

**II LEVEL UNIVERSITY MASTER IN:
STATISTICS, DATA INTELLIGENCE, AND THE FOUNDATIONS OF THE
SCIENCES**

REGULATION

A.Y. 2023/2024

Art. 1 - Activation

The Master in “STATISTICS, DATA INTELLIGENCE, AND THE FOUNDATIONS OF THE SCIENCES” (henceforth MASTER) is activated in the academic year 2023/2024, at the Faculty of Medicine and Surgery of the Polytechnic University of the Marches (henceforth UNIVPM), by initiative of the Department of Biomedical Sciences and Public Health (Dipartimento di Scienze Biomediche e Sanità Pubblica, henceforth: DSBSP).

Art. 2 - Venue, and didactic-administrative Management and Organization

The venue of the MASTER is the Faculty of Medicine and Surgery.

An Organization Committee which consists of 4 members: Prof. Barbara Osimani, Dr. Alexander Gebharter, Prof. Aldo Dragoni, Prof. Nicola Matteucci is in charge of the didactic management of the MASTER. The Coordinator of the MASTER is Prof. Barbara Osimani.

The administrative and financial management of the MASTER is entrusted to the DSBSP. The Post Graduate Student Secretariat Office in the Healthcare Area (Ufficio Segreteria Studenti Post Laurea di Area Sanitaria) takes care of the students career management.

Art. 3 – Goals and objectives

The MASTER aims to fill a gap in the STEM field relating to the integration of theoretical tools and empirical observations for a conscious approach to data analysis, scientific experimentation, use of simulation tools in scientific inference and forecasting, and evaluation of evidence for policy purposes. The uniqueness of the Master's training offer is linked to three aspects that are not sufficiently developed in the current education landscape:

1. The integration of courses and tutorials on advanced data analysis and processing techniques (machine learning, deep learning, AI), as well as tutorials on some of the most widespread tools (Python, STATA, R, Matlab), with courses dedicated to the foundations of the scientific method, epistemology and philosophy of science, which aim to put such inferential methodologies into perspective and relate them among each other, thereby

contributing to their conscious use, with a particular focus on the theoretical foundations that underlie them and which, possibly, justify them.

2. Emphasis on the scientific ecosystem in a broad sense: the various stakeholders who animate it, with their different interests (not exclusively epistemic, but also economic, ethical-practical, political, etc.). This emphasis also underlines the strategic elements in the interaction between agents of various scientific sub-systems (scientific, governmental, socio-economic institutions and society at large), and inscribes scientific practice within these socio-economic structures.

3. Orientation to policy and the role of scientific evidence in decision-making, both personal and collective, with particular attention to the debate on the so-called "Evidence-based policy" and the related political and civil implications.

The professional profile that the MASTER aims to form is multifaceted and of various backgrounds: the MASTER is aimed at students and scholars from both the human sciences and STEM disciplines, but also at professionals who want to enrich their skills in the field of data analysis, science epistemology, evidence-based policy. The figure that emerges is essentially that of a data analyst, with a rich methodological and foundational background, but the MASTER can very well also contribute to enriching the educational profile of journalists, politicians and professionals in any sector (from economic to healthcare to legal).

Art. 4 – Duration

The duration of the MASTER is one year.

Art. 5 – Number of available places

A minimum of 15 and a maximum of 50 students are admitted to the MASTER. The activation of the MASTER is revoked if the number of 15 registrations is not reached.

A number of student auditors corresponding to the vacant ordinary positions are admitted to the MASTER's course.

Art. 6 – Admission requirements and incompatibilities

Graduates with the following qualifications are admitted to the MASTER:

Master's degree/single-cycle master's degree obtained pursuant to the Ministerial Decree 270/2004

Degree obtained according to the regulations prior to the Ministerial Decree. 509/1999 or Ministerial Decree 270/2004

Specialist degree obtained pursuant to the Ministerial Decree 509/1999.

Holders of a qualification obtained abroad recognized by the Organizing Committee as comparable, for the sole purposes of admission to the MASTER, in terms of duration and content, to the requested Italian qualification are also admitted.

The aforementioned requirements must be possessed by the candidate at the expiry date of the deadline for submitting applications to the MASTER.

Art. 7 – Selection and Registration

If the number of applicants is greater than the maximum number of places foreseen (50), access to the MASTER will take place through a selection of the candidates based on their qualifications and CV (with a special attention to their degree of affinity with the MASTER topics).

There will be no selection if the number of candidates is less than the number of places available.

If the number of aspiring auditors is greater than the maximum number of places foreseen (the difference between 50 ordinary places and the number of registrations on ordinary places), access to the MASTER for auditors will take place through a selection of candidates based on qualifications and of the curriculum.

There will be no selection if the number of auditor candidates is lower than the number of places available.

Art. 8 – Training

The teaching activity is carried out by teachers from the Polytechnic University of the Marche, teachers from other Italian Universities and other European countries and qualified experts.

The Master is held in English.

Art. 9 – Teaching Plan

The Master is divided into 24 teaching modules and 8 seminars. Frontal teaching amounts to 400 hrs of lectures.

At the end of each teaching module and each seminar there is an exam.

The details of the training activities are reported in the teaching plan attached to these Regulations (ALL. No. 1).

Art. 10 – Attendance obligations and final exam

Attendance at the Master is mandatory.

Lessons take place in person at the MASTER's headquarters. Auditors will be granted the option of following lessons remotely.

To be admitted to the final test the participant must have regularly attended at least 70% of the teaching activities and have passed the related exams.

The final exam consists of the production of a Thesis on one of the topics of the MASTER's teaching plan (10 CFU).

Art. 11 – Conseguimento del titolo

Upon passing the final exam, participants will obtain the title of II level Master in "STATISTICS, DATA INTELLIGENCE, AND THE FOUNDATIONS OF THE SCIENCES" issued by the Polytechnic University of the Marche.

Auditors will be able to obtain a certificate of attendance validated by actual participation in the courses (in person or remotely) for a minimum of 70% of the lessons.

Art. 12 – Proponents of the MASTER and Organizing Committee

The professors who propose the MASTER are:

Prof. Barbara Osimani

The Members of the Organizing Committee are:

Prof. Barbara Osimani

Dr. Alexander Gebharter

Prof. Aldo Dragoni

Prof. Nicola Matteucci

The Coordinator of the Master is:

Prof. Barbara Osimani

Art. 13 – Financial Rules

The MASTER fee amounts to €3300.00, which includes the regional tax for the right to study, the cost of the parchment and the insurance, and excludes revenue stamps (around €16), shouldered by the student, as per the admission rules.

This fee must be paid in a single installment upon registration.

The registration fee will not be refunded.

The amount of the contribution due by the Auditors is equal to €1000.00. This fee must be paid in a single payment upon registration.

The amount of this registration fee will not be refunded.

Art. 14 – Registration Procedure and start of the Master

Starting from the publication of the Call, interested parties will be able to submit an application for admission to the MASTER, according to the methods specifically indicated in the competition notice, available on the web page www.univpm.it (Didattica / Master universitari / denominazione master / Norme e moduli / Norme di ammissione).

Art. 15 – Safeguard Rules

For anything not provided for in this regulation, reference is made to the current University Masters regulation, issued with Rectoral Decree no. 361 of 23 January 2003 and modified with Rectoral Decrees n. 591 of 15 May 2007, n. 235 of 20 January 2010, n. 518 of 23 May 2016 and n.1163 of 17 October 2018.

Art. 16 – Contact

Administrative and Didactic Office: Dr. Roberto Biagioli

Master Secretariat: Dipartimento di Scienze Biomediche e Sanità Pubblica

Tel. 071 2206294; e-mail: dip.disbsp@sm.univpm.it

Students career management office:

Ufficio Segreteria studenti post laurea di area sanitaria, Servizio Sanità; Via Tronto 10/A
Torrette, 60126 Ancona.

Tel. 071 2206281; e-mail: scuole-master.medicina@univpm.it

MASTER IN STATISTICS, DATA INTELLIGENCE, AND THE FOUNDATIONS OF THE SCIENCES A.A. 2023/2024						
Piano didattico						
Title of activity	Teacher Typology	Teacher	SSD	CFU	Structure of credit points	
					Number of frontal teaching hours	Number of individual study hours
PART A						
WINTER SEMESTER						
Foundations of the Sciences	UNIVPM Dipartimento Scienze Biomediche e Sanità Pubblica	Barbara Osimani	M-FIL/02	2	16	34
Epistemology I	Seminario	Michal Sikorski	M-FIL/02	1	8	17
Epistemology II	UNIVPM Dipartimento Scienze Biomediche e Sanità Pubblica	Alexander Gebharter	M-FIL/02	1	8	17
Causation and Probabilities	UNIVPM Dipartimento Scienze Biomediche e Sanità Pubblica	Alexander Gebharter	M-FIL/02	1	8	17
Tutorial: Introduction to STATA for Data Analysis	UNIVPM Dipartimento di Scienze Economiche e Sociali	Riccardo Cappelli	SECS-P/06	2	16	34
Tutorial: PYTHON	UNIVPM Dipartimento di Ingegneria dell'Informazione	Adriano Mancini	ING-INF/05	2	16	34
Tutorial: R & Matlab	UNIVPM Dipartimento di Scienze Economiche e Sociali	Federico Giri	SECS-P/02	3	24	43
Risk and Decision-Making for Data Science and AI	Seminario	Norman Fenton	SECS-S/01	1	8	17
The Philosophy of Evolutionary Theory	Seminario	Elliot Sober	M-FIL/02	1	8	17
PART B						

WINTER SEMESTER						
Foundations of Econometrics I	UNIVPM Dipartimento di Scienze Economiche e Sociali	Claudia Pigni	SECS-P/05	1	8	17
Artificial Intelligence & Logic Programming I	UNIVPM Dipartimento di Ingegneria dell'Informazione	Aldo Dragoni	ING-INF/05	1	8	17
Fundamentals of Machine Learning	DOCENTE ALTRO ATENEO		INF/01	4	32	68
Bayesian Inference	Seminario	Eric-Jan Wagenmakers	M-FIL/02	2	16	34
Introduction to Epidemiology	UNIVPM Dipartimento Scienze Biomediche e Sanità Pubblica	Rosaria Gesuita	MED/01	1	8	17
Principles of Systematic Reviews and Meta-analysis	UNIVPM Dipartimento Scienze Biomediche e Sanità Pubblica	Marica Iommi	MED/01	1	8	17
Experimental Study Design	UNIVPM Dipartimento Scienze Biomediche e Sanità Pubblica	Edlira Skrami	MED/01	1	8	17
Study protocol and Sample Size Estimation	UNIVPM Dipartimento Scienze Biomediche e Sanità Pubblica	Andrea Faragalli	MED/01	1	8	17
Statistical Schools: Concepts of Probability, Statistical Inference, and Data Analysis	DOCENTE ALTRO ATENEO		SECS-S/01	1	8	17
PART A						
SUMMER SEMESTER						
Bayesian Philosophy of Science	Seminario	Stephan Hartmann	M-FIL/02	1	8	17
Formal Epistemology I	Seminario	Michal Sikorski	M-FIL/02	1	8	17
Formal Epistemology II	UNIVPM Dipartimento Scienze Biomediche e Sanità Pubblica	Alexander Gebharter	M-FIL/02	1	8	17
Time-series forecasting with Deep Learning	UNIVPM Dipartimento di Ingegneria dell'Informazione	Alessandro Galdelli	ING-INF/05	1	8	17
Foundations of Econometrics II	UNIVPM Dipartimento di Scienze Economiche e Sociali	Claudia Pigni	SECS-P/05	1	8	17

Rationality in the Sciences	UNIVPM Dipartimento Scienze Biomediche e Sanità Pubblica	Barbara Osimani	M-FIL/02	2	16	34
Beyond Inferential Statistics: Abduction and Q Methodology	UNIVPM Dipartimento di Scienze Agrarie, Alimentari e Ambientali	Raffaele Zanolì	AGR/01	1	8	17
Casual Inference	UNIVPM Dipartimento Scienze Biomediche e Sanità Pubblica	Alexander Gebharter	M-FIL/02	2	16	34
PART B						
SUMMER SEMESTER						
Imprecise Probabilities	DOCENTE ALTRO ATENEO		MAT/06	2	16	34
Rational Choice Theory	DOCENTE ALTRO ATENEO		M-FIL/02	1	8	17
Economics of Science and Technology	UNIVPM Dipartimento di Scienze Economiche e Sociali	Nicola Matteucci	SECS-P/06	1	8	17
Economics of Regulation in Science-Based Domains	UNIVPM Dipartimento di Scienze Economiche e Sociali	Nicola Matteucci	SECS-P/06	1	8	17
Artificial Intelligence & Logic Programming II	UNIVPM Dipartimento di Ingegneria dell'Informazione	Aldo Dragoni	ING-INF/05	1	8	17
Time Series Econometrics	UNIVPM Dipartimento di Economia	Giulio Palomba	SECS-P/05	4	32	68
Integrity of Research	Seminario	Andrea Saltelli	M-FIL/02	1	8	17
Ethics of Quantification	Seminario	Andrea Saltelli	M-FIL/02	1	8	17
Questionnaire development: How to collect data from surveys. Do's and Don'ts	UNIVPM Dipartimento Scienze e Ingegneria della Materia, dell'Ambiente ed Urbanistica	Simona Naspetti	AGR/01	1	8	17
FINAL EXAM				10		
SUM				60	400	1100