

The data science Master degree
Data & Knowledge Engineering (MDKE)



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Research focus:

- ▶ Learning methods for streams and for time series with gaps
- ▶ Cost-aware information acquisition

Application areas:

- Treatment outcome prediction
- Monitoring the health of humans and machines
- Inferring strategies in experiments

Teaching: courses and projects on

- Data mining
- Recommenders
- Business informatics

1. MDKE for data science

2. Planing your MDKE studies

3. How to choose modules

4. Getting Advice

1. MDKE for data science

What do you need to do Data Science?

1. Data

- a social network
- a medical record
- a patient
- a disease
- a pizza
- ...

2. Methods

- ▶ to process data – efficiently
- ▶ to learn from data
- ▶ to describe complex objects
- ▶ to present complex objects
and what we know on them

3. Business understanding

4. Understand how to match Data with Methods

Structure of the MDKE

- | | |
|--|--------------|
| 1. Fundamentals of Data Science | [12-18 ECTS] |
| 2. Learning Methods and Models of Data Science | [18-36 ECTS] |
| 3. Data Processing for Data Science | [18-30 ECTS] |
| 4. Applied Data Science | [18-24 ECTS] |
| and finally: the Master thesis | [30 ECTS] |

Where to find the organization and contents of MDKE ?

In the shelves of the FIN bookstack

<https://bookstack.cs.ovgu.de/shelves/master-data-and-knowledge-engineering>

For the data science MDKE, the bookstack contains:

- ▶ an overview of the plan of studies, with colours per thematic area ^a
- ▶ one section per area, with all modules that fit to it ^b and are **active now** ^c
- ▶ the description of each module, including goals, content, examination form ^d
- ▶ information about modules that are inactive but open for exams
- ▶ links to other important documents, including the statutes of the degree

^aCheck 'Orientierung' → 'Orientierung am Regelstudienplan'

^bYou may find a module more than once; some modules fit in more than one area.

^cA module can be 'inactive', e.g. if the teacher is on sabbatical leave.

^di.e. the Module Hand Book (MHB) of the degree

LSF, moodle and more



Where to find more information?

<i>Acronym</i>	<i>Location</i>	<i>For each module</i>	<i>Updated</i>
LSF	lsf.ovgu.de	brief description, hours and rooms, link to the module description, evtl registration to exercises; may contain inconsistencies	–
(moodle)	elearning.ovgu.de	materials, announcements, evtl registration to exercises	continuously
MHB	bookstack	officially approved module description for each degree	once per semester
Prüferportal		where a student registers for examination to a module	–

Inconsistencies may occur

<i>Where</i>	<i>How</i>	<i>What to do</i>
LSF	Disagrees with MHB	Inform the Studies Coordinator
(moodle)	Disagrees with LSF Disagrees with MHB	Inform the Teacher Inform the Teacher & the Studies Coordinator
Prüferportal	allows you to be examined to a module that is nowhere else	MAJOR ERROR! Inform the Teacher, the Studies Coordinator & the Examinations Office; NOT EVEN THINK of registering to the exam!

2. Planing your MDKE studies

NO compulsory modules!

YOU CHOOSE among the modules to fill each thematic area.

MUST DO: Scientific Teamproject & Master thesis

HOW TO CHOOSE MODULES:

1. Make yourself familiar with the different module types
 - 1.1 Lecture with Exercises
 - 1.2 Seminar
 - 1.3 Scientific Teamproject, intended for teams; is mapped exclusively to 'Applied Data Science'
 - 1.4 Individualproject, intended for one student only
2. Consult the MHB: find what we offer in each term
3. Consult the LSF: find how to register to modules now
4. Consult your mind and your heart: write down what you are interested in, listen to your curiosity, go with your strengths
5. Plan for three semesters, but be ready to re-plan later!

DOs and DONT's

While you choose modules and assign them to areas

- ▶ DO NOT choose seminars before attending PPSW, unless you have had a scientific seminar in your previous studies
- ▶ DO NOT choose modules that expect background you do not have !
- ▶ DO NOT use LSF to map courses to areas! only the MHB!
- ▶ DO map teamprojects *only* to 'Applied Data Science'
- ▶ DO NOT ask teachers to shift module to an area that suits you better

HELP us eliminate discrepancies and errors:

If you find a disagreement with the statutes, eg a teamproject assigned outside the ADS

If you hear that a teacher suddenly shifted their module to another area

THEN DO NOT try to take advantage !

INFORM teacher, mentors & studies coordinator asap!

Before the exam

When you register for a course exam:

the course is also assigned to a thematic area.

- ! If you do not assign the course to a thematic area yourself,
it is assigned automatically to a default area !

The area 'Additional modules' / 'Zusätzliche Module'

- ▶ If a course is assigned to this area, you do not get ECTS for it.
- ▶ **Under some circumstances, the examination registration system assigns a module for you to this area by default**
- ▶ You discover it only when you find that you did not get the ECTS. **and then you cannot change it...**

THEREFORE: Always assign a course to a thematic area manually!

The moment of the exam: CHECKLIST

AT THE END OF each written exam:

- ▶ Did I write my name?
- ▶ Did I give my exam paper?
- ▶ Did I assign this exam to the thematic area myself?

WHEN ENTERING an oral exam:

- ▶ Do I have all materials I need?
- ▶ Did I bring my ID and studentID with me?
- ▶ Did I assign this exam to the thematic area myself?

If NO: (1) Inform the teacher and (2) the Studies Coordinator ! (3) Ask the Examinations Office for a change

and **Make sure you do not know what your grade is!**

' No guarantees ...

Where to find more information?

Landing page: <https://www.inf.ovgu.de/inf/en/Study/Being+a+student/Incoming.html>

and from there you follow the links to:

- ▶ Entry point for new students
- ▶ FAQs for new students
- ▶ Support for international students

Interviews with teachers on their courses under

www.inf.ovgu.de/inf/en/Study/Being+a+student/Incoming/Courses+Introduction-p-5078.html

From that page you reach interview videos, in which teachers elaborate on their courses: what the course is about, what expectations they have from the students, what can the students do after completing the course successfully

Mentors!

There is an international team of mentors to help you in the start of your studies. Infos on how to reach them from the URLs above.

3. How to choose modules

EXAMPLES hereafter

Area	1st & 2nd semester	2nd & 3rd semester
<i>Fundamentals of Data Science</i>	PPSW [A] Data Mining I & Machine Learning [L] Introduction to Simulation [S]	
<i>Learning Methods & Models for Data Science</i>	(S) Applied Discrete Modelling, (L) Recommenders, (L) Introduction to Deep Learning [DL]	(L) Data Mining II, (A, L) Seminars: Advanced topics in ML, Predictive Maintenance, ... Evolutionary Multiobjective Optimization [CI], [DL] Learning Generative Models ...
<i>Data Processing for Data Science</i>	Advanced Database Models [D], Transaction Processing 2, Information Retrieval, (D) Data Warehouse Technologies, Advanced Topics in Databases, Introduction to Distributed Sensor Data Fusion, Parallel Storage Systems, VLBA – Cloud DevOps Technologies, ...	
<i>Applied Data Science</i>	XXXXXXXXXXXXXX	
Teamproject	XXXXXXXXXXXXXX	

Mark after the title	Mark before the title	How to read it
Introduction to Deep Learning [DL]	[DL] Learning Generative Models	'DL' is a competency. The module with the mark '[...]' after the title delivers this competency; the module with the mark at the right demands this competency. Hence: pass the module that gives the competency before you attempt the module that demands this competency.
Advanced Database Models [D]	(D) Data Warehouse Technologies	The mark '(...)' denotes a 'better-have' competency. Hence: better attend the module at the left before you attempt the module at the right.

On the naming of the modules

Machine Learning	Advanced Topics of Machine Learning	The module at the right expects skills that you learn in the module at the left.
Data Mining I	Data Mining II	The module at the right expects some skills. Best choice is the module at the left.

Special cases

PPSW [A]	(A, -) Seminar on '...'	Next to competencies on methods (e.g. L or DL), these modules demand personal and social skills. PPSW delivers such skills. If you never attended a seminar, you need PPSW.
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One possible way:

1. Plan the 'Fundamentals of Data Science' over the first two semesters.
2. Select from 'Learning ...': There are entry-barriers, so plan over all three semesters.
3. Select from 'Data Engineering ...': The modules of this area are heavily visited but have less entry-barriers, so plan for semesters 1 and 2 first.

Another possible way:

1. Plan the 'Fundamentals of Data Science' over the first two semesters.
2. Go to 'Applied Data Science' and check what topics you want to attend in semesters 2 and 3. Check the titles and descriptions of the modules.
3. Go to 'Learning ...' and pick the modules that deliver the skills you need for your Applied Data science choice.
3. Go to 'Data Engineering ...' and do alike.

...and how to make a full plan?

Option 1: Go wide to learn as many topics as possible.

1. Identify some business areas that you consider promising / attractive, e.g. Cloud computing, Robotics, Business Informatics, Security, Health ...
2. Find the professor(s) who teach in these areas
3. Find the courses they offer in the data science MDKE, and schedule them
4. Make sure that you choose *no less than three areas* in that way

Option 2 **which demands a fallback:** Go deep

1. Schedule all courses on advanced DL and AI topics
2. Schedule all courses that count as prerequisites
3. If you need and want to wait: choose courses like 'Logic for Knowledge Representation' to make yourself fit on important concepts like KR

WARNING: If you fail one course, then you can give it up. If you fail more, you are tied.

Option 3: Train yourself *cautiously* on learning methods

1. Find courses with titles associated to mining, learning and intelligence
2. Schedule these courses, concentrate on doing all assignments associated to them
3. If you find them difficult, ask for help/advice!
4. Once you have passed some of them, go for Option 1 and/or Option 2

Things to keep in mind:

1. The data science MDKE has many courses.

No course agrees with all students. For each course it holds that some find it fine and others find it boring; some find it easy and others find it difficult.

2. The option you choose determines who is willing to give you a teamproject and supervise your master thesis.

Each teacher has limited number of projects and theses, and a limited amount of time. The more a teacher can rely on your background and competencies, the better are your chances to get a project/thesis from him/her.

3. There is a difference between (a) knowing how to induce models and assess their quality and (b) applying algorithms from a library with help of a co-pilot.

In the data science Master DKE, we want you to learn the former.

4. Getting Advice

First thing to do: Write down what advice you want.

The first place to look for advice:

FAQs – to be reached from the landing page

The persons to ask for advice:

- ▶ On how to plan your studies: Mentors
- ▶ General student issues: FARAFIN team
- ▶ On how to prepare for a specific course: Course teacher
- ▶ Exam issues: Examinations Office
- ▶ Complex plans of studies, general troubleshooting: Studies coordinator (me)
`masterdke_advisor@iti.cs.uni-magdeburg.de`
- ▶ General issues on international studies: Coordinator of International Studies

Thank you for your attention!

Much success with your studies with us!

... and a link on mobility

<https://www.ovgu.de/unimagdeburg/en/erasmusstudy-p-38972.html>