

Big Data Analytics

Analys av Big Data
6 credits

Programme course

732A54

Valid from: 2025 Spring semester

Determined by	Main field of study	
The Quality Board at the Faculty of Arts and Sciences	Statistics	
Date determined	Course level	Progressive specialisation
2016-09-30	Second cycle	A1N
Revised by	Disciplinary domain	
Chairman of the Course and Programme Syllabus Board at the Faculty of Arts and Sciences	Technology	
Revision date	Subject group	
2024-12-18	Statistics	
Offered first time	Offered for the last time	
Autumn semester 2016		
Department	Replaced by	
Institutionen för datavetenskap		

Course offered for

- Master's Programme in Statistics and Machine Learning

Entry requirements

- 180 ECTS credits passed including 90 ECTS credits in one of the following subjects:
 - statistics
 - mathematics
 - applied mathematics
 - computer science
 - engineering
- Passed courses in:
 - calculus
 - linear algebra
 - statistics
 - programming
- English corresponding to the level of English in Swedish upper secondary education (Engelska 6)
Exemption from Swedish
- Passed Advanced Academic Studies, 3 ECTS credits

Intended learning outcomes

After completed the course, the student should on an advanced level be able to:

- collect and store Big Data in a distributed computer environment
- perform basic queries to a database operating on a distributed file system
- account for basic principles of parallel computations
- use MapReduce concept to parallelize common data processing algorithms
- account for how standard machine learning models should be modified in order to process Big Data
- use tools for machine learning for Big Data

Course content

The course introduces main concepts and tools for storing, processing and analyzing Big Data which are necessary for professional work and research in data analytics.

- Introduction to Big Data: concepts and tools
- Introduction to Python
- Basic principles of parallel computing
- Introduction to databases
- File systems and databases for Big Data
- Querying for Big Data
- Resource management in a cluster environment
- Parallelizing computations for Big Data
- Basic Machine Learning algorithms
- Machine Learning for Big Data

Teaching and working methods

The teaching consists of lectures, lessons and computer labs. In addition to this, independent study is a necessary complement to the course.

Language of instruction: English.

Examination

The course is examined by:

- written reports on computer assignments in groups grade scale: EC, P/F
- individually written examination, grade scale: EC

For Pass (E) as the final grade, at least E is required on the individually written examination and Pass on other parts. Higher grades are based on the individually written computer examination.

Detailed information can be found in the study instructions.

If special circumstances prevail, and if it is possible with consideration of the nature of the compulsory component, the examiner may decide to replace the compulsory component with another equivalent component.

If the LiU coordinator for students with disabilities has granted a student the right to an adapted examination for a written examination in an examination hall, the student has the right to it.

If the coordinator has recommended for the student an adapted examination or alternative form of examination, the examiner may grant this if the examiner assesses that it is possible, based on consideration of the course objectives.

An examiner may also decide that an adapted examination or alternative form of examination if the examiner assessed that special circumstances prevail, and the examiner assesses that it is possible while maintaining the objectives of the course.

Students failing an exam covering either the entire course or part of the course twice are entitled to have a new examiner appointed for the reexamination.

Students who have passed an examination may not retake it in order to improve their grades.

Grades

ECTS, EC

Other information

Planning and implementation of a course must take its starting point in the wording of the syllabus. The course evaluation included in each course must therefore take up the question how well the course agrees with the syllabus.

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

If special circumstances prevail, the vice-chancellor may in a special decision specify the preconditions for temporary deviations from this course syllabus, and delegate the right to take such decisions.

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is “Swedish”, the course as a whole could be given in Swedish, or partly, or as a whole, in English. Examination language is Swedish, but parts of the examination can be in English.
- If teaching language is “English”, the course as a whole is taught in English. Examination language is English.
- If teaching language is “Swedish/English”, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English depending on teaching language.