

Illinois Institute of Technology
Stuart School of Business
Course Syllabus¹
Spring 2012

Instructor Information

Name:	Hendrarto Supangkat
Office:	R A42-1
Telephone:	7-5007
Email:	hsupangk@hawk.iit.edu
Office hours:	Mon, 1-3 pm and 4.30-5.30 pm, on MC. Wed, 1- 3 pm and 4.30-5.30 pm, on MC. By appointment on DTC.
TA Information:	NA
TA's Office hours:	NA

Course Information

Course #:	BUS221
Course name:	STATISTICS FOR MANAGERIAL DECISION MAKING

Course description and objectives:

Many real world decision making activities must rely on uncertain data and information. Statistical methods can be used to appropriately summarize the uncertain data into a set of meaningful parameters, equipped with a measure of confidence level. This course introduces the basic statistical methods commonly used to support business decision making. The course focus on procedures and tools for data collection and reporting, testing of hypotheses, identification of critical factors in experiments, and construction of linear model for regression analysis and forecasting. The roles of probability concept and random variable distributions in statistical analysis are also discussed. Furthermore, a familiarity to real world business decision making problems and computer based tool for statistical analysis is built through regular assignments. Learning objectives are summarized below:

- Understand descriptive statistics, data collection, probability concept, distribution of statistical parameters, hypothesis testing, ANOVA, linear regression, and related statistical topics.
- Be able to use Microsoft Excel (or other software) to organize data and conduct statistical analysis.

¹ **Note:** The instructor reserves the right to change the syllabus. You will be given sufficient advance notice for major changes.

- Be able to use statistical concepts to solve problems that resemble the real-world business situations.

Course day and time: Monday and Wednesday 3.15 – 4.30 pm

Course Materials

Text:

Ronald M. Weiers, “**Introduction to Business Statistics**”, 7th Edition, 2010, South-Western College Pub, ISBN-10: 053845217X | ISBN-13: 978-0538452175.

Note: Most of the questions in Homeworks will be taken from the book.

Software and Data Files:

1. **Statistical Analysis : Microsoft Excel 2007 – Data Analysis ToolPak**
This is the standard data analysis module in Excel 2007. We will use the tool quite frequently, however the software only offers a limited number of statistical tests and procedures. You are free to use any other software (SPSS, SAS, etc.) for your assignments.
2. **Data Analysis Plus™ 7.0**
The software is available on the premium website of the textbook, “*Introduction to Business Statistics*”. It greatly extends Excel’s capabilities to include practically every statistical test and procedure covered in the text. You are encouraged to learn how to use the software package for future reference. However we will only use it at a minimum level in this course, and you are free to use any other software (SPSS, SAS, etc.) for your assignments.
3. **Data Files**
You will need some supplementary data files from the textbook (available on the premium website) for the regular homework assignments.

Course & Instructor Policies

Assignments Submission Policy:

I will assign a number of exercises for each lecture, which will help you to understand the concepts and the methods introduced in lectures and how to apply them to solve business decision problems.

All problem sets can be done in groups of maximum THREE STUDENTS.

It is preferred to submit the works by hardcopy before the class begin, but if one cannot attend the class on the due date, use the digital drop box on the blackboard to submit.

Email submissions and late submissions will be disregarded.

Class attendance, conduct and discipline:

- Attendance in class is important.
- Come to class on time.
- Well-prepared for classes.
- Actively involved in the class discussion.
- Do the assignments on time.

Readings:

Often the concepts are more difficult to truly understand than they may first appear. I will assign reading materials for each lecture. You should read the assigned material thoroughly at least twice: once before coming to class, and again soon afterward.

Grading System/Policy

Grading Scheme:

Class Participation	5%
Homework	10%
Quizzes	10%
Mid-Term	35%
Final	40%

Grade Scale: TBA

Disabilities

Reasonable accommodations will be made for students with documented disabilities. In order to receive accommodations, students must obtain a letter of accommodation from the Center for Disability Resources and make an appointment to speak with me as soon as possible. My office hours are listed on the first page of the syllabus. The Center for Disability Resources is located in the Life Sciences Building, room 218, 312-567-5744 or disabilities@iit.edu

Copyright/Plagiarism/Academic Integrity Rules on Plagiarism and Academic Integrity

Plagiarism and other violations of academic integrity are strictly prohibited and subject to penalty as defined by the University. Information about the IIT academic requirements for graduate students can be found at:

http://www.iit.edu/graduate_admission/admitted_students/orientation/pdfs/Graduate_Student_Handbook.pdf

The academic integrity material in the handbook is found at page 31 in the IIT student handbook. Other parts of the handbook also contain material and rules that apply to graduate students. Students will be expected to conform to the rules and procedures set forth in the handbook.

The code of conduct governing writing by students at IIT requires original writing, prohibits plagiarism and provides severe sanctions for plagiarism. Original writing consists of thinking through ideas and expressing them in your own way. If the ideas are from other sources, use footnotes or other citation methods to indicate the source of the ideas. Plagiarism is the act of passing off someone else’s work or ideas as your own. The sanctions include, but are not limited to, expulsion and the imposition of a punitive grade of ‘E’.

What is Plagiarism?

Often there is some confusion as to what constitutes plagiarism. Plagiarism is the act of passing off someone else’s work as your own. To assist in providing an understanding of the types of writing that constitute plagiarism, three types of are each discussed below. Also discussed below is the problem of “string citations.” String citations are not plagiarism, but many professors will reject string citations because they are not the student’s original work.

Word for Word copying: The use of any phrase or excerpt from another source requires the use of quotation marks around the copied material, or if the material is more than a few lines, the copied material should be placed in its own indented paragraph. A citation in proper form is always required to identify the source.

Plagiarizing by Paraphrase: When a writer uses a source, substitutes words and sentences, or even changes the order but keeps the meaning of the original, a citation is required. In the example given below, the original is on the left. The paraphrase in the right box constitutes plagiarism.

<p><u>Original:</u> It is not generally recognized that at the same time when women are making their way into every corner of our work-world, only one percent of the professional engineers in the nation are female. A generation ago, this statistic would have raised no eyebrows, but today, it is hard to believe.</p>	<p><u>Paraphrase:</u> Few people realize now that women are finding jobs in all fields, that a tiny percentage of the country’s engineers are female. Years ago this would have surprised no one, but now it seems incredible.</p>
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The writer could avoid plagiarism here by acknowledging the source and providing a proper citation.

Mosaic Plagiarism: Here the writer lifts phrases and terms from the source and embeds them in his own prose. An example follows in which the lifted phrases are underlined:

The pressure is on to get more women into engineering. The engineering schools and major corporations have opened wide their gates and are recruiting women zealously. Practically all women engineering graduates can find attractive jobs. Nevertheless, at the moment, only one percent of the professional engineers in the country are female.

Mosaic plagiarism is sometimes caused by careless note taking. However, it looks dishonest and is judged as such. The use of quotation marks around the original wording and citation avoid the problem of plagiarism. Often a better approach is to use paraphrase or to quote directly (with appropriate citations).

Plagiarism can be avoided by providing citations for the sources of any material, including *ideas, phrases, or sentences* that you have used in your paper. A number of different systems are available for providing citations. The key to all of them is that the writer must clearly identify for the reader the sources of all material (including ideas) that have come from somewhere else.

String Quotation Problem: Sometimes a student will write a paper consisting of a string of quotations. It is usually much better for a student to provide his or her own analysis and write the paper in his or her own words. Many professors will reject a paper consisting primarily of material quoted from other sources because they do not view such a paper as the student's own work. You should understand your professor's view with respect to string quotations prior to writing your paper.

Course Schedule and Important Dates

Course Schedule

M 01/09 Lecture 1: *Introduction*

- Reading Assignments
 - Weiers Chapter 1 and 2
- In Class Activity
 - Discuss the importance of statistics in business decision making
 - Learn how to organize data into tables and charts
- Assignment:
 - Re-read the chapters
 - Prepare for the next class

W 01/11 Lecture 2: *Data Description*

- Reading Assignments
 - Weiers Chapter 2 and 3
- In Class Activity
 - Learn how to organize data into tables and charts
 - Learn how to calculate some statistical measures
- Assignment:
 - HW 1 assigned – Data description
 - Re-read the chapters
 - Prepare for the next class

W 01/18 Lecture 3: *Data Description*

- Reading Assignments
 - Weiers Chapter 2 and 3
- In Class Activity
 - Discuss the roles of multiple tables, charts and statistical measures
 - Intro to data collection
- Assignment:
 - HW 1 due
 - Re-read the chapters
 - Prepare for the next class

M 01/23 Lecture 4: *Data Collection and Sampling*

- Reading Assignments
 - Weiers Chapter 4
- In Class Activity
 - Quiz 1
 - Learn the procedure to conduct data collection and sampling
- Assignment
 - HW 2 assigned – Data collection and sampling
 - Re-read the chapters
 - Prepare for the next class

W 01/25 Lecture 5: *Probability Concepts*

- Reading Assignments
 - Weiers Chapter 5
- In Class Activity
 - Review the procedure to conduct data collection and sampling
 - Discuss the role of probability in statistical analysis
 - Learn basic concepts of probability
- Assignment:
 - Re-read the chapters
 - Prepare for the next class

M 01/30 Lecture 6: *Probability Concepts*

- Reading Assignments
 - Weiers Chapter 5
- In Class Activity
 - Learn basic concepts of probability
- Assignment
 - HW 2 due
 - HW 3 assigned – Probability Concepts
 - Re-read the chapters
 - Prepare for the next class

W 02/01 Lecture 7: *Discrete Probability Distribution*

- Reading Assignments
 - Weiers Chapter 6
- In Class Activity
 - Discuss the role of binomial, hypergeometric and poisson distribution in statistical analysis
- Assignment
 - Re-read the chapters
 - Prepare for the next class



M 02/06 Lecture 8: *Continuous Probability Distribution*

- Reading Assignments
 - Weiers Chapter 7
- In Class Activity
 - Discuss the role of normal and exponential distribution in statistical analysis
- Assignment
 - HW 3 due
 - HW 4 assigned – Probability Distribution
 - Re-read the chapters
 - Prepare for the next class

W 02/08 Lecture 9: *Sampling Distribution*

- Reading Assignments
 - Weiers Chapter 8
- In Class Activity
 - Quiz 2
 - Discuss the probability distribution of sampling statistics
- Assignment
 - Re-read the chapters
 - Prepare for the next class

M 02/13 Lecture 10: *Estimation from Sample Data*

- Reading Assignments
 - Weiers Chapter 9
- In Class Activity
 - Learn how to calculate point estimate and interval
 - Learn how to determine the sample size
- Assignment
 - HW 4 due
 - HW 5 assigned – Sampling Distribution and Estimation
 - Re-read the chapters
 - Prepare for the next class

W 02/15 Lecture 11: *Hypothesis Test for a Single Sample*

- Reading Assignments
 - Weiers Chapter 10
- In Class Activity
 - Learn how to test a hypothesis for a mean and proportion
- Assignment
 - Re-read the chapters
 - Prepare for the next class

M 02/20 Lecture 12: *Hypothesis Test for Comparing Two Samples*

- Reading Assignments
 - Weiers Chapter 11

- In Class Activity
 - Learn how to test a hypothesis for comparing two samples
- Assignment
 - HW 5 due
 - HW 6 assigned – Testing Hypothesis
 - Re-read the chapters
 - Prepare for the next class

W 02/22 Lecture 13: *Chi – Square Applications*

- Reading Assignments
 - Weiers Chapter 13
- In Class Activity
 - Learn how to conduct Chi – Square testing
- Assignment
 - Re-read the chapters
 - Prepare for the next class

M 02/27 Lecture 14: *Review Hypothesis Testing*

- Reading Assignments
 - Weiers Chapter 11 and 12
- In Class Activity
 - Quiz 3
 - Review single sample and two sample hypothesis testing
- Assignment
 - Re-read the chapters
 - Prepare for the next class

W 02/29 Lecture 15: *Review for Midterm*

- Reading Assignments
 - Weiers Chapter 1 – 11 and 13
- In Class Activity
 - Review all previous materials
- Assignment
 - HW 6 Due
 - Prepare for Midterm

M 03/05 MIDTERM

W 03/07 Lecture 16: *ANOVA*

- Reading Assignments
 - Weiers Chapter 12
- In Class Activity
 - Intro to ANOVA
 - Learn how to conduct the one way ANOVA method
- Assignment

- Re-read the chapters
- Prepare for the next class

M 03/12 Lecture 17: *ANOVA*

- Reading Assignments
 - Weiers Chapter 12
- In Class Activity
 - Learn how to conduct randomized block design analysis
- Assignment
 - Re-read the chapters
 - Prepare for the next class

W 03/14 Lecture 18: *ANOVA*

- Reading Assignments
 - Weiers Chapter 12
- In Class Activity
 - Intro to Two Ways ANOVA method
- Assignment
 - HW 7 assigned - ANOVA
 - Re-read the chapters
 - Prepare for the next class

M 03/26 Lecture 19: *Non Parametric Methods*

- Reading Assignments
 - Weiers Chapter 14
- In Class Activity
 - Quiz 4
 - Intro to Non Parametric
 - Learning how to conduct Rank Test
- Assignment
 - Re-read the chapters
 - Prepare for the next class

W 03/28 Lecture 20: *Non Parametric Methods*

- Reading Assignments
 - Weiers Chapter 14
- In Class Activity
 - Learning how to conduct other Non parametric Test
- Assignment
 - HW 7 due
 - HW 8 assigned – Non Parametric Methods
 - Re-read the chapters
 - Prepare for the next class

M 04/02 Lecture 21: *Linear Regression*

- Reading Assignments
 - Weiers Chapter 14
- In Class Activity
 - Intro to linear regression analysis
 - Learn how to conduct linear regression analysis
- Assignment
 - Re-read the chapters
 - Prepare for the next class

W 04/04 Lecture 22: *Linear Regression*

- Reading Assignments
 - Weiers Chapter 14
- In Class Activity
 - Learn how to conduct linear regression analysis
- Assignment
 - HW 8 due
 - HW 9 assigned – Linear Regression
 - Re-read the chapters
 - Prepare for the next class

M 04/09 Lecture 23: *Time Series and Forecasting*

- Reading Assignments
 - Weiers Chapter 18
- In Class Activity
 - Intro to time series analysis
 - Learn how to conduct time series forecasting
- Assignment
 - Re-read the chapters
 - Prepare for the next class

W 04/11 Lecture 24: *Time Series and Forecasting*

- Reading Assignments
 - Weiers Chapter 18
- In Class Activity
 - Learn how to conduct time series forecasting
- Assignment
 - HW 9 due
 - HW 10 assigned - Time Series & Forecasting
 - Re-read the chapters
 - Prepare for the next class

M 04/16 Lecture 25: *Structuring Decision Making Process*

- Reading Assignments
 - Weiers Chapter 19

- In Class Activity
 - Quiz 5
 - Learn how to structure a decision making process
- Assignment
 - Re-read the chapters
 - Prepare for the next class

W 04/18 Lecture 26: *Structuring Decision Making Process*

- Reading Assignments
 - Weiers Chapter 19
- In Class Activity
 - Intro to Bayesian Decision Making
- Assignment
 - HW 10 due
 - HW 11 assigned – Structuring Decision Making Process
 - Re-read the chapters

M 04/23 Lecture 27: *Review Session*

- Reading Assignments
 - All Chapters
- In Class Activity
 - Review previous chapters
- Assignment
 - *Prepare for Final Exam*

W 04/25 Lecture 28: *Review Session*

- Reading Assignments
 - All Chapters
- In Class Activity
 - Review previous chapters
- Assignment
 - HW 11 due
 - *Prepare for Final Exam*

M 04/30 FINAL EXAM



Important Dates²

	Date	Lectures	Homework Due	Quiz
1	M, 01/09	L01 Introduction		
2	W, 01/11	L02 Data Description		
3	M, 01/16	No Class (Martin L. King Day)		
4	W, 01/18	L03 Data Description	HW 1	
5	M, 01/23	L04 Data Collection & Sampling		Q 1
6	W, 01/25	L05 Probability Concepts		
7	M, 01/30	L06 Probability Concepts	HW 2	
8	W, 02/01	L07 Discrete Probability Distribution		
9	M, 02/06	L08 Continuous Probability Distribution	HW3	
10	W, 02/08	L09 Sampling Distribution		Q 2
11	M, 02/13	L10 Estimation from Sample Data	HW 4	
12	W, 02/15	L11 Hypothesis Test for a Single Sample		
13	M, 02/20	L12 Hypothesis Test for Comparing Two Samples	HW 5	
14	W, 02/22	L13 Chi-Square Applications		
15	M, 02/27	L14 Review Hypothesis Testing		Q 3
16	W, 02/29	L15 Review for Midterm	HW 6	
17	M, 03/05	Midterm		
18	W, 03/07	L16 ANOVA		
19	M, 03/12	L17 ANOVA		
20	W, 03/14	L18 ANOVA		
21	M, 03/19	No Class (Spring Break)		
22	W, 03/21	No Class (Spring Break)		
23	M, 03/26	L19 Non Parametric Methods		Q 4
24	W, 03/28	L20 Non Parametric Methods	HW 7	
25	M, 04/02	L21 Linear Regression		
26	W, 04/04	L22 Linear Regression	HW 8	
27	M, 04/09	L23 Time Series & Forecasting		
28	W, 04/11	L24 Time Series & Forecasting	HW 9	
29	M, 04/16	L25 Structuring Decision Making Process		Q 5
30	W, 04/ 18	L26 Structuring Decision Making Process	HW 10	
31	M, 04/23	L27 Review Session		
32	W, 04/25	L28 Review Session	HW 11	
33	M, 04/30	Final Exam		

² **Note:** The instructor reserves the right to change the dates. You will be given sufficient advance notice for major changes.

Last Day to Add/Drop the class:	Fri, Jan 20
Last Day for Official Withdrawal:	Mon, Apr 2
Final Grades Due:	Wed, May 9