

Master of Computer Science 2016-2017

Programme Structure

Introduction

This document is a brief presentation of the programme Master of Computer Science at the University of Antwerp. It is a research-oriented programme with emphasis on one of three research areas, each corresponding to a **major** in the programme.

Majors

The programme offers three majors. You can choose only one.

1. Computer Networks and Distributed Systems,
2. Data Science
3. Software Engineering.

You will find useful information on each of the following webpages.

- General information about the [University of Antwerp](#)
- Information about the [Department Mathematics and Computer Science](#)
- General information for the major [Computer Networks and Distributed Systems](#)
- General information for the major [Data Science](#)
- General information for the major [Software Engineering](#)

When you navigate to the subpage “>Study Programme” you will find the list of all courses for any of the majors with names of the lecturers (each list is adopted in this document).

Each course links to a course content description and indicates the semester, number of ECTS credits and assessment method. With Elective courses it indicates whether the course is taught in even or odd years or every year.

Some remarks though:

- **Research internships** are listed as second semester courses. This is only an administrative label. At the start of the academic year you need to consult the online register of available internships and select an internship and promoter. You will discuss with the promoter whether the work will be performed in the first semester or spread throughout the academic year. It is possible to split the workload to balance your full course workload over the whole year.
- For the **Master thesis**, you need to consult the online register of available master theses and find a topic and promoter at the start of your second year. Detailed guidelines for the master thesis are available once you are a registered student. You will discuss the organization of the workload with the promoter. Often students work on the thesis for an equivalent of 6-12 ECTS credits in the first semester in the second Master year. This allows you to spread the workload over the year.

Programme organisation

All majors have the same structure in terms of semesters and in terms of the four curriculum components:

- compulsory courses
- elective courses
- research internships
- master thesis.

Evidently, each major differs in its content of courses that are offered.

Guidelines for the curriculum:

The Master programme is a set of courses over two years for a total of 120 ECTS credits.

Each academic year consists of 54 to 66 ECTS credits (60 is standard, 66 is a maximum). The number of course hours varies from course to course but 45 course hours for a six-credit course is a rough average.

There is no maximum amount of credits per semester. We do encourage you to find a balance with roughly 30 credits per semester.

A year is divided into two semesters that each consist of 27 to 33 ECTS credits. The semesters run from the mid-September to the beginning of February and from the mid-February to the end of June. Each semester consist of twelve to thirteen weeks courses, four to five weeks exams and a two weeks vacation.

Curriculum components

Each major has three components.

COMPULSORY COURSES (60 ECTS credits)

48 credits in the first year and 12 credits in the second year. The contents of the courses vary across the majors, but there are always **30 ECTS credits of regular courses** and **30 ECTS credits of research skills development**. The latter includes two research internships, one in the first year (15 ECTS credits) and one in the second year (12 ECTS credits). Usually, but not necessarily, they are with a research group in the department.

ELECTIVE COURSES (30 ECTS credits)

At least five (depending on the number of credits per course, but most of the courses are 6 ECTS credits) courses need to be selected. If the course schedule (some courses are only taught in even or in odd years) you should choose twelve ECTS credits in the first year, 18 ECTS credits in the second. There is one constraint: at least 12 ECTS must be electives directly associated with your major.

MASTER THESIS (30 ECTS credits)

This falls entirely in the second year. Again the remarks in section “Majors” are relevant.

Examples

Below you will find two examples of course selection, in this case for the major Computer Networks and Distributed systems. They are perfectly balanced in terms of the workload per semester. That need not be the case for every combination of elective courses. In part this is because some elective courses are taught only in even or odd years and so an imbalance may be unavoidable.

Research Internship 1 (part 1)	Scientific English + Research Internship 1 (part 2)	Research Internship 2	Master thesis (part 2)
Model driven engineering		Master thesis (part 1)	
Modelling software intensive systems	Advanced networking lab	Sensor networks lab + Software resilience	
Introduction to performance modelling	Distributed Computing	Parallel Computing	Topics in distributed computing
Mobile and wireless networks	Data mining		
Year 1, Sem 1	Year 1, Sem 2	Year 2, Sem 1	Year 2, Sem 2

Example 1 of a perfectly balanced model trajectory
for Computer Networks and Distributed Systems:

Compulsory Course

Elective Course

Research Internship 1 (part 1)	Scientific English + Research Internship 1 (part 2)	Research Internship 2	Master thesis (part 2)
Sensor networks lab + Software resilience		Master thesis (part 1)	
Modelling software intensive systems	Advanced networking lab		Advanced Performance Modelling
Introduction to performance modelling	Distributed Computing	Information retrieval	Programming Paradigms
Mobile and wireless networks	Data Mining		
Year 1, Sem 1	Year 1, Sem 2	Year 2, Sem 1	Year 2, Sem 2

Example 2 of perfectly balanced model trajectory
for Computer Networks and Distributed Systems:

Compulsory Course

Elective Course

Summary

In order to define your tentative programme, you need to walk through the following five steps:

- 1) Choose one of the three majors. The programmes, broken down into first year and second year are listed at the end of this document.
- 2) Choose elective courses for 30 ECTS credits (usually this means 5 courses) from the list defined for your major, with preferably 12 ECTS credits for the first year and the remaining 18 ECTS credits for the second year. At least 12 ECTS credits (totaled over first and second year) must be elective courses that are directly associated with your major.
- 3) At the start of the first semester of the first year, you select a promoter and a topic for Research internship 1. Discuss how to spread your workload over the semesters of the first year with the promoter. The promoter of the Internship need not be a professor directly associated with the major.
- 4) At the start of the first semester of the second year, you select a promoter and a topic for your Master thesis. Discuss how to spread your workload over the semesters of the second year with the promoter. The promoter of the Master thesis needs to be a professor directly associated with the major.
- 5) At the start of the first semester of the second year, you select a promoter and a topic for Research internship 2. Discuss how to spread your workload over the semesters of the second year with the promoter. The promoter of the Internship need not be a professor directly associated with the major.

The latter three steps you take once you have been registered and accepted to the programme. There is an online system available for registered students, listing all topics and promoters for Internships and Master theses.

On the pre-screening form you only specify a tentative selection of elective courses (for 30 ECTS credits) you wish to take. That selection is not cast in stone. The final selection will be fixed when you actually register. Your choice of major is irreversible.

Computer Networks and Distributed Systems **First Year**

COMPULSORY COURSES (48 ECTS credits)

Introduction to performance modeling	1 st semester	6 ECTS
Mobile and wireless networks	1 st semester	6 ECTS
Modelling of software-intensive systems	1 st semester	6 ECTS
Distributed Computing	2 nd semester	6 ECTS
Data mining	2 nd semester	6 ECTS
Scientific English	2 nd semester	3 ECTS
Research internship 1	1 st + 2 nd semester	15 ECTS

ELECTIVE COURSES (12 ECTS credits)

Select 12 ECTS credits, at least 6 from the list Computer Networks and Distributed Systems.

Computer Networks and Distributed Systems		
Sensor networks lab	1 st semester	3 ECTS
Software resilience	1 st semester	3 ECTS
Parallel computing	1 st semester	6 ECTS
Topics in distributed computing	2 nd semester	6 ECTS
Advanced networking lab	2 nd semester	6 ECTS
Advanced performance modeling	2 nd semester	6 ECTS
Data science		
Database systems	1 st semester	6 ECTS
Information retrieval	1 st semester	6 ECTS
Bioinformatics	2 nd semester	6 ECTS
Software engineering		
Capita selecta software engineering	1 st semester	6 ECTS
Model driven engineering	1 st semester	6 ECTS
Programming paradigms	2 nd semester	6 ECTS
Software reengineering	2 nd semester	6 ECTS

Computer Networks and Distributed Systems **Second Year**

MASTER THESIS (30 ECTS)

Master thesis	1 st + 2 nd semester	30 ECTS
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COMPULSORY COURSES (12 ECTS)

Research internship 2	1 st + 2 nd semester	12 ECTS
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ELECTIVE COURSES (18 ECTS)

Computer Networks and Distributed Systems		
Sensor networks lab	1 st semester	3 ECTS
Software resilience	1 st semester	3 ECTS
Parallel computing	1 st semester	6 ECTS
Topics in distributed computing	2 nd semester	6 ECTS
Advanced networking lab	2 nd semester	6 ECTS
Advanced performance modeling	2 nd semester	6 ECTS
Data Science		
Database systems	1 st semester	6 ECTS
Information retrieval	1 st semester	6 ECTS
Bioinformatics	2 nd semester	6 ECTS
Data mining	2 nd semester	6 ECTS
Software Engineering		
Capita selecta software engineering	1 st semester	6 ECTS
Model driven engineering	1 st semester	6 ECTS
Software reengineering	2 nd semester	6 ECTS

Data science

First Year

COMPULSORY COURSES (48 ECTS)

Database systems	1 st semester	6 ECTS
Information retrieval	1 st semester	6 ECTS
Modelling of software-intensive systems	1 st semester	6 ECTS
Data mining	2 nd semester	6 ECTS
Distributed computing	2 nd semester	6 ECTS
Scientific English	2 nd semester	3 ECTS
Research Internship	1 st + 2 nd semester	15 ECTS

ELECTIVE COURSES (12 ECTS)

Data Science		
Project databases	1 st semester	6 ECTS
Bioinformatics	2 nd semester	6 ECTS
Current trends in information retrieval	2 nd semester	6 ECTS
Computer Networks and Distributed Systems		
Introduction to performance modelling	1 st semester	6 ECTS
Mobile and wireless networks	1 st semester	6 ECTS
Parallel computing	1 st semester	6 ECTS
Topics in distributed computing	2 nd semester	6 ECTS
Software Engineering		
Capita selecta software engineering	1 st semester	6 ECTS
Model driven engineering	1 st semester	6 ECTS
Programming paradigms	2 nd semester	6 ECTS
Software reengineering	2 nd semester	6 ECTS

Data Science **Second Year**

MASTER THESIS (30 ECTS)

Master thesis	1 st + 2 nd semester	30 ECTS
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COMPULSORY COURSES (12 ECTS)

Research internship 2	1 st + 2 nd semester	12 ECTS
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ELECTIVE COURSES (18 ECTS)

Data Science		
Project databases	1 st semester	6 ECTS
Bioinformatics	2 nd semester	6 ECTS
Current trends in information retrieval	2 nd semester	6 ECTS
Computer Networks and Distributed Systems		
Introduction to performance modelling	1 st semester	6 ECTS
Mobile and wireless networks	1 st semester	6 ECTS
Parallel computing	1 st semester	6 ECTS
Topics in distributed computing	2 nd semester	6 ECTS
Software Engineering		
Capita selecta software engineering	1 st semester	6 ECTS
Model driven engineering	1 st semester	6 ECTS
Programming paradigms	2 nd semester	6 ECTS
Software reengineering	2 nd semester	6 ECTS

Software Engineering **First Year**

COMPULSORY COURSES (48 ECTS)

Model driven engineering	1 st semester	6 ECTS
Modelling of software-intensive systems	1 st semester	6 ECTS
Software reengineering	2 nd semester	6 ECTS
Data mining	2 nd semester	6 ECTS
Distributed computing	2 nd semester	6 ECTS
Scientific English	2 nd semester	3 ECTS
Research internship 1	1 st + 2 nd semester	15 ECTS

ELECTIVE COURSES (12 ECTS)

Software Engineering		
Capita selecta software engineering	1 st semester	6 ECTS
Information retrieval	1 st semester	6 ECTS
Programming paradigms	2 nd semester	6 ECTS
Software testing	2 nd semester	6 ECTS
Computer Networks and Distributed Systems		
Introduction to performance modeling	1 st semester	6 ECTS
Mobile and wireless networks	1 st semester	6 ECTS
Parallel Computing	1 st semester	6 ECTS
Topics in distributed computing	2 nd semester	6 ECTS
Data Science		
Database systems	1 st semester	6 ECTS
Bioinformatics	2 nd semester	6 ECTS

Software Engineering **Second Year**

MASTER THESIS (30 ECTS)

Master thesis	1 st + 2 nd semester	30 ECTS
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COMPULSORY COURSES (12 ECTS)

Research internship 2	1 st + 2 nd semester	12 ECTS
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ELECTIVE COURSES (18 ECTS)

Software Engineering		
Capita selecta software engineering	1 st semester	6 ECTS
Information retrieval	1 st semester	6 ECTS
Specification and verification	1 st semester	6 ECTS
Computer Networks and Distributed Systems		
Introduction to performance modelling	1 st semester	6 ECTS
Mobile and wireless networks	1 st semester	6 ECTS
Parallel computing	2 nd semester	6 ECTS
Data Science		
Database systems	1 st semester	6 ECTS
Bioinformatics	2 nd semester	6 ECTS