

International Master in *Statistical Sciences*

<https://corsi.unibo.it/2cycle/StatisticalSciences>

Bologna Campus

Programme director: Gabriele Soffritti – gabriele.soffritti@unibo.it

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Programme coordinator: Maria Luigia Loiudice – cdl.clamss@unibo.it

Programme tutor: TBA – didatticasociale.tutorclamss@unibo.it

Duration: 2 years

Code: LM-82

Why a Master in Statistical Sciences?

"What **steam** was to the 19th century, and **oil** has been to the 20th, **data** is to the 21st."

Royal Statistical Society (RSS) Data Manifesto

Statistics is the science of using data to make decisions.

Aim of the **Master's Degree in Statistical Sciences:**

training experts able to collect, manage, analyze and interpret data to produce the knowledge essential for evidence-based decision-making in companies and public institutions.

U.S. rankings of best jobs



Rankings

Statisticians rank #3 in [Best Business Jobs](#). Jobs are ranked according to their ability to offer an elusive mix of factors. [Read more about how we rank the best jobs.](#)

🏆 #3 in **Best Business Jobs**

🏆 #7 in **Best STEM Jobs**

🏆 #8 in **100 Best Jobs**

SCORECARD

7.6

Salary 7.6

Job Market 8

Future Growth 8

Stress 8

Work Life Balance 8

[HOW WE RANK JOBS »](#)

Career opportunities

Graduates have access to a wide range of **national** and **international** positions in companies, research centers, and public institutions.

More specifically, graduates will be:

- **data scientists,**
- **scientific researchers,**
- **biostatisticians,**
- **experts** in the analysis of **socio-demographic phenomena,**
- **experts** in the analysis and production of **official statistics.**



Placement

PhD programs:



Public institutions and national/international companies:



General information about the Master

Programme type: Second cycle degree/two year master (120 ECTS)

Department: Statistical Sciences

One of the largest statistics departments in the world
(more than 80 faculty members)

Place of teaching: Bologna

Official language: English

Type of access: Open with assessment of personal competences

Attendance: Not formally compulsory, but highly encouraged

Tracks: **Data science;**
Health and population analytics;
Official statistics.

RSS accreditation



<https://rss.org.uk/membership/professional-development/gradstat/>

Reference people for the Master

Programme director: Gabriele Soffritti – gabriele.soffritti@unibo.it

Academic advisors:

for **Data science**

Laura Anderlucci – laura.anderlucci@unibo.it

for **Official statistics**

Elisabetta Carfagna – elisabetta.carfagna@unibo.it

for **Health and population analytics**

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Entry procedure and enrolment 2024/25

- Application (intakes) → evaluation (admission board) → admission → enrolment
- Candidates who have not completed their first level degree (bachelor) can apply but they must graduate within December 2024
- 3 intakes (March - July 2024) (online documentation)
- Enrolment (July - November 2024)
- The call for applications for the a.y. 2024/25 and more detailed information on the entry procedure will be available in February 2024:
<https://corsi.unibo.it/2cycle/StatisticalSciences/admission>

Curricular requirements

Admission is subjected to the possession of a three-year university degree or other suitable qualification obtained abroad.

Students must have acquired **credits (ECTS) in the following subject areas:**

- **PROBABILITY AND STATISTICS (at least 15 ECTS)**(SECS-S/01, SECS-S/02, SECS-S/03, SECS-S/04, SECS-S/05, SECS-P/05, MAT/06)
- **MATHEMATICS (at least 10 ECTS)** (SECS-S/06, MAT/02, MAT/03, MAT/05, MAT/06, MAT/07, MAT/08, MAT/09)

Such credits must be possessed at the time of the application.

English requirements

Knowledge of the English language to level B2 can be demonstrated by anyone of the following:

- ✓ a certificate by CLA (Centro Linguistico di Ateneo) or similar University language centers,
- ✓ English Language certification among the following: TOEFL, ISE, IELTS, Cambridge English Language Assessment, Trinity College London,
- ✓ a first cycle degree (bachelor) taught in English (suitably certificated),
- ✓ a B2 level English exam in the bachelor study plan (suitably certificated),
- ✓ English is the student's mother tongue (to be indicated on the CV).

For more information:

<https://centri.unibo.it/cla/it/riconoscimento-idoneita-linguistica>

Courses and tracks

The two-year programme consists of **common compulsory** courses (36 ECTS), **track compulsory** courses (min. 48 ECTS), **elective** courses (10 ECTS) and a master's **thesis**, for a total of 120 ECTS.

To tailor the programme to your interests, you can choose one of three tracks:

- ***Data Science (DS)***
- ***Health and Population Analytics (HPA)***
- ***Official Statistics (OS)***



Internships and international perspectives

Internships (250 hours – 10 ECTS)

- **Optional for DS and HPA**
 - **Within the Department of Statistical Sciences:** acting as a Research Assistant (**RAships**) of a faculty member of CLAMSS (or another member of the Department of Statistical Sciences).
 - **In private companies, public institutions, professional firms** (either in Italy or abroad).
- **Compulsory for OS**
 - **At national statistical institutes, national central banks, national authorities or international organizations.**

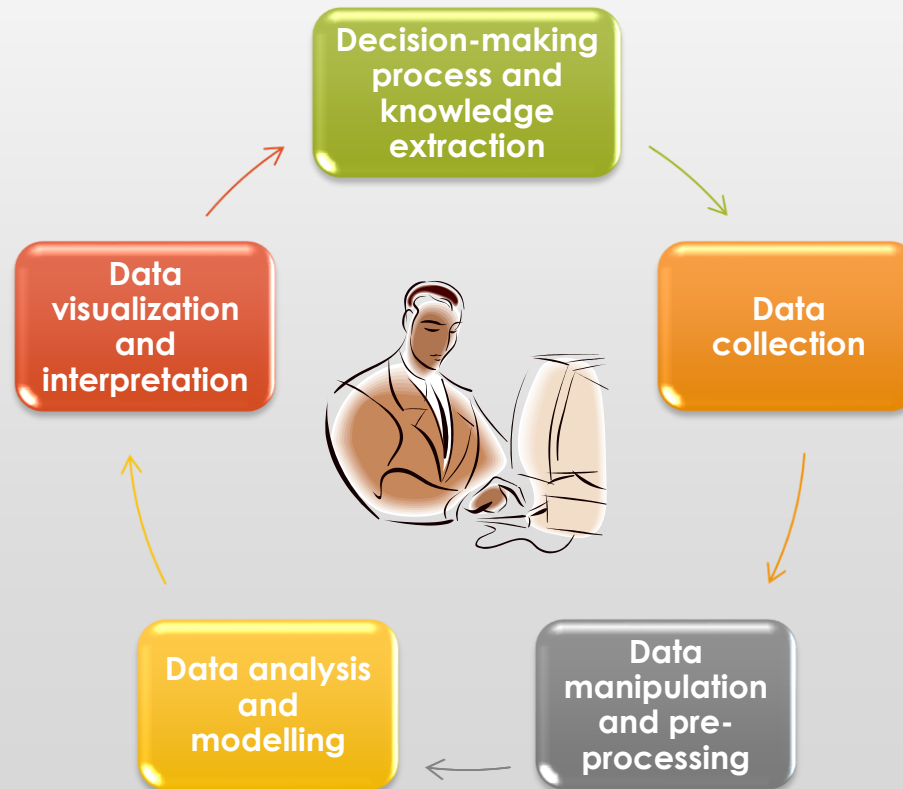
International perspectives

- **Exchange mobility programmes**
 - Erasmus + for study
 - Erasmus + for traineeship
 - Overseas
- **Final dissertation abroad**

Curriculum in Data Science

Academic advisor: Prof. Laura Anderlucci

Statistics is a crucial part of data science, but data science also includes applied work on data manipulation and visualization.



Data Science - Study Plan

Academic advisor: Prof. Laura Anderlucci

DATA SCIENCE (a.y. 2024/25)				
	FIRST YEAR	Term	No. exams	ECTS
Common compulsory	Fundamental concepts of statistics	1-2	1	10
	Statistical models and applications	3-4	1	10
	Statistical software	1-2	1	4
	Bayesian inference	2	1	6
	One among:		1	6
	Measure theory	3		
	Differential calculus	2		
	Advanced probability	1		
	Differential equations	2		
Track compulsory	Stochastic processes	3	1	6
	Advanced time series	4	1	6
	Supervised statistical learning	3	1	6
	Data science applications	4	1	6
Total first year			9	60
	SECOND YEAR			
Track compulsory	Modern statistics and big data analytics	1-2	1	10
	Latent variable models	2	1	6
	Machine learning systems for data science	1-2	1	10
10 cfu from electives (first or second year)			1	10
Total second year			4	36
Master thesis				24
TOTAL			13	120

Double Degree with the Master in Computational Science of USI in Lugano, Switzerland



Bologna students attending the degree programme in Statistical Sciences, [curriculum Data Science](#), can apply in order to be admitted to the double degree programme with the Università della Svizzera Italiana (USI) in Lugano.

They will spend the **first semester of their second year** in Lugano.

If they successfully complete their studies they will **obtain both the Master's Degree in Statistical Sciences (LM-82)** delivered by Bologna University **and the Master's Degree in Computational Science** delivered by USI.

Lugano students will attend our second year courses.

<https://corsi.unibo.it/2cycle/StatisticalSciences/opportunities-international-degree-programme>

Curriculum in Health and Population Analytics

Academic advisor: Prof. Rossella Miglio

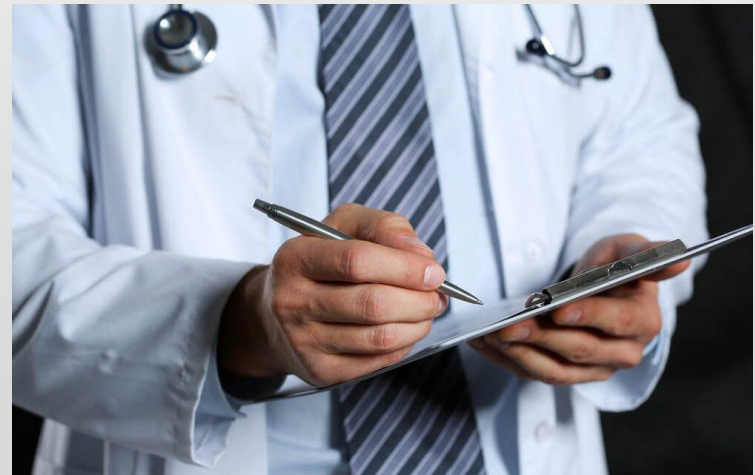
Investigation and application of statistical techniques to scientific research in health, population and life:

- ▶ epidemiology
- ▶ medicine
- ▶ public health
- ▶ genetics
- ▶ social and demographic studies



Biostatistician

Expert in social and demographic studies



Health and Population Analytics - Study Plan

Academic advisor: Prof. Rossella Miglio

HEALTH AND POPULATION ANALYTICS (a.y. 2024/25)				
	FIRST YEAR	Term	No. exams	ECTS
Common compulsory	Fundamental concepts of statistics	1-2	1	10
	Statistical models and applications	3-4	1	10
	Bayesian inference	2	1	6
	Statistical software	1-2	1	4
	One among:	3	1	6
	Measure theory	2		
	Differential calculus	1		
	Advanced probability	2		
	Differential equations			
Track compulsory	Sociogenomics	3-4	1	10
	Data science applications	4	1	6
	Human genetics	4	1	6
10 cfu from electives (first or second year)			1	10
Total first year			9	68
SECOND YEAR				
Track compulsory	Analysis of categorical data	1	1	6
	Biodemography	1-2	1	10
	Advanced survival analysis	1	1	6
	Methods and tools for health statistics	3	1	6
Total second year			4	28
Master thesis				24
TOTAL			13	120

Curriculum in Official Statistics

Academic advisor: Prof. Elisabetta Carfagna

Official statistics are all statistics produced by government departments, local authorities, businesses for the purpose of making policy decisions and analyzing economic, social and demographic phenomena.

Statistical domains



- Tourism
- Employment
- Population
- Migration
- Balance of payments
- Regional and GIS
- Transport
- ICT usage
- Prices and inflation
- Land use
- Agriculture

Official Statistics

Academic advisor: Prof. Elisabetta Carfagna

The curriculum **Official Statistics** has been awarded the **EMOS** label by the **European Statistical System Committee (ESSC)**

Students of this curriculum receive the **EMOS** certification

• EMOS for students

- Master Thesis Competition
 - Paid cross-border traineeships
 - Sponsorship for participation in statistical conferences
 - Labelled Universities
 - Learning material
 - Coding Labs
 - Tools and Software
 - EMOS brochure and posters
- Financially supported cross-border traineeships in organisations forming the European Statistical System (ESS) and European System of Central Banks (ESCB) - EMOS students can submit a general application or can apply for specific internship offers abroad
 - Blue Book traineeship programme: twice a year the European Commission offers 5-month paid traineeships
 - National statistical institutes (NSI), National Central Banks, Other National Authorities, International Organization (European and UN)



Official Statistics - Study Plan

Academic advisor: Prof. Elisabetta Carfagna

OFFICIAL STATISTICS (a.y. 2024/25)				
	FIRST YEAR	Term	No. exams	ECTS
Common compulsory	Fundamental concepts of statistics	1-2	1	10
	Statistical models and applications	3-4	1	10
	Bayesian inference	2	1	6
	Statistical software	1-2	1	4
	One among:		1	6
	Measure theory	3		
	Differential calculus	2		
	Advanced probability	1		
	Differential equations	2		
Track compulsory	Social demography	3-4	1	10
	Methods and tools for official statistics: Socio-economic statistics	3	1	6
10 cfu from electives (first or second year)			1	10
Total 1° year			8	62
	SECOND YEAR			
Track compulsory	Systems and algorithms for data science	1-2	1	10
	Analysis of categorical data	1	1	6
	Compulsory internship (in the area of official statistics)			10
	Methods and tools for official statistics: Health statistics	3	1	6
Total 2° year			3	32
Master thesis				26
TOTAL			11	120

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