MD2SL

The 2nd Level Master in Data Science and Statistical Learning (MD2SL) is promoted by the Florence Center for Data Science, through t

The master MD2SL aims to equip professionals with extensive theoretical knowledge of more advanced statistical, IT and computational tools, allowing them to use and critically evaluate the potential of different methods to extract information from the increasing amount of data available in diverse application areas, with particular reference to applications in the economic, business and health sectors, to provide research questions and foster innovation.
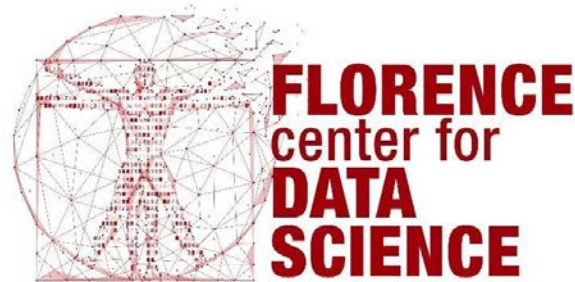
ARTES 4.0

Industry 4.0 Competence Center on
Advanced Robotics and
enabling digital TEchnologies
& Systems

2nd Level Master Course in Data Science and Statistical Learning

Florence Center for Data Science

Scuola IMT Alti Studi Lucca

FLORENCE center for DATA SCIENCE

IMT SCUOLA ALTI STUDI LUCCA

UNIVERSITÀ DEGLI STUDI FIRENZE

COURSE OF STUDY

The 2nd Level Master in Data Science and Statistical Learning (MD2SL) is promoted by the Florence Center for Data Science, through the Department of Statistics, Computer Science, Applications "G. Parenti" (DISIA) of the University of Florence, and the IMT School for Advanced Studies Lucca. The master MD2SL comprises three distinct teaching blocks and an (optional) data science lab.

1. DATA SCIENCE BOOTCAMP

Provides a solid knowledge on the foundations of Data Science:

- Mathematics and Statistics for Data Science
- Algorithmic Foundations and Programming Skills

2. CORE COURSES

Provide theoretical and practical skills in Data Science and Data Analytics:

- Statistical Learning for Data Science
- Supervised and Unsupervised Learning
- Complex Systems
- Decision Theory for Data Science

3. ELECTIVE COURSES

Provide specific skills in the fields of economics and business or health and medical science, organized in three possible tracks:

- Data Science for Economics
- Data Science for Business
- Data Science for Health

The specific objectives of each block are achieved through a balanced mix of theoretical lectures, case studies, workshops and individual and group practical exercises.

TEACHING MODULES

Second Block
CORE COURSES

Course	SSD	CFU	Hrs
Statistical Learning for Data Science		**6**	**48**
Statistical Learning	SECS-S/01	2	16
Geo-spatial data analysis	SECS-S/01	2	16
Network data analysis	SECS-S/01	2	16
Supervised and Unsupervised Learning		**6**	**48**
Advanced Machine Learning	MAT/09	3	24
Deep Learning, Neural Networks, and Reinforcement Learning	ING-INF/05	3	24
Complex Systems		**6**	**48**
Text Mining and NLP	ING-INF/05	2	16
Network and Media Analysis	FIS/03	2	16
Complex System Analysis	FIS/03	2	16
Decision Theory for Data Science		**7**	**56**
Bayesian Inference and Causal Machine Learning	SECS-S/01	3	24
Analytics in Economics and Business	SECS-P/06	3	24
Ethics and Law for Data Science	IUS/01	1	8
Hands-On Labs	**SECS-S/01**	**3**	**24**

First Block
DATA SCIENCE BOOTCAMP

Course	SSD	CFU	Hrs
Mathematics and Statistics for Data Science		**8**	**64**
Optimization	MAT/09	2	16
Numerical Calculus and Linear Algebra	MAT/08	2	16
Probability and Stochastic Processes	MAT/06	2	16
Statistical Inference and Modeling	SECS-S/01	2	16
Algorithmic Foundations and Programming Skills		**6**	**48**
Algorithms and Programming in Python and R for Data Science	INF/01	3	24
Machine Learning	ING-INF/05	2	16
Optimization for Machine Learning	MAT/09	1	8

Third Block
ELECTIVE COURSES
Two tracks to select from the following:

Course	SSD	CFU	Hrs
1) Data Science for Economics		**4**	**32**
Experiments and real-world evidence in economics	SECS-P/01	2	16
Policy Evaluation and Impact Analysis	SECS-P/06	2	16
2) Data Science for Business		**4**	**32**
Time Series Analysis	SECS-S/03	2	16
Optimization of Financial Portfolios	SECS-S/06	2	16
3) Data Science for Health		**4**	**32**
Health Analytics and Data-driven Medicine	SECS-P/02	2	16
Environmental and Genomic Data Analysis	MED/01	2	16

FINAL ACTIVITIES

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Seminars, real-case studies by colleagues and partners	2 CFU	16 ore
Internship (25 ore per CFU)	9 CFU	225 ore
Final project	3 CFU	

INTERNSHIP

At the end of the course, students will have the opportunity to put the acquired knowledge into practice through a 225-hour internship at one of the public or private companies, research centers and units, or local authorities that are partners of the master's program.

The inclusion in the working environment allows students to follow first-hand the design/creation/development phases of software and the implementation of complex data analysis.

The internship activity aims to equip students with specific skills, such as:

- the ability to apply technical skills to real-world cases;
- an orientation to problem solving in the design, implementation and monitoring of specific projects;
- the ability to communicate the results of projects developed in corporate or institutional contexts;
- managerial skills useful in all phases of the development of data science and big-data analytics projects.
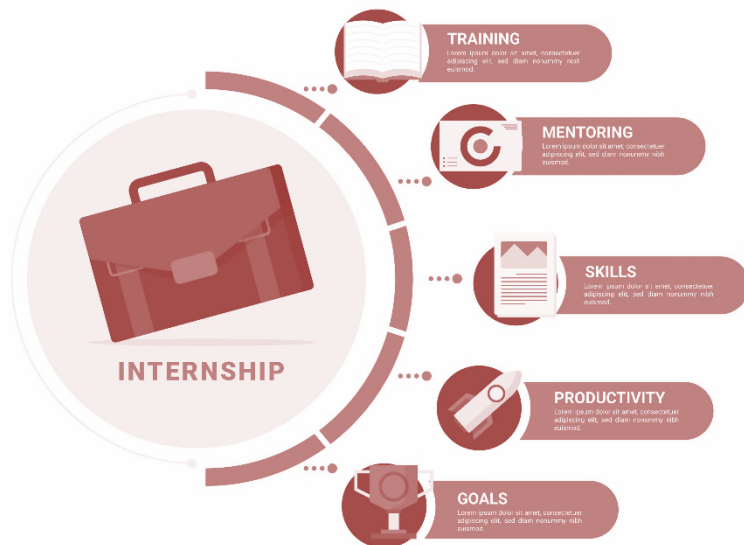
PROFESSIONAL PROFILE

At the end of the program, students will be able to collect, structure, clean, and analyze complex, unstructured and high-dimensional data. They will be able to identify the relevant information, as well as develop innovative methodological and computational solutions for data collection and analysis. This will allow them to address emerging information needs and support decision-making processes in the medical/health or economic/business fields.

Students will also develop strong communication skills, which are essential for adequate and effective dissemination of results to subjects without a technical background in data science.

The presence of notable partners from the business and research world gives a practical and concrete imprint to the master's program; this approach will be further strengthened by the internship experience at some of the partners and other institutions involved in the program. The resulting professional profile can find employment in different fields such as public administrations and local authorities, data analysis units of medium and large enterprises, insurance companies, marketing offices of production and distribution companies, research centers, and consulting firms.

Furthermore, thanks to the solid theoretical foundations acquired during the program, students will be ready to access doctoral programs related to the topics covered, in Italy and abroad.

PARTNERS:

KEY FACTS:

Qualification: 2nd level Master's Degree

Schedule: 16 hours per week, including Saturdays, in blended mode

Admission Requirements: Degree from the previous system, specialist/ 2nd-cycle degree, single-cycle degree

Language: English

Deadline call for Application: 15/11/2022

Duration: 1/02/2023 - 31/01/2024

Location: Florence and Lucca

Enrollment Fee: Master: 4,500€ Individual modules: 100€/CFU

Max Number of Participants: 20

Internship: 225 hours at one of the Master's partners

For further information write to

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