



Inferential Statistics for Finance

QM-715

Course Description

Important decisions are rarely made by intuition alone. We need to use the data to develop our insights and to support our analysis. Today, statistics and its applications are an integral part of our lives. In such diverse settings as politics, medicine, education, and business, human activities are both measured and guided by statistics. More and more decisions made in the business world now rely on soundness of statistical information, and on appropriateness of the use of analytical tools. It is, therefore, imperative for a business manager to be aware of the multifaceted role of statistics as a descriptor of information, a tool for analysis, a means of reaching conclusions, and an aid to decision.

This course is aimed to provide the necessary tools to managers and entrepreneurs for decision making in variety of business situations. Participants will learn to formulate the real life business problems into quantitative models. Teaching of conceptual framework of these tools will be supplemented by hands on application of various software packages that will aide in solving these models. Expertise will be developed in interpretation of these solutions and their use in decision making.

Learning Objectives

Purpose of the course is to provide the participants with statistical and analytical tools useful for business managers. Future managers will use these tools in planning, executing and evaluating their business needs. Upon successfully completing this course, the participants will be able to:

- Identify and formulate problems where quantitative techniques can have an impact.
- Use mathematical and statistical tools to solve these problems.
- Assess data with healthy skepticism and seek expert help when needed.
- Recognize when better data and information are needed for decision making.

Learning Methodology

Following instructional tools and methodologies would be used during the course.

Lectures: 15 sessions in total including MID TERM Exam. Each of these lectures is accompanied by detailed description of the technique, its use in the form of data analysis, and pertinent examples from the research world.

Research Papers & Case Studies: Every alternate session would be accompanied by discussions on Case Studies as well as Research Publications.

In Class Exercises: Data analyses would be conducted to appreciate numerical aspects of the techniques.

Computer Software: IBM SPSS, MS EXCEL

Recommended Text

Considering the nature and requirement of this course no single book is recommended. However, there are some books available that can cover the course in its minimum requirements. This deficiency may be overcome by using some references besides a recommended book. Following is the recommended text as well as some reference texts for the course;

- 1- Business Statistics – A Decision Making Approach, 7th Edition**
by Kent D. Smith & Philip C. Fry
- 2- Multivariate Data Analysis, 6th Edition**
by Hair, Black, and Anderson
- 3- Spread Modeling & Decision Analysis, 5th Edition**
by Cliff T. Ragsdale
- 4- Doing Data Analysis with SPSS**
by Robert H. Carver and Jane Gradwohl Nash
- 5- Quantitative Analysis for Management, 10th Edition**
by Barry Render, Ralph M. Stair, Jr., and Michael E. Hanna
- 6- SPSS for Intermediate Statistics, Use and Interpretation, 3rd Edition**
by Nancy L. Leech, Karen C. Barrett, and George A. Morgan

Topics to be Discussed

- ✓ The Where, Why, and How of Data Collection
- ✓ Graphs, Charts, and Tables – Describing Your Data
- ✓ Describing Data Using Numerical Measures
- ✓ Using Probability, Probability and Sampling Distributions
- ✓ Selecting and Interpreting Inferential Statistics
- ✓ Models and Model Building, Linear and Multiple Regression
- ✓ Linear Programming and Sensitivity Analysis
- ✓ Decisions Theory Analysis
- ✓ Exploratory Factor Analysis and Principal Components Analysis
- ✓ Logistic Regression and Discriminant Analysis
- ✓ Analysis of Variance ANOVA, Multiple Analysis of Variance MANOVA and Canonical Correlation

Calendar of Activities

Topic	Content to be Covered	Chapter Reading
The Where, Why, and How of Data Collection	What is Statistics? Tools for Collecting data, Populations, Samples, and Sampling Techniques, Data Types and Data Measurement Levels Activity: Demonstration through SPSS	Ch-1 Business Statistics – A Decision Making Approach, 7th Edition, by Kent D. Smith & Philip C. Fry
Graphs, Charts, and Tables – Describing Your Data	Frequency Distributions and Histograms, Bar Charts, Pie Charts, and Stem and Leaf Diagrams, Line Charts and Scatter Diagrams Activity: Demonstration through SPSS	Ch-2 Business Statistics – A Decision Making Approach, 7th Edition, by Kent D. Smith & Philip C. Fry
Describing Data Using Numerical Measures	Measures of Center and Location, Measures of Variation, Using Both Together Activity: Demonstration through SPSS	Ch-3 Business Statistics – A Decision Making Approach, 7th Edition, by Kent D. Smith & Philip C. Fry
Using Probability, Probability and Sampling Distributions	The Basics of Probability, The Rules of Probability, Discrete and Continuous Probability Distributions, Introduction to Sampling Distributions	Ch-4, 5, 6, and 7 Business Statistics – A Decision Making Approach, 7th Edition, by Kent D. Smith & Philip C. Fry
Selecting and Interpreting Inferential Statistics	Selection of Inferential Statistics, The General Linear Model, Interpreting the Results of a Statistical Test Activity: Demonstration through SPSS	Ch-5 SPSS for Intermediate Statistics, Use and Interpretation, 3rd Edition By Nancy L. Leech, Karen C. Barrett, and George A. Morgan
Models and Model Building	What is Simple and Multiple Regression Analysis? A Decision Process for Multiple Regression Analysis Activity: Demonstration through SPSS	Ch-4 Multivariate Data Analysis, 6th Edition by Hair, Black, and Anderson
Financial Models	Black Scholes Option Pricing (BSOP) Model, Value at Risk (VAR)	Handout
Linear Programming and Sensitivity Analysis	Optimization and Linear Programming, Modeling and Solving LP in Spread Sheet, Sensitivity Analysis and Simplex method Activity: Demonstration through	Ch-2, 3, and 4 Spread Modeling & Decision Analysis, 5th Edition by Cliff T. Ragsdale

	MS EXCEL	
Decisions Theory Analysis	Characteristics of Decision Problem, Non Probabilistic Vs Probabilistic Models, Decision Trees Activity: Demonstration through MS EXCEL	Ch-3 Quantitative Analysis for Management, 10th Edition by Barry Render
Exploratory Factor Analysis and Principal Components Analysis	What is Factor Analysis? Factor Analysis Decision Process Activity: Demonstration through SPSS	Ch-3 Multivariate Data Analysis, 6th Edition by Hair, Black, and Anderson
Logistic Regression and Discriminant Analysis	Logistic Regression, Hierarchical Logistic Regression, Discriminant Analysis (DA) Activity: Demonstration through SPSS	Ch-7 SPSS for Intermediate Statistics, Use and Interpretation, 3rd Edition by Nancy L. Leech, Karen C. Barrett, and George A. Morgan
Analysis of Variance ANOVA, Multiple Analysis of Variance MANOVA and Canonical Correlation	Factorial (2-Way) ANOVA, Post Analysis of a Significant Interaction, Multiple Analysis of Variance and Canonical Correlation Activity: Demonstration through SPSS	Ch-8, and 9 SPSS for Intermediate Statistics, Use and Interpretation, 3rd Edition by Nancy L. Leech, Karen C. Barrett, and George A. Morgan

Term Paper

A term paper is a research paper written by students over an academic term. These are generally intended to describe an event, a concept, or argue a point. A term paper is a written original work discussing a topic in detail, usually several typed pages in length. Typically, a term paper is composed of following sections;

- ✓ **Introduction**
 - Objectives of the Term Paper
- ✓ **Literature Review**
 - Hypotheses to be tested in the Term Paper
- ✓ **Methodology**
 - Data Instrument to be used in the Term Paper
 - Data Collection Scheme
- ✓ **Analysis and Results**
 - The statistical analysis; its rational and its findings
- ✓ **Discussion and Conclusion**
 - Implication
 - Direction for Future Research