Freie Universität Bozen
Libera Università di Bolzano
Università Liedia de Bulsan

MASTER IN COMPUTATIONAL DATA SCIENCE

Study plan by year and semester - Cohort 2020/21

Curriculum Data Analytics
The "Data Analytics" curriculum is mainly oriented towards teaching mathematical and statistical techniques for data analysis, together with computer and engineering techniques for the creation of data-centred, end-user-oriented applications capable of learning and extracting knowledge to support decision-making and business processes.

First Year

1st Semester		
Course	**CP**	**Exam**
Advanced Data Management Technologies	6	Sì/Ja
Artificial Intelligence – Methods and Applications	6	Sì/Ja
Programming and Visualisation for Data Analytics • Data Visualisation and Exploration • Programming for Data Analytics	12	Sì/Ja
Statistics for Data Science	6	Sì/Ja
	30	

2nd Semester		
Course	**CP**	**Exam**
Human-Centered Computing	6	Sì/Ja
Information Retrieval	6	Sì/Ja
Machine Learning	6	Sì/Ja
Systems Security	6	Sì/Ja
Optional Course	6	Sì/Ja
	30	

Second Year

1st Semester		
Course	**CP**	**Exam**
Data Curation • Data Integration	12	Sì/Ja

• Data Profiling		
Capstone Project	6	Idoneità/Eignung
Optional Course	6	Sì/Ja
Free Choice*	6	**
	30	

2nd Semester		
Course	**CP**	**Exam**
Advanced English for Scientific Communication	4	Idoneità/Eignung
Free Choice*	6	**
Thesis	20	Graduation
	30	

* The student can freely advance or postpone the Free Choice credit points

** The student can choose courses that foresee both exams with grades and pass/fail tests

Optional Courses - Curriculum Data Analytics

NB – the choice of optional courses depends on courses activated in the respective academic year

Course	**CP**	**Exam**
Advanced Topics in Machine Learning	6	Sì/Ja
Agile Software Development	6	Sì/Ja
Computational Linguistics	6	Sì/Ja
Data and Information Modelling	12	Sì/Ja
Data Maintenance and Evolution	6	Sì/Ja
Data Scientist Toolbox	6	Sì/Ja
Decision Making and Support Systems	6	Sì/Ja
Development of Data Products	6	Sì/Ja
Enterprise Architecture	6	Sì/Ja
Formal Verification of Software and Systems	6	Sì/Ja
Intelligent Agents	6	Sì/Ja
Introduction to Parallel Computing	6	Sì/Ja
Lean Start-Up and Entrepreneurship	6	Sì/Ja
Management of Temporal and Spatial Data	6	Sì/Ja
Process-Aware Information Systems	6	Sì/Ja
Process Mining	6	Sì/Ja
Real-Time Big Data Processing	6	Sì/Ja
Recommender Systems	6	Sì/Ja

Research Methods and Technology Transfer	6	Sì/Ja
Semantic Technologies and Linked Data	6	Sì/Ja
Simulation and Modelling	6	Sì/Ja
Web and Text Mining	6	Sì/Ja

Curriculum Data Management

The "Data Management" curriculum is mainly focused on the modelling and management of data and corresponding software architectures at enterprise level, and imparts techniques and methods typical of computer science for the development of information systems and IT infrastructures for storing data and supporting the execution of decision and business processes.

First Year

1st Semester		
Course	**CP**	**Exam**
Advanced Data Management Technologies	6	Sì/Ja
Algorithms for Data Processing	6	Sì/Ja
• Artificial Intelligence - Methods and Applications	6	Sì/Ja
Data and Information Modelling • Data and Process Modelling • Information Systems Design	12	Sì/Ja
	30	

2nd Semester		
Course	**CP**	**Exam**
Enterprise Architecture	6	Sì/Ja
Machine Learning	6	Sì/Ja
Semantic Technologies and Linked Data	6	Sì/Ja
Systems Security	6	Sì/Ja
Optional Course	6	Sì/Ja
	30	

Second Year

1st Semester		
Course	**CP**	**Exam**
Data Curation • Data Integration • Data Profiling	12	Sì/Ja
Capstone Project	6	Idoneità/Eignung
Optional Course	6	Sì/Ja
Free Choice*	6	**
	30	

2nd Semester		
Course	**CP**	**Exam**
Advanced English for Scientific Communication	4	Idoneità/Eignung
Free Choice*	6	**

Thesis	20	Graduation
	30	

* The student can freely advance or postpone the Free Choice credit points

** The student can choose courses that foresee both exams with grades and pass/fail tests

Optional Courses - Curriculum Data Management

NB – the choice of optional courses depends on courses activated in the respective academic year

Course	**CP**	**Exam**
Advanced Topics in Machine Learning	6	Sì/Ja
Agile Software Development	6	Sì/Ja
Computational Linguistics	6	Sì/Ja
Data Maintenance and Evolution	6	Sì/Ja
Data Scientist Toolbox	6	Sì/Ja
Decision Making and Support Systems	6	Sì/Ja
Development of Data Products	6	Sì/Ja
Formal Verification of Software and Systems	6	Sì/Ja
Human-Centered Computing	6	Sì/Ja
Information Retrieval	6	Sì/Ja
Intelligent Agents	6	Sì/Ja
Introduction to Parallel Computing	6	Sì/Ja
Lean Start-Up and Entrepreneurship	6	Sì/Ja
Management of Temporal and Spatial Data	6	Sì/Ja
Process Mining	6	Sì/Ja
Process-Aware Information Systems	6	Sì/Ja
Programming and Visualisation for Data Analytics	12	Sì/Ja
Real-Time Big Data Processing	6	Sì/Ja
Recommender Systems	6	Sì/Ja
Research Methods and Technology Transfer	6	Sì/Ja
Simulation and Modelling	6	Sì/Ja
Web and Text Mining	6	Sì/Ja

Capstone Project

Capstone projects allow the student to apply the scientific and technical knowledge acquired during the study using real data from a specific application domain in areas such as bioinformatics, sensors, internet of things, business information systems, tourism and agriculture.

Capstone projects are project-based courses during which the student works independently on an individual or group project. The project takes place under the supervision of a professor or researcher from the faculty (hereinafter referred to as the tutor), and a domain expert.

The tutor is responsible for the lecture and supervises, directs and evaluates the project. The domain expert introduces the student to the data and characteristics of the application domain and provides requirements, guidance and feedback.

The Faculty Council decides annually which capstone projects to activate. The application domains are defined through contacts in the local area.

Free Choice

The student is free to choose lectures or an internship for a total of 12 credits points.

These educational activities must be consistent with the student's academic pathway.

The methods for verifying consistency are decided by the Course Council.

For internships, please refer to the general internship regulations of the University.

Examinations taken for lectures chosen as Free Choice count as a single examination for the purposes of calculating the total number of examinations taken by the student.

Teaching language

The official language of all Master's degree lectures is English.