The data science Master degree

Data & Knowledge Engineering (MDKE)

OTTO VON GUERICKE UNIVERSITÄT MAGDEBURG

INF FACULTY OF COMPUTER SCIENCE

Myra Spiliopoulou (Studies Coordinator)

Knowledge Management & Discovery Lab

Chair Business Informatics II, Head of Knowledge Management & Discovery Lab

Methods: Machine learning algorithms for high-dimensional dynamic data

- web business – opinion monitoring
- medicine & healthcare – phenotyping and predictive modeling, mHealth

Ongoing Projects:

- ImmunLearning (2019 - 2022): EFRE project on a diagnostic test for immunocompetence for elderly people (with U Med OVGU)
- UNITI (2020-2022) EU Project on "Unification of treatments and Interventions for Tinnitus patients"

Further cooperations in medical research:

- Understanding the process of human learning (LIN)
- Phenotyping, patient evolution - clinic & m/eHealth (U Med Regensburg)
- Phenotyping and patient response to treatment (CHARITE)
- Semi-automating the annotation of epidemiological data (U Med Greifswald)

1. MDKE for data science

2. Planing your MDKE studies

More on:
When to choose modules?

4. Getting Advice

1. MDKE for data science

Data science and MDKE

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

Data science and MDKE

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Structure of the MDKE

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 $\Rightarrow$ Choose the most recent one.

and in the LSF

2. Planing your MDKE studies

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IMPORTANT:

- The data science Master DKE has no compulsory modules.
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- Obligatory: one Scientific Teamproject and the Master thesis

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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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the course is also assigned to a thematic area.

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- If a module is assigned to this area, you do not get ECTS for it.
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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
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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.

More on:

When to choose modules?

When to choose which modules?

Area	1st & 2nd semester	2nd & 3rd semester
Fundamentals of Data Science	PPSW [A] Data Mining I, Machine Learning [L] Introduction to Simulation [S] Wissenschaftliches Rechnen IV & V [L]	Fuzzy Systems [S], (L) Advanced Topics in Geometric Mechanics [L+]
Learning Methods & Models for Data Science	(S) Applied Discrete Modelling, Intelligent Data Analysis, Recommenders, Einführung in die angewandte Ontologie, (L/S) Neuronale Netze, Bayes Networks (L) Introduction to Deep Learning [DL] . . .	Data Mining II, (A) Advanced topics in ML , Swarm Intelligence, Evolutionary Multiobjective Optimization [CI], [CI] Organic Computing, (A) Seminar CLEAN, (A) Advanced topics in KMD, (L) 1Argumentation-stheorie in der Künstlichen Intelligenz, [DL] Learning Generative Models, Neural-Symbolic Integration, . . .
Data Processing for Data Science	Advanced Database Models [D], (D) Data Warehouse Technologies, Advanced Topics in Databases, Information Retrieval, Multimedia Retrieval Datenbanken Implementierungstechniken, Geometrische Datenstrukturen, Grundlagen semantischer Technologien, Distributed Data Management, Transaction Processing, Big Data – Storage and Processing, In-Memory and Cloud Technologien I, II & III VLBA – Cloud DevOps Technologies, Parallel Storage Systems, . . .	
Applied Data Science	XXXXXXXXXXXXX	
Teamproject	XXXXXXXXXXXXX	

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 / ML / CLEAN / ...	The modules at the right 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.

4. Getting Advice

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- On how to prepare for a specific course: Course teacher
- Exam issues: Examinations Office
- 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!