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

Myra Spiliopoulou (Studies Coordinator)
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:**

- 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
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
- a patient
- a disease
- a bicycle
- a pizza
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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]
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
Planing your MDKE studies

IMPORTANT:
▶ The data science Master DKE has no compulsory modules.
▶ It is up to you to choose the modules in each thematic area.
▶ Obligatory: one Scientific Teamproject and the Master thesis

HOW TO CHOOSE MODULES:
1. Make yourself familiar with the types of modules we offer
1.1 Lecture (called “Vorlesung”) with Exercises (called “Übung”)
1.2 Seminar
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
2. Consult the Module catalogue to find what we offer in winter & summer
3. THEREAFTER consult the LSF to find what we offer in this term
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 consult the interview video with the teacher, before enrolling to the course

When you assign modules to the thematic areas

▶ DO NOT use LSF to map courses to areas; use only the Module Hand Book
▶ DO map teamprojects exclusively to the area ‘Applied Data Science’ – even if the Module Hand Book seems to permit something different!!
▶ 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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When registering for an exam:

When you register for the examination of a course:
the course is also assigned to a thematic area.
If you do not assign the course to a thematic area per hand,
it is assigned automatically to a default area!

ALWAYS choose MANUALLY the thematic area of the module.

CAUTION
▶ There is an area called 'Additional modules' / 'Zusätzliche Module'.
▶ If a module 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 and you discover it only when you find that you did not get the ECTS.
▶ and then you cannot change it.

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At the end of EACH written exam:

Checklist:

? Did I give my exam paper?

If NO:
Tell the teacher IMMEDIATELY.
Apply for a change to the Examination Office.
Inform the Studies Coordinator IMMEDIATELY.
and Make sure you do not know what your grade is! No guarantees . . .
At the end of EACH written exam:

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No guarantees ...
Where to find more information?


and from there you follow the links to:

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

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.
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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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More on:
When to choose modules?
### When to choose which modules?

<table>
<thead>
<tr>
<th>Area</th>
<th>1st &amp; 2nd semester</th>
<th>2nd &amp; 3rd semester</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fundamentals of Data Science</strong></td>
<td>PPSW [A]</td>
<td>Fuzzy Systems [S], (L) Advanced Topics in Geometric Mechanics [L+]</td>
</tr>
<tr>
<td></td>
<td>Data Mining I, Machine Learning [L]</td>
<td></td>
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<tr>
<td></td>
<td>Introduction to Simulation [S]</td>
<td></td>
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<tr>
<td></td>
<td>Wissenschaftliches Rechnen IV &amp; V [L]</td>
<td></td>
</tr>
<tr>
<td><strong>Learning Methods &amp; Models for Data Science</strong></td>
<td>(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] ...</td>
<td>Data Mining II, (A) Advanced topics in ML, Swarm Intelligence, Evolutionary Multiobjective Optimization [CI], (A) Seminar 'Predictive Maintenance', [DL] Learning Generative Models, Neural-Symbolic Integration, ...</td>
</tr>
<tr>
<td><strong>Data Processing for Data Science</strong></td>
<td>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 &amp; III VLBA – Cloud DevOps Technologies, Parallel Storage Systems, ...</td>
<td></td>
</tr>
<tr>
<td><strong>Applied Data Science</strong></td>
<td>XXXXXXXXXXXXXXXXXXXXX</td>
<td></td>
</tr>
<tr>
<td><strong>Teamproject</strong></td>
<td>XXXXXXXXXXXXXXXXXXXXX</td>
<td></td>
</tr>
</tbody>
</table>
What do these symbols mean?

<table>
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<tr>
<th>Mark after the title</th>
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<th>How to read it</th>
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<tr>
<td>Introduction to Deep Learning [DL]</td>
<td>[DL] Learning Generative Models</td>
<td>'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.</td>
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<td>Advanced Database Models [D]</td>
<td>(D) Data Warehouse Technologies</td>
<td>The mark '(…)’ denotes a 'better-have' competency. Hence: better attend the module at the left before you attempt the module at the right.</td>
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</table>

Special cases

| PPSW [A] | (A) Advanced topics \{of KMD, of ML, \ldots\}, 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.
4. Go to 'Data Engineering ...' and do alike.
4. Getting Advice
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The first place to look for advice:

FAQs – to be reached from the landing page
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- On how to plan your studies: Mentors
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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!