# IM 503 Statistical Analysis and Decision Modelling

**(통계분석 및 의사결정 모형)**

## Spring 2014

### Tuesday, Thursday, 10:00-11:15


**Instructor:**

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- **Purpose:**

This course introduces fundamental concepts and applications in business statistics. From lectures, examples, students will learn the basic subject matter required to understand statistical problems in business. Therefore, this is not to derive mathematical equations for statistics.

The major focus of the class will prepare students for other classes with statistical applications in marketing, finance, manufacturing, operation management, and other business analysis. Also, the class will relate the statistical concept with the business analytics and big data applications. During the class, we learn not only statistical concepts, but simulation and decision modeling framework.

Therefore, the learning objectives of the courses are

1. Understand the statistical approach and techniques including hypothesis test, regression, simulation, and decision models with the purpose of applying them to the business problems.

2. Understand how the computer software can be used to facilitate data analysis and hypothesis testing.

3. Understand how statistical approach and techniques can be applied to the intertwined business problems in the areas of marketing, finance, manufacturing, operation management, and other business analysis.

- **Required Text Book:**

Essentials of Contemporary Business Statistics, 2012, 5th Ed. Thomson Books, Sweeney DJ, Williams TA, and Anderson, DA.

- **Other reading: (File of Ch. 13 to be distributed)**

Quantitative Analysis for Management, 2012, Barry Render, Ralph Stair, Michael Hanna, Pearson (Ch. 13, Simulation part).

Making Hard Decisions with the DecisionTools Suite 3rd Edition, 2014, Clemen and Reilly

ISBN-13: 9780538797573 | ISBN-10: 0538797576, Soon to be available.

- **Resource in the Internet:** http://onlinestatbook.com/2/index.html

- **Articles about business analytics, big data:**

  - The Use and Misuse of Statistics, May 2000, Harvard Management Update.
  - A picture's worth a thousand numbers, Robin Hogath and Emre Soyer, HBR, June 2013, p. 26.
  - Big Data: Management Revolution, Andrew McAfee and Erik Erynjolfsson, *Harvard Business Review*, Oct 2012, pp. 59-68.
  - Data Scientist: The Sexiest Job of the 21st Century, *Thomas H. Davenport, D.J. Harvard Business Review*, Oct 2012.
  - The Big Deal About Big Data And What It Means For IT And You, Forbes, Christopher Versace, Jan 2014

- **Policy on Academic Misconduct:**

Academic misconduct includes cases of cheating and plagiarism in assignments or exams. It is important for the students to avoid any misconduct during the whole class.

- **Homework:**

You need to submit homework with handwritten format.

- **Computer Practice:**

Excel Add-ins/SPSS/Simulation

Computer LAB 1: Descriptive Statistics
Computer LAB 2: Regression Analysis/SPSS

- **Evaluation:**

Class Attendance & Participation: 10%
Homework: 20%
Midterm and Finals with one information sheet on both side: 70%

HW #2: Group Project. (teams TBA).

1. What is Big data?: History and definition: Big data, BI, and Business Analytics

2. What were the typical applications and what are the promising areas for application?

3. How can we be benefited from big data? In other words, benefit from the statistical point of view and general business perspective.

4. What is the challenge of big data? And your thought about the furfure of big data.

## Weekly Schedule:

| Week | Synopsis | Homework and Lab |
|---|---|---|
| 1 | Ch. 1: What is statistics?<br>Ch. 2: Descriptive Statistics: Numerical measure | Reading:<br>Hogath (2013)<br>Management update(2000) |
| 2 | Ch. 3: Descriptive Statistics: Numerical Measures | Computer Exercise: Excel |
| 3 | Ch. 4: Introduction to Probability<br>Ch. 5: Discrete probability distribution | HW #1 Due (Ch. 1-3) |
| 4 | Ch. 6: Continuous probability distribution | |
| 5 | Ch. 7: Sampling and Sampling distribution | HW #2 Presentation: Big data and business impact |
| 6 | Ch. 8: Interval Estimation | HW #3 Due (Ch. 4-7) |
| 7 | Ch. 9: Hypothesis Tests | |
| 8 | Ch. 10: Comparing Involving Means | |
| 9 | Midterm<br>TBD | HW #4 Due (Ch. 8-10)<br>TA Session |
| 10 | Ch. 11: Comparisons Involving Proportions and a Test of Independence | |
| 11 | Ch. 12, 13: Simple & Multiple Regression Analysis | |
| 12 | Continued | Computer Exercise: Regression |
| 13 | Simulation Modeling | HW #5 Due (Ch. 11,12, 13)<br>Computer Exercise: Simulation |
| 14 | Decision Modeling and Analysis | |
| 15 | Continued & Class Wrap-Up | TA session |
| 16 | Final Exam | |