



FREEMAN SCHOOL OF BUSINESS

MGSC 7310-02
Modeling and Analytics
Fall 2018

Instructor: Professor Yinliang (Ricky) Tan

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Office Hours:

- Thursday – 2:30 PM - 3:30 PM

Tulane Canvas Site:

<http://www2.tulane.edu/mytulane/>

Class Meeting Day & Time:

- T and R – 12:30 PM - 01:45 PM

Class Location:

GWBC-180

Course Description:

Business analytics (BA) refers to the skills, technologies, practices for continuous iterative exploration and investigation of past business performance to gain insight and drive business planning. Business analytics focuses on developing new insights and understanding of business performance based on data and statistical methods.

Recently, Business Analytics has been widely adopted in different functional areas (i.e. Accounting, Finance, Operations, Marketing, and Human Resource) as well as a wide range of different industries (Energy, Healthcare, Sports, Government, etc.). For example, Banks, such as Capital One, use analytics, to differentiate among customers based on credit risk, usage and other characteristics and then to match customer characteristics with appropriate product offerings. Harrah's, the gaming firm, uses analytics based on tracking the consumer behavior to improve its customer loyalty programs.

This course provides students with the fundamental concepts, tools and applications needed to understand the emerging role of business analytics in organizations, apply basic business analytics tools, and to communicate with analytics professionals to effectively use and interpret analytic

models and results for making better business decisions. We will concentrate on the descriptive, predictive, and prescriptive business analytics.

Course Goals

This course is designed to teach students the elements of

- Business Analytics
- Descriptive Statistics
- Data Visualization
- Unsupervised Learning Methods
- Supervised Learning Methods

Student Learning Objectives

1. Students will be able to explain and use the mining process for descriptive and predictive analytics.
2. Students will be able to use R for basic data preparation, data exploration and analysis, and predictive modeling.
3. Students will understand and be able to apply the core data mining methods of
 - Principal Component Analysis
 - Cluster Analysis
 - Association Rules
 - Collaborative Filtering
 - Regression
 - Logistics Regression
 - Neural Nets
 - Decision Trees
4. Students will be able to conduct a complete data mining project including research, data preparation, and reporting the results.

Acknowledgements

The material in this course draws significantly from Xianjun Geng at Tulane University, Geoff Parker from Dartmouth College, Hong Guo from Notre Dame University and Lai Wei from

Shanghai Jiaotong University. Thanks are due to these colleagues for sharing their syllabi and teaching materials.

Course Material

Required Course Materials

- Data Mining for Business Analytics: Concepts, Techniques, and Applications in R (1st edition) by Galit Shmueli, Peter C. Bruce, Inbal Yahav, Nitin R. Patel, and Kenneth C. Lichtendahl Jr., Wiley

Software Requirement (Free)

- Tableau Software (Students can get a free copy of Tableau at <http://origin-www.tableau.com/academic/students>)
- R latest version (Students can get this open source statistical software at <http://cran.r-project.org/bin/windows/base/>)
- RStudio latest version (Available at <https://www.rstudio.com/products/rstudio/download/>)

Grading

- **Course grades:** The course grades will be determined by assigning the following weights to the following course components (subject to change):

<u>Grade component</u>	<u>Percentage weight</u>
Class Participation	5%
Team Project	30%
Exam 1 (Midterm)	35%
Exam 2 (Final)	35%

- **Final grades:** The final grades will be curved subject to the college grading policy, and letter grades assigned according to natural breaks in the grades that are near the following cutoffs:

<u>Letter grade</u>	<u>Approximate cutoff (subject to natural breaks)</u>
A	92
A-	88
B+	86
B	82
B-	78

C+ or lower

TBD

Team Assignments and Peer Evaluation

Team-based learning has been widely acknowledged for its effectiveness. Throughout this course, we will emphasize the role of team-based learning in homework, class exercise, and project. Team will be assigned on a principle of “resource wealth distribution” during the first class period. As the course emphasizes the team-based learning, we will have a lot of team activities. To ensure every team member contribute the fair amount of time and effort to the group, we will conduct the peer evaluations near the end of the course. Peer evaluation is going to affect your assignment, and project score. If you don’t submit the peer evaluation before the due date, penalty will be enforced towards your grade. The peer evaluation result is strictly confidential, which is only shared between the individual student and the instructor. Please write your truthful and objective comments to your peers.

Homework

Skill-building exercises will be assigned throughout the semester.

- Although I am going to collect your assignment, I am not going to grade those. They will be counted towards your class participation score. Each homework assignment must be submitted no later than 5:00PM on its due day. **NO LATE HOMEWORK WILL BE ACCEPTED.** A grade of zero will be assigned if you do not turn in the homework.
- Answers to homework problems should be submitted individually directly to Assignment Folder on Canvas.

Team Projects

These team project will apply the concepts and tools introduced in class to “Real-World” problems. The objective is to encourage creative thinking when approaching unstructured problems, and critical thinking in your analysis and recommendations. You need to define the problem and find the relevant data. This is followed by the analysis relying on the tools that we have covered during the course.

- You can find the due dates on the Tentative Class Schedule below.
- Each team will have an opportunity to give a presentation which roughly takes 15-20 minutes to introduce your findings through data analysis.
- A single grade is assigned to each group, but the instructor may adjust the grading based on the peer evaluation.

In-class Exercise and Participation:

Regular attendance at all class meetings is expected. At the end of each topic, we might have team-based exercise, focusing on a real-world applications of the tools covered during the

lecture. During the exercise, teams were encouraged to engage with the instructor and each other in order to arrive at the best solution.

- Attendance will be taken randomly in some class by signing the attendance sheet.
- You are allowed to miss up to three lectures without deduction from your participation grade.
- Prepare before class. Actively participate and follow the instructions for in-class exercises and lectures.
- Please be on time! No disrupting classmates, no surfing the net, reading newspapers, ringing phones, talking, sleeping, or working on that assignment due in another course.
- Answers to in-class exercise should be submitted though email at ytan2@tulane.edu Please make sure to list your group number as well as team member who contribute to the exercise.

Specific Course Policies

Appeals:

If you wish to appeal your grade on any assignment or exam, you have a week from the time it was returned to the class (not when you receive it). **After that week, I will consider all grades final.** Please realize that there are standard policies for point deductions for each problem with any exam or assignment, so unless the grader has misapprehended your intent or misread your work, any partial credit is unlikely to change.

Laptops:

You need to bring your laptop to every session. Laptops are only for course related purposes. No surfing the net, tweeting, IMing etc. Freeman policy requires students to have Windows operating system on their laptops (<http://www.freeman.tulane.edu/lib-tech/computing/tools.php>). If you have a Mac, the best solution is to partition your Macintosh drive and install Windows, as well as Microsoft Office for Windows (<http://www.freeman.tulane.edu/lib-tech/computing/mac.php>). There is also a Freeman resource called VDI where you can remote access the lab computers (<https://freeman.vdi.tulane.edu>).

Tentative Class Schedule (The class schedule is subject to change)

Week	Dates	Topic	Assignments
1	T R 21-Aug 23-Aug	Introduction to Business Analytics Data Visualization using Tableau	
2	T R 28-Aug 30-Aug	Data Visualization using Tableau Data Visualization using Tableau	

3	T R	04-Sep 06-Sep	Data Visualization using Tableau Overview of Data Mining Process	
4	T R	11-Sep 13-Sep	Basics of R Basics of R	
5	T R	18-Sep 20-Sep	Basics of R Basics of R	
6	T R	25-Sep 27-Sep	Cluster Analysis Cluster Analysis	Assignment 1 Due (Sep 25)
7	T R	02-Oct 04-Oct	Cluster Analysis Association Rule	
8	T R	09-Oct 11-Oct	Fall Break Fall Break	
9	T R	16-Oct 18-Oct	Association Rule Exam 1	Assignment 2 Due (Oct 16)
10	T R	23-Oct 25-Oct	Collaborative Filtering Multiple Linear Regression	
11	T R	30-Oct 01-Nov	Multiple Linear Regression Multiple Linear Regression	
12	T R	06-Nov 08-Nov	Logistic Regression Logistic Regression	Assignment 3 Due (Nov 13)
13	T R	13-Nov 15-Nov	Classification and Regression Trees Classification and Regression Trees	
14	T R	20-Nov 22-Nov	Classification and Regression Trees Thanksgiving Holiday	
15	T R	27-Nov 29-Nov	Project Presentation Project Presentation	Assignment 4 Due (Nov 29)
16	T	4-Dec	Exam 2	

Statement about Academic Integrity

This class will be conducted in full accordance with Tulane's policies about academic integrity including, but not limited to, the Code of Academic Integrity and the Code of Student Conduct. These can be found at: <http://college.tulane.edu/code.htm> and <http://tulane.edu/studentaffairs/conduct/rights/code-of-conduct.cfm>.

Freeman Educational Norms and Expectations

This class will be conducted in full accordance with Freeman's Educational Norms and Expectations. Please reread the Norms and Expectations, which can be found at <http://www.freeman.tulane.edu/students/bsm/pdf/Expected%20Behavioral%20Norms.pdf>.

Student Accessibility:

If you believe you may encounter barriers to the academic environment due to your specific learning style or known challenges, please feel free to contact me and/or the Goldman Center for Student Accessibility. Any student with approved academic accommodations is encouraged to contact me during office hours or by emailing me to schedule an appointment. If you have questions regarding registering a disability or receiving accommodations, please contact the Goldman Center for Student Accessibility at 504-862-8433 or <https://accessibility.tulane.edu>.