CYPRUS INTERNATIONAL INSTITUTE OF MANAGEMENT

# COURSE UNIT DESCRIPTION

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| Course Unit Title | **QUANTITATIVE METHODS & STATISTICAL ANALYSIS** | | |
| Course Unit Code | BI430 | | |
| Type of Unit | Core | | |
| Level of Course Unit | First cycle | | |
| Year of Study | First/second year | | |
| Semester | On demand | | |
| Number of ECTS Credits | 6 ECTS | | |
| Course Unit Objectives | The objective of this course is to introduce the fundamental concepts and tools of statistics, to provide the appropriate theoretical and practical skills necessary for collecting, analyzing and interpreting data and to offer necessary tools to conduct research and data analysis. | | |
| Learning Outcomes | On completion of the course the students are expected to be able to: | | |
| | CILO 1 | Comprehend the notion and the use of statistics. | |
| | CILO 2 | Apply tabular, graphical, and descriptive methods in order to study and understand a variable | |
| | CILO 3 | Know and understand the basic concept of probability theory, and probability and sampling distribution | |
| | CILO 4 | Analyze and draw conclusions using a confidence interval and a hypothesis test. | |
| | CILO 5 | Apply statistical methods in order to study and understand the relationship between two or more variables | |
| | CILO 6 | Analyze data using Microsoft Excel | |
| Name of Lecturer(s) | Dr. Dario Pontiggia | | |
| Mode of delivery | Face to Face | | |
| Prerequisites | Some very basic algebra and Microsoft Excel knowledge. | | |
| Course Content | 1. **Introduction to Statistics**: The 1st part of the course deals with preliminary notions of statistics, including data types, scales of measurement, types of statistics, and sampling. | | CILO 1 |
| | 2. **Descriptive Statistics**: The 2nd part of the course deals with the ways of organizing, presenting and describing data. Additionally, it studies the measures of location and variability, and the relationship between 2 variables using the correlation coefficient. Finally, Microsoft Excel is introduced, along with tools for the study of descriptive statistics. | | CILO 2<br>CILO 6 |

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| | 3. **Introduction to Probability and Sampling Distribution**: The 3rd part of the course deals with the preliminary notion of probability theory (e.g., sets, experiments, sample space, events), random variables, and sampling distribution. Additionally, it deals with discrete distribution (bernoulli, binomial, and poisson) and continuous distribution (normal and standard normal). Finally, it discusses Central Limit Theorem and the sampling distribution of the sample mean and the sample proportion. | CILO 3 |
| | 4. **Interval Estimation**: The 4th part of the course demonstrates the way of creating a confidence interval for the population mean, the population proportion, the population mean and proportion with two populations and the population variance and standard deviation. | CILO 4 |
| | 5. **Hypothesis Testing**: The 5th part of the course demonstrates the way of performing a hypothesis test for the population mean, the population proportion, the population mean and proportion with two populations and the population variance and standard deviation. | CILO 4 |
| | 6. **Linear Regression**: The 6th part of the course presents the way to estimate the population relationship between two variables through the use of the least squares method. Finally, it examines the way to estimate the relationship between two or more independent variables and a dependent variable through the use of the multiple linear regression. | CILO 5<br>CILO 6 |
| | **7. Introduction to Time-Series**: The final part of the course deals with preliminary notions of time-series, including trend, seasonality, and stationarity. Finally, it examines the way to estimate using time-series data (AR and ADL models) | CILO 5<br>CILO 6 |
| Recommended or required reading | **Suggested Textbooks:**<br>➢ Anderson, D.R, Sweeney D.J., Williams T.A., Camm J.D., and Cochran J.J. (2018). Essentials of Modern Business Statistics with Microsoft Office Excel. Cengage Learning.<br>➢ Stock, J., and Watson, M. (2020). Introduction to Econometrics, Global Edition, 4th Edition. Pearson Education<br>➢ Illowsky, B. and Dean, S. (2012). Collaborative Statistics. http://cnx.org/content/col10522/latest/<br>➢ Groebner, D.F., Shannon, P.W., and Fry, P.C. (2017). Business Statistics: A Decision Making Approach. Pearson Education<br>➢ Anderson, D.R, Sweeney D.J., and Williams T.A., (2008). Statistics for Business and Economics. Pearson Education<br><br>**Online Reading**: Useful online materials can be found in the khan Academy webpage ( https://www.khanacademy.org):<br>➢ **Descriptive Statistics**: https://www.khanacademy.org/math/statistics-probability/analyzing-categorical-data https://www.khanacademy.org/math/statistics-probability/displaying-describing-data | |

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| | https://www.khanacademy.org/math/statistics-probability/summarizing-quantitative-data<br>https://www.khanacademy.org/math/statistics-probability/describing-relationships-quantitative-data<br><br>➢ **Introduction to Probability**:<br>https://www.khanacademy.org/math/statistics-probability/probability-library<br>https://www.khanacademy.org/math/statistics-probability/counting-permutations-and-combinations<br><br>➢ **Probability and Sampling Distributions**:<br>https://www.khanacademy.org/math/statistics-probability/random-variables-stats-library<br>https://www.khanacademy.org/math/statistics-probability/sampling-distributions-library<br><br>➢ **Interval Estimation**:<br>https://www.khanacademy.org/math/statistics-probability/confidence-intervals-one-sample<br><br>➢ **Hypothesis Testing**:<br>https://www.khanacademy.org/math/statistics-probability/significance-tests-one-sample<br>https://www.khanacademy.org/math/statistics-probability/significance-tests-confidence-intervals-two-samples<br><br>➢ **Linear Regression**:<br>https://www.khanacademy.org/math/probability/regression/regression-correlation/v/regression-line-example<br>https://www.khanacademy.org/math/probability/regression/regression-correlation/v/correlation-and-causality<br>https://www.khanacademy.org/math/statistics-probability/advanced-regression-inference-transforming |
| Planned learning activities and teaching methods | Formal presentation of the basic concepts with exercises<br>In-class discussions and debates<br>Individual and team-work<br>Demonstration of statistical use on a computer |
| Assessment methods and criteria | **10%** - Individual Class Participation<br>**40%** - In-class Examination (Final Lecture)<br>**40%** - Group Project (Deadline: 23/01/2022)<br>**10%** - Peer-to-peer Evaluation |
| Language of Instruction | English |