

**42.DATA SCIENCE AND STATISTICAL LEARNING (MD2SL)**

Il livello

*Florence Center for Data Science*

**Dipartimento di Statistica, Informatica, Applicazioni "G. Parenti"**

*Corso realizzato in collaborazione con*

*Scuola IMT Alti Studi Lucca*

*con rilascio di titolo congiunto*

**Coordinatrice del corso**

Chiara Bocci

**PIANO DI STUDI**

| Insegnamento   | Settore Scientifico Disciplinare | CFU       |
|--|----------------------------------|-----------|
| <b>Primo blocco – Bootcamp courses</b>   |                                  |           |
| <b>Mathematics and Statistics for Data Science</b>                             |                                  | <b>10</b> |
| Optimization   | MAT/09                           | 2         |
| Numerical calculus and linear algebra  | MAT/08                           | 2         |
| Probability and stochastic processes   | MAT/06                           | 2         |
| Statistical inference  | SECS-S/01                        | 2         |
| Statistical modelling  | SECS-S/01                        | 2         |
| <b>Algorithmic Foundations and Programming Skills</b>                          |                                  | <b>6</b>  |
| Algorithms and programming in Python for data science                          | INF/01                           | 2         |
| Algorithms and programming in R for data science                               | SECS-S/01                        | 1         |
| Machine learning   | ING-INF/05                       | 2         |
| Optimization for machine learning  | MAT/09                           | 1         |
| <b>Secondo blocco – Core courses</b>   |                                  |           |
| <b>Statistical Learning for Data Science</b>                                   |                                  | <b>6</b>  |
| Statistical learning   | SECS-S/01                        | 2         |
| Geo-spatial data analysis  | SECS-S/01                        | 2         |
| Network data analysis  | SECS-S/01                        | 2         |
| <b>Supervised and Unsupervised Learning</b>                                    |                                  | <b>6</b>  |
| Advanced machine learning  | MAT/09                           | 3         |
| Deep learning, neural networks, and reinforcement learning                     | ING-INF/05                       | 3         |
| <b>Complex Systems</b>   |                                  | <b>6</b>  |
| Text mining and NLP  | ING-INF/05                       | 2         |
| Complex networks analysis  | FIS/03                           | 2         |
| Complex system analysis  | FIS/03                           | 2         |
| <b>Decision Theory for Data Science</b>  |                                  | <b>7</b>  |
| Bayesian causal inference  | SECS-S/01                        | 3         |
| Analytics in economics and business  | SECS-P/06                        | 3         |
| Ethics and law for data science  | IUS/08                           | 1         |
| <b>Terzo blocco – Elective courses</b><br><i>Due insegnamenti a scelta tra</i> |                                  |           |
| <b>1) Data Science for Economics</b>   |                                  | <b>4</b>  |
| Experiments and real-world evidence in economics - Part A                      | SECS-P/02                        | 1         |
| Experiments and real-world evidence in economics - Part B                      | SECS-P/01                        | 1         |
| Policy evaluation and impact analysis  | SECS-P/06                        | 2         |
| <b>2) Data Science for Business</b>  |                                  | <b>4</b>  |
| Time series analysis   | SECS-S/03                        | 2         |
| Financial risk management  | SECS-S/06                        | 2         |

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|--|----------------------------------|-----------|
| <b>3) Data Science for Health</b>                      |                                  | <b>4</b>  |
| Health analytics and data-driven medicine              | SECS-P/02                        | 2         |
| Environmental and genomic data analysis                | MED/01                           | 2         |
| <b>Hands-on labs</b>                                   | INF/01                           | <b>4</b>  |
| <b>Totale CFU didattica frontale</b>                   |                                  | <b>53</b> |
| Seminars, real-case studies by colleagues and partners |                                  | 2         |
| Tirocinio  |                                  | 9         |
| Prova finale   |                                  | 3         |
| <b>Totale CFU</b>                                      |                                  | <b>67</b> |

### MODULI SINGOLI

| Insegnamento   | Settore Scientifico Disciplinare | CFU      |
|--|----------------------------------|----------|
| <b>Algorithmic Foundations and Programming Skills</b>      |                                  | <b>6</b> |
| Algorithms and programming in Python for data science      | INF/01                           | 3        |
| Machine learning   | ING-INF/05                       | 2        |
| Optimization for machine learning                          | MAT/09                           | 1        |
| <b>Statistical Learning for Data Science</b>               |                                  | <b>6</b> |
| Statistical learning                                       | SECS-S/01                        | 2        |
| Geo-spatial data analysis                                  | SECS-S/01                        | 2        |
| Network data analysis                                      | SECS-S/01                        | 2        |
| <b>Supervised and Unsupervised Learning</b>                |                                  | <b>6</b> |
| Advanced machine learning                                  | MAT/09                           | 3        |
| Deep learning, neural networks, and reinforcement learning | ING-INF/05                       | 3        |
| <b>Complex Systems</b>                                     |                                  | <b>6</b> |
| Text mining and NLP  | ING-INF/05                       | 2        |
| Complex networks analysis                                  | FIS/03                           | 2        |
| Complex system analysis                                    | FIS/03                           | 2        |
| <b>Decision Theory for Data Science</b>                    |                                  | <b>7</b> |
| Bayesian causal inference                                  | SECS-S/01                        | 3        |
| Analytics in economics and business                        | SECS-P/06                        | 3        |
| Ethics and law for data science                            | IUS/08                           | 1        |