Managerial Statistics

Course Syllabus

Managerial Statistics

Managerial Statistics (3 Credits)

Lecturers: Dr. MA Hong

                 hongma@zju.edu.cn

Class Meetings   To be decided

Course Materials:

1. Teaching notes developed by lecturers.
2. D. Anderson, D. Sweeney, and T. Williams, Statistics: Business and Economics, 9th Edition, China Machine Press (机械工业出版社), 2009（原著第 10 版有中译本）
3. Business Statistics, by D. Levine, T. Krehbiel, and M. Berenson, 4th ed., Pearson Education.

Course Objectives:

By this courses, the students will learn:
1. Basic concepts in probability and statistics
2. The principle of fact based decision making
3. Necessary skills for business data analysis based on statistics
4. Manipulating softwares for statistical analysis such as Excel and SPSS.

Course Description

This course introduces students to basic concepts in probability and statistics of relevance to managerial decision making. Topics include basic data analysis, random variables and probability distributions, sampling distributions, interval estimation, hypothesis testing and regression. Numerous examples will be chosen from business applications.

Tentative Course Outline

Lecture 1: General introduction to statistics

1. Population, Sample
2. Descriptive statistics, Inferential statistics

Lecture 2: Probability distribution and Normal distribution
1. The normal distribution
2. The standardized normal distribution
3. Evaluating the normality assumption
4. The exponential distribution

Lecture 3 : Sampling and sample distribution
1. Introduction to sampling distribution
2. Sampling distribution of the mean
3. Sampling distribution of proportion

Lecture 4: Confidence interval estimation and tests of hypothesis (about 70 min)
1. Estimation process
2. Point estimates
3. Interval estimates
4. Confidence interval estimation for the mean (σ known)
5. Determining sample size
6. Confidence interval estimation for the mean (σ unknown)
7. Confidence interval estimation for proportion
8. Hypothesis testing methodology
9. Z test for the mean (σ known)
10. P-value approach to hypothesis testing
11. Connection to confidence interval estimation
12. One-tail tests
13. T test for the mean (σ unknown)
14. Z test for the proportion

Lecture 5: Two sample tests and analysis of variance (about 55 min)
1. Comparing two independent samples
    a) Independent samples Z test for the difference in two means
    b) Pooled variance t test for the difference in two means
2. F test for the difference in two variances
3. The completely randomized design: one-factor analysis of variance
    a) ANOVA assumptions
    b) F test for difference in c means

Lecture 6: Regression (about 70 min)
1. Types of regression models
2. Determining the simple linear regression equation
3. Measures of variation
4. Assumptions of regression and correlation
5. Residual analysis
6. Measuring autocorrelation
7. Inferences about the slope

8. Correlation - measuring the strength of the association
9. Estimation of mean values and prediction of individual values
10. Multiple regression

Lecture 7: Time series analysis (about 55 min)
1. What is time series analysis
2. Components of time series
3. Different trend models
4. Model selection
5. Auto regression

Lecture 8: A brief introduction to data mining (about 60 min)
1. What is data mining?
2. Popular data mining techniques
3. Popular data mining software
4. Examples

Teaching Methods:
This course will be conducted in multiple formats:
1. Teaching based on lecturers' notes
2. Experiments on software such as SPSS and Excel
3. After class assignments and in-class assignment**s**

Student Learning
Students can learn from the lectures, teaching notes, textbook. They are also advised to do exercises using SPSS and Excel to get observable experience with statistics analysis.

Outcome Expectation
The students are expected to be able to perform basic statistical analysis using SPSS and Excel after the attendance of this course. They are also expected to form the basic idea of fact based decision making.

Student Evaluation

The students will be evaluated based on multiple criteria:

Class participants: 10%

After class assignment: 20%

In-class assignment: 10%

Final exam: 60%