

Master's Degree Program in Data Science – Study Program for the academic year 2025/2026

Exam code	Course name	SSD		Module	Credits	Semester	TAF
FIRST YEAR							
U5383	Mathematical methods for Data Science	MAT/08	MATH-05/A	single	6	I	B
U5387	Statistical Learning & Data Analysis	SECS-S/01	STAT-01/A	A	6	I	B
		SECS-S/01	STAT-01/A	B	6		B
U5393	Fundamentals of programming & Data management	ING-INF/05	IINF-05/A	A	6	I	B
		ING-INF/05	IINF-05/A	B	6	II	B
U5386	Hardware and Software for big data	ING-INF/05	IINF-05/A	A	6	I	B
		ING-INF/05	IINF-05/A	B	6	II	B
U5390	Data Mining & Machine Learning	SECS-S/01	STAT-01/A	A	6	II	B
		INF/01	INFO-01/A	B	6		B
U5396	Theory and Ethics of Big Data and AI	M-FIL/03	PHIL-03/A	single	6	II	B
SECOND YEAR							
	CURRICULAR TEACHING I (*)				12	I/II	C
	CURRICULAR TEACHING II				6	I/II	C
	INDEPENDENT CHOICE BY THE STUDENT (**)				6	I/II	D
	INDEPENDENT CHOICE BY THE STUDENT				6	I/II	D
	ADDITIONAL KNOWLEDGE (***)				6		F
	INTERNSHIP OR PROJECT (****)				8		F
	GRADUATION EXAM				16		E

(*) The CURRICULAR COURSES are defined in Table 1 for each STUDY PROGRAM (PdS) from among the following:

1. **FUNDAMENTAL SCIENCES Curriculum, divided into the following paths:**
 - PHYSICS-INSPIRED METHODOLOGIES – **FSC/PM**
 - MATHEMATICAL METHODOLOGIES – **FSC/MM**
 - LIFE SCIENCES – **FSC/LS**
2. **Curriculum INFORMATION TECHNOLOGIES, divided into the following paths:**
 - TEXT AND SPEECH PROCESSING – **ITE/TS**
 - SIGNAL AND VIDEO PROCESSING – **ITE/SV**
 - ROBOTICS AND STATISTICS – **ITE/RS**
 - INDUSTRIAL APPLICATIONS – **ITE/IA**
 - DESIGN AND SECURITY OF AI SYSTEMS – **ITE/AI**
3. **PUBLIC ADMINISTRATION, ECONOMY, AND MANAGEMENT Curriculum – ECO**
4. **INTELLIGENT SYSTEMS Curriculum - ISY**

(**) The two 6-credit COURSES CHOSEN INDEPENDENTLY BY THE STUDENT can be replaced by a single 12-credit course chosen independently by the student. Courses chosen independently by the student can be selected from among all those offered in the Master's Degree programs at the University of Naples Federico II, provided they are consistent with the educational path chosen by the student. Table 2 lists the automatically approved elective courses for each STUDY PROGRAM (PdS). Alternatively, students may submit a request for an individual study plan, which must be approved by the Teaching Committee of the Study Program.

(***) For foreign students only, these credits will be awarded after obtaining a certificate of knowledge of the Italian language (courses provided by the University Language Center - CLA). For Italian students, credits can be earned by acquiring technical skills outside the course of study (e.g., participation in seminars, conferences, tutoring activities, etc.).

(****) Extramural internships are carried out at companies, research centers, or other public and/or private institutions, in Italy or abroad, with the support of a company or institution tutor and the supervision of a university tutor. Intramural internships are carried out at university research laboratories with the support of at least one university tutor (professor or researcher).

KEY

Type of Training Activity (TAF):

B = Characterizing

C = Related or Supplementary

D = Elective

E = Final exam

F = Additional training activity and language skills

List of prerequisites: The course of study has no prerequisites.

TABLE I – CURRICULUM CHOICE FOR YEAR II (12 CFU + 6 CFU) – TAF C

Exam code	Course name	Module	Field	Credits	Sem	Reference degree program		
FSE/PH STUDY PROGRAM - FUNDAMENTAL SCIENCES/PHYSICS-INSPIRED METHODOLOGIES CURRICULUM								
U5450	Advanced Statistical Learning and Modeling	Advanced Statistical Learning and Modeling Mod A	SECS-S/01	STAT-01/A	6	12	I	DIETI – LM Data Science
		Advanced Statistical Learning and Modeling Mod B	SECS-S/01	STAT-01/A	6		I	DIETI – LM Data Science
U7202	Physics Informed Machine Learning	single	MAT/08	MATH-05/A	6	6	II	DIETI – LM Data Science
PDS FSE/MM - FUNDAMENTAL SCIENCES/MATHEMATICAL METHODOLOGIES CURRICULUM								
U5430	Algorithms and Parallel Computing and Computational Complexity	Algorithms and Parallel Computing MOD A	INF/01	INFO-01/A	6	12	II	DMRC - LM Engineering Mathematics D71
		Computational Complexity MOD B	INF/01	INFO-01/A	6		I	DMRC - LM Engineering Mathematics D71
U1624	Operational Research	single	MAT/09	MATH-06/A	6	6	I	DMRC - LM Engineering Mathematics D71
PDS FSE/LS - FUNDAMENTAL SCIENCES/LIFE SCIENCES CURRICULUM								
U7216	Biochemistry and computational biochemistry	Biochemistry	BIO/10	BIOS-07/A	6	12	II	DIETI - LM Data Science
		Computational Biochemistry	BIO/10	BIOS-07/A	6			
U1581	Cell and Molecular Biology	unique	BIO/11	BIOS-08/A	6	6	I	DICMAPI – LM Industrial Bioengineering
PDS ITE/TS - CURRICULUM INFORMATION TECHNOLOGIES/TEXT AND SPEECH PROCESSING								
U7206	Information Retrieval and Text Mining	Information Retrieval	ING-INF/05	IINF-05/A	6	12	II	DIETI – LM Computer Engineering
		Text Mining	ING-INF/05	IINF-05/A	6		I	DIETI – LM Data Science
U6636	Speech Processing	single	L-LIN/01	GLOT-01/A	6	6	II	DIETI – LM Data Science
PDS ITE/SV - CURRICULUM INFORMATION TECHNOLOGIES/SIGNAL AND VIDEO PROCESSING								
U5444	Information Theory and Signals Theory	Information Theory	ING-INF/03	IINF-03/A	6	12	I	DMRC - LM Engineering Mathematics D71
		Signals Theory	ING-INF/03	IINF-03/A	6		2	DMRC - LM Engineering Mathematics D71
U3423	Image and Video Processing for Autonomous Driving	single	ING-INF/03	IINF-03/A	6	6	II	DII - LM Autonomous Vehicle Engineering
PDS ITE/RS - CURRICULUM INFORMATION TECHNOLOGIES/ROBOTICS AND STATISTICS								
U2563	Robotics	Robotic Systems	ING-INF/04	IINF-04/A	6	12	I	DIETI – LM Computer Engineering
		Robotic Lab	ING-INF/04	IINF-04/A	6		II	DIETI – LM Computer Engineering
U7207	Advanced Statistical Learning	single	SECS-S/01	STAT-01/A	6	6	I	DIETI – LM Data Science
PDS ITE/IA - CURRICULUM INFORMATION TECHNOLOGIES/INDUSTRIAL APPLICATIONS								
U5450	Advanced Statistical Learning and Modeling	Advanced Statistical Learning and Modeling Mod A	SECS-S/01	STAT-01/A	6	12	I	DIETI – LM Data Science
		Advanced Statistical Learning and Modeling Mod B	SECS-S/01	STAT-01/A	6		I	DIETI – LM Data Science
U2659	Statistical Methods for Industrial Process Monitoring	single	SECS-S/02	STAT-01/B	6	6	I	DMRC - LM Engineering Mathematics D71
PDS ITE/AI - CURRICULUM INFORMATION TECHNOLOGIES/DESIGN AND SECURITY OF AI SYSTEMS								
U7208	Algorithm Design and Methods of AI	Algorithm Design	INF/01	INFO-01/A	6	12	II	DIETI – LM Computer Science
		Methods for Artificial Intelligence	INF/01	INFO-01/A	6		II	DIETI – LM Computer Science
U2652	Data Security	single	ING-INF/05	IINF-05/A	6	6	I	DIETI – LM Data Science
PDS ECO - PUBLIC ADMINISTRATION, ECONOMY AND MANAGEMENT CURRICULUM								
U7213	Computational Statistical Inference and Categorical Data Analysis	Computational Statistical Inference	SECS-S/01	STAT-01/A	6	12	I	DISES – LM Economics and Business D78
		Categorical Data Analysis	SECS-S/01	STAT-01/A	6		I	DISES – LM Economics and Business D78
U6373	Financial Time Series Analysis	single	SECS-S/01	STAT-01/A	6	6	I	DISES – LM Economics and Finance DHS
PDS ISY - INTELLIGENT SYSTEMS CURRICULUM								
U7211	Quantum Computation and Computational Intelligence	Mod I Theory	INF/01	INFO-01/A	6	12	II	DFEP – LM Quantum Science and Engineering D60
		Computational Intelligence	INF/01	INFO-01/A	6		II	DIETI – LM Data Science
U7215	Generative Artificial Intelligence	single	INF/01	INFO-01/A	6	6	I	DIETI – LM Data Science

KEY:

DFEP: Department of Physics Ettore Pancini; DIETI: Department of Electrical Engineering and Information Technology; DII: Department of Industrial Engineering; DISES: Department of Economics and Statistics; DMRC: Department of Mathematics and Applications Renato Caccioppoli; DICMAPI: Department of Chemical Engineering, Materials and Industrial Production; NI: New Institution

**TABLE 2 – List of courses for INDEPENDENT CHOICE with automatic approval
SECOND YEAR (6 CFU + 6 CFU or 12 CFU) – TAF D**

Exam code	Course name	SSD		Credits	Sem	Reference degree program
Previously taught courses or modules if not part of THE CHOSEN STUDY PROGRAM						
U7207	Advanced Statistical Learning	SECS-S/01	STAT-01/A	6	I	DIETI – LM Data Science
U7218	Advanced Statistical Modeling	SECS-S/01	STAT-01/A	6	I	DIETI – LM Data Science
U1643	Algorithms and Parallel Computing	INF/01	INFO-01/A	6	II	DMRC - LM Engineering Mathematics
U7219	Computational Intelligence	INF/01	INFO-01/A	6	II	DIETI – LM Data Science
U2652	Data Security	ING-INF/05	IINF-05/A	6	I	DIETI – LM Data Science
U7215	Generative Artificial Intelligence	INF/01	INFO-01/A	6	I	DIETI – LM Data Science
NI	Financial Time Series Analysis	SECS-S/01	STAT-01/A	6	I	DISES – LM Econ. and Finance
U3423	Image and Video Processing for Autonomous Driving	ING-INF/03	IINF-03/A	6	II	DII - LM Autonomous Vehicle Engineering
U1644	Information Theory	ING-INF/03	IINF-03/A	6	I	DMRC - LM Engineering Mathematics
U3522	Methods for Artificial Intelligence	INF/01	INFO-01/A	6	II	DIETI – LM Computer Science
U5902	Text Mining	ING-INF/05	IINF-05/A	6	I	DIETI – LM Data Science
Other courses						
U5494	AI Systems Engineering	ING-INF/05	IINF-05/A	6	I	DIETI – LM Computer Engineering
U4763	Applied Quantum Systems	FIS/03	PHYS-03/A	6	II	DFEP – LM Quantum Science and Engineering
U1205	Astroinformatics	FIS/05	PHYS-05/A	6	II	DFEP – LM Physics
U3525	Biometric Systems	INF/01	INFO-01/A	6	II	DIETI – LM Computer Science
U3523	Computer Vision	INF/01	INFO-01/A	6	I	DIETI – LM Computer Science
U2658	Data visualization	ING-INF/05	IINF-05/A	6	II	DIETI – LM Data Science
U3536	Human robot interaction	INF/01	INFO-01/A	6	I	DIETI – LM Computer Science
U3546	Information Systems and Business Intelligence	ING-INF/05	IINF-05/A	6	I	DIETI – LM Computer Engineering
U3539	Natural Language Processing	INF/01	INFO-01/A	6	II	DIETI – LM Computer Science
U1437	Real and Functional Analysis	MAT/05	MATH-03/A	6	I	DMRC - LM Engineering Mathematics
U3835	Reliability and Risk in Aerospace Engineering	SECS-S/02	STAT-01/B	6	II	DII – LM Aerospace Engineering
U5937	Software Architecture Design	ING-INF/05	IINF-05/A	6	I	DIETI – LM Computer Engineering
U6635	Techniques of Text Analysis and Computational Linguistics	L-LIN/01	GLOT-01/A	6	I	DIETI – LM Data Science
25880	Advanced Microeconomics	SECS-P/01	ECON-01/A	12	I	DISES – LM Economics and Finance
25881	Advanced Macroeconomics	SECS-P/01	ECON-01/A	12	II	DISES – LM Economics and Finance
27381	Economics of Regulation	SECS-P/03	ECON-03/A	6	II	DISES – LM Economics and Finance
27382	Financial Econometrics	SECS-P/05	ECON-05/A	6	II	DISES – LM Economics and Finance
25884	Mathematics for Economics and Finance	SECS-S/06	STAT-04/A	12	I	DISES – LM Economics and Finance
NI	Statistical Methods for Social Research	SECS-S/05	STAT-03/B	6	I	DISES – LM Economics and Business
NI	Preference learning	SECS-S/01	STAT-01/A	6	I	DISES – LM Economics and Business
U6640	SW and methods for statistical analysis of economic data	SECS-S/01	STAT-01/A	6	II	DIETI – LM Data Science