MIM532
Business Analytics and Data Mining
FALL 2017

Course Information

Class Schedule	W 19:00 – 21:50
Classroom	101 (도곡캠퍼스)
Instructor	Cho, Daegon (조대곤)
Office Location	SUPEX Hall 284 (홍릉캠퍼스)
Phone	958-3331
Email	`dgcho@business.kaist.ac.kr`
Office Hour	Walk-in or by appointment

I have an open door policy for student questions. For quick questions, feel free to contact me any time; I will do my best to respond within 24 hours for most cases. If you would like to meet in person, do not hesitate to e-mail me to make an appointment.

TA, email	Sim, Jaeung (심재웅) `jaeung@business.kaist.ac.kr`
	Choi, Kyungmin (최경민) `kmc@business.kaist.ac.kr`
Office Hour	before/after Wednesday class or Saturday by appointment
Textbook	There is no required textbook. A coursepack will be available.
SLACK Team	We use SLACK as an experiment of flipped learning. Now, enter `imms2017.slack.com/signup` on your browser, and get involved. Course announcements, homework, lecture notes, and web readings will be posted. Active discussions and postings are encouraged. Try to use the cloud-based team collaboration tool that is currently being widely used by technology firms and software developers.

Important Note:
There is no prerequisite for this course; however, some basic knowledge and understanding of statistics may be very helpful. So, some fundamental concepts of statistics will be covered in this course, but I guess some students may need to work to catch up the course materials. (Friendly TAs may help you or there are many good materials on the Internet.) At the same time, we do not dive deeper into the sophisticated techniques and theories. So, if you want to go further, I recommend you to learn more from other resources.

Course Overview

Business analytics is a set of data analysis and modeling techniques for understanding business situations and improving decisions under uncertainty. To understand the fundamental of business intelligence, we need to analyze real data sets with data mining techniques. Data mining is the process of analyzing the data and creating the meaningful information to clarify the decision choice. Business analytics is *conventionally* divided into three domains:

- **Descriptive** – what is happening now?

  Descriptive methods involve using data to describe the current or recent past situation for an organization. For example, one might use such methods to ask how profits are distributed across regions, or which baseball player contributed the most to a winning season.

- **Predictive** – what will happen in the future?

  Predictive methods also rely heavily on data, although some modeling approaches are usually involved. Here, the focus is on forecasting future outcomes, normally under the assumption that the driving forces in play in the past will continue into the future.

- **Prescriptive** – what should we do?

  Prescriptive methods answer questions related to what decision makers want to happen in the future. Thus, they are most closely tied to the decision making process. Data plays a role in these methods but modeling is the fundamental tool here.

With the increasing availability of broad and deep sources of information (*Big Data!*), business analytics are becoming a more important capability for any organizations.

Learning Objectives

- Think critically about data and analyze based on those data
- Learn techniques for gathering, transforming, and cleaning data from disparate sources
- Examine and practice parts of the data science pipeline for the use in business decision making
- Explain how to use appropriate data mining techniques to solve decision problems.
- Develop predictive models and apply them to the real-world cases
- Understand and apply methods to drive value using business analytics

To achieve these objectives we will use a combination of lectures, hands-on exercises, case studies, class discussions, group task & presentations, and special guest speaker lectures.

Course Topics

Module I: (Advanced) Introduction to BA
— Some thoughts on Big Data
— Skills for data science
— Data-driven thinking & management

Module II: Overview of Data Life Cycle
— Data preparations
— Explanatory data analysis (using stat. software)
— Glancing at supervised vs. unsupervised data analysis
— Data visualization (using TABLEAU)

Module III: Introduction to Data Mining
— Decision Tree Analysis
— Regression Analysis / Logistic Regression
— Clustering Analysis
— Association Rule Mining
— Neural Network Analysis

Module IV: Further Topics
— Glancing at Machine Learning / Deep Learning
— Randomized experiments in the wild
— Text mining and analysis
— Sentiment analysis
— Social network analysis (if time permitted)

Note that the suggested topics are subject to change. If something is unclear, if you have questions, or if you have suggestions for improvements, do not hesitate to contact me.

Grading Schemes

Grading Policy	Participation (individual)	5%
	Short Essays (individual)	15%
	Homework (individual)	20%
	Bi-weekly Briefs (individual)	10%
	Case Studies (group)	10%
	BA Project (group)	20%
	Final Quiz (individual)	20%
	TOTAL	**100%**

Grading Components

Participation & Attendance (5%): Attendance is important and will be taken regularly every week. If it is confirmed that a student would be absent from **more than 5 times** of lectures, they will be failed in the course. Please make every effort to be present for the beginning of class. If an emergency or conflict occurs which prevents you from attending class, it is your responsibility to notify the teaching team (an instructor or a teaching assistant). Please let us know your absence for every class that you missed – not later than one week after missing it. You may use the SLACK as a communication channel for this matter.

Also, note that much of the learning in this course will occur in class as you share your experiences, questions, and analyses with each other. Topics of Business Analytics are still emerging and quite holistic. In other words, some topics need further discussions, and there could be no solutions at this moment. Therefore, you cannot make up for a missed class by simply reading lecture notes later. Note that your class participation grade is not simply a function of the "air time" you take up; you will be evaluated on how effectively you contribute to the learning of the class and how thoughtfully you respond to questions.

ONE MORE THING: This course uses SLACK for multiple purposes: 1) course logistics (announcements, Q&A, homework, lecture notes, and web readings), 2) knowledge share (news articles, reports, and 3) productive communications (with classmates or team members). I hope you to have fun with using the advanced and convenient tool. Note that I also consider students' activities in this virtual space as a part of your attendance.

Short Essay (15%): Three essay assignments will be given to provide an opportunity to think of current states of Business Analytics and Big Data. Each write-up will be equally weighted (5%) and count for a total of 15% of your final grade. This assignment may be a short write-up, and details will be provided when each assignment is released.

Homework (20%): There will be 5 problem sets. I will permit you to drop your lowest homework grade, so there is no harm on your grade as long as you submit 4 homework assignments. The problem sets will be equally weighted and count for a total of 20% of your final grade – i.e., each counted homework accounts for 5% of your final grade.

A problem set in the homework includes both qualitative and quantitative questions related to lecture materials. The objective is to provide an opportunity to do a hands-on experience by yourself. More detail will be provided later.

Homework will be released on our SLACK team, and your homework should be submitted at the beginning of class of the due date. You may discuss problems and methods with friends, but **homework must be done individually.** You must complete your homework *by yourself*. Late submission will not be accepted.

Weekly Briefs (10%): This assignment is a very short write-up with a couple of sentences (a sort of instant messages to your friend) to provide an opportunity to think back what you learned in the class. I will explain further in the class.

Case Studies (10%): One of two cases will be assigned to you, and your team needs to analyze the case following the suggested guideline. Due to the the fact that the large class size is expected, I will provide a guideline in September.

BA Project (20%): This assignment is a team-based final project. (Detailed project description will be provided in early October.) Your group is expected to identify an interesting and relevant BA challenge, and use your learning from the course, along with your creativity and problem-solving skills, to recommend a course of action to solve the problem. As long as time is allowed, it may be required to have a presentation at the end of the semester.

Final Quiz (20%): The final exam is intended to give you the opportunity to apply the concepts you have learned throughout the term and demonstrate your understanding of key principles. The final exam will consist of multiple choice questions, short answers and short essays.

A Note on Regrade Requests

We will make every effort to return graded assignments within two-week of their submission. If you believe that your grade is inaccurate, you may request a regrade under the following condition.

1. Regrade requests must be submitted within 1 week of the date when the grade was returned.
2. Regrade requests must be in writing and must include a copy of original assignment.
3. Regrade requests must outline the reasons you deserve a higher grade. These will be that the grader misread or misunderstood your answer, or didn't take something into account that they should have. For this you should use the written comments on the assignment as your reference point. Referencing another student's grade is inappropriate and irrelevant.
4. I reserve the right to regrade the entire assignment and thus your grade may go up or down.
5. Class participation grades are inherently subjective and not subject to a regrade request.

Academic Integrity

Each student in this course is expected to abide by Academic Integrity Policy of this institution. Violations against academic honesty may include cheating, plagiarism, aid of academic dishonesty, fabrication or forgery, lying, bribery, and threatening behaviors. Any work submitted by a student in this course for academic credit must be the student's own work. If you are found to be cheating, plagiarizing or engaged in any form of academic misconduct in the preparation of materials that are evaluated for grading purposes you will automatically be failed in the course.

(Tentative) Course Schedule

Week	Date	Topic	Assignment
1	8/30	Course introduction, introduction to BA Some thoughts on big data, skills for data science	Short Essay#1 out
2	9/6	Data analytics thinking & management Data-analysis examples and discussions	Group Formation Short Essay#1 due
3	9/13	Data preparation & Measurement Guest Lecture#1	HW#1 out
4	9/20	Explanatory data analysis More on data analysis	HW#2 out HW#1 due
5	9/27	Data visualization Hands-on Experience with TABLEAU	HW#3 out HW#2 due
6	10/4	National Holiday (NO CLASS)	
7	10/11	Data Mining (1) Guest Lecture#2	Group Project out HW#3 due
8	10/18	Data Mining (2)	Short Essay#2 out
9	10/25	Data Mining (3)	Short Essay#2 due HW#4 out
10	11/1	Mid-term Team Meeting Guest Lecture#3	
11	11/8	Data Mining (4)	HW#4 due
12	11/15	Machine Learning Advanced techniques	HW#5 out
13	11/22	Randomized experiments Text mining and analysis	Short Essay#3 out
14	11/29	Case slam presentation	HW#5 due
15	12/6	Course Wrap-up Guest Lecture#4	Short Essay#3 due
16	12/13	Final Quiz	Group Project due

Important Note:

- Note that this week-by-week schedule program is **tentative and subject to change** as the class progresses. I will notify you of any schedule-related changes in advance if such events occur.
- In addition, reading materials will be updated or can be modified as we progress. You will be notified of any changes in advance.
- **Please be attentive to notifications during classes and through our Slack.**