

Analytics and Data Science

Code: SCI3073

Extent:

- 20-25 cr for students of the Aalto schools of technology
- 24 cr for students of the School of Art, Design and Architecture and the School of Business

Language: English

Professors in charge: Professor Harri Lähdesmäki (SCI) & Assistant Professor Pekka Malo (BIZ)

Administrative contact: Anu Kuusela

Target group: All Aalto master students who want to sharpen their data analysis skills and be educated on the application of data science methods to different domains.

Application procedure: If you are interested in taking the minor, please send your confirmed HOPS to Study Coordinator Anu Kuusela (anu.kuusela@aalto.fi).

Quotas: No quotas for the minor; separate courses may have space for only a limited number of students. If you are not admitted to a course, you will have to choose another course.

Prerequisites: No prerequisites for the minor as a whole, but some courses may have their own prerequisites. The prerequisites can be checked in the course descriptions; if in doubt, please consult the teacher of the course.

Content and structure of the minor

We live in the information age, where a deluge of data is being generated by human activity, scientific data collection processes, business transactions, and adoption of new technologies. Distilling the information contained in such big volumes of data has the potential to transform science, technology, business, and arts, and to revolutionise the organisation and functioning of society. Data science is a new discipline that has emerged and its objective is to provide the students with knowledge of the underlying theory and with the necessary tools to cope with the data revolution. The goal of the Analytics and Data Science minor in Aalto is to educate students on becoming proficient in making sense of such big data, and in applying data analysis skills to their domain of expertise.

The minor is structured in four subareas. Students need to complete courses from different subareas, as indicated in the course description below.

Structure

The minor is composed of elective courses in four subareas:

SF: Statistical foundations
CM: Computational methods
BA: Business analytics
AP: Applications

Subarea	Code	Name	Credits	Period
1) COMPULSORY COURSE				
	CS-E4620	Introduction to Analytics and Data Science	2	I
	The course is removed from the course selection and it is no longer required as compulsory course of the Analytics and Data Science minor.			
2) AT LEAST ONE COURSE FROM THE SF SUBAREA				
SF	CS-E5710	Bayesian Data Analysis	5	I-II
SF	MS-C1620	Statistical Inference	5	III-IV
SF	MS-C2128	Prediction and Time Series Analysis*	5	II
SF	30E00800	Time Series Analysis*	6	IV-V
SF	MS-E2112	Multivariate Statistical Analysis	5	III-IV
3) AT LEAST ONE COURSE FROM THE CM SUBAREA				

CM	CS-E3210	Machine Learning: Basic Principles	5	I-II
CM	CS-E4600	Algorithmic Methods of Data Mining	5	I-II
CM	CS-E4840	Information Visualization	5	IV
CM	CS-E4640	Big Data Platforms	5	I-II
CM	CS-E4100	Mobile Cloud Computing	5	I-II
CM	CS-E4580	Programming Parallel Computers	5	V
CM	CS-E4830	Kernel Methods in Machine Learning	5	III-IV
CM	CS-E4800	Artificial Intelligence	5	III-IV
CM	ELEC-E5422	Convex Optimization I	5	I-II
CM	ELEC-E5431	Large Scale Data Analysis	5	III-IV
4) SELECT AT LEAST ONE OF THE FOLLOWING				
BA	MS-E2134	Decision Making and Problem Solving	5	III-IV
BA	23E47000	Digital Marketing	6	I, V
BA	30E03000	Data Science for Business	6	III
BA	37E01600	Data Resources Management	6	I
BA	57E00500	Capstone: Business Intelligence	6	
BA	31E00920	Applied Microeconomics II	6	Not lectured 2018-2019 or 2019-2020
BA	31E40100	History of Economic Growth and Crisis	6	II
AP	CS-E5740	Complex Networks	5	II
AP	MS-C2103	Design of Experiments and Statistical Models (in Finnish only)	5	III
AP	MS-E2177	Seminar on Case Studies in Operation Research (in Finnish only)	5	III-V
AP	ELEC-E5510	Speech Recognition	5	II
AP	GIS-E4020	Advanced Spatial Analytics L	5	III-IV
AP	ELEC-E5550	Statistical Natural Language Processing L	5	III-IV
AP	30E03500	Data Science for Business II	6	IV
AP	CS-E4870	Research Project in Machine Learning and Data Science	5-10	I-II
AP	ELEC-E5410	Signal Processing for Communication	5	I-II
AP	ELEC-E5440	Statistical Signal Processing	5	I-II
AP/BA	31E00910	Applied Microeconometrics I	6	I
AP/BA	31E00700	Labor Economics	6	IV

AP/BA	31E40200	Economics of Science and Innovation	6	Not lectured 2018-2019 or 2019-2020
AP/BA	31E16000	Development Economics II	6	IV

* The courses MS-C2128 and 30E00800 are alternative, i.e. the student can include only one of them in the degree.