INF FAKULTÄT FÜR INFORMATIK

The Data Science Master Degree
Data & Knowledge Engineering

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http://www.kmd.ovgu.de/

DKE in the times of Data Science

What do you need to do Data Science?

1. Data
2. Methods
   - Methods for processing data – efficiently
   - Methods for learning from data
   - Methods for describing complex objects
   - Methods for visualizing complex objects and what we know on them
3. Business understanding
4. Understanding on how to match Data with Methods

DKE in the times of Data Science

What do you need to do Data Science?

1. Data →
   - a social network
   - a medical record
   - a patient
   - a disease
   - a car
   - a liver
   - a pizza
2. Methods
   - Methods for processing data – efficiently
   - Methods for learning from data
   - Methods for describing complex objects
   - Methods for visualizing complex objects and what we know on them
3. Business understanding
4. Understanding on how to match Data with Methods

DKE in the times of Data Science

What Expertise do you need to become a Data Scientist?

2. Methods

- Methods for processing data – efficiently
- Methods for learning from data
- Methods for describing complex objects
- Methods for visualizing complex objects and what we know on them

Data Engineering

Data Mining / Machine Learning

Knowledge Engineering

Visualization

DKE in the times of Data Science

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   - Methods for processing data – efficiently
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3. Business understanding

Data Engineering

Data Mining / Machine Learning

Knowledge Engineering

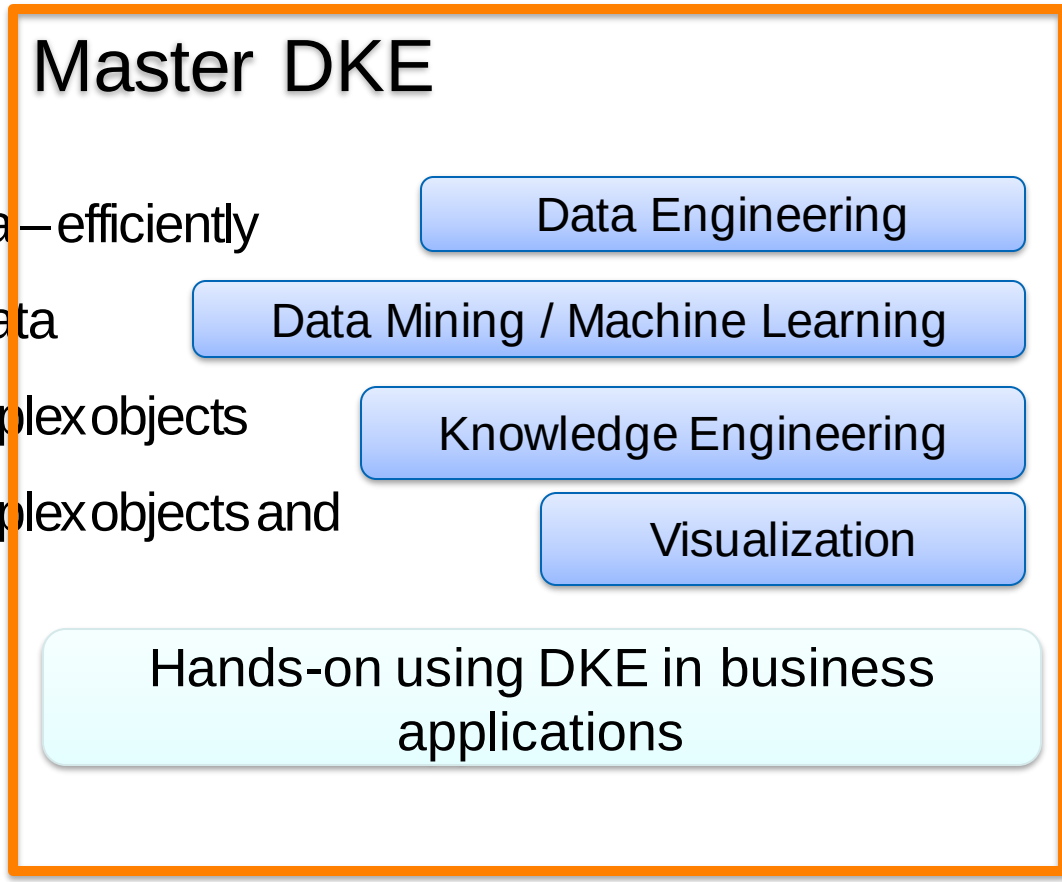
Visualization

Hands-on using DKE in business applications

DKE in the times of Data Science

What Expertise do you need to become a Data Scientist?

2. Methods
   - Methods for processing data – efficiently
   - Methods for learning from data
   - Methods for describing complex objects
   - Methods for visualizing complex objects and what we know on them
3. Business understanding



Data Science Master DKE in the Faculty of Computer Science

Bachelor degree
(at least 10 CS courses)

Data Science Master DKE

4 semesters / 120 ECTS

3 semesters=90 ECTS for courses
+
1 semester=30 ECTS for the Master thesis

Structure of the Master DKE

FIVE thematic areas:

1. Fundamentals
2. Models
3. Methods I
4. Methods II
5. Applications

Structure of the Master DKE

FIVE thematic areas:

1. Fundamentals: Basics of data mining, database processing, data/image/multimedia engineering
2. Models: Knowledge representation, knowledge modeling, knowledge processing
3. Methods I: Knowledge discovery, artificial intelligence, machine learning
4. Methods II: Information processing and retrieval
5. Applications: Application of DKE, including business applications, medical applications, engineering applications, core CS applications (e.g. security, image understanding)

Structure of the Master DKE

Choose modules in the thematic areas:

1. Fundamentals: 30 ECTS
2. Models: 12-24 ECTS
3. Methods I: 12-24 ECTS
4. Methods II: 12-24 ECTS
5. Applications: 12-24 ECTS

Master thesis: 30 ECTS

Among them: At least one *TeamProject* (WTM: 6 ECTS) in one of the thematic areas 2-5

Where to choose modules from?

Fundamentals:

- Late semesters of the FIN programme for Bachelor degrees — 5 ECTS
- Modules from the FIN programme for Master degrees
  except of team projects ("Wissenschaftliches Teamprojekt WTM")

Models, Methods I & II, Applications:

- Modules from the FIN programme for Master degrees
  including team projects ("Wissenschaftliches Teamprojekt WTM")

Information on all modules

Module catalogues, with the assignment of courses to each thematic area are under

`http://www.inf.ovgu.de/ordnungenma.html`

- Move down the page to **Data & Knowledge Engineering**
- Under the entry **Modulhandbuch** you find all offered modules under

  → **Modulkatalog** (Übersicht über alle Module): **<current term>**

The modules offered in the current term are in the LSF.

DO NOT use LSF to map modules to thematic areas.

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→ **Modulkatalog** (Übersicht über alle Module): **<current term>**

This catalogue is updated once per semester, so make sure you choose the most recent one.

The modules offered in the current term are in the LSF.

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The index provides a fast overview on which modules fit to which area.

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- Under the entry **Modulhandbuch** you find all offered modules under

→ **Modulkatalog** (Übersicht über alle Module): **<current term>**

The index provides a fast overview on which modules fit to which area.
We expect changes in this overview only in exceptional cases (e.g. for fully redesigned modules).

DO NOT use LSF to map modules to thematic areas.

Choosing modules to PLAN YOUR STUDIES

How to choose modules?

YOU
choose the courses you want to attend

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From WiSe 2017/2018 on, we have a recommended plan for the 1st semester.

RECOMMENDED PLAN FOR 1st Semester (WS 2018)

- **Fundamentals:** PPSW (3 ECTS), Information Retrieval, Introduction to Simulation (also fits under Models)
- **Further Courses:** Distributed Data Management, Modeling UML with Semantics, Machine Learning, Swarm Intelligence (check the description for pre-requisites or educational background)

Registration open for 3 weeks after semester start

Focus "Data Science Methods"

Get a solid understanding on learning methods — Methods I: 18

Get a solid understanding on data management — Methods II: 18

Master some modeling technologies — Models: 12

Understand business applications — Applications: 12

Spread your Fundamentals: 30 block judiciously between

- learning methods
- data management

Make a plan NOW!

Personalized Plan of Studies

1. Find modules
2. Assign each module you chose to one of the thematic areas
3. Write down your plan and cross-check that you have the right number of modules in each thematic area!
4. When you register for the exam of a course, pick your plan and make sure that you assign the course to the correct thematic area.
5. ...

Write down the plan for your studies

1. Find modules
   - Go through the modules offered, according to the LSF
   - Read the module descriptions (web pages) and
   - Drop by at the first one or two meetings
   - Make sure you have the background needed to attend the course – ASK the teacher if you are not sure
2. Assign each module you chose to one of the thematic areas

Write down the plan for your studies

1. Find modules
2. Assign each module you chose to one of the thematic areas
   - You find the mapping of modules to thematic areas in the DKE module hand book.

The LSF also lists the areas to which a module belongs, but this is often obsolete. IGNORE it!

The DKE module hand book is in German, but the index is inEnglish. You can use the index.

Write down the plan for your studies

1. Find modules
2. Assign each module you chose to one of the thematic areas
   - You find the mapping of modules to thematic areas in the DKE module hand book.
   - Make sure that you assign only as many modules to an area as are permitted.

For example, you cannot assign 30 ECTS to Applications.

Write down the plan for your studies

1. Find modules
2. Assign each module you chose to one of the thematic areas
   - You find the mapping of modules to thematic areas in the DKE module hand book.
   - Make sure that you assign only as many modules to an area as are permitted.
   - If a module can be assigned to more than one area, check:
     - Is it a seminar or a teamproject?
       Then, the thematic area depends on the concrete topic.

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     - Is it a seminar or a teamproject?
       Then, the thematic area depends on the concrete topic.

There are default areas for seminars & teamprojects, for example:
- most seminars/teamprojects with the word "business" in the name belong to APPLICATIONS.
- most seminars/teamprojects on databases belong to Methods II.
- seminars that belong to FUNDAMENTALS must deliver fundamental knowledge on methods I or II.

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   - You find the mapping of modules to thematic areas in the DKE module hand book.
   - Make sure that you assign only as many modules to an area as are permitted.
   - If a module can be assigned to more than one area, check:
     - Is it a seminar or a teamproject?
       Then, the thematic area depends on the concrete topic.
     - If it is a course (e.g. Swarm Intelligence), then choose one of the permitted thematic areas carefully!

Write down the plan for your studies

1. Find modules
2. Assign each module you chose to one of the thematic areas
3. Write down your plan and cross-check that you have the right number of modules in each thematic area!

Example template for PLAN OF STUDIES

Name	Date

	Fundamentals	Models	Methods I	Methods II	Applications	
Sem 1	1. ... 2. ...	1. ...	1. ...	1. ...		
Sem2	3. ... 4. ...		2. ...	2. ...	1. ...	
Sem3	5. ...	2. ...	3. ...	3. ...	2. ...	
	30 ECTS	...	...	...	...	90
	Sem 4: Master thesis					

Write down the plan for your studies

1. Find modules
2. Assign each module you chose to one of the thematic areas
3. Write down your plan and cross-check that you have the right number of modules in each thematic area!
4. When you register for the exam of a course in HISQIS: Consult your plan of studies!
   - Is the course's area, as is in your plan, also listed in HISQIS?

YES: Click into the area you want.

Do not forget to click the area you want!
Each course has a default area.
If you click nothing, you get the default.

Write down the plan for your studies

1. Find modules
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3. Write down your plan and cross-check that you have the right number of modules in each thematic area!
4. When you register for the exam of a course in HISQIS: Consult your plan of studies!
   - Is the course's area, as is in your plan, also listed in HISQIS?

YES: Click into the area you want.

NO: Cross-check into the latest version of the module hand book!
- If HISQIS disagrees with the module hand book: go to the Examinations Office and ask for help

Write down the plan for your studies

1. Find modules
2. Assign each module you chose to one of the thematic areas
3. Write down your plan and cross-check that you have the right number of modules in each thematic area!
4. When you register for the exam of a course in HISQIS: Consult your plan of studies!
   - Is the course's area, as is in your plan, also listed in HISQIS?

YES: Click into the area you want.

NO: Cross-check into the latest version of the module hand book!
If your plan disagrees with the module hand book, you must change your plan!

Write down the plan for your studies

1. Find modules
2. Assign each module you chose to one of the thematic areas
3. Write down your plan and cross-check that you have the right number of modules in each thematic area!
4. Register to the course exams according to your plan of studies.
5. After the exam, check in HISQIS:

Is your course (and the ECTS) assigned in the area you wanted?

YES

NO: Pick the printout of your enrollment and ask for help.

Write down the plan for your studies

1. Find modules
2. Assign each module you chose to one of the thematic areas
3. Write down your plan and cross-check that you have the right number of modules in each thematic area!
4. Register to the course exams according to your plan of studies.
5. After the exam, check in HISQIS:

Is your course (and the ECTS) assigned in the area you wanted?

YES

NO: Pick the printout of your enrollment and ask for help.

Write down the plan for your studies

1. Find modules
2. Assign each module you chose to one of the thematic areas
3. Write down your plan and cross-check that you have the right number of modules in each thematic area!
4. Register to the course exams according to your plan of studies.
5. After the exam, check in HISQIS whether the courses are assigned as you wanted them.

6. At each semester, UPDATE your plan of studies according to the most recent version of the module hand book.

Do's and Don'ts

- **DO:** choose introductory courses
- **DO:** prefer courses that give you background in Methods; this will give you the background you need for a larger choice of advanced courses from the next term
- **DO:** read carefully the background expected by each course -- it is really expected
- **DO:** approach faculty members
- **DO NOT choose:** too many courses
- **DO NOT choose yet:** scientific teamprojects -- wait until a higher semester

Do's and Don'ts

- **DO NOT choose:** courses that are not in the Module Hand Book, even if they show up in LSF - ask the mentors and the studies coordinator first!
- **DO NOT choose before attending PPSW:** seminars - unless you have had a scientific seminar in your previous studies
- **DO NOT choose:** courses that expect background you do not have
- **DO NOT assume:** that you can acquire background knowledge you do not have in parallel to a course that requires this background knowledge
- **DO NOT use:** LSF to map courses to areas; use exclusively the Module Hand Book

Frequently Asked Questions on the Choice of Modules

Q1: Are all modules I can choose in LSF ?

Answer: NO

- Modules are being added each semester:
  If you look now, you do not necessarily see all modules of the next semester. (new Prof. joining this month)
- Seminars and individual projects are not listed (see later Q)

Q2: Can I enroll to any further module I find ?

Answer: NO

- Modules must fit thematically
- Some modules that fit thematically are not permitted, e.g. early bachelor modules

➔ Get permission before enrolling

Never enroll to a module for which you have no prior approval ! You risk that you cannot have the credits counted.

Q3: Can I make an internship during my studies?

ANSWER:

- You can do an internship if you want,
- but it is not part of your studies!

IMPLICATIONS:

1. The company may ask for a verification that an internship is part of your studies.
2. If you need a visum to do the internship, the visa-issuing authority will ask for a verification that an internship is part of your studies.

You cannot get such a verification. Under no circumstances.

Q3: Can I make an internship during my studies?

ANSWER:

- You can do an internship if you want,
- but it is not part of your studies!

We can certify that the specific internship is good for your further study, but IF AND ONLY IF:

➢ The internship fits excellently into one area of your studies, and in this area you still must make ECTS.

Q3: Can I make an internship during my studies?

ANSWER:

- You can do an internship if you want,
- but it is not part of your studies!

A specific internship may be good for your further study.

Example: You want to write your master thesis on the analysis of ecommerce data. you got an internship at a company to do data engineering on such data.
TODO 1: Find a supervisor for your master thesis.
TODO 2: Discuss with your supervisor whether this internship would be good for your master thesis.

If your supervisor thinks that the internship is important for your master thesis, s/he may decide to write for you a confirmation on that.

Do not apply for an internship, unless you are sure that it fits to the rest of your studies.

Q4a: Can I spend part of my studies at another University?

ANSWER:

Yes, you can use either

the Erasmus exchange programme or

one of our bilateral exchange programmes.

BEWARE: Restrictions apply!

Q4b: How do I make sure that my ECTS from my semester abroad are taken over ?

1. Prepare a learning agreement between OVGU and the target university BEFORE you leave.
   - Choose the modules carefully.
   - Map the modules to the thematic areas.
   - Make sure that the Credit Points agree.
2. Get the learning agreement approved by your Studies Advisor and have it filed in the Examinations Office
3. Get the learning agreement approved by the target university
4. Report any changes to the learning agreement, as soon as you encounter them, and have the changes approved (see Step 2)

Q5: What *kinds* of modules are there?

Modules in Master DKE:

- Eligible courses that fit to the thematic areas of Master DKE
- 6 ECTS per course (5 or less ECTS possible)

Course Types offered in the FIN:

- Vorlesung mit Übung
- Scientific Seminar
- Team Project
- Individual Project
- ...

- Individual projects:
  are not listed in LSF
  are designed individually for each student

➔ Ask the Faculty members for individual projects they offer

Q6: How many team projects can I enroll to?

ANSWER: At least one!

- no explicit limit
- must fit to a thematic area (NOT: Fundamentals)
- must give 6 ECTS each

Q6: How many scientific seminars can I enroll to?

ANSWER:

- no explicit limit
- must fit to thematic area (see issues 1-3)
- must give 6 ECTS each

How much to study?

Data Science is fascinating – the more of it the better

Q 1: Can I enroll to more courses than 90 ECTS ?

A: Perhaps. Get approval before enrolling !

Extra courses appear in your Transcript of Records in a separate field. So, you have evidence that you passed them.

BUT

Extra courses are not counted in the final grade.

Data Science is fascinating – the more of it the better

Q2: I have enrolled to more than 90 ECTS. What now?

A: Courses are sorted by 1st exam, earliest first,
and the ECTS sum up.
As soon as 90 ECTS are reached,
the remaining courses are extra courses.

The courses are sorted by the 1st exam,
and the ECTS are sumed up,
even if you did not pass the exam.

- The ECTS you will get from a course are counted
  as soon as you had an exam for it.
  They are already reserved for you.
  This is a consequence of the fact that
  you cannot step down from an exam.

Getting Advice

You can get advice from:

1. Studies Coordinator
2. Coordinator for International Studients: Dr. Claudia Krull
3. Examinations Office
4. FARAFIN & Mentors for international students

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3. Examination Office
4. FaRaFIN & Mentors for international students

FARAFIN is the Students' Board of the Faculty of Computer Science (FIN).
They are students.
They are already familiar with the studies here.
They are volunteers who support other students in their studies.
They organize several events – from time management courses to get-together parties.

www.inf-international.ovgu.de/Welcome/Mentoring+Program.html

Studies Coordinator

Prof. Myra Spiliopoulou
myra@ovgu.de
R135
http://www.kmd.ovgu.de/

Arrange meetings with
silke.reifgerste@ovgu.de

Studies Vice-Coordinator

Prof. Andreas Nürnberger
andreas.nuernberger@ovgu.de

http://www.findke.ovgu.de/

Which Studies Coordinator to contact?

Prof. Myra Spiliopoulou
myra@iti.cs.uni-magdeburg.de
R135
http://www.kmd.ovgu.de/

1. Advice for choosing modules
2. Advice for making plans of studies
3. Crosscheck of module mappings (seminars, projects)
4. Arbitrary questions

Thanks!!