

# Course Syllabus

## MIS 6324.011

The University of Texas at Dallas

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### Course Information

#### Course

Course Number Section	MIS 6324. 011
Course Title	Business Intelligence Software and Techniques
Term and Dates	Fall 2013 (Aug 26 – Dec 19)

#### Professor Contact Information

Professor	Syam Menon
Office Phone	972-334-0037
Email Address	syam@utdallas.edu
Office Location	JSOM 3.421
Online Office Hours	By Appointment
Other Information	<a href="http://www.utdallas.edu/~syam">http://www.utdallas.edu/~syam</a>

#### About the Instructor

Syam Menon has taught information systems and operations courses for over 15 years. He received his MBA and PhD from the University of Chicago, and has been at UTD since 2002. His research and teaching interests revolve around optimization, data mining and privacy.

#### Course Pre-requisites, Co-requisites, and/or Other Restrictions

There are no pre-requisites for this class. Some knowledge of basic statistics and probability can be helpful.

#### Course Description

Most organizations are data rich and information poor. For instance, Walmart captured 20 million transactions per day as early as 2003. The rate at which data has been accumulating has only increased since, with newer sources like social networks and RFID. These large volumes of data potentially could reveal useful information about the target of interest – customers, in most business contexts. The primary objective of this course is to introduce you to various techniques available to extract useful information (business intelligence) from the large volumes of data an organization might possess. At the end of the semester, you will not only appreciate the substantial opportunities that exist in the business intelligence realm, but also learn techniques that will allow you to exploit these opportunities. The course will cover general concepts in the BI field, along with many popular BI techniques like association rules, decision trees, neural networks, classification and clustering. The focus will be on how the

techniques are to be used, and the details of the methodologies will be covered only to the extent necessary to understand when and how each technique can be used. Students will also gain experience using BI software, in the form of SAS Enterprise Miner.

### **Student Learning Objectives/Outcomes**

- To gain a general understanding of business intelligence/data mining, and to appreciate the data rich environment of today's global economy.
- To gain a practical understanding of many key methods integral to data mining.
- To gain an understanding of when to use which technique.
- To become aware of some current trends in the use of BI.
- To gain the intellectual capital required to provide business analytics services.

### **Required Textbooks and Materials**

#### Required Texts

- Data Mining for Business Intelligence, 2nd Edition, by Shmueli, Patel and Bruce. Wiley, ISBN-10: 0470526823, ISBN-13: 978-0470526828 (**available as an eBook from the UTD library**)

#### Required Software

- **SAS 9.3.** There will be many exercises using SAS Enterprise Miner in this class. Students are required to purchase and install SAS 9.3 on their computers. It can be purchased from UT Austin's online shop. Instructions on how to purchase and install SAS are provided as separate handouts. **Shipping takes time, so do this ASAP.**

### **Suggested Course Materials**

#### Suggested Readings/Texts

- Data Mining Techniques, 3<sup>rd</sup> Edition, by Linoff and Berry. Wiley, ISBN-10: 0470650931, ISBN-13: 978-0470650936 (**available as an eBook from the library**)

Textbooks and some other bookstore materials can be ordered online through [Off-Campus Books](#) or the [UTD Bookstore](#). They are also available in stock at both bookstores.

### **Course Policies**

#### *Make-up exams*

Make-ups (tests, quizzes or homework) will not be allowed without prior permission. In general, there will be no make-ups except for extenuating circumstances.

#### *Extra Credit*

There will be no work available for extra-credit.

### *Late Work*

Late submissions will not be accepted without prior permission.

### *Class Participation*

Students are required to login regularly to the online class site. The instructor will use the tracking feature in eLearning to monitor student activity. Students are also required to participate in all class activities such as discussion board, chat or conference sessions and group projects.

### *Virtual Classroom Citizenship*

The same guidelines that apply to traditional classes should be observed in the virtual classroom environment. Please use proper netiquette when interacting with class members and the professor.

### *Policy on Server Unavailability or Other Technical Difficulties*

The university is committed to providing a reliable online course system to all users. However, in the event of any unexpected server outage or any unusual technical difficulty which prevents students from completing a time sensitive assessment activity, the instructor will extend the time windows and provide an appropriate accommodation based on the situation. Students should immediately report any problems to the instructor and also contact the UTD eLearning Help Desk:

<http://www.utdallas.edu/elearninghelp>, 1-866-588-3192. The instructor and the UTD eLearning Help Desk will work with the student to resolve any issues at the earliest possible time.

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## Technical Requirements

In addition to a confident level of computer and Internet literacy, certain minimum technical requirements must be met to enable a successful learning experience. Please review the important [technical requirements](#) on the [Getting Started with eLearning webpage](#).

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## Course Access and Navigation

This course was developed using a web course tool called eLearning. It is to be delivered entirely online. Students will use their UTD NetID account to login at: <http://elearning.utdallas.edu>. Please see more details on [course access and navigation information](#).

To get familiar with the eLearning tool, please see the [Student eLearning Tutorials](#).

UTD provides eLearning technical support 24 hours a day/7 days a week. The services include a toll free telephone number for immediate assistance (1-866-588-3192), email request service, and an online chat

service. Please use this link to access the UTD eLearning Support Center:  
<http://www.utdallas.edu/elearninghelp>.

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## Communications

This eLearning course has built-in communication tools which will be used for interaction and communication. Some external communication tools such as regular email and a web conferencing tool may also be used during the semester. For more details, please visit the [eLearning Tutorials webpage](#) for video demonstrations on numerous tools in eLearning.

### **Interaction with Instructor**

The instructor will communicate with students mainly using the Announcements and Discussions tools. Students may send personal concerns or questions to the instructor using the course email tool. The instructor will reply to student emails or Discussion board messages within 3 working days under normal circumstances, particularly if there has not been a resolution to a query from other students (which is encouraged).

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## Student Resources

The following university resources are available to students:

### **UTD Distance Learning:**

<http://www.utdallas.edu/elearning/students/cstudents.htm>

### **McDermott Library:**

Distance Learners (UTD students who live outside the boundaries of Collin, Dallas, Denton, Rockwall, or Tarrant counties) will need a UTD-ID number to access all of the library's electronic resources (reserves, journal articles, ebooks, interlibrary loan) from off campus. For UTD students living within those counties who are taking online courses, a Comet Card is required to check out materials at the McDermott Library. For more information on library resources go to <http://www.utdallas.edu/library/distlearn/disted.htm>.

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## Student Assessments

### Grading Information

#### *Weights*

Assessment Title	Points	Weightage
Homework 1	50	5 %
Homework 2	50	5 %
Homework 3	50	5 %
Exam 1 (online)	250	25 %
Exam 2 (Proctored)	250	25 %
Project 1	50	5 %
Project 2	100	10 %
Term Paper	150	15 %
Class Participation/Contribution	25	2.5 %
Peer Evaluation	25	2.5 %
<b>Total</b>	<b>1,000</b>	<b>100%</b>

#### *Grading Scale*

Overall Course Total	Letter Grade
920 – 1000	A
890 – 919	A-
860 – 889	B+
820 – 859	B
790 – 819	B-
750 – 789	C+
680 – 749	C
0 – 679	F

#### *Accessing Grades*

Students can check their grades by clicking “My Grades” on the course menu after the grade for each assessment task is released.

### Group Projects

All the homework assignments and projects in this course are to be done in **groups of 4-5 students**. You can sign up into groups using the online group sign-up tool. Once formed, altering the groups will not be possible except in very special circumstances. Groups should be formed as soon as possible, and **no later than September 2, 2013**. **Any student who fails to do so will be assigned to a group by themselves, and will have to do all the work needed for the course individually.**

**The objective of a group assignment is for everyone to contribute and learn from each other. The suggested approach is for each member of a group to work through the entire assignment first, and then to meet and discuss each other’s findings to improve the final product. If you split the**

**assignment up and assign different parts to different group members, the amount you learn, and therefore your grade, will be affected.**

A private discussion area may be set up on the discussion board for internal group communications. A group chat room can also be created for each group to use. A web conference system is available for use. Teams can schedule a live web conference for team work. Please see the [Web Conferencing page](#) for instructions on making a reservation and other web conference information.

### **Homework Assignments**

There are three group homework assignments in this course. Each of them will contribute 50 points (5%) towards the final grade. They will involve the use of SAS Enterprise Miner, and you will have 1 week to work on each homework assignment.

### **Term Paper**

150 points (15%) of the final grade will be determined by your performance on a group term paper. The primary objective of the term paper is to encourage you to explore and think about potential applications of the techniques you will learn in this class. This group project offers you an opportunity to either

- apply your BI knowledge to real-life data and to mine managerially-relevant insights, or
- explore a frontier BI topic that is of interest to you

A 1-page proposal is due on or before **September 30, 2013** and must be approved by the instructor; **failure to submit a proposal by this date will result in a grade of zero for the paper.** Topics will be approved on a first-come-first-served basis, and no two groups can work on the same topic.

A halfway report is due by **November 4, 2013**, while the final paper is due on or before **December 6, 2013**. You have two options to choose from – you can decide to mine real data, or to conduct a detailed survey of business intelligence as applied to a particular domain. Please think and discuss carefully when you choose. While it is easy to do a project for the sake of doing a project, it is in your interest to select a topic that is not only of interest to you, but will also help your career.

**Detailed requirements and expectations relating to the term paper will be provided in a separate handout.**

### **Projects**

There are two group projects in this course. Both projects are related, and will be assigned together during the week of **September 23, 2013**. The projects are time consuming, and it is suggested that you get started on them as soon as they are assigned. Going through the projects will also help you understand what you can and cannot do, as far as your term paper is concerned, thereby enabling you to do a better job on it. Therefore, doing the projects early can have a wider consequence.

Project 1 will guide students through the SEMMA process in SAS Enterprise Miner, and is due on **October 28, 2013**. You will follow the steps provided in a guide from SAS; the objective is to immerse yourself in SAS EM so you get a good understanding of how it works. This guide involves methodologies

beyond what you will see in this course, so you get some exposure to them through this process. This project will count towards 50 points (5%) of the final grade.

Project 2 makes you go through somewhat similar steps as in Project 1, except on a different, real dataset. It will be due on **November 18, 2013**. In this project, you should focus on the methodologies covered in this course for insight; you are only expected to know what you did in Project 1 as far as methodologies not covered in the course are concerned. This project will count towards 100 points (10%) of the final grade.

### **Assignment submission instructions**

Locate the assignment in your eLearning course. You will submit your assignments in the required file format with a simple file name and a file extension. Click the assignment name link and follow the on-screen instructions to upload and submit your file(s). For additional information on how to submit assignments, view the [Submitting An Assignment video tutorial](#).

**Please Note:** Each assignment link will be deactivated after the assignment due time. After your submission is graded, you may go to My Grades on the course menu and click the score link to check the results and feedback.

For any team project assignments, one group member will submit the assignment for the group and all group members will be able to view the results and feedback once it's been graded.

### **Turnitin eLearning Assignment Submission Instructions**

The assignment(s) will be submitted and examined through the integrated plagiarism detection tool called Turnitin. Please find the [Turnitin](#) assignment submission icon on the designated course page and click to open it. You can click the assignment title to view the assignment information. To submit your file, please click the submit icon, on the next page, select the option of "file upload" (or "cut and paste"), enter the submission title, click Browse to locate your file and click Submit button. You can then review (click "cancel, go back" if needed) and confirm your submission. (Note: only one single file may be submitted. Some common file types accepted are: Word, HTML, PDF, TXT and RTF.) You can go back to the assignment page to check the Originality Report (showing the percentage of similarity match and the sources detected) when it becomes available. Please note it may take some time for Turnitin to generate the originality report especially during the semester end busy time. For overwritten or resubmitted paper, it takes 24 hours. For more information and assistance on using Turnitin, please go to: <http://www.turnitin.com/static/training.html>.

### **Participation/Discussions**

Class participation is encouraged via the various tools described earlier. While direct answers are obviously not allowed, positive posts that help groups or the class in general will be noticed. There are 25 points for participation and discussion, and quality rather than quantity is the key grading criterion.

### **Peer Evaluation**

Each student will evaluate himself/herself as well as other group members, on all group work, using a Peer Evaluation Form. Peer evaluation form will be submitted using the Assignment tool by **December 6, 2013**.

### Online Tests/Quizzes

There will be one online examination, worth 250 points (25% of the final grade).

You can access this exam clicking the exam link on the designated page. The exam is timed, and you are allowed only one attempt. You will have one hour to attempt the exam. Please read the on-screen instructions carefully before you click "Begin". After the exam is graded and released, you may go to My Grades page and click the score link of the exam to view your graded submission.

### Final Examination

This course requires a proctored final examination, worth 250 points (25% of the final grade). It will comprise a mix of true-false, multiple choice and problem-solving/descriptive questions. You are allowed only a writing instrument when taking this exam – **no scantrons or calculators are needed, or allowed**. You will have **two hours** to take the test.

### Proctored Final Exam Information

This course requires a proctored final examination. Local students can take their exams on-campus at the **UTD Testing Center** (no fee charge). Please see the [UTD Testing Center Website](#) for more information. Please be sure to view and follow the Test Center Policies. You will go to UTD Testing Center (MC 1.304) during the *Exam Time Window for UTD Testing Center (12/09/13 - 12/11/13)*. You will need to sign in with your Comet Card (or a photo ID and UTD ID number if you don't have a Comet Card) to take the exam. If you cannot take the exam at the UTD Testing Center, then you take the exam with an outside testing service by following the procedure below.

Students who find UTD geographically inconvenient may use a testing service of their choice at a convenient location to have the exam proctored. All exams must be completed within the *exam time window for external testing center: (12/09/13 – 12/11/13)*. All students must inform the instructor, as well as the UTD eLearning Team ([proctoredexam@utdallas.edu](mailto:proctoredexam@utdallas.edu)) of their testing location. A proctored exam form **must** be completed and sent back to the eLearning Team before **(12/02/13)**. Please go to the [Proctored Exam Information](#) page to access and complete the [Online Proctored Exam Form](#) and find all the detailed information and procedures on arranging a proctored exam. Please note students are responsible for any fee charge of their testing services.

All completed exams must be received by **12:00 NOON CT on December 13, 2013** to allow timely grade reporting to the UTD Registrar. The UTD eLearning Team requests all students strictly follow the proctored exam scheduling deadlines.

If any student needs special accommodations, please seek the instructor's approval in advance.

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## ACADEMIC CALENDAR

DATES	TOPIC/LECTURE	READING	ASSIGNMENTS
WEEK 1 08/26 – 08/30	Course Access; Self-Orientation	Syllabus	<ol style="list-style-type: none"> <li>1. Purchase &amp; install SAS (Instructions given on eLearning)</li> <li>2. Form groups for projects</li> <li>3. Get the Text Book (eBook available from the library)</li> <li>4. Go over the syllabus in detail</li> </ol>
<b>MODULE I : INTRODUCTION AND DIMENSIONALITY REDUCTION</b>			
WEEK 2 09/02 – 09/06	Unit 1: Introduction to Analytical Data Mining/ Business Intelligence	Lecture 1 Chapters 1 & 2	<b>All students should have signed up for groups by 09/03</b>
	Unit 2: Introduction to SAS Enterprise Miner (EM)	Lecture 2 SAS Handouts ( <i>PVA97NK.pdf</i> & <i>pva97nk.sas7bdat</i> )	
WEEK 3 09/09 – 09/13	Unit 3: Dimensionality Reduction and PCA;	Lecture 3 Chapter 4	
	Unit 4: PCA in SAS Enterprise Miner	Lecture 4 SAS Handouts ( <i>Appledat.pdf</i> & <i>appledat.sas7bdat</i> )	
<b>MODULE II : UNSUPERVISED MODELS: ASSOCIATION RULE MINING AND CLUSTERING</b>			
WEEK 4 09/16 – 09/20	Unit 1: Association Rule Mining	Lecture 5 Chapter 13	Homework 1 will be made available on 09/16
	Unit 2: Association Rule Mining and SAS EM	Lecture 6 SAS Handouts ( <i>Bank.pdf</i> & <i>bank.sas7bdat</i> )	
WEEK 5 09/23 – 09/27	Unit 3: Introduction to Clustering	Lecture 7 Chapter 14	<p style="color: red; text-align: center;"><b>Homework 1 is due on 09/23 (Monday) by 11.59 pm CST.</b></p> <p>Projects 1 &amp; 2 will be made available to Groups</p>

WEEK 6 09/30 – 10/04	Unit 4: Hierarchical Clustering;	Lecture 8 Chapter 14	Homework 2 will be made available on 09/30  <b>Term Paper “Proposal” is due 09/30 by 11:59 pm CST.</b>
	Unit 5: Clustering in SAS EM	Lecture 9 SAS Handouts ( <i>census2000.pdf</i> & <i>census2000.sas7bdat</i> )	
<b>MODULE III : SUPERVISED MODELS: CLASSIFICATION METHODS AND EVALUATION</b>			
WEEK 7 10/07 – 10/11	Unit 1: Classification: Fundamentals & Decision Trees	Lecture 10 Chapter 9	<b>Homework 2 is due on 10/07 (Monday) by 11.59 pm CST.</b>
WEEK 8 10/14 – 10/17	READING DAYS FOR EXAM 1		
<b>EXAM 1 (Online Exam)</b> Exam will be available on eLearning from 10/18 at 12:00 AM till 10/20 11:59 PM CST. Exam must be completed within this time frame.			
WEEK 9 10/21 – 10/25	Unit 2: Classification: Logistic Regression	Lecture 11 Chapter 10	
WEEK 10 10/28 – 11/01	Unit 3: Evaluating Classifiers	Lecture 12 Chapter 5	<b>Project 1 is due on 10/28 (Monday) by 11.59 pm CST.</b>
WEEK 11 11/04 – 11/08	Unit 4: Classifiers and SAS EM	Lecture 13 SAS Handouts ( <i>PVA97NK.pdf</i> and <i>pva97nk.sas7bdat</i> )	Homework 3 will be made available on 11/04  <b>Term Paper “Halfway Report” is due 11/04 by 11:59 pm CST.</b>
<b>MODULE IV : RECOMMENDER SYSTEMS</b>			
WEEK 12 11/11 – 11/15	Unit 1: Recommender Systems	Lecture 14	<b>Homework 3 is due on 11/11 (Monday) by 11.59 pm CST.</b>
<b>MODULE V : TEXT MINING</b>			
WEEK 13 11/18 – 11/22	Unit 1: Text Mining	Lecture 15	<b>Project 2 is due on 11/18 (Monday) by 11.59 pm CST.</b>
WEEK 14 11/25 – 11/29	Fall Break: No Classes		
WEEK 15	Free Week for Self Review & Term Paper Completion		<b>Term Paper &amp; Peer Evaluations are due</b>

12/02 – 12/06

12/06 (Friday) by 11:59 pm CST.

**EXAM 2 (Proctored Exam)**  
**Testing Window is 12/09 – 12/11**

**If taking at external Testing center, then completed exams must be received by 12:00 NOON CT on 12/13/13**

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## Scholastic Honesty

Any student who commits an act of scholastic dishonesty is subject to discipline. Scholastic dishonesty includes but is not limited to cheating, plagiarism, collusion, and the submission for credit of any work or materials that are attributable in whole or in part to another person, taking an examination for another person, any act designed to give unfair advantage to a student or the attempt to commit such acts.

**Students in this course suspected of scholastic dishonesty are subject to disciplinary proceedings, and if found responsible, will be subject to sanctions that include severe reduction in course grades or a final grade of F for the course.**

The University has policies and discipline procedures regarding scholastic dishonesty. Detailed information is available on the [UTD Judicial Affairs](#) web page. All students are expected to maintain a high level of responsibility with respect to academic honesty. Students who violate University rules on scholastic dishonesty are subject to disciplinary penalties, including the possibility of failure in the course and/or dismissal from the University. Since such dishonesty harms the individual, all students and the integrity of the University, policies on scholastic dishonesty will be strictly enforced.

Plagiarism, especially from the web, from portions of papers for other classes, and from any other source is unacceptable and will be dealt with under the university's policy on plagiarism (see general catalog for details). This course will use the resources of [turnitin.com](#) to detect possible plagiarism.

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## Course Evaluation

As required by UTD academic regulations, every student must complete an evaluation for each enrolled course at the end of the semester. A link to an online instructional assessment form will be emailed to you for your confidential use.

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## University Policies

The information contained in the following link constitutes the University's policies and procedures segment of the course syllabus.

Please go to <http://go.utdallas.edu/syllabus-policies> for these policies.

***These descriptions and timelines are subject to change at the discretion of the professor.***

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