Master of Science in Computer Science

Paderborn University
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October 2017
Outline

- Prerequisites
- Elements of the Master Programme
- Structure of the programme
- Scope and Schedule
- Examinations
Prerequisites of the Masters Program

- What you learnt in your Bachelor’s degree …
  - in India, Syria, Egypt, Pakistan, …

- … must match (roughly) what Paderborn students learn in their Bachelor’s degree
  - PB Bachelor provides the necessary requisites

- Most important check done before admission!
  - We want you to succeed!
Prerequisites of the Masters Program

- Paderborn Bachelor
  - mostly done in German
  - content organization analogous to Master
  - same teaching personnel
  - teaching goals **match** prerequisites

- Bachelor and Master designed as a consecutive study program
Prerequisites of the Masters Program

- Ability to apply foundations of Computer Science
- Experience in Doing Practical Work
- Ability to do Scientific Work
Prerequisites: Ability to apply foundations of CS

- usage of **formal calculi** to specify problems, structures, systems, languages, ...
- formal methods to **analyze algorithms**
- formal methods to **check solutions**
Prerequisites: Experience in Doing Practical Work

- application of methods and tools for software design and implementation

- substantial experience in at least one programming language

- ability to switch to a new programming language within short time
Prerequisites: Ability to do Scientific Work

- searching for and investigating scientific publications

- writing scientific documents
  - adequate structure
  - clear descriptions and explanations
  - correct use of citations and references
  - correct English

- developing and performing presentations
Elements of the Masters Program

- (Lectures)
- (Exercises)
- Seminar
- Project Group
- Thesis
- German Language Course
Elements of the Masters Program

- Seminar (*Seminar*)
  - 2 meeting hours per week (*S2, 5 ECTS*)
  - Teacher proposes topics (*Seminarthemen*)
  - Every student
  - selects one topic to work on
  - prepares a talk with slides (*Seminarvortrag*)
  - submits a written elaboration (*Ausarbeitung*)
Elements of the Masters Program

- Project Group *(Projektgruppe)*
  - **Workload**: „One-third“–time for one **year** *(20 ECTS)*
  - PG topic presentation in a public event *(Projektgruppenvorstellung)* in the last week of teaching season
  - Interested students apply for a PG and 8 to 16 students are accepted
  - Working for two semesters on a project *(often: concept and implementation of some software)*
  - **Highly self–organized**
    - You have to contribute actively!
  - **All** our project–groups are in English
Elements of the Masters Program

- **Master’s Thesis** *(Masterarbeit)*
  - **Workload:** Full-time for one semester *(30 ECTS)*
  - **What has to be done?**
    - Literature review
    - Research: develop new results!
    - Obey rules of good scientific practice!
    - Often: implementation of some software
    - Writing a thesis (~ 80–120 pages) on scientific level
    - All this: within 6 months (formally checked!)

- First a **planning** phase (typically 1 month)
- Then the **performing** phase (5 months)
Elements of the Masters Program

- Master‘s Thesis *(Masterarbeit)*
  - Finding an advisor *(Betreuer)*
    - adress professors working in an interesting area
    - adress project group organizer
    - ask friends
  - Finding a topic *(Thema)* is an *interactive* process between student and advisor
    - own ideas?
    - project group topic?
    - discussion with the (potential) advisor!
Elements of the Masters Program

- German Language Course (*Deutschkurs*)
  - No Master’s degree without German Level A2!
  - Language Courses hosted by the International Office
  - Typically covers the „General Studies“ part (*12 ECTS*)
  - Check
    - [http://www.upb.de](http://www.upb.de)
    - International Students
    - EN (for English)
    - International Office
    - German Language Courses
    - German for international degree students
There are five Focus Areas:

1. Software Engineering
2. Algorithm Design
3. Networks and Communication
4. Computer Systems
5. Intelligence and Data

Every student has to choose one of the five as specialization area.
Study Structure

- **Modules** *(Module)*
  - Every module *(6 ECTS)*
    - belongs to one or more focus areas (of the five)
    - consists of exactly one class (from that focus area)
    - is described in the module handbook *(Modulhandbuch)*
  - Every student has to
    - study 3 modules in the area of specialization
    - 1 module in *some other* focus area
    - and 4 more modules in *whatever area* is wanted
    - (Hence every student has to take 8 modules overall)
Study Structure

- Handbook of modules
  Will be available on-line as PDF

- Contains descriptions of
  - Focus Areas
  - Modules (one-class modules)
  - Assignment of modules to Focus Areas
Every student has to... | ECTS credits
---|---
... take **three** modules from the area of specialization | 18
... take **one** module in one other area | 6
... take **four** modules in whatever area | 24
... take **two** seminar modules | 10
... take part in a project group | 20
... write a Master‘s thesis (must be from you specialization area) | 30
... do general studies (in general the German language course) | 12

SUMMING UP TO 120

It is your own responsibility to meet these criterions!
You have the choice!

- Which specialization area? (1 of 5)
- Which modules with regular classes? (big freedom)
- Which project group? (every semester 5 new project groups start)
- Which Master thesis? (unlimited choice)
Schedule

- **Good idea** (not always possible):

  Do a lot of modules in the **specialization area** first...

  - ... then a project group
  - ... then a thesis in this area

  → „grow“ into your favourite subject
Consider workload!

- 30 ECTS points is the officially recommended average workload per semester
- The first semester is tough! (for all the other reasons)
Examinations

- **Module exams**
  - oral exam about the class
  - individual date with the teacher
  - class may include written homework or project work as pre-requisite

- **Project group**
  - permanent evaluation throughout the project

- **Master’s Thesis**
  - evaluation from the advisor and a co-advisor

- **Language Course**
  - Language certificate after the course
Examinations

Repetition

- Module exams can be repeated twice
- Master’s Thesis can be repeated once
- Project group can be repeated twice (you will not want that!)
- German Language Course can be repeated infinitely
Examinations

Compensation

There are (limited) ways

- to shift aside („compensate“) exam **failures**
  - e.g. failure in one module
  - give up on that one and try another one instead

- to **improve** exam results
  - e.g. you succeeded in a module exam but with an unsatisfactory result, you can
  - try a different module additionally
Final failure is possible!

- you have no more option to use compensation and you are no more able to fulfill the requirements
  - 3 modules in the specialization area
  - 5 modules with at least one of them in another area
- three attempts for a project group failed
- two attempts for a Master's thesis failed

😊
Welcome in Paderborn!

- We wish you a successful and enriching study experience!
- Questions?
  - Now!
  - Anytime: study-advice.cs@upb.de