



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze Economiche, Aziendali e Statistiche		
<b>ACADEMIC YEAR</b>	2022/2023		
<b>MASTER'S DEGREE (MSC)</b>	STATISTICS AND DATA SCIENCE		
<b>INTEGRATED COURSE</b>	STATISTICAL AND ECONOMIC EVALUATION IN HEALTHCARE - INTEGRATED COURSE		
<b>CODE</b>	20616		
<b>MODULES</b>	Yes		
<b>NUMBER OF MODULES</b>	2		
<b>SCIENTIFIC SECTOR(S)</b>	SECS-S/03, SECS-S/05		
<b>HEAD PROFESSOR(S)</b>	VASSALLO ERASMO	Professore Associato	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>	VASSALLO ERASMO	Professore Associato	Univ. di PALERMO
	VITTORIETTI MARTINA	Ricercatore a tempo determinato	Univ. di PALERMO
<b>CREDITS</b>	9		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	2		
<b>TERM (SEMESTER)</b>	1° semester		
<b>ATTENDANCE</b>	Not mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<b>VASSALLO ERASMO</b> Monday 14:30 15:30 Ufficio docente o da remoto via Teams Tuesday 14:30 15:30 Ufficio docente o da remoto via Teams  <b>VITTORIETTI MARTINA</b> Friday 15:00 17:00 Stanza 117, Edificio 13, Dipartimento di Scienze Economiche, Aziendali e Statistiche - Online via Teams		

DOCENTE: Prof. ERASMO VASSALLO

<b>PREREQUISITES</b>	The course requires knowledge of statistical inference and statistical modeling, as well as basic and specific content of public economy and health economy.
<b>LEARNING OUTCOMES</b>	<p>Knowledge and understanding Acquisition: 1. essential tools for analysis of the healthcare market; 2. Proper language of the economic health disciplines; 3. structure and content of economic models to analyze effects of public policy intervention in the health field; 4. principles of performance measurement; 5. principles of the cost and production functions in health.</p> <p>Applying knowledge and understanding Be able to: 1. Evaluate the relevant areas for intervention in the public health system; 2. Identify relevant information to assess the degree of effectiveness of a policy; 3. Making elementary analysis on capacity of the health systems to meet the needs of a community; 4. Perform elementary cost-benefit analysis to recognize the potential effects of public policies on the market; 5. Search, extract and comment the statistical data related to evaluation and performance of the health system in a regional, national and international context.</p> <p>Making judgments Being able to: evaluate implications and results that public policies can reach on regulation of the health markets; provide a critical reading of the results obtained through different analysis models. Use proper indices and proper performance indicators in line with the structure of public finances and Regional Public Accounts.</p> <p>Communication skills Be able to: present the main concepts and tools of health economics and statistical performance; expose results obtained through the economic and statistical analysis and to highlight the socio-economic effects of expenditure programs; Summarize and report the main issues on the economic and statistical analysis in health.</p> <p>Learning skills Be able to: critically evaluate, using the knowledge acquired in the course, both the specialist studies that the institutional structure of health systems by comparing different countries. 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 on the health sector and relative performances. Use the knowledge acquired in the course to attend advanced master or specialized seminars.</p>
<b>ASSESSMENT METHODS</b>	Written and oral test for both courses. The final mark takes into account both tests. The written exam focuses on practical skills and interpretation about the resolution of a problem 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. The oral exam is focused on all the topics of the syllabus and, besides, mathematical and statistical proofs or short exercises can be requested. The oral exam takes about half an hour. 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. For each of these 3 dimensions is given a rating: absent, poor, adequate, good, excellent. The minimum positive rating (18) is given in the case of sufficient knowledge of the arguments, whereas the maximum rating (30) is attributed to a full and mature knowledge of the arguments. Only if reports and homework are carried out during the course and such as to be sufficient to evaluate the student's skills, the student can request to use the evaluation of the reports in place of the traditional exam.
<b>TEACHING METHODS</b>	Lessons in classroom, specific lectures, tutorials, labs and homeworks with wide use of R statistical software. Preparation of teaching materials and slides uploaded on the course website. Procedures with SAS and Python are also used.

**MODULE**  
**STATISTICAL EVALUATION METHODS IN HEALTHCARE**

*Prof. ERASMO VASSALLO*

**SUGGESTED BIBLIOGRAPHY**

- 1- Hollingsworth B. e Peacock S.J. (2008) "Efficiency Measurement in Health and Health Care", Routledge: New York. (Capp. 2, 3 e 4 per gli argomenti introduttivi, concetti e definizioni; capp.5 e 6 per misure di efficienza ed applicazioni). ISBN 9780415569491, ed.2008.
- 2- Jacobs R., Smith P.C. e Street A. (2009) "Measuring Efficiency in Health Care Analytic Techniques and Health Policy", Cambridge University Press: Cambridge. (Capp.1 e 2, concetti e definizioni; capp. 3 e 4, modelli di efficienza; capp.5, 6 e 7, approfondimento sui modelli e confronti). ISBN 9780511617492, ed.2009.
- 3- Vassallo E. (2018). Statistica Economica con R. Amazon: Dublin. ISBN: 978-1977619426, ed.2018.
- 4- Slide e materiale didattico aggiuntivo del docente caricato sul portale didattico con riferimenti teorici ed applicazioni con R, SAS e Python.

<b>AMBIT</b>	21031-Attività formative affini o integrative
<b>INDIVIDUAL STUDY (Hrs)</b>	108
<b>COURSE ACTIVITY (Hrs)</b>	42

**EDUCATIONAL OBJECTIVES OF THE MODULE**

The student must attain knowledge and skills useful and necessary to the professional activities involved in measurement and statistical analysis of the characteristics and performance of the healthcare institutions both locally and nationally / internationally. In particular, the student must acquire the statistical tools used and usable by health professionals. In addition, an objective is to acquire the theoretical and practical elements for the search of the statistical data, analysis and interpretation of the statistical information through appropriate indices and indicators in the context of parametric and non-parametric modeling. The student who learns the structure of the main health institutions and the performance evaluation methods should be able to know the main features of these health systems and to have the ability to assess the specific characteristics, highlighting the improvement paths and adaptation to the highest standards.

**SYLLABUS**

<b>Hrs</b>	<b>Frontal teaching</b>
2	Principles of performance measurement
2	economic and statistical factors of performance in health
4	statistical sources of data for European, national and regional comparisons
2	Production, productivity and efficiency in health
4	parametric and non-parametric models for performance measures
4	univariate and multivariate control charts for quality in healthcare
6	Composite indicators for health performance: data, aggregation, weighting. Theory and examples.
<b>Hrs</b>	<b>Practice</b>
4	Performance measurement. Use of statistical softwares (R, SAS o Python).
4	Productivity and efficiency. Use of statistical softwares (R, SAS o Python)
4	Control charts. Use of statistical softwares (R, SAS o Python)
6	Exercises and case studies. Other applications with software.

**MODULE  
EXPERIMENTAL PLANS AND CLINICAL TRIALS**

*Prof.ssa MARTINA VITTORIETTI*

**SUGGESTED BIBLIOGRAPHY**

Meinert C. Clinical Trial , Overview 37-51, voce nel volume Biostatistics in Clinical Trials, Carol K. Redmond (Editor), Theodore Colton (Editor) Wiley.  
 Machin D, Campbell M. Walters S ( 2007) Medical Statistics capp 12, 13, 14, 15, Wiley  
 Rosenberger, W. F., & Lachin, J. M. (2015). Randomization in clinical trials: theory and practice. John Wiley & Sons. cap 1-3  
 Materiale fornito dal docente (in inglese).

<b>AMBIT</b>	21031-Attività formative affini o integrative
<b>INDIVIDUAL STUDY (Hrs)</b>	54
<b>COURSE ACTIVITY (Hrs)</b>	21

**EDUCATIONAL OBJECTIVES OF THE MODULE**

The student must i) know basics of randomised and non-randomised trials, ii) be able to interpret relevant elements of the trial (sample size, study quality, statistical analysis of results), iii) apply some methods devoted to bias in non-randomised studies (propensity score methods)

**SYLLABUS**

<b>Hrs</b>	<b>Frontal teaching</b>
2	Basic concepts of medical research. Overview of epidemiological studies versus clinical studies
2	Clinical trials: protocol structure and guidelines for the statistical plan. Definitions, Eligibility criteria, Ethics, Endpoints,
2	Randomized clinical trials: examples and comparison of different randomisation techniques
2	Randomized Clinical Trials: Bias, Blinding and Sample size
4	Methos for bias reduction for non-randomised clinical studies (propensity score)
<b>Hrs</b>	<b>Practice</b>
4	Research of randomized clinical trials and analysis of the protocols of randomized clinical trials
2	Randomization and sample size in R
3	Examples of propensity score analysis in R