

# Curriculum for the Master of Science Programme in Computer Science at the IT University of Copenhagen

Curriculum of 1 August 2023  
Revised 29 January 2024

## Content

Background  
Chapter 1 Programme Title and Objectives  
Chapter 2 Programme Structure, Content and Programme Language  
Chapter 3 General rules and Miscellaneous Regulation  
Chapter 4 Date of Commencement and Transitional Regulations  
Appendix

## Background

This curriculum for the Master of Science Programme in Computer Science, has been drawn up by the Board of Studies at the IT University of Copenhagen (henceforth referred to as the IT University). The curriculum has been drawn up in compliance with the current legislation governing bachelor's and master's (Candidatus) programmes at the universities.

Students enrolled in the above MSc study programmes with study start from autumn of 2018 study according to this curriculum.

## Chapter 1

### Programme Title and Objectives

#### *Programme Title*

**Section 1.** A student, who has completed the programme, has the right to use the title *candidatus/candidata scientiarum (cand.scient.) i datalogi*.

*Subsection 2.* The title in English is Master of Science (MSc) in Computer Science.

### *Programme Objectives*

**Section 2.** The purpose of this programme is to provide students with the scientific qualifications to identify, formulate, solve and reflect on complex problems relating to computer science.

*Subsection 2.* The programme prioritises the student's ability to assess, apply and develop the underlying technology and the scientific theories, methods and tools upon which it is based.

*Subsection 3.* The student must have the ability to independently initiate and carry out collaborative work in professional and multidisciplinary settings. Furthermore, the student must have the ability to engage in global and distributed interaction, drawing on research-based perspectives.

*Subsection 4.* On the background of the student's preceding bachelor's programme, the programme provides the student with the qualifications to define his or her own academic profile within the field of computer science and to take independent responsibility for his or her own professional development and specialisation.

*Subsection 5.* Within the framework of the programme, the student can acquire the requisite individual qualifications for specialised posts in business, industry, the public sector, and for research training programmes (PhD programme) in computer science.

### *Objectives for Learning Output*

**Section 3** The graduate will develop research based *knowledge and understanding of, and will be able to reflect on:*

- concepts of programming languages
- analysis of software performance and correctness in theory and practice
- principles of software design and modelling and its applications to real-world scenarios
- 
- Principles of machine learning

Each graduate obtains specialised knowledge and understanding at highest international research level in the selected specialisation area.

*Subsection 2.* The graduate will develop the following research-based *skills:*

- The graduate can master a modern programming platform to implement software
- The graduate can use, assess and develop fundamental processes and practices of software development, such as requirements analysis, architecting, implementing, tuning, validating and documenting software.
- The graduate is able to communicate and discuss the acquired knowledge with both academic peers and non-specialists.

Each graduate obtains specialised skills at highest international research level in the selected specialisation area.

*Subsection 3.* The graduate will develop the following research based *competences*:

- The graduate can evaluate and customise software tools and technologies that are complex and unpredictable, and design and develop new solutions.
- The graduate can independently initiate and implement collaboration with others in complex and changing contexts.
- The graduate can independently take responsibility for own professional development and specialisation.

Each graduate obtains specialised competences at highest international research level in the selected specialisation area.

## Chapter 2

### Programme Structure, Content and Programme Language

#### *Programme Structure*

**Section 4.** The Master of Science programme requires passes in study activities corresponding to 120 ECTS points comprising a mandatory backbone, specialisation modules, optional modules and a master's thesis.

*Subsection 2.* The study activities of the programme are composed of modules corresponding to 90 ECTS points and a concluding master's thesis corresponding to 30 ECTS points.

*Subsection 3.* A visualisation of the programme structure is available at the IT University's online Student handbook.

#### *Programme Content*

**Section 5.** The mandatory backbone of the MSc study programme in Computer Science consists of modules corresponding to 37,5 ECTS points within the first three terms.

The content of the mandatory backbone focuses on advanced techniques and methods for designing, implementing, and maintaining software, drawn from both computer science and software engineering research. In detail, modules contain techniques for designing and implementing efficient and correct software for modern IT systems, including concurrent and parallel software, aspects of machine learning, advanced features of programming languages, and project organisation in heterogeneous working environments.

*Subsection 2.* The choice of a specialisation is mandatory. A specialisation comprises modules corresponding to 22.5 ECTS points within the second and the third term.

*Subsection 3.* The optional modules comprise 30 ECTS points within the second and third term.

#### *Programme Language*

**Section 7.** The MSc Computer Science study programme is conducted in English.

### *Master Thesis*

**Section 8.** The thesis is worth 30 ECTS points and must document skills in applying scientific theories and methods while working within the study programme's subject area.

*Subsection 2.* The thesis is placed on the final year of the programme. The student must have obtained 60 ECTS of the programme before writing the thesis.

*Subsection 3.* The abstract must be written in English or Danish.

*Subsection 4.* Intended learning outcomes for the Master thesis in Computer Science:

ILO 1 To identify, define, and delimit a relevant research problem within Computer Science.

ILO 2 To identify, justify, and describe relevant means for addressing the research problem. These include academic theories, methods, literature, and tools.

ILO 3 To analyze and relate the selected means to the current state of the art.

ILO 4 To combine the selected means, develop them further if necessary, and apply them in a concerted effort.

ILO 5 To report clearly the achieved results using appropriate scientific terminology and methods.

ILO 6 To discuss the achieved results and relate them to the current state of the art.

*Subsection 5.* Information on examination for Master theses can be found in the appendix.

## **Chapter 3**

### **General Rules and Miscellaneous Regulation**

**Section 9.** Furthermore, please refer to the IT University's rules and regulation, appendix to this curriculum.

## **Chapter 4**

### **Date of Commencement and Transitional Regulations**

**Section 10.** This curriculum comes into force 1 September 2023 and applies to all students admitted to the programme from autumn 2023.

*Subsection 2.* When a new curriculum is published, or in the event of significant changes to this curriculum, transitional regulations will be set out in the curriculum as appendix.

*Subsection 3.* Revision to this curriculum regarding Section 8 Master Thesis comes into force 29 January 2024.

Approved by the Board of Studies ITU 6 September 2023

Approved by rector Per Bruun Brockhoff 1 December 2023



**Transitional Regulations:**

Students admitted before autumn 2023 complete the program under the old curriculum.