



# UNIVERSITÀ DEGLI STUDI DI PALERMO

<b>DEPARTMENT</b>	Scienze Economiche, Aziendali e Statistiche		
<b>ACADEMIC YEAR</b>	2023/2024		
<b>MASTER'S DEGREE (MSC)</b>	STATISTICS AND DATA SCIENCE		
<b>INTEGRATED COURSE</b>	STATISTICAL MODELS FOR THE EVALUATION OF SERVICES - INTEGRATED COURSE		
<b>CODE</b>	23162		
<b>MODULES</b>	Yes		
<b>NUMBER OF MODULES</b>	2		
<b>SCIENTIFIC SECTOR(S)</b>	SECS-S/05, SECS-S/03		
<b>HEAD PROFESSOR(S)</b>	VASSALLO ERASMO	Professore Associato	Univ. di PALERMO
<b>OTHER PROFESSOR(S)</b>	VASSALLO ERASMO	Professore Associato	Univ. di PALERMO
	GIAMBALVO ORNELLA	Professore Ordinario	Univ. di PALERMO
<b>CREDITS</b>	9		
<b>PROPAEDEUTICAL SUBJECTS</b>			
<b>MUTUALIZATION</b>			
<b>YEAR</b>	1		
<b>TERM (SEMESTER)</b>	2° semester		
<b>ATTENDANCE</b>	Not mandatory		
<b>EVALUATION</b>	Out of 30		
<b>TEACHER OFFICE HOURS</b>	<p><b>GIAMBALVO ORNELLA</b></p> <p>Tuesday 10:00 12:00 Il servizio prenotazione ricevimento e sospeso. Per fissare un appuntamento con la docente si prega di inviare una mail all'indirizzo <a href="mailto:ornella.giambalvo@unipa.it">ornella.giambalvo@unipa.it</a></p> <p>Wednesday 12:00 13:00 Il servizio prenotazione ricevimento e sospeso. Per fissare un appuntamento con la docente si prega di inviare una mail all'indirizzo <a href="mailto:ornella.giambalvo@unipa.it">ornella.giambalvo@unipa.it</a></p> <p><b>VASSALLO ERASMO</b></p> <p>Monday 14:30 15:30 Ufficio docente o da remoto via Teams</p> <p>Tuesday 14:30 15:30 Ufficio docente o da remoto via Teams</p>		

<p><b>PREREQUISITES</b></p>	<p>The course requires knowledge of inferential statistics and statistical modeling, as well as basic skills on SAS and PYTHON and advanced skills on R.</p>
<p><b>LEARNING OUTCOMES</b></p>	<p>Knowledge and understanding  Acquisition: 1. Essential tools for the analysis of public and private services and their evaluation; 2. Of the language proper to the disciplines in this area disciplinary in order to understand and use it appropriately; 3. Of structure and content of the analysis models of the statistical disciplines to analyze the effects of public intervention policies; 4. Of the principles of performance measurement; 5. Of the principles of factors and of service production functions.</p> <p>Ability to apply knowledge and understanding  Be able to: 1. Evaluate and process relevant areas for intervention public in the service system; 2. Find out what the information is necessary to be able to evaluate the degree of efficiency and effectiveness of a policy or intervention public; 3. Perform elementary analyzes on the capacity that service systems have in responding to the needs of the community; 4. Carry out elementary analyses cost-benefit to recognize the potential effects of public policies on market; 5. Search, extract and comment on the statistical data connected to evaluation and performance system both in the regional/ national and international. 6. the analysis of multidimensional data in the evaluation field.</p> <p>Judgment autonomy  Be able to evaluate the implications and results that public policies can achieve in the regulation of services; to be in able to provide a critical reading of the results obtained with the application of different analysis models. Appropriate use of indices and performance indicators.</p> <p>Communication skills  Ability to present the main concepts and tools of economics and statistics about the statistical evaluation of performance. Being able to expose the results obtained through economic and statistical analysis and to highlight the socio-economic effects of spending interventions. To be able to summarize and report the main problems of the economical and statistical analysis also with reduction of multivariate data with composite indicators.</p> <p>Learning ability  Ability to critically evaluate, using the knowledge acquired in the course, both sector studies and institutional structure of systems and services present in different countries. Ability to update with the consultation of scientific publications of applied statistics. Ability to enroll, using the knowledge acquired in the course, in more advanced training areas such as masters or specialist seminars.</p>
<p><b>ASSESSMENT METHODS</b></p>	<p>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. During the course, the teacher will share a short article, a book chapter, or a part thereof in English with the students, which will be the subject of analysis and debate, also aimed at a presentation or independent discussion by the students.</p>
<p><b>TEACHING METHODS</b></p>	<p>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. During the course it will be possible to organize workgroups, analysis and reports, autonomous presentations of the students</p>

also in homework mode to be discussed in the classroom. Free participatory software such as kahoot, wooclap, etc. may be used.

## MODULE APPLICATIONS IN THE ECONOMIC FIELD

*Prof. ERASMO VASSALLO*

### SUGGESTED BIBLIOGRAPHY

- 1- K.J.Fox (2002). Efficiency in the Public Sector. Springer: New York. ISBN: 978-1-4757-3592-5.
- 2- Green W.H., Khalaf L, Sickles R.,Veall M., Voia M. (2019). Productivity and Efficiency Analysis. Springer: New York. ISBN: 978-3-319-79460-0.
- 3- Anselin L. (2011). Spatial Econometrics: Methods and Models. Springer: New York. ISBN: 978-90-481-8311-1.
- 4- Vassallo E. (2018). Statistica Economica con R. Amazon: Dublin. ISBN: 978-1977619426.
- 5- Slide e materiale didattico aggiuntivo del docente caricato sul portale didattico con riferimenti teorici ed applicazioni con R, SAS e Python.

<b>AMBIT</b>	50607-Statistico applicato
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<b>INDIVIDUAL STUDY (Hrs)</b>	108
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<b>COURSE ACTIVITY (Hrs)</b>	42
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### 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 public institutions both locally and nationally / internationally. In particular, the student must acquire the statistical tools used and usable by professionals in different sectors. 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 public institutions and the performance evaluation methods should be able to know the main features of these systems and to have the ability to assess the specific characteristics, highlighting the improvement paths and adaptation to the highest standards.

## SYLLABUS

Hrs	Frontal teaching
2	Principles of performance measurement
2	economic and statistical factors of performance in public services
4	statistical sources of data for European, national and regional comparisons
2	Production, productivity and efficiency in health, transport, justice, education, etc
4	parametric and non-parametric models for performance measures
4	Spatial models for performance analysis
6	Composite indicators for performance: data, aggregation, weighting. Theory and examples.
Hrs	Practice
4	Performance measurement. Use of statistical softwares (R, SAS o Python).
4	Productivity and efficiency. Use of statistical softwares (R, SAS o Python)
4	Spatial models. Use of statistical softwares (R, SAS o Python)
6	Exercises and case studies. Other applications with software. Further examples also with Gretl and Stata.

**MODULE  
APPLICATIONS IN THE SOCIAL FIELD**

*Prof.ssa ORNELLA GIAMBALVO*

**SUGGESTED BIBLIOGRAPHY**

Joint Research Centre-European Commission. Handbook on constructing composite indicators: methodology and user guide. OECD publishing, 2008.

F. Aiello, M. Attanasio (2004), How to transform a batch of simple indicators to make up a unique one?, Atti della XLII Riunione Scientifica della SIS, Bari, giugno 2004.

Aiello F, Attanasio M. (2008). Alcune considerazioni sulla costruzione di indicatori composti. In: Capursi V., Ghellini G. Dottor Divago: Discernere valutare e governare la nuova Università. Collana Valutazione - AIV - Teoria, metodologia e ricerca. p. 123-138, Milano: Franco Angeli, ISBN/ISSN: 978-88-464-9634-8

Borenstein et.al. (2009), Introduction to Meta-analysis, Wiley

<b>AMBIT</b>	50607-Statistico applicato
<b>INDIVIDUAL STUDY (Hrs)</b>	54
<b>COURSE ACTIVITY (Hrs)</b>	21

**EDUCATIONAL OBJECTIVES OF THE MODULE**

The primary objective of the course is the acquisition of statistical skills for the analysis of multidimensional data in the evaluation field.

The student will be able to apply and know the advantages and disadvantages of statistical techniques and methods suitable for the measurement of data in the form of ranks / rankings and know the "philosophy" of metaanalysis, using the most common statistical tests (Q and P, Funnel Plot) and know how to apply simple statistical methods to evaluate the combinability of studies in meta-analysis.

**SYLLABUS**

Hrs	Frontal teaching
2	Introduction to the course. Evaluation in statistics. Simple and compound indicators (definitions, objectives and data)
2	Data transformation and standardisation techniques
2	Composite Indicator Construction
2	Introduction to meta-analysis. Relevant statistical aspects
4	Meta-analysis (fixed effects and random effects) Funnel Plot, metaregression notes
Hrs	Practice
5	Composite indicator applications (quality of life; health; education)
4	Applications on Data transformation and standardisation techniques