Study plan: Computer Science - Master

**Duration:** 2 years  
**Workload:** 120 ECTS Credits  
**Study format:** Full-time study  
**Responsible faculty:** Faculty of Science and Technology  
**Responsible department:** Department of Computer Science

**Program name:** Computer Science – Master  
**Degree awarded:** Master of Science in Computer Science

**Target group**  
Your completion of the master’s program guarantees that you have a broad and solid foundation in computer science, combined with deeper and more detailed understanding and skills within your chosen area of specialization. You are well prepared to serve as a dependable computer specialist developing computerized solutions for large complex problems. You are also prepared for teaching, and for further education towards a Ph.D. degree in computer science. Your education, combined with a continued interest in maintaining and developing your insights and competence, will form the basis for your ensuing professional career. After completing the program, most master’s candidates enter technical positions in the private and public sector. Over the duration of their careers, many move into leadership positions with various mixes of leadership and technical duties.

Your study will consist of courses/seminars and the fulfillment of a master’s thesis in computer science. For the thesis you will apply broad skills in computer science, combined with deeper insights in your selected specialty to solve difficult problems within the particular area you are pursuing. The theme of your master’s thesis will reflect and shall contribute to ongoing research activities at the department within the broad areas of computer systems research and/or medical informatics and applications. Current topics include software architectures, distributed systems, parallel systems, exascale computing, programming methodologies, dependable systems, real-time systems, operating systems, performance measurements and evaluation, large scale visualization, feature-rich large-scale search, computer networks and communication, handling of massive data, web-services, collaborative editing, bioinformatics, social media, social data analysis, medical informatics, eHealth and telemedicine applications. An appropriate selection of courses/seminars will be selected in conjunction with your thesis advisor.

**Laboratories**  
Laboratories are used extensively throughout all our study programs as a means for students to gain experience, insight and skills required to develop well-functioning, effective computer systems.

**Teaching assistantships**  
Master’s students typically compete for time-limited part-time employment as teaching assistant (TA). TAs contribute towards the department’s teaching goals. Employment as TA strengthens your ability to present and convey computer science issues. TA positions are advertised by the department administration, typically once per semester.

**Test of learning outcome**  
All exams are evaluated against national quality standards as practiced by the universities of Oslo, Trondheim, Bergen and Tromsø. External sensors are used extensively and in accordance with UiT regulations.
Learning Outcome
For each programme at the UiT there are set targets for knowledge, analytical understanding, skills and competences that a student should have reached by the end of studies.

Knowledge – The candidate will…

- Have a broad solid foundation in computer science
- Have considerable depth of understanding of a selected area of specialization
- Have a deep understanding on state of the art distributed and parallel software architectures
- Have a solid understanding of system and application development relevant to the chosen specialty

Skills – The candidate will…

- Work independently on a significant non-trivial problem over a longer time-period
- Analyze a problem and plan how to work towards a solution
- Plan, organize and execute the work required to solve the problem. Adapt to changes and limitations.
- Demonstrate the feasibility of the solution by implementing key parts
- Collect and analyze relevant metrics characterizing the problem and the solution
- Write a well-structured and clearly formulated report describing the thesis work and reflecting on its results

General competence – The candidate will…

- Have an interest for the continued development of computer science as a dynamic field under the influences of advances in the discipline, changes in technology, and in application areas, business models, and businesses.
- Communicate effectively, orally and in writing, within the field, and with the public as well as experts in other fields
- Pursue life-long learning and development
- Be aware of relevant social and ethical issues and apply this awareness to their professional conduct

Admission requirements
Admission to the Master’s program in Computer Science requires a Bachelor’s degree or equivalent qualification in Computer Science as approved in accordance with the Norwegian Universities Act section 3-4.

In addition, specialization in Computer Science worth the equivalent of not less than 80 ECTS credits is required. An average grade of equivalent to C or better in the Norwegian grading system is required.

Good programming skills, (preferably in C, Python) at a systems level, and knowledge of operating systems is strongly required. Students are expected to have skills equivalent to the prerequisites the courses in the study program build upon.

Applicants must enclose an overview on their practical programming skills and what large implementation projects they have been involved in. The applicants should give examples (refer to URLs) of such projects and their own contribution (the programming part) to these projects.

All mandatory courses will be thought in English. Applicants must document adequate proficiency in oral and written English.
Application deadline
All deadlines described below is for admittance to the programme commencing in the autumn semester. Master’s program in Computer Science do not admit new students in the spring semester.

The application deadline for Norwegian and other Nordic applicants is April 15th.

The application deadline for students outside the Nordic countries (self-financed applicants) is December 1st. More information is available at: General admission requirements for self-financed applicants

Programme description and teaching
The program covers both the theoretical basis and the experimental methods in computer science. Higher level courses are directly connected to the research within the Department. This imply an opportunity for substantial knowledge in the fields covered.

The program consists of four mandatory courses in computer science, a total of 40 ECTS credits, and 20 ECTS credits of elective courses. The elective courses may be within topics such as economics, management, psychology and entrepreneurship. The program concludes with a master thesis of 60 ECTS credits. The master thesis can also be done in collaboration with an external IT-company.

The program offers various forms of instruction. Most courses consist of lectures as well as tutorials and colloquia. In the lectures the theory of the syllabus is covered. In the colloquium students are active by solving assignments and discussing aspects of the field. A significant part of all courses in Computer Science is the experimental training at the programming laboratories.

During the individual special topics and the years master thesis individual supervision is given by the Department's faculty members.

Programme structure

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<td>First term</td>
<td>INF-3200 Distributed Systems Fundamentals</td>
<td>INF-3201 Parallel Programming</td>
<td>Optional course</td>
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<td>Second term</td>
<td>INF-3203 Advanced Distributed Systems</td>
<td>INF-3701 Advanced database systems</td>
<td>Optional course</td>
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<td>Third term</td>
<td>INF-3990 Master’s Thesis in Computer Science</td>
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Examination and assessment methods:
Mandatory coursework is given to each course. Approved assignments give access to the exam. The examination structure differs between the courses; from written examination to project work reports, presentation of scientific work or oral examination. And often a combination of these methods. Details on assessment methods and access to any types of exams in the teaching free semester are stated in course descriptions.

Work practice:
The programme has no work practice requirements.
Language of instruction and examination
The language of instruction is English and all of the syllabus material is in English. Examination questions will be given in English, but may be answered either in English or a Scandinavian language.

Also the Master’s thesis may be written either in English or a Scandinavian language.

Student exchange
It is not possible to take an educational sabbatical as part of the master’s program.

Syllabus:
Reading lists will be available when the study programme starts.

Other regulations:
The study programme is evaluated every year according to the university’s quality assurance system. The courses constituting the programme are evaluated every third time they are given, as a minimum. Course evaluation consists of both student and teacher reports.

An overview of which courses to be evaluated each semester can be found on the faculty's web pages.

Access to further studies
On successful completion of the degree programme, students may be qualified for admission to a PhD programme in Computer Science, depending on satisfactory grades in the Master's and Bachelor's degree. PhD-studies in Computer Science are offered at the UiT.