UNIVERSITÀ DEGLI STUDI DI PALERMO

DEPARTMENT	Scienze Economiche, Aziendali e Statistiche		
ACADEMIC YEAR	2023/2024		
BACHELOR'S DEGREE (BSC)	STATISTICS FOR DATA ANALYSIS		
INTEGRATED COURSE	ECONOMICAL STATISTICS 2 - INTEGRATED COURSE		
CODE	18230		
MODULES	Yes		
NUMBER OF MODULES	2		
SCIENTIFIC SECTOR(S)	SECS-S/03		
HEAD PROFESSOR(S)	VASSALLO ERASMO	Professore Associato	Univ. di PALERMO
OTHER PROFESSOR(S)	VASSILIADIS ELLI VASSALLO ERASMO	Ricercatore Professore Associato	Univ. di PALERMO Univ. di PALERMO
CREDITS	12		
PROPAEDEUTICAL SUBJECTS	06674 - ECONOMIC STATISTICS 1 19596 - STATISTICAL INFERENCE		
MUTUALIZATION			
YEAR	3		
TERM (SEMESTER)	Annual		
ATTENDANCE	Not mandatory		
EVALUATION	Out of 30		
TEACHER OFFICE HOURS	**VASSALLO ERASMO** Monday 14:30 15:30 Ufficio docente o da remoto via Teams Tuesday 14:30 15:30 Ufficio docente o da remoto via Teams **VASSILIADIS ELLI** Tuesday 12:00 14:00 Stanza del docente		

DOCENTE: Prof. ERASMO VASSALLO

PREREQUISITES	The course requires knowledge of the basic concepts of descriptive and inferential statistics, as well as the specific content of Economic Statistics I. Also, the course requires basic knowledge of R, SAS and PYTHON with reference to the main data manipulation functions.
LEARNING OUTCOMES	Knowledge and understanding Acquire: 1. Statistical tools and techniques useful to the analysis of economic phenomena in a micro and macro context, as well as measurement, estimation and interpretation with use of appropriate statistical software; 2. Understanding the evolution of economic phenomena, searching the data sources of economic statistics. 3. Skills on electronic spreadsheets, statistical and econometric software and skills on script writing with R. 8. Knowledge of product and service markets and segmentation of the target market. Applying knowledge and understanding Be able to: use independently statistical tools to answer business questions (sales analysis, process monitoring, prediction of sales, cost and production efficiency) and macroeconomic planning (analysis of demand, impact analysis, analysis of the economic framework and trend, measures of productivity and production efficiency, measures of income inequality) making use of open-source software. Making judgments Be able to: identify scope and conditions of the proposed instruments, read correctly the results and evaluate their implications for firms, areas and economic systems. Communication skills Be able to: explain conditions, tools and results of the analysis also to a non-technical audience through oral presentations or written reports. Learning skills Be able to: consult official reports and statistics from Istat, OECD, Eurostat, etc. and relative scientific publications with analysis of the national and international literature.
ASSESSMENT METHODS	Written and oral test for each module. The final mark takes into account both tests. The written exam focuses on practical skills and interpretation about the resolution of a problem of economic statistics usually with the use of a statistical model for time series or cross-section series. The written test takes about an hour and it is structured so that the student can successfully use different strategies and alternatives analysis. In particular, it is required attention to meaning and interpretation of the data and results with the support of statistical softwares. The oral exam is focused on all the topics of the syllabus and, besides, mathematical and statistical proofs or short exercises can be requested. During the course, the teacher will share with the students a short article, a book chapter or a part of it in English which will be discussed with the students. The student's assessment takes into account some factors in both written exam and oral exam: knowledge of concepts and subjects, practical use skills, proper use of statistical language. The lowest positive rating (18) is attributed a minimum knowledge of the arguments, whereas the maximum rating (30) is attributed to a full and mature knowledge of the arguments. The overall evaluation is a simple mean of the two evaluations for the two modules. The oral exam includes questions on statistical software and some specific questions on the SAS language in relation to the subjects of the discipline.
TEACHING METHODS	Lessons in classroom, specific lectures, tutorials, labs and homeworks with wide use of R, SAS and PYTHON. Preparation of teaching materials and slides uploaded on the course website. During the course it will be possible to organize workgroups, analysis and reports, autonomous presentations of the students also in homework mode to be discussed in the classroom. Free participatory software such as kahoot, wooclap, etc. may be used.

MODULE
ECONOMIC TIME SERIES MODELS AND FORECASTING

Prof. ERASMO VASSALLO

SUGGESTED BIBLIOGRAPHY

1-Vassallo E. (2018). Statistica Economica con R, Amazon: Dublin. ISBN: 9788854828759, ed.2018.
2-Koop G. (2013). Analysis of Economic Data.Wiley: New York. ISBN: ISBN: 9781118472538, ed.4-2013.
3-Bakerman J. (2019). "SAS programming for R users", SAS Institute: NY (liberamente scaricabile da SAS free book). ISBN: 9781642957136, ed.2019.
4- Gilliland M. (2020). "Forecasting with SAS", SAS Institute: NY (liberametne scaricabile da SAS free book). ISBN: 9781951685737, ed.2020.
5- Hamilton J.D. (1994). "Time Series Analysis", Princeton University Press: Princeton. ISBN: 978-0691042893.
6- Slide e materiali didattici aggiuntivi caricati dal docente sul portale circa concetti teorici ed applicazioni con i diversi software e con dettaglio aggiuntivo su Python.

AMBIT	50250-Statistico, statistico applicato, demografico
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56

EDUCATIONAL OBJECTIVES OF THE MODULE

Provide the statistical tools useful for the analysis of economic phenomena of specific interest in the microeconomic business environment and for economic analysis and planning in the macroeconomic context. The student must be able to read and interpret the main statistical data related to the structure and performance of firms, as well as to the European / national / regional territory with specific reference to the economic and financial framework, also with the use of appropriate software and, specifically, R, SAS, and Python. Specific attention will be devoted to the analysis of economic time series in the micro and macro context and the theoretical and applied tools of ARIMA-ARIMAX-GARCH modeling will be provided, also with particular attention to seasonal adjustment procedures. The principles and applications used by official statistics to analyse, estimate and forecast the main economic aggregates and deal with the effects of seasonality, also in anticipatory terms, will be illustrated.

SYLLABUS

Hrs	Frontal teaching
4	statistical sources of economic data
4	Statistical models and econometric specifications in time and space
4	Classical approach to time series with deterministic business models
4	Naive methods, exponential smoothing, Holt-Winters models and predictive filters for economic analysis. Examples with R, SAS and Python.
4	Modern approach to time series with micro-economic and macro-economic data.
4	Census methods I and II; hybrid approach X12-arima and X13-arima
4	Tramo-Seats model (Bank of Spain) and Demetra approach (Eurostat). Use of R, SAS and Python. Use in Istat.
4	Other theoretical references and applications with further specific use of procedures in R, SAS and Python. ARIMA-ARIMAX-SARIMA-GARCH structure.

Hrs	Practice
2	statistical sources of economic data
6	Deterministic and classical models in the analysis of time series. Use of R and SAS for decomposition procedures, exponential smoothing and Holt-Winters techniques.
6	Seasonal adjustment models. Classic and modern approach with R and SAS. Reading and interpretation of the related textual and graphic outputs.
10	Examples and additional exercises with different softwares. Comparison of estimates and results between R and SAS and reproducibility with Python. More examples with Gretl and Stata.

MODULE
BUSINESS STATISTICS AND MARKET ANALYSIS

Prof.ssa ELLI VASSILIADIS

SUGGESTED BIBLIOGRAPHY

1- Brasini S., Freo M., Tassinari F., Tassinari G., Statistica aziendale e analisi di mercato, Il Mulino, 2002. ISBN 9788815088765
2- Montgomery D.C., Statistical Quality Control: A Modern Introduction.Wiley, 2012. ISBN: 978-1118322574.
3- Marbach G., Le migliori pratiche nellle ricerche di mercato, Rogiosi, 2016. ISBN 978-8869500718
4- Testo per la prova inglese: capitoli 1 e 2 in Chakrapani C. Statistics in Market Research. Wiley, 2009. ISBN 978-0-470-68937-0.

AMBIT	50250-Statistico, statistico applicato, demografico
INDIVIDUAL STUDY (Hrs)	94
COURSE ACTIVITY (Hrs)	56

EDUCATIONAL OBJECTIVES OF THE MODULE

Provide knowledge to use statistical methods for analysis of markets and analysis of market stakeholders. In particular, the student must acquire tools for the demand analysis (buyers, customers, consumers) and supply analysis (firms) with specific reference to the design and realization of a market research. The topics are treated both from a theoretical and applied point of view with examples and case studies developed using statistical software R. Some topics typically dealt with in the course of business economics will be resumed with specific reference to the product life cycle, market segmentation and the determination of fixed and variable costs and their surveys. Particular attention will be paid to customer satisfaction resulting from the quality of the product. Therefore, the concept of product and process statistical quality according to TQM and its measurement and representation will be introduced. In this regard, control charts will be presented, also for drift, and indicators for measuring process capacity. The topics are covered both from a theoretical and applied point of view with examples and case studies developed using statistical software R.

SYLLABUS

Hrs	Frontal teaching
2	Introduction to market Analysis. marketing and its foundamental concepts. Life cycle of the product.
2	Market research and use of panels.
4	Questionnaires and scales of measurement. Attitudes and their measurement
4	Statistical sources and classification of consumption. The Istat survey on consumption. Analysis of demand
2	The purchasing behavior. Models and customer satisfaction measures
4	Market segmentation. The a priori and posterior segmentation techniques and use of Cluster Analysis and Conjoint Analysis.
4	Product and process quality. Total Quality Management.
2	Control charts for attributes and for variables.
2	Charts for individual measurements and drift, cusum and ewma charts
2	Test and management of statistical out of control
4	process capability

Hrs	Practice
6	Examples and exercises on consumption analysis
6	Examples and applications of Cluster Analysis and Conjoint Analysis
6	Use and applications of control charts
6	More examples on statistical control and process capability.