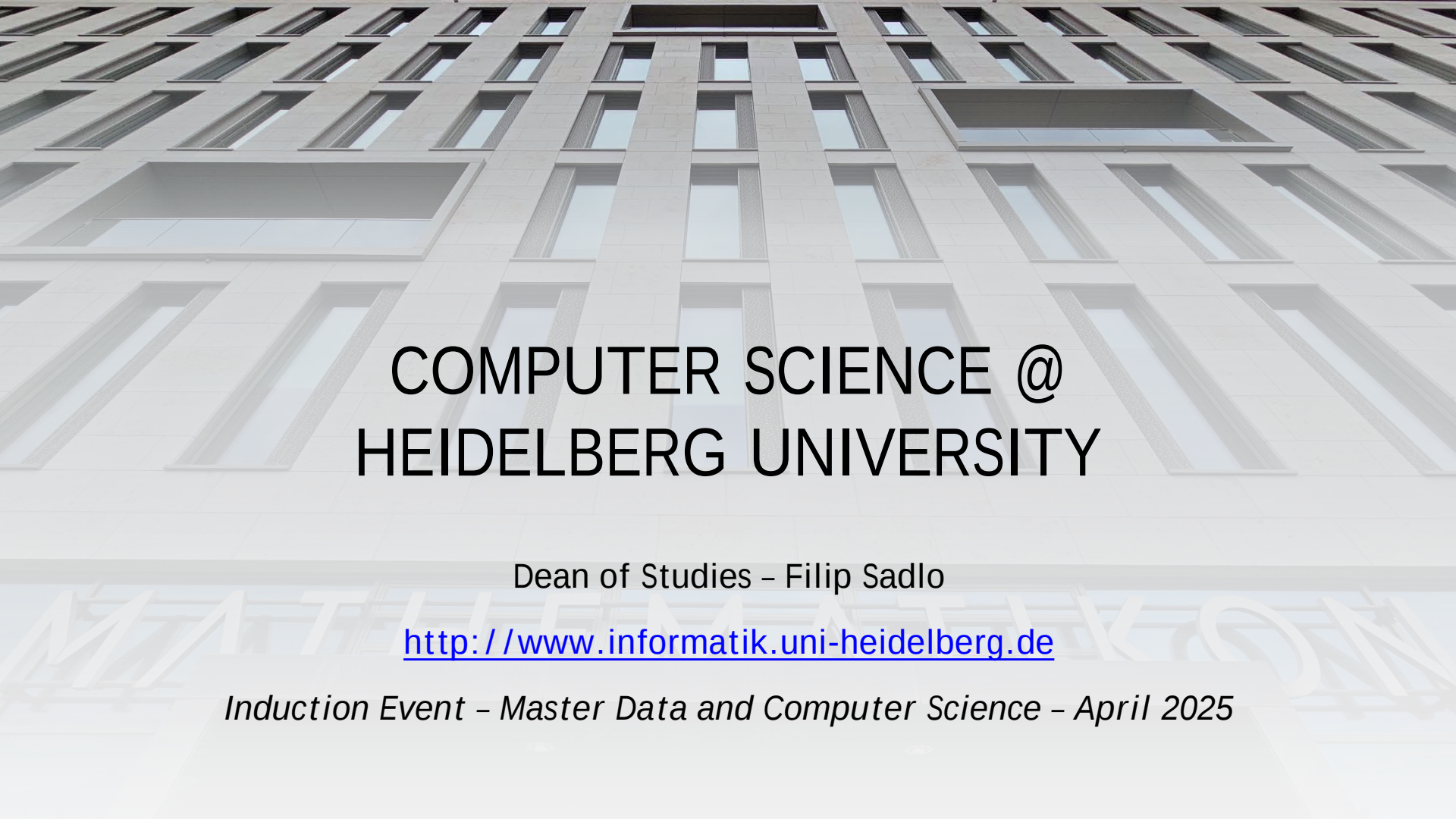




COMPUTER SCIENCE @ HEIDELBERG UNIVERSITY

Dean of Studies – Filip Sadlo

<http://www.informatik.uni-heidelberg.de>

Induction Event – Master Data and Computer Science – April 2025



Heidelberg University

Since 1386 – oldest university in Germany

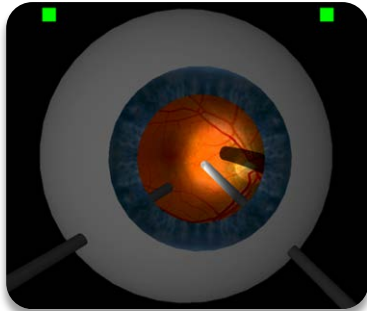
Approx. 30 k students

Approx. 500 professors (incl. medicine)

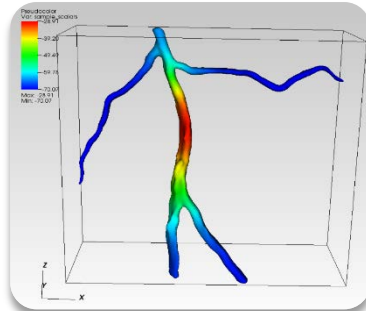
57 Nobel Prizes

Since 2007 one of the German Universities of Excellence

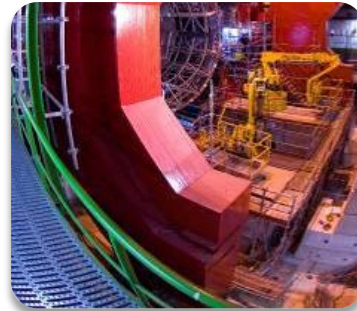
MAIN RESEARCH AREAS AT HEIDELBERG UNIVERSITY



Medicine



Biology



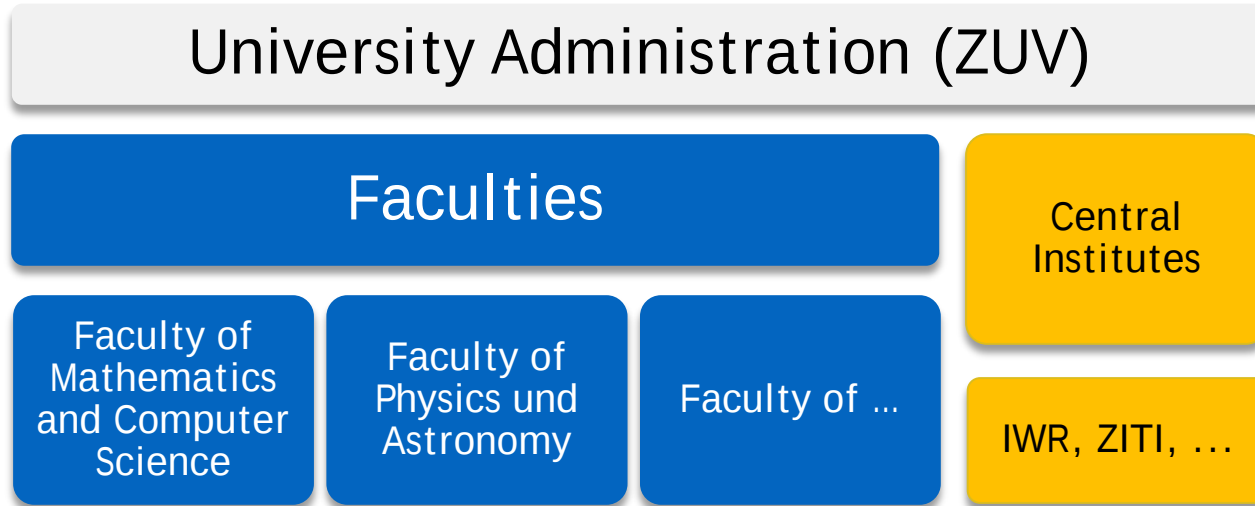
Physics



Astronomy

... as well as many other natural sciences and humanities!

STRUCTURE OF THE UNIVERSITY (SIMPLIFIED)



Faculties combine sciences into administrative units and may consist of institutes

FACULTY OF MATHEMATICS AND COMPUTER SCIENCE

Our faculty consists of two institutes

- Institute for Computer Science (IfI): teaching and research mainly in applied computer science (www.informatik.uni-heidelberg.de)
- Institute for Mathematics: mathematics education of computer science students (www.math.uni-heidelberg.de)

Other participating centers/institutes

- Interdisciplinary Center for Scientific Computing (IWR) (interdisciplinary, many contributing faculties) (www.iwr.uni-heidelberg.de)
- Institute for Computer Engineering (ZITI) (jointly with Faculty for Engineering Sciences) (www.ziti.uni-heidelberg.de)

Teaching: all are involved (to varying extent)

Research: see www.informatik.uni-heidelberg.de/forschung.html

INSTITUTE OF COMPUTER SCIENCE (IFI)

ESTABLISHED IN 2001, COVERS CORE OF COMPUTER SCIENCE, INF 205

Core



Artur Andrzejak:
Parallel & Distributed
Systems



Michael Gertz:
Database Systems



Felix Joos:
Theoretical
Computer Science



Barbara Paech:
Software Engineering



Christian Schulz:
Algorithm
Engineering

Associated



Peter Bastian:
Scientific Computing



Klaus Maier-Hein:
Medical Imaging
Computing



Lena Maier-Hein:
Computer Assisted
Medical Interventions



Stefan Riezler:
Statistical Natural
Language Processing



Filip Sadlo:
Visual Computing

INTERDISCIPLINARY CENTER FOR SCIENTIFIC COMPUTING (IWR)

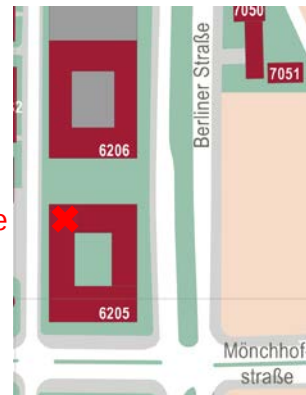
Research (and teaching) in mathematics and applied computer science

- Math. modeling • simulation/optimization • machine learning • visual computing
- Applications in physics, biology, archaeology, ...
- Approx. 50 members

Mathematikon, INF 205, partly in Part B



We are here



6205 Mathematikon Part A
6206 Mathematikon Part B

INSTITUTE OF COMPUTER ENGINEERING (ZITI)

Teaching and research in the areas of computer engineering

- Computer architecture • robotics • medical technology • application specific computers • circuitry and simulation • computing systems

In building INF 368



Robert Strzodka
Application Specific
Computing



Peter Fischer
Circuit Design



Holger Fröning
Computing
Systems



Lorenzo Masia
Biomedical
Engineering &
Biorobotics



Dirk Koch
Novel Computing
Technologies



Alexander Schubert
Optimization,
Robotics &
Biomechanics



Nima TaheriNejad
Computer
Architecture

PRACTICALITIES: GUIDANCE

Course guidance

Priv.-Doz. Dr. W. Merkle (merkle@math.uni-heidelberg.de)



Examination matters bachelor/master

Prof. Dr. Michael Gertz (gertz@informatik.uni-heidelberg.de)



Examination matters bachelor 50% with LA-Option/teaching profession/Lehramt

Prof. Dr. Barbara Paech (paech@informatik.uni-heidelberg.de)



Examination office

Anke Sopka (sekretariat@informatik.uni-heidelberg.de)



PRACTICALITIES: MAILING LISTS

Informatik-Erstfragen

Informatik-BSC

Informatik-MSc

Informatik-LA

Informatik-M-Edu

Inf-Weiterstud

Inf-Stellen

Inf-Externes

Automagically enrolled in the first five lists. See:

www.informatik.uni-heidelberg.de/mailing



Ersti-Info 2024

FACHSCHAFT MATHPHYSINFO

$\mu\phi\iota$ | Fachschaft
MathPhysInfo



WE WANT YOU

Representation of students in committees

Organization of socializing events

Passing on experiential knowledge

Informations for freshmen: [Ersti-Info \(pdf\)](#)

Games Night:

- April 17, 2025, 6 pm Foyer (basement), INF 205

Web: mathphys.info

Mail: fachschaft@mathphys.info

Discord: discord.mathphys.info

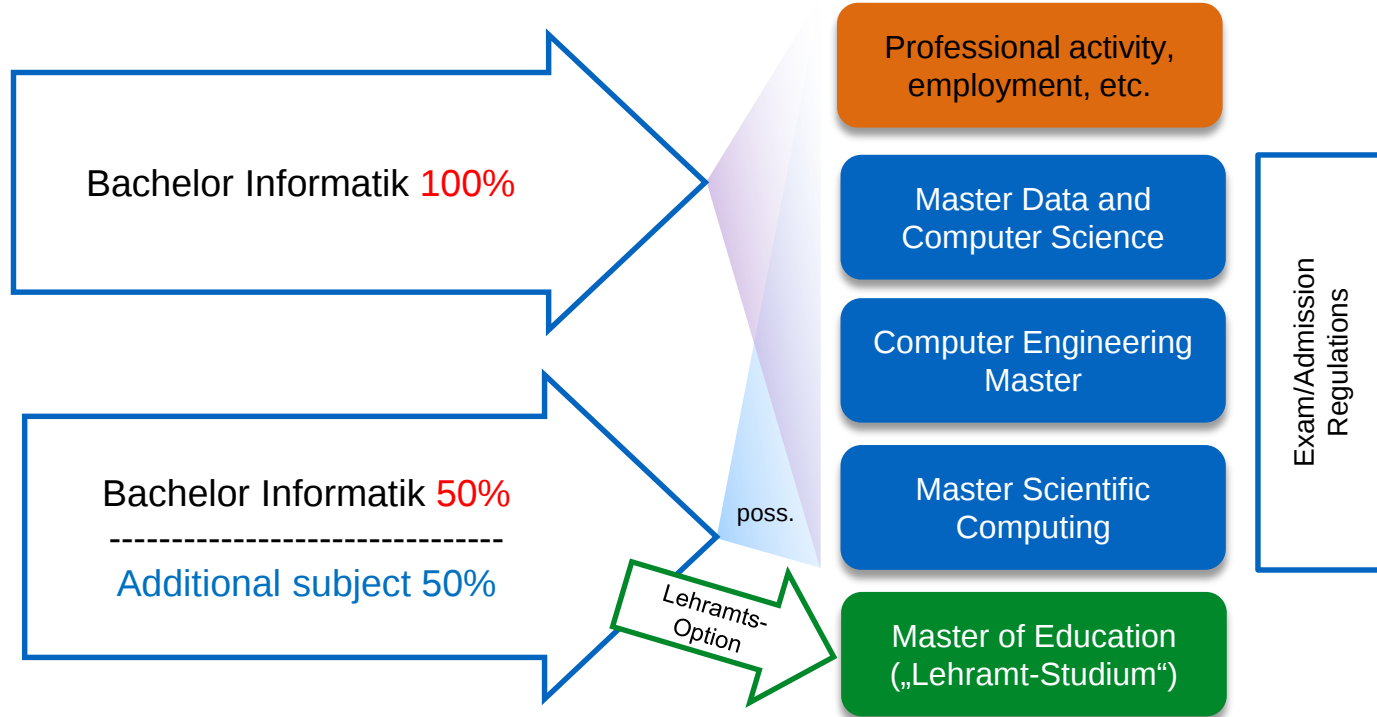
Instagram: [@mathphys.info](https://www.instagram.com/mathphys.info)



Weekly events:

- Student council meeting: Wednesdays 6 pm in SR A, INF 205
- Kaffeeklatsch: Wednesdays 1:30–2:30 pm in Foyer, INF 205

OVERVIEW OF THE STUDY PROGRAMS IN COMPUTER SCIENCE



MASTER DATA AND COMPUTER SCIENCE (MSC DACS)

www.informatik.uni-heidelberg.de/studium/master/dacs

STRUCTURE OF THE MASTER

Duration: 3 semesters lectures, 1 semester master thesis

- Total of 120 CP

62 CP in computer science

Compulsory modules: • Master Advanced Seminar (4 CP) • Master Advanced Practical (8 CP)

- Elective modules (50 CP)

18 CP in application field

6 CP interdisciplinary skills (ÜK)

30 CP for master thesis

4 CP for master colloquium

ELECTIVE MODULES & SUBJECT AREAS

Required to cover 3 subject areas of the following list, each with at least 6 CP

Visual Computing (VC)

Software Systems and Engineering (SE)

Scientific Computing (SC)

Algorithmic Data Analysis and Machine Learning (AM)

Algorithmics and Theoretical Computer Science (AT)

Computer Engineering (CE)

Module	VC	SE	SC	AM	AT	CE
Advanced Machine Learning (IAML)				•		
Algorithm Engineering (IAE)					•	
Applied Combinatorial Optimization (IACO)					•	
Artificial Intelligence for Programming (IAIP)				•		
Complex Network Analysis (ICNA)					•	
Computational Geometry (ICGeo)	•					
Computer Vision (ICV)	•					
Computer Games (ICS)	•					
Discrete Structures 2 (IDS2)					•	
Distributed and Parallel Algorithms (IDPA)					•	
Fundamentals of Machine Learning (IFML)				•		
Generative Neural Networks for the Sciences (IGNNS)				•		
Geometric Modeling and Animation (IGMA)	•					
Hardware Aware Scientific Computing (IHASC)			•			
Inverse Probleme (IIP)			•			
IT Project Management (IPM)		•				
IT-Sicherheit 2 (IITS2)		•				
Knowledge Management and Decision-Making in Software Engineering (ISWKM)		•				
Machine Learning Essentials (IMLE)				•		
Machine Learning and Physics (MKTP6)				•		
Mining Massive Datasets (IMMD)				•		
Natural Language Processing with Transformers (INLPT)				•		
Practical Geometry (IPGeo)	•					
Scientific Visualization (ISV)	•					
Software Economics (ISWEco)		•				
Software Evolution (ISWEvol)		•				
Time Series Analysis With Applications to Cognitive Science (ITSA-ACS)			•			
Volume Visualization (IVV)	•					
All basic & advanced modules of the MSc Computer Engineering (MScTI)						•

APPLICATION FIELD

Recommended: application field of the master continues the application field of the bachelor (exceptions of course possible)

- Astronomy • life sciences • chemistry • computational linguistics • geography
- earth sciences • mathematics • philosophy • physics • economics

All application fields of the bachelor program Informatik are allowed

Further application fields are possible on application (→ examination board)

On application: computer science as application field (→ examination board)

Optional: implementation of an interdisciplinary project

In consultation with one lecturer each from computer science and application area

www.informatik.uni-heidelberg.de/studium/master/application_fields

SPECIALIZATIONS

Specialization = proposal of a combination of modules

Visual Computing

Information Systems Engineering

Scientific Computing

Algorithms and Theoretical Computer Science

More details in the module handbook and at

www.informatik.uni-heidelberg.de/studium/master/dacs

Example “Information Systems Engineering”

Focuses on database systems and software engineering

Capability of developing, operating, and maintaining large-scale information systems

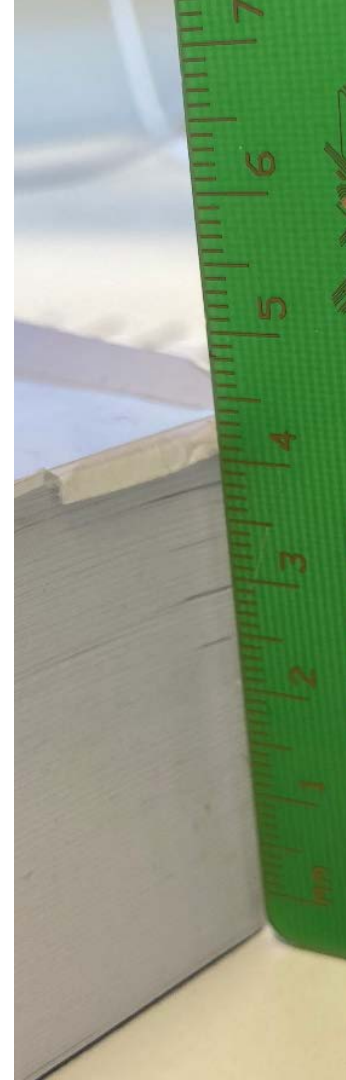
MASTER THESIS

Goal: Work independently on problems in computer science according to scientific methods

- Recommended in the 4th semester (30 CP)
- Should be prepared by the modules of the first 3 semesters
- Deepening the work at a research group by attending lectures, advanced practical course, seminars
- Potential advisors: www.informatik.uni-heidelberg.de/about/gruppen

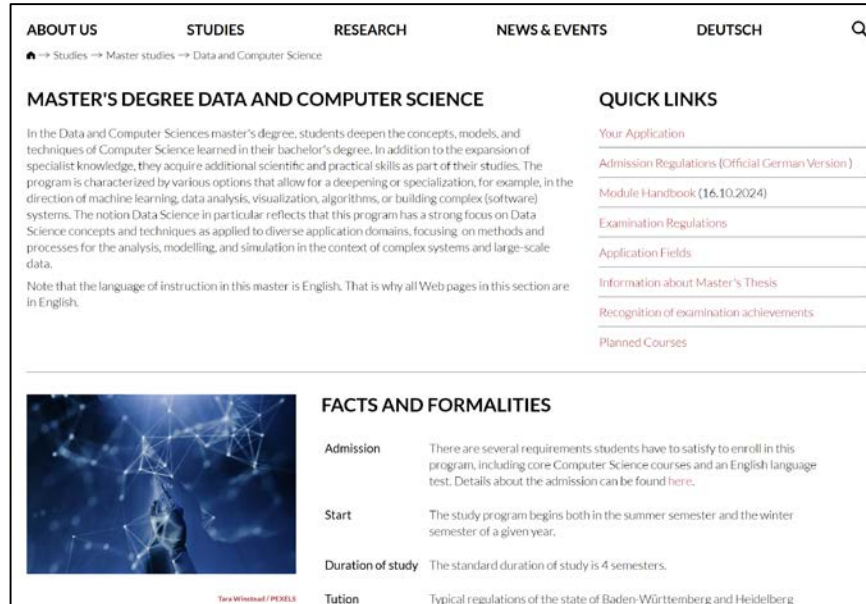
In principle possible in industry, but in practice only if there is close cooperation between chair and industry

- Caution: Not solely a “programming project”
- Formal advising and grading by a lecturer of computer science required
- Please contact at an early stage of your preparations the examination office or the chairman of the examination board



RTFM ;-)

Before asking, e.g., the Examination Office, please consult
<https://www.informatik.uni-heidelberg.de/studium/master/dacs>



ABOUT US STUDIES RESEARCH NEWS & EVENTS DEUTSCH

Home → Studies → Master studies → Data and Computer Science

MASTER'S DEGREE DATA AND COMPUTER SCIENCE

In the Data and Computer Sciences master's degree, students deepen the concepts, models, and techniques of Computer Science learned in their bachelor's degree. In addition to the expansion of specialist knowledge, they acquire additional scientific and practical skills as part of their studies. The program is characterized by various options that allow for a deepening or specialization, for example, in the direction of machine learning, data analysis, visualization, algorithms, or building complex (software) systems. The notion Data Science in particular reflects that this program has a strong focus on Data Science concepts and techniques as applied to diverse application domains, focusing on methods and processes for the analysis, modelling, and simulation in the context of complex systems and large-scale data.

Note that the language of instruction in this master is English. That is why all Web pages in this section are in English.

QUICK LINKS

- Your Application
- Admission Regulations (Official German Version)
- Module Handbook (16.10.2024)
- Examination Regulations
- Application Fields
- Information about Master's Thesis
- Recognition of examination achievements
- Planned Courses

FACTS AND FORMALITIES



Admission There are several requirements students have to satisfy to enroll in this program, including core Computer Science courses and an English language test. Details about the admission can be found [here](#).

Start The study program begins both in the summer semester and the winter semester of a given year.

Duration of study The standard duration of study is 4 semesters.

Tuition Typical regulations of the state of Baden-Württemberg and Heidelberg

Tara Weinhold / PSE/DS

Module Handbook

Examination Regulations

...

CLOSING REMARKS

NETWORK!

COMMUNITY

Campus-eigenes Online-Tool auf
Moodle: Mitmachen und
unterstützen, netzwerken,
informieren, treffen – you!

Different fora:

- Kick-off
- Learning together
- Master challenges together
- Share experiences
- Shape common recreation
- Materials exchange
- Lost and found

To COMMUNITY:

<https://moodle.uni-heidelberg.de/course/view.php?id=13456>



QUALITY MANAGEMENT & TEACHING EVALUATIONS

- Online evaluation usually at mid term
- Important feedback for the lecturer and the Studies Committee
- Usually discussed at the end of term (lecturer and students)

heiCO

Heidelberg Campus Online

(heico.uni-heidelberg.de/)



- New system for management of studies
- and many more ...
- Still being set up and learned ...

He who asks a question is a fool for five minutes;
he who does not ask a question remains a fool forever.
– Chinese Proverb

Slides online:

www.informatik.uni-heidelberg.de/events



Thank you and good luck!