

The data science Master degree

Data & Knowledge Engineering (MDKE)



INF

FACULTY OF
COMPUTER SCIENCE

Myra Spiliopoulou (Studies Coordinator)



Knowledge
Management &
Discovery Lab





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Spiliopoulou**



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Büttner**



**Noor
Jamaludeen**



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**Christian
Beyer**



**Anne
Rother**



**Miro
Schleicher**



**Vishnu
Unnikrishnan**



**Sajjal
Shahania**

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. More on how to choose modules?
4. Getting Advice

1. MDKE for data science

What do you need to do Data Science?

1. Data
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

What do you need to do Data Science?

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- ▶ a social network
- ▶ a medical record
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Thematic areas:

Starting: Fundamentals of Data Science [12-18 ECTS]

1. Learning Methods and Models of Data Science [18-36 ECTS]

2. Data Processing for Data Science [18-30 ECTS]

3. Applied Data Science [18-24 ECTS]

and finally: the Master thesis [30 ECTS]

Where to find more information?

Module catalogue of the degree, also known as “Module Hand Book” (MHB)

- ▶ This is a large PDF document:
 - ★ It contains the description of each module we offer in the FIN.
 - ★ It contains one section per thematic area of the degree, with all the modules that fit to this area.
 - ★ In it, you may find a module more than once! Some modules fit to more than one thematic area.
- ▶ You find it under
<https://www.inf.ovgu.de/en/Study/Being+a+student/Examination+Office/Study+Regulations.html>
Entry ‘Data & Knowledge Engineering’ (in the middle of the page, left side)
- ▶ It is updated once per semester ⇒ Choose the most recent one.

and in the LSF

2. Planing your MDKE studies

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 - 1.1 Lecture (called "Vorlesung") with Exercises (called "Übung")
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 - 1.3 Scientific Teamproject or Teamproject for short, intended for teams;
is mapped exclusively to the area 'Applied Data Science'
 - 1.4 Individualproject, intended for one student only

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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!

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- ▶ DO NOT ask the teacher to shift your assignment of his/her module to a thematic area that suits you better !!

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

and from there you follow the links to:

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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

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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. More on how to choose modules

When to choose which modules?

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]	Topics in Algorithmics, Introduction to Numerical Ordinary and Partial Differential Equations and their Applications
<i>Learning Methods & Models for Data Science</i>	(S) Applied Discrete Modelling, Intelligent Data Analysis, Recommenders, Logic for Knowledge Representation [KR], (L) Introduction to Deep Learning [DL], ...	Data Mining II, (A) Advanced topics in ML, Swarm Intelligence, Evolutionary Multiobjective Optimization [CI], (A) Seminar 'Predictive Maintenance', (KR) Neural-symbolic Integration, [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>	XXXXXXXXXXXXXXXXXX	
Teamproject	XXXXXXXXXXXXXXXXXX	

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.

Special cases

PPSW [A]	(A) Advanced topics {of KMD, of ML, ...}, Seminar 'Predictive Maintenance', Seminar '...'	The modules in the middle column are on advanced topics; most of them are seminars. PPSW delivers skills that you need to pass a seminar. If you never attended a seminar, you need PPSW.
Scientific computing [L+]		Delivers mathematical underpinnings that are valuable for many other courses.

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.

So, how to choose modules in the 1st semester?

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

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Option 2 which demands a fallback: Go deep because DL is used everywhere.

1. Schedule all courses offered by Prof. Sebastian Stober
2. Schedule all courses that he demands 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.

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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

When making a full plan ...

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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

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- ▶ Complex plans of studies, general troubleshooting: Studies coordinator (me)
`myra@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!