Course Outline

BUSINESS ANALYTICS
COURSE CODE OM612C

COURSE OBJECTIVE

This course gives an introduction to the area of business analytics. Business Analytics (BA) is generally understood as the extensive use of data, mathematical and statistical models using exploratory, descriptive, predictive and causal models under the framework of evidence and fact-based management to drive decisions and actions. This course is offered for 2 credits hours. Course objectives are:

1. To gain an understanding of how managers use business analytics to formulate and solve business problems and to support managerial decision making;
2. To become familiar with the processes needed to acquire and prepare data, develop, fit, validate and deploy models and use them for decision making;
3. To learn how to use and apply selected business analytics software (SAS enterprise miner / Rapid Miner).

LEARNING OUTCOMES

Upon completion of this course, students will be able to complete the following key tasks:

1. Gain an understanding of how managers use BA to formulate and solve business problems and to support managerial decision making.
2. Describe and interpret the basic concepts of BA. Evaluate business problems and determine suitable analytical methods
3. Plan, organize and evaluate methods to prepare raw data for business analytics, including partitioning data and imputing missing values
4. Compare and contrast various descriptive and predictive BA techniques
5. Analyze, Interpret and validate the results extracted from data mining and statistical algorithms.
6. Understand how to use Rapid Miner / SAS enterprise miner for data preparation and analysis for association rules, correlation, regression (OLS / Logistic), clustering, discriminant analysis, decision tree analysis and neutral network applications.

COURSE DESCRIPTION

This course gives an introduction to the area of business analytics. Business Analytics is an interactive process of analyzing and exploring enterprise data to find valuable insights that can be exploited

for competitive advantage. Business Analytics makes extensive use of data, mathematical and statistical models using exploratory, descriptive, predictive models under the framework of evidence and fact-based management to drive decisions and actions

Technological advances, decreased costs of system hardware and software components, and the global web revolution have allowed for large amounts of data to be generated, collected, stored, analyzed, distributed and used at an ever-increasing rate by organizations. At the same time, managers must rapidly understand factors driving their business in order to sustain a competitive advantage. Organizational speed and agility supported by fact /evidence based decision making are critical to ensure an organization remains ahead of its competitors. This means that there is an ever growing awareness and agreement that by leveraging data resources to develop and deploy business strategies to enhance their decision-making capabilities, organizations can gain and sustain a competitive advantage. Business Analytics (BA) is an attempt to achieve these goals.

This course introduces business analytics as tool to gain competitive advantage and provides a number of practical implementation details using several real-life cases. Specifically, the course shows how to discover subtle patterns and associations from business data and develop and deploy descriptive and predictive models to optimize decision-making throughout the organization.

REQUIRED COURSE MATERIALS AND READINGS

1. Data Mining for the Masses; by Dr. Matthew A North; ISBN-13: 978-0615684376; Global Text Project, 2012.

2. "*Applied Analytics Using SAS® Enterprise Miner™.* This text is based on course notes that were developed by Jim Georges, Jeff Thompson, and Chip Wells for a course in Business Analytics taught at SAS institute. Additional contribution to the book was made by Tom Bohannon, Mike Hardin, Dan Kelly, Bob Lucas, and Sue Walsh. The ISBN for this book is: 978-160764-593-1.

OPTIONAL COURSE MATERIALS & READINGS (CASES, ARTICLES, REPORTS ETC)

Case studies administered by the instructor for the discussion of different topics in the course.

SOFTWARE NEEDED FOR THE COURSE

1. Rapid Miner (available from www.rapidminer.com). This is one of the most widely used miners for descriptive and predictive analytics and also for many data mining applications.

2. This course also makes extensive use of *SAS® Enterprise Miner™ 13.2* for this class. You have two options for using this software.

   a. Get your own personal copy of *SAS® Enterprise Miner™* and install it on your laptop.

b. Get access via SAS Cloud environment. To do this, instruction will be provided during the first session of the course. It is expected that starting second week of the course, all of you have Rapid miner and SAS enterprise miner (on demand academics) installed in your system.

EVALUATION

Components and Weights

Components	Weightage (%)
Home work assignments /cases	30
Test	25
End term exam	40
Class work / participation	5
Total	**100%**

The course grading pattern is as follows. Each component will be evaluated on a scale of 0-100 marks. The final mark X (0-100) will be a weighted average of four components, with weights as above. Based on final mark, letter grade for the course will be assigned as follows:

$X >= 95$	A+
$85 <= X < 95$	A
$75 <= X < 85$	A-
$65 <= X < 75$	B+
$55 <= X < 65$	B
$45 <= X < 55$	B-
$35 <= X < 45$	C+
$25 <= X < 35$	C
$15 <= X < 25$	C-
$5 <= X < 15$	D
$X < 5$	F

ACADEMIC DISHONESTY

Plagiarism is the use of another person's words without proper citation. Because the writer represents these words as his or her own, plagiarism is the academic equivalent of theft. Plagiarism will not be tolerated in this class or at University. In accordance with the University Code of Academic Misconduct, plagiarism in any form will result in an "F" for this course and possible expulsion from the University. Cheating on exams carries similar penalties. In this course, as a part of the continuous assessment, participants will work on many

case studies and associated data sets. Rapid Miner / SAS E miner is used to extract results and report the solution. Participants are required to load, prepare, analyze the data in their respective systems and report the solution. Reporting other's solution and interpretation will is considered as academic dishonesty.

	DETAILS OF SESSION: TENTATIVE COURSE SCHEDULE	

WEEK #	SESSION #	TOPICS COVERED	ASSIGNED READING
1	01	Introduction to Data Mining	Chap. 1 (North)
1	02	Organizational and Data Understanding	Chap. 2 (North)
2	03-04	Data Preparation in E-miner	Chap. 3 (North) Chap.1,2 &3 (Sarma)
2	05	Correlation with E-miner	Chapter 4 (North)
3	06–07	Association Rules in E-miner	Chapter 5 (North)
3	08 -09	k-Means Clustering using E-miner	Chapter 6 (North)
4	10 -11	Discriminant Analysis with E-miner	Chapter 7 (North)
5	12–13	Linear Regression with E-miner	Chapter 8 (North)
6	14–16	Logistic Regression with E-miner	Chapter 9 (North)
7	17–19	Decision Tree Analysis with E-miner	Chapter 10 (North)
8 -9	20–22	Neural Network Analysis with E-miner	Chapter 11 (North)
10	23-24	Evaluation and Deployment	Chapter 13 (North)

Each session will discuss the conceptual and methodological aspects of different analytics techniques included in the course followed by a case problem using a data set. Rapid Miner / SAS enterprise miner will be used to extract the results. Participants are expected to install the Rapid Miner / SAS enterprise miner in their system and participate actively in each session. While this will form a component of the continuous internal assessment, the other component will be in the form of home work case assignments based on a company situation. Relevant data will be provided and participants are expected to use SAS e minter to run the analysis and report the solution.

CASE STUDIES FOR HOME WORK ASSIGNMENTS AS A PART OF CONTINUOUS INTERNAL ASSESSMENT

CASE #	TOPIC
1	Correlation with E-miner (Predicting Sales of DVD player)
3	k-Means Clustering using E-miner (Conglomerate Inc.'s New PDA)

4	Discriminant Analysis with E-miner (Conglomerate Inc.'s New PDA)
5	Linear Regression with E-miner (Predictive Model for Boat Prices)
6	Logistic Regression with E-miner (Book Binder's club)
7	Decision Tree Analysis with E-miner (HMEQ Data set work – Credit scoring)
8	Association Rules using E-miner (Basket analysis)
9	Neural Network Analysis using E miner

Note: Details of each case and the associated data will be released during sessions covering each topic. Participants are required to mail the solution within 3 days of administration of the case.

Pre-Requisites

Students are expected to read and review the course content of QMM I, QMMII and Research Methodology (RM). It is expected that participants will have a clear understanding of descriptive statistics, concept of probability, sampling methods, logic of hypothesis testing, important parametric tests like Z, t, F and also correlation and regression analysis. Further, students are expected to review the concepts related research design, scaling and measurements (RM) and also multivariate statistical methods like multiple regression, exploratory factor analysis and discriminant analysis. While a summary of the conceptual aspects of these topics will be done in the course, it cannot be expected that detailed review and explanation of each of these topics is done. The course is clearly positioned in terms of understanding how these techniques are used in different business applications and how the associated results are extracted and interpreted using enterprise miner.