Module Description 39-Inf-BDA_ver1 Big Data Analytics

Faculty of Technology

Version dated Nov 2, 2026

This module guide reflects the current state and is subject to change. Up-to-date information and the latest version of this document can be found online via the page

https://ekvv.uni-bielefeld.de/sinfo/publ/modul/108247038

The current and valid provisions in the module guide are binding and further specify the subject-specific regulations (German "FsB") published in the Official Announcements of Bielefeld University.

Non-official translation of the module descriptions. Only the German version is legally binding.

39-Inf-BDA_ver1 Big Data Analytics

Faculty

Faculty of Technology

Person responsible for module

Prof. Dr. Alexander Schönhuth

Regular cycle (beginning)

To be discontinued

Credit points

5 Credit points

Competencies

Students learn in the lectures and are the exercise courses competencies in performing data mining tasks on very large amounts of data that cannot be stored in main memory. The lectures provide the key ideas of similarity search using minhashing and locality-sensitive hashing, of data stream processing where data arrives so fast that it has to be processed immediately or is otherwise lost, of Web-related algorithms such as Google's PageRank, of algorithms for mining frequent itemsets, association rules and frequent subgraphs, of algorithms to analyze the structure of large graphs such as social network graphs, and of the map-reduce principle to design parallel algorithms. The module includes an exam at the end of the term.

Content of teaching

The module Big Data Analytics deals with methods and algorithms in the context of big data analytics. In particular, the following topics are addressed:

1. Finding Similar Items
2. Stream Data Analysis
3. PageRank
4. MapReduce
5. Mining Frequent Itemsets
6. Mining Frequent Subgraphs
7. Mining Social Network Graphs
8. Recommender Systems

Recommended previous knowledge

Knowledge about databases can be helpful.

Necessary requirements

–

Explanation regarding the elements of the module

Module structure: 1 bPr [1]

Courses

Title	Type	Regular cycle	Workload [5]	LP[2]
Big Data Analytics	lecture	SoSe	60 h (30 + 30)	2 [Pr]
Big Data Analytics	exercise	SoSe	60 h (30 + 30)	2

Examinations

Allocated examiner	Type	Weighting	Workload	LP[2]
Teaching staff of the course **Big Data Analytics (lecture)** *Portfolio consisting of per default weekly exercises or programming tasks and final written exam (per default 60 minutes) or final oral exam (per default 15 minutes). The exercises are based on the content of the lecture and enable students to train and further investigate the topics. It is required that a sufficient percentage of the exercises are successfully completed (per default 50% of the total number of points which can be achieved during a semester). The final oral exam concerns both, the content of the lecture as well as the exercises.*	Portfolio mit Abschlussprüfung	1	30h	1

Further notices

Recommended literature:

- Jure Leskovec, Anand Rajaraman, Jeffrey David Ullman, "Mining of Massive Datasets", 2nd Edition, Cambridge University Press, 2014.
- Tom White, "Hadoop: The Definitive Guide Storage and Analysis at Internet Scale", 3rd edition, O'Reilly
- Viktor Mayer-Schönberger, Kenneth Cukier, "Big Data: A Revolution That Will Transform How We Live, Work and Think", John Murray, 2013

Previously, the programme was offered every summer semester.

Legend

1	The module structure displays the required number of study requirements and examinations.
2	LP is the short form for credit points.
3	The figures in this column are the specialist semesters in which it is recommended to start the module. Depending on the individual study schedule, entirely different courses of study are possible and advisable.
4	Explanations on mandatory option: "Obligation" means: This module is mandatory for the course of the studies; "Optional obligation" means: This module belongs to a number of modules available for selection under certain circumstances. This is more precisely regulated by the "Subject-specific regulations" (see navigation).
5	Workload (contact time + self-study)
SoSe	Summer semester
WiSe	Winter semester
SL	study requirement
Pr	Examination
bPr	Number of examinations with grades
uPr	Number of examinations without grades