

Curriculum for the Master of Science Programme in Information Technology at the IT University of Copenhagen, Software Design

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Background

This curriculum for the Master of Science Programme in Information Technology, Software Design, has been drawn up by the Board of Studies ITU 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 programme with study start from autumn of 2019 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 informationis technologiae (cand.it.) i softwaredesign.

Subsection 2. The title in English is Master of Science (MSc) in Information Technology, Software Design.

Programme Objectives

Section 2. The purpose of the Master of Science Programme in Information Technology is to provide students with the scientific qualifications to identify, formulate, solve and reflect on complex problems relating to information technology.

Subsection 2. The programme prioritises the student's ability to assess, apply and develop the underlying technology as well as 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 information technology 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 and industry as well as for research training programmes (PhD programme) in information technology.

Objectives for Learning Output

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

- general concepts of programming languages
- analysis of software performance in theory and practice
- principles of software design, modelling and software architecture

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

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

- The graduate can independently initiate and implement collaboration with others in complex, inter-disciplinary and changing contexts, for example, in international and industrial projects.
- The graduate can independently take responsibility for own professional development and specialisation.
- The graduate can exploit his or her non-software domain knowledge (obtained in the undergraduate studies) with newly obtained software development expertise to design domain-specific application software.
- The graduate can work with customers, end-users and other business stakeholders on designing and developing software solutions meeting the business requirements.

Each graduate obtains specialised competences at 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 Study Guide.

Programme Content

Section 5. The mandatory backbone of the MSc study programme in Software Design comprises four modules corresponding to 52.5 ECTS points within the first three terms as follows.

1. Programming (22.5 ECTS)

The module focuses on introductory programming concepts and practical experience, including imperative object-oriented programming and/or functional programming, and introductory database design.

2. Foundations (15 ECTS)

The module focuses on the foundations of software development, such as algorithms, data structures and discrete mathematics.
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3. Software Engineering (7.5 ECTS)

The module focuses on software development methods for assuring quality.
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4. Research Module (7.5 ECTS)

The module focuses on establishing research background and methodology in preparation for the subsequent thesis module.

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 comprises 15 ECTS points within the second and the third term.

Programme Language

Section 6. The MSc in Software Design study programme is conducted in English.

Master Thesis

Section 7. 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 Software Design:

- ILO 1: To identify, define, and delimit a relevant research problem within Software Design.
- 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

Admission Requirements

Section 8. To apply for the MSc in Software Design you need:

- A university bachelor's degree or a professional bachelor's degree.
- A maximum of 30 ECTS in courses related to software development. This includes courses that involve some form of programming but also courses on theoretical aspects of software development such as algorithms or software architecture.
- Have English corresponding to B-level with a minimum of 3,0 in grade point average.

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 August 2019 and applies to all students admitted to the programme from autumn 2019.

Subsection 2. Students, who are enrolled under previous curriculums, may apply to the Board of Studies ITU to complete the programme under the present curriculum if this can be done within a maximum of 120 ECTS point.

Subsection 3. 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.

Approved by the Board of Studies ITU 1 February 2019

Revision approved by the Board of Studies 5 September 2023.

Revision approved by Rector Per Bruun Brockhoff November 2023.

Revision approved by the Board of Studies 17 December 2024.