Meeting | During Class Meeting |
| 1 – October 20, 2014What is Data Analytics?Data Visualization | Read/Prepare:* See reading list
* Download and install Tableau

Submit:* Weekly Writeup
* Response to Discussion Question
 | Discuss:ReadingsIn-Class Activity:Tableau Public |
| 2 – October 27, 2014Data-Driven Management and KPIs | Read/Prepare:* Intermountain Case
* Pivot Table Tutorial
* See reading list

Submit: * Weekly Writeup
* Intermountain Case Analysis
* Response to Discussion Question
 | Discuss:Readings Intermountain CaseIn-Class Activity:Pivot Tables in Excel |
| 3 – November 3, 2014Access Versus AccuracyExtract, Transform, Load | Read/Prepare:* See reading list
* Download and install R and RStudio
* Run R test script to verify it works

Submit: * Weekly Writeup
* Visualization Assignment
* Response to Discussion Question
 | Discuss: ReadingsIn-Class Activity:Access Versus AccuracyandETL using Excel |

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| 4 – November 10, 2014Predictive Analytics:Decision Trees (Classification) | Read/Prepare:* See reading list
* Run R descriptive statistics script

Submit:* Weekly Writeup
* Response to Discussion Question
 | Discuss:ReadingsIn-Class Activity:Decision Trees in R |
| 5 – November 17, 2014Predictive Analytics:Association Rule Mining | Read/Prepare:* See reading list
* Netflix Case

Submit:* Weekly Writeup
* Netflix: Leading with Data
* Response to Discussion Question
 | Discuss:ReadingsNetflix CaseIn-Class Activity:Association Mining in R |
| 6 – December 1, 2014Sentiment Analysis | Read:* See reading list

Submit:* Weekly Writeup
* Analytics Assignment
* Response to Discussion Question
 | Discuss:ReadingsIn-Class Activity:Sentiment Analysis using Excel |
| November 26THANKSGIVING BREAK |
| 7 – December 8, 2014Guest Speaker“Lightning Round” Group Presentations | Read/Prepare:* No readings assigned.
* Do a little background research on the guest speaker

Submit:* Writeup of analysis
* Final presentation
* Response to Discussion Question
 | Guest SpeakerGroup Presentations |
| December 15FINAL EXAM |

Reading List

You can access almost everything through the web or the Temple library. For library-hosted materials, you may need to use your AccessNet ID.

* Material you must pay for is labeled with a ($). Use the Harvard Publishing link provided on the Community Site.
* Material from the library is labeled with an (L). Use Summon to search for the title.
* For the book chapters, pay close attention to the specific chapters and sections specified!
* Read the material prior to class (i.e., the first set of readings should be read by week 1).

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| Session | Readings |
| 1 | Hopkins, M. and Brokaw, L. (2011). Matchmaking with Math. Sloan Management Review, Vol. 52, No. 2. (L)Gualtieri, M. (June 7, 2013). What is Hadoop? (watch the video)<http://blogs.forrester.com/mike_gualtieri/13-06-07-what_is_hadoop>Davenport, T. (2013). Telling a Story with Data. Deloitte University Press. <http://dupress.com/articles/telling-a-story-with-data>Unwin, A. (2008). Chapter II.2: Good Graphics? Handbook of Data Visualization. Chen, Hardle, and Unwin (Eds.). pp. 57-78. (L) |
| 2 | Scientific Management. Wikipedia. <http://en.wikipedia.org/wiki/Scientific_management> Performance Indicator. Wikipedia: <http://en.wikipedia.org/wiki/Performance_indicator> Vrentas, J. (2013). Chip Kelly’s Mystery Man. MMQB (Sports Illustrated).<http://mmqb.si.com/2013/07/24/chip-kellys-mystery-man>Olavsrud, T. (March 19, 2013). Data-Driven Companies Outperform Competitors Financially. CIO.<http://www.cio.com/article/730457/Data_Driven_Companies_Outperform_Competitors_Financially> |
| 33 (continued) | Snibbe, A.C., Fall 2006. Drowning in Data. Stanford Social Innovation Review. <http://www.ssireview.org/articles/entry/drowning_in_data> Mongini, M. (February 2, 2004). Quickstudy: ETL. Computerworld.com<http://www.computerworld.com/article/2575153/business-intelligence/quickstudy---etl.html> Henschen, D. (December 4, 2012). Big Data Debate: End Near For ETL? InformationWeek.<http://www.informationweek.com/big-data/news/big-data-analytics/big-data-debate-end-near-for-etl/240143068>*See next page for the rest of the readings for session 3…*Taber, D. 2010. Stupid Data Corruption Tricks: Take Our CRM Quiz <http://www.cio.com/article/632156/Stupid_Data_Corruption_Tricks_Take_Our_CRM_Quiz>Using VLOOKUP in Excel. How-To-Geek.<http://www.howtogeek.com/howto/13780/using-vlookup-in-excel/> [Optional - For Reference Only]Machlis, S. (2013). Beginner’s Guide to R. Computerworld.<http://www.computerworld.com/s/article/9239625/Beginner_s_guide_to_R_Introduction> |
| 4 | Surma, J. (2011). Chapter 4: Advanced Business Analysis. Expert Press. ($)Read sections 4.1 and 4.2: Introduction and Classification.Various. (2013). The Promise and Challenge of Big Data. A Harvard Business Review Insight Center Report. <http://www.sas.com/content/dam/SAS/en_us/doc/whitepaper2/promise-challenge-bigdata-106222.pdf>  |
| 5 | Surma, J. (2011). Chapter 4: Advanced Business Analysis. Expert Press. ($)Read section 4.4: Association Rules. Carr, D. (February 14, 2013). Giving Viewers What They Want. The New York Times.<http://www.nytimes.com/2013/02/25/business/media/for-house-of-cards-using-big-data-to-guarantee-its-popularity.html>  |
| 6 | Wohlsen, M. (July 2, 2014). Don’t Worry, Facebook Still Has No Clue How You Feel. Wired.com<http://www.wired.com/2014/07/business-facebook-feelings/> Leetaru, K. (June 3, 2014). How to Teach Heartless Computers to Really Get What We’re Feeling.<http://www.wired.com/2014/06/how-to-teach-heartless-computers-to-really-get-what-were-feeling/>  |