



OTTO VON GUERICKE
UNIVERSITÄT
MAGDEBURG

INF

FAKULTÄT FÜR
INFORMATIK

The Master Programme

Data & Knowledge Engineering

Studies Advisor Prof. Myra Spiliopoulou
Institute for Technical and Business Information Systems
<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

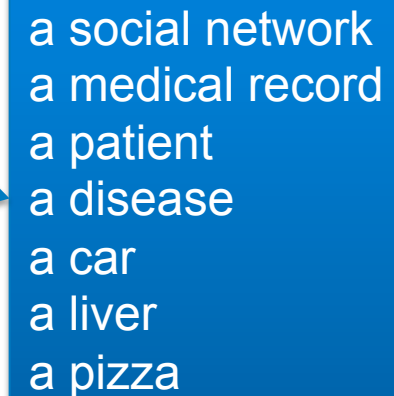
DKE in the times of Data Science

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a social network
a medical record
a patient
a disease
a car
a liver
a pizza

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 **Data Engineering**
- Methods for learning from data **Data Mining / Machine Learning**
- Methods for describing complex objects **Knowledge Engineering**
- Methods for visualizing complex objects and what we know on them **Visualization**

DKE in the times of Data Science

What Expertise do you need to become a Data Scientist?

2. Methods

- Methods for processing data – efficiently **Data Engineering**
- Methods for learning from data **Data Mining / Machine Learning**
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3. Business understanding

Hands-on using DKE in business applications

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2. Methods

- Methods for processing data – efficiently
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3. Business understanding

Master DKE

Data Engineering

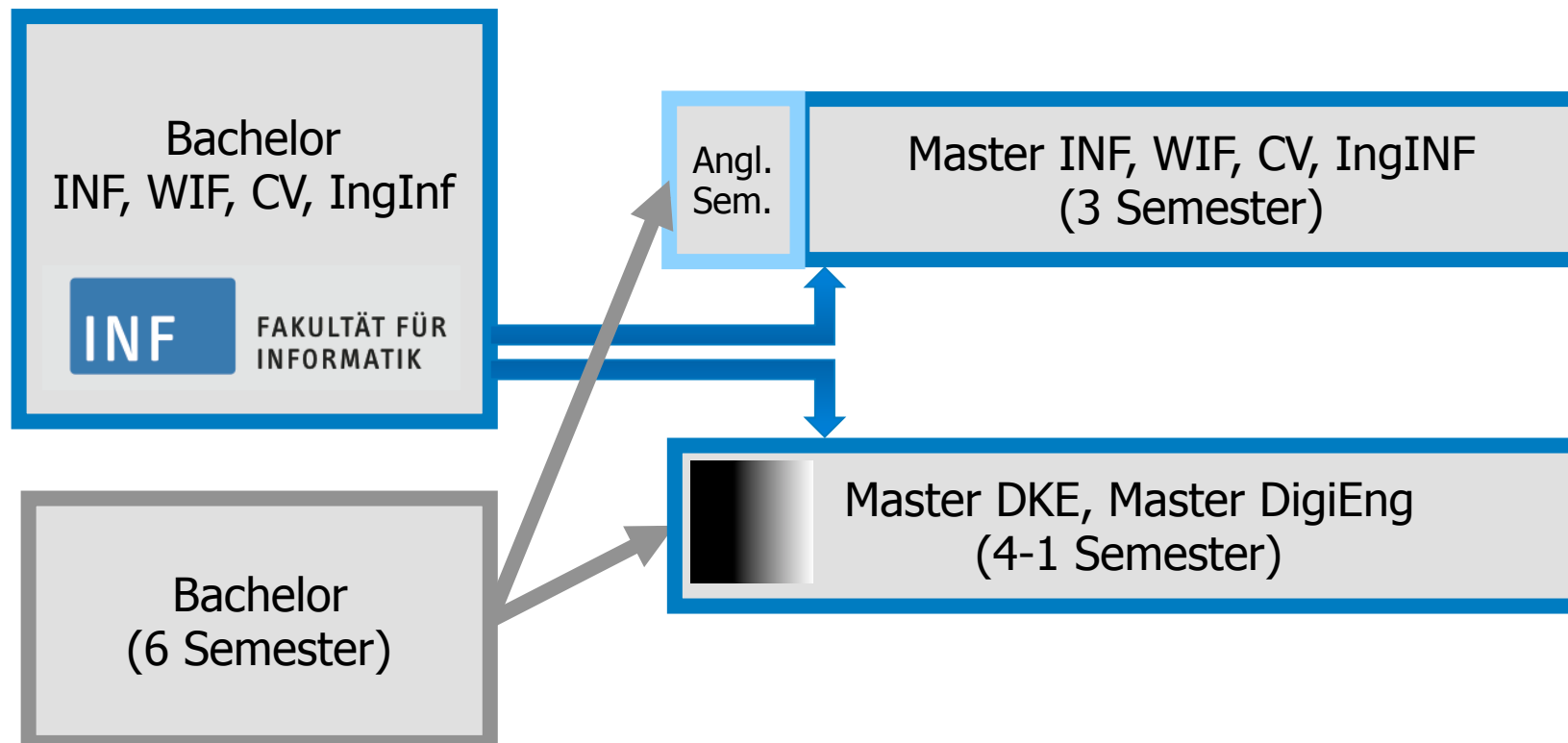
Data Mining / Machine Learning

Knowledge Engineering

Visualization

Hands-on using DKE in business applications

Master DKE in the Faculty of Computer Science



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 (0 if you take the 3–Semester MDKE)

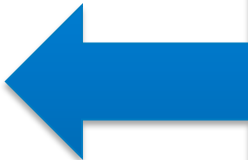
2. **Models:** 12–24 ECTS

3. **Methods I:** 12–24 ECTS

4. **Methods II:** 12–24 ECTS

5. **Applications:** 12–24 ECTS

Master thesis: 30 ECTS



6 ECTS reserved
for a *TeamProject*
in one of the
thematic areas

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

Models, Methods I & II, Applications:

- Modules from the FIN programme for Master degrees

Information on all modules is in LSF

Isf → Courses → Course Overview

- Fakultät für Informatik
 - Courses sorted by Degree Programme
 - [Data & Knowledge Engineering \(neu\) – Master \(DKE–neu;M\)](#)

Choosing modules to PLAN YOUR STUDIES

How to choose modules?

YOU
choose the courses you want to attend

Example Plan – with focus on "Mining"

Fundamentals + Methods I 30+24 ECTS

- Data Mining
- Machine Learning
- Intelligent Data Analysis
- Swarm Intelligence
- Organic Computing
- Evolutionary Algorithms
- Adv. Topics in KMD
- Adv. Topics in Machine Learning
- Seminars & Teamprojects in DKE, KMD, FuzzySys, SwarmIntelligence

and many more

Models: 12 ECTS

- Applied Discrete Modelling
- Bayesian Networks
- Fuzzy Systems
- Neural Networks
- Ontologies

and more

Methods II: 12 ECTS

- Data Warehousing
- Advanced Topics in Databases
- In-Memory Technologies

and more

Applications: 12 ECTS

- Pattern Recognition in Image Analysis
- Recommender Sys: Methods & Apps
- Multimedia Retrieval

and more

Example Plan – with focus on "Big Data"

Methods I: 18...24 ECTS

- Data Mining
 - Machine Learning
 - Intelligent Data Analysis
 - Adv. Topics in KMD
 - Adv. Topics in Machine Learning
 - Seminars DKE, KMD, FuzzySys
 - Teamprojects KMD, DKE, FuzzySys
- and more

Fundamentals + Methods II: 30+(18...24) ECTS

- Distributed Data Management
 - Advanced Topics in DB
 - In-Memory Technologies I & II
 - Seminar & Teamproject DBSE
 - Data Warehousing
 - Information Retrieval
 - Multimedia Retrieval
 - Cloud Computing
- and more

Models: 12 ECTS

- Ontologies
 - Applied Discrete Modelling
 - Bayesian Networks
 - Neural Networks
- and more

Applications: 12 ECTS

- Very Large Business Applications
 - Multimedia and Security
 - CRM/RecSys
 - Pattern Recognition in Image Analysis
- and more

Example Plan – with focus on "Business"

Methods I: 18 ECTS

- Data Mining and more
- Machine Learning
- Intelligent Data Analysis
- Swarm Intelligence

Methods II: 18 ECTS

- Data Warehousing and more
- Advanced Topics in DB
- In-Memory Technologies
- Information Retrieval

Models: 12 ECTS

- Bayesian Networks
- Neural Networks
- Fuzzy Systems and more

Fundamentals +Applications: 30+12 ECTS

- Very Large Business Applications
 - Recent Topics in Business Inf
 - Multimedia Retrieval
 - Multimedia and Security
 - CRM/RecSys
 - Recommender Sys: Methods & Applications
 - Teamprojects WIF I, WIF III
 - Seminars + Teamprojects of DBSE, DKE, KMD, AMSL
- (Attention: Only some topics fit!)

and more

Example Plan – with focus on "Applications"

Methods I: 18 ECTS

- Data Mining and more
- Machine Learning
- Intelligent Data Analysis
- Swarm Intelligence

Methods II: 18 ECTS

- Data Warehousing and more
- Advanced Topics in DB
- In-Memory Technologies
- Information Retrieval

Models: 12 ECTS

- Bayesian Networks
- Modelling with UML, with semantics and more

Fundamentals +Applications: 30+12 ECTS

- Very Large Business Applications
- Pattern Recognition in Image Analysis
- Computer Vision
- Multimedia and Security
- Seminars + Teamprojects on medicine, visualistics, security, business applications, telematics
- CRM/RecSys
- Recommender Sys: Methods & Applications and many many more

Focus "Data Science"

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 (see: Example plan for "Mining")
- data management (see: Example plan for "Big Data")

Make a plan at the beginning of each semester:

Personalized Plan of Studies

1. Find modules for each thematic area:

- ✓ Go through the module catalogues in 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. Write down your plan and have it approved →

PLAN OF STUDIES

Student ID

Name

Date

	Fundamentals	Models	Methods I	Methods II	Applications
Sem 1	1. ... 2. ... 3. ...	1. ... 2. ...	1. ... 2. ...	1. ... 2. ...	1. ... 2. ...
Sem 2	1. ... 2. ... 3. ...	1. ... 2. ...	1. ... 2. ...	1. ... 2. ...	1. ... 2. ...
Sem 3	1. ... 2. ... 3. ...	1. ... 2. ...	1. ... 2. ...	1. ... 2. ...	1. ... 2. ...

Keep your plan up to date:

Personalized Plan of Studies

1. Find modules for each thematic area
 2. Write down your plan and have it approved
 - Consult the Studies Advisor
 - **Submit the plan to the Examinations Office**
 - Go back and ask: Is my plan already approved?
 3. Enroll to the modules once the plan is approved
- Update the plan at the end of each semester !

PLAN OF STUDIES

Student ID

Name

Date

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

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.
- 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 !
There are no a posteriori approvals !

Q3: Can I spend some time of my studies at another University?

Answer: YES! As part of an Erasmus exchange

Q4: 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)

**Never enroll to a module for which you have no prior approval !
There are no a posteriori approvals !**

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 the individual projects they offer

Q6: How many team projects can I enroll to?

ANSWER: At least one!

- no explicit limit
- must fit to thematic area (see issues 1-3)
- 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

Taking over ECTS from your previous studies

Eligibility

The Master DKE requires a 6–semester Bachelor degree that corresponds to 180 ECTS.

→ You can only take over ECTS from your previous studies IFF your previous degree corresponds to a Bachelor degree of more than 180 ECTS.

Q1: My previous degree was 7/8 semesters long. Am I eligible?

Answer: NOT NECESSARILY !

The Master DKE requires a Bachelor degree **that is equivalent to a 6-semester Bachelor degree according to the German system.** Such a degree corresponds to 180 ECTS.

- Most Master DKE students hold such a Bachelor degree.
 - You are eligible to take over some ECTS, **IFF your degree is equivalent to 7-semester Bachelor degree according to the German system.**
- If you are not sure of the equivalence, please consult the Admissions Office.

Q2: I am eligible! How many ECTS can I take over?

**30
ECTS**

Q2a: I have 35 ECTS on DKE-related subjects. Why not take them all over?

Answer: You cannot count a course twice.

A Bachelor degree of 180 ECTS is prerequisite for the Master DKE.

If your Bachelor is equivalent to 210 ECTS, then:

- you use 180 ECTS to become eligible for the Master DKE, and**
- you have $210 - 180 = 30$ ECTS left: these can be recognized.**

Applying for the transfer of ECTS: FORM

TO: Examinations Office

Student ID

Name

Date

Old course
name

Grade

ECTS

Most similar course from the FIN Bachelor
catalogue

1. ...
2. ...
3. ...
4. ...
5. ...

...
...

...
...

...
...

Applying for the transfer of ECTS: FORM

TO: Examinations Office

Student ID

Name

Date

Old course
name

Grade

ECTS

Most similar course from the FIN Bachelor
catalogue

1. ...
2. ...
3. ...
4. ...
5. ...

...
...

...
...

...
...

The course must
fit to the
Fundamentals of
DKE

Applying for the transfer of ECTS: FORM

TO: Examinations Office

Student ID

Name

Date

Old course
name

Grade

ECTS

Most similar course from the FIN Bachelor
catalogue

1. ...
2. ...
3. ...
4. ...
5. ...

...
...

...
...

...
...

Grades are taken over and are used
in the computation of your Master
DKE final grade.

- Choose the courses where you
have the best grades.

Q3: My grades are not according to the German system. Should I translate them?

TO: Examinations Office

Student ID

Name

Date

Old course name	Grade	# ECTS	Most similar course from the FIN Bachelor catalogue
1. ...			
2. ...			
3.	
4.	
5. ...			

Answer: NO.

1. Just sort the courses, best grade first.
2. Computation according to the German system is done by the Examinations Office.

Q4: My old course is 18 ECTS, the most similar FIN Bachelor course is 5 ECTS. How to match them?

TO: Examinations Office

Student ID

Name

Date

Old course name	Grade	# ECTS	Most similar course from the FIN Bachelor catalogue
1. ...			
2. ...			
3.	
4.	
5. ...			

1. Attach to your application a detailed description of the old course.
 2. On the right column, list all courses of the FIN Bachelor catalogue, which match to a part of your old course.
- After you submit the application to the Examinations Office, the Studies Advisor will decide.

Q4: My old degree does not have ECTS. How to do the matching?

TO: Examinations Office

Student ID

Name

Date

Old course
name

Grade

ECTS

Most similar course from the FIN Bachelor
catalogue

1.	...		
2.	...		
3.	...	...	...
4.	...	...	...
5.	...		

1. Replace #ECTS with number of teaching hours per week.
2. Write down the duration of the course in weeks.

Q6: I am not sure whether the courses fit. What should I do?

TO: Examinations Office

Student ID

Name

Date

Old course name	Grade	# ECTS	Most similar module from the FIN Bachelor catalogue
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1.	...		
2.	...		
3.
4.
5.	...		

List more old courses than the sum of 30 ECTS.

Let the Studies Advisor choose among them.

BUT:

1. Try to find similar modules; do not leave the last column empty.
2. Do not forget to sort the courses on grade; best grade first.

Q7: When to apply?

TO: Examinations Office

Student ID

Name

Date

Old course
name

Grade

ECTS

Most similar module from the FIN Bachelor
catalogue

IMMEDIATELY !!

1
2
3
4
5

Applications must be submitted **NO LATER** than **4 WEEKS**
AFTER ENROLLMENT.

Don't miss the deadline!

The most frequent reason for rejecting an application for
ECTS transfer is that the deadline has passed.

Q8: To whom do I give my application ?

TO: Examinations Office

Student ID

Name

Date

Old course
name

Grade

ECTS

Most similar module from the FIN Bachelor
catalogue

1
2
3
4
5

1. Submit your application to the Examinations Office !
2. Make sure your application is filed.
3. Keep a copy for your records.

DOs and DONTs when you apply for a transfer of ECTS (1 / 2)

1. DO NOT submit your application to the Studies Advisor.
 - You must submit your application to the Examinations Office.
 - The Examinations Office will forward it to the Studies Advisor.
2. DO NOT wait until your old University sends you documents (transcripts of records, certificates, course descriptions etc).
 - Most of this information is already available as part of your DKE application.
 - If you need additional information (e.g. a course description), then **submit without it**:
 - Write a description yourself and attach it to your application.
 - Declare in your application that you will provide the missing information asap and then ask IMMEDIATELY your old University for it.

DOs and DONTs when you apply for a transfer of ECTS (1 / 2)

3. DO NOT ask the Studies Advisor for an appointment, and wait till the appointment to discuss how you formulate your application.
 - Fill in the old courses you think that fit best.
 - Consult the LSF, find the most similar Bachelor courses.
 - Describe the old courses for which you want to transfer ECTS, write down their duration.
 - If you definitely cannot formulate the application, contact the Studies Advisor per mail.
4. See the entry "Getting Advice"

Examinations

Examinations for Master students

Each module must be completed with an exam.

What types of exam are there?

- Oral examination – **mündliche Prüfung**
- Written examination – **Klausur**
- Homework – **Hausarbeit**

Type of exam depends on module.

ASK: teacher

Examinations for Master students

When planning an exam, BEWARE:

- NO automatic enrollment – *You* must take action !
- There are enrollment deadlines; if you miss a deadline, you cannot enroll.
- You can cancel an enrollment until 14 days before exam.
- At most three tries per course:
 - If you fail in the 2nd try,
you are enrolled automatically to the 3rd one
(which is oral exam).
- No way of stepping back from the exam of a course!

ASK: teacher,
exam office

Getting Advice

You can get advice from:

1. Studies Advisor
2. Examinations Office
3. FARAFIN Students
4. DKE Students

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1. Studies Advisor
2. Examinations Office
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4. DKE Students

[Link to Other DKE Students !](#)

In the courses, you meet DKE students of higher semesters; they can help you to

1. make your plan of studies
2. enroll for examinations
3. find out whether you can apply for a transfer of ECTS and how
4. find your way through unfamiliar procedures

You can get advice from:

1. Studies Advisor
2. Examinations Office
3. FARAFIN Students

Establish contact to FARAFIN !

4 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 through their studies.

They organize several events – from time management courses to come-together parties.

They just launched a mentoring programm for international Master students.

Studies Advisor



On sabbatical leave in
Summer Term 2015

Prof. Myra Spiliopoulou
myra@iti.cs.uni-magdeburg.de

R135

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

Arrange meetings with
silke.reifgerste@ovgu.de

Studies Vice-Advisor



Prof. Andreas Nürnberger
andreas.nuernberger@ovgu.de

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

Which Studies Advisor to contact?



Prof. Myra Spiliopoulou
myra@iti.cs.uni-magdeburg.de

R135

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

1. Advice for making plans of studies
2. Approval of plans of studies
3. Approval of applications for ECTS transfer – ONLY for applications submitted to the Examinations Office
4. Arbitrary questions

No appointments in SoSe 2015, all discussions **per mail !**

Your direct contacts

Tatiana Gossen <tatiana.gossen@ovgu.de>

FIN/ITI, DKE Group

Pawel Matuszyk <pawel.matuszyk@ovgu.de>

FIN/ITI, KMD Group

can give you:

- hints on whom you should address for a specific issue
- hints about exam types, also for seminars and projects (Pawel)
- what materials you need for ECTS transfer (Tatiana)