ΟΙΚΟΝΟΜΙΚΟ ΠΑΝΕΠΙΣΤΗΜΙΟ ΑΘΗΝΩΝ
ATHENS UNIVERSITY OF ECONOMICS AND BUSINESS

MSc in International Shipping, Finance and Management

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Statistics for Business

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Sessions: 4 × 3 hours each

Course Assessment: Weekly Assignments (30%)
Written Examination (70%)

AIMS and OBJECTIVES

The course aims to provide a sound understanding of the principles of statistics for business. Tools which allow one to make probabilistic statements and draw conclusions about the *population* from a particular data set are discussed, highlighting the role of probability and/or uncertainty in making thorough business.

The main objectives include:

- Introducing students to the statistical analysis of financial/accounting data.
- Familiarizing students with the concepts of probability and its role in forming statements and making business decisions in uncertain situations.
- Familiarizing students with the application statistical methods in order to address business related questions and help make decisions based on statistical evidence.

BRIEF DESCRIPTION

The course provides the necessary background to perform a sound statistical analysis of ***economic,*** financial and accounting data. The concepts of probability and probability distributions are discussed, focusing on specific discrete and continuous probability distributions. Estimation techniques for basic parameters (e.g. mean, variance) of commonly used probability distributions are presented, along with steps in making inference about these parameters. The same techniques will be used in evaluating business claims through use of confidence intervals and hypothesis testing. Finally, predictions using simple regression models are discussed.

MAIN TOPICS

- ***Elements of Probability Theory***

  Random Experiment, Outcomes, and Events; Definitions of Probability: Classical Probability (Permutations and Combinations), Relative Frequency, Subjective Probability. Probability Rules: Joint, Marginal, and Conditional Probability; Statistical Independence. Bayes's Law.

- ***Random Variables and Probability Distributions***

Random Variables. Probability Distributions for Discrete Random Variables; Properties of Discrete Random Variables (Expected Value and variance). Jointly Distributed Discrete Random Variables (Conditional Mean and Variance; covariance and correlation). Continuous Random Variables: Expected Value and Variance. Jointly Distributed Continuous Random Variables (Linear Combinations of Random Variables).

- ***Special Discrete and Continuous Probability Distributions***

Discrete Probability Distributions: Bernoulli, Binomial. Continuous Probability Distributions: Uniform, Normal.

- ***Sampling, Estimation and Sampling Distributions***

Sampling from a Population, Sampling Distributions of Sample Means. Properties of Point Estimators.

- ***Interval Estimation and Hypotheses Tests***

Concepts of Hypothesis Testing. Tests of the Mean of a Normal Distribution. Tests of the Difference Between Two Normal Population Means. Confidence Interval Estimation for the Mean; Confidence Interval Estimation of the Difference Between Two Normal Population Means.

- ***Introduction to Regression Analysis***

Correlation and Simple Linear Regression; Parameter estimation and interpretation; Regression standard error and regression fit; Prediction with simple linear regression; Multiple linear regression; Prediction with multiple regression.

READING MATERIAL

- Newbold, P., Carlson, W.L. and Thorne, B. M. (2013) *Statistics for Business and Economics*, 8th edition, Essex: Pearson Education
- Stock, J. and Watson, M. (2020) *Introduction to Econometrics*, 4th Global Edition, New York: Pearson (Ch. 1 – Ch.4)
- Keller, G. (2014) *Statistics for Management and Economics*, 10th Edition, Stamford, CT: Cengage Learning
- Anderson, D.R, Sweeney, D.J. Williams, T.A. (2011) *Statistics for Business and Economics*, 11th Edition, Mason, OH: South-Western College Pub.
- Anderson, D.R, Sweeney, D.J. Williams, T.A. (2012) *Essentials of Modern Statistics with MS Office Excel*, 5th Editon, Mason, OH: South-Western College Pub.
- Mendenhall, M., Beaver, R.J., and Beaver, B.M. (2012) *Introduction to Probability and Statistics*, 14th Edition, Boston, MA: Cengage Learning
- Wood, M. (2003) ***Making Sense of Statistics: A Non-Mathematical Approach***, Basingstoke: Palgrave Macmillan

In addition to the above, it is recommended to read:

- Financial periodicals/papers, which include: Financial Times, Economist, Wall Street Journal, Nautemporiki.

Useful Databases for data collection and analysis:

Reuters, Bloomberg, Datastream, Web pages of Stock Exchanges and Central Banks (e.g. FRED for the US).

Other References (more advanced) which may be used during lectures

- Wackerly, D.D., Mendenhall, W. and Scheaffer, R.L. (2008) *Mathematical Statistics with Applications*, 7th Edition, Belmont, CA: Thomson Higher Education
- Ramachandran, K.M. and Tsokos, C.P. (2009) Mathematical statistics with applications, Burlington, MA: Elsevier Academic Press