UNIVERSITY OF SKÖVDE

PROGRAMME SYLLABUS

Data Science - Master's Programme

120 credits

Programme code: DSCMA
Version number: 10
Valid from: Autumn term 2024
Ratified by: Curriculum Committee for Informatics
Date of ratification: 15 August 2022

1. General information about the study programme

The study programme is provided by the University of Skövde and is named Data Science - Master's Programme (Data Science - masterprogram). It comprises 120 credits and is a second-cycle programme. The main field of study is Informatics.

2. Entry requirements

A Bachelor's degree equivalent to a Swedish Kandidatexamen of 180 credits, and skills equivalent to 7,5 credits in Programming and 7,5 credits in Mathematics or Statistics.

A further requirement is proof of skills in English equivalent of studies at upper secondary level in Sweden, known as English course 6. This is normally demonstrated by means of an internationally recognized test, e g IELTS, TOEFL or the equivalent.

The entry requirements above are applicable for admission to the study programme. For further studies within the programme, the entry requirements for each course must be met. These entry requirements are specified in each separate course syllabus.

3. Study programme content

The study programme provides wide and deep knowledge and understanding of the area of education, with considerable in depth knowledge within the computer science specialisation of informatics. The main focus of the study programme is data science, which can be described as the science concerned with the development and use of information systems for extracting knowledge from big data. The programme, which contains a large amount of practical assignments, provides a holistic perspective on data science. This entails the study of different theories, methods and techniques that aim at using all relevant, most often, complex and heterogeneous, data for the purpose of supporting and providing insight to a decision maker. The main contents of the programme are within artificial intelligence (AI), data mining, programming, visual data analysis, business intelligence, and decision support for big data (large quantities of complex data).

The study programme has a main theme that focuses on basic and wide understanding of informatics, the main area of education, and on central areas of data science, e.g., programming and AI. This fundamental knowledge is deepened and applied through different methods for visual data analysis and data mining and in an individual project in which the students can solve a chosen problem within data science. Application and synthesis of analysis methods and theories within decision making and analysis of complex data structures, in particular within the area of business intelligence, constitute a third theme. The study programme ends with a master degree project where the student is trained in identifying and approaching a problem within data science from a scientific perspective. The student has

the possibility to extend and elaborate upon a problem encountered in the previous courses or, alternatively, formulate a new problem based on what has been learned throughout the programme.

The study programme comprises the following courses

Artificial Intelligence A1N, 7.5 credits

Data Mining A1N, 7.5 credits

Introduction to Data Science A1N, 15 hp

Visual Data Analysis A1N, 7.5 credits

Big Data Programming A1F, 7.5 credits

Business Intelligence A1F, 7.5 credits

Data Science Project A1F, 15 credits

Explainable AI A1F, 7,5 hp

Information Fusion A1F, 7.5 credits

Predictive Analytics A1F, 7,5 hp

Master Degree Project in Informatics with Specialization in Data Science A2E, 30 credits

4. General objectives

Objectives for education at the second-cycle level in The Higher Education Act

Second-cycle courses and study programmes shall involve the acquisition of specialist knowledge, competence and skills in relation to first-cycle courses and study programmes, and in addition to the requirements for first-cycle courses and study programmes shall:

- further develop the ability of students to integrate and make autonomous use of their knowledge,
- develop the students' ability to deal with complex phenomena, issues and situations, and
- develop the students' potential for professional activities that demand considerable autonomy, or for research and development work.

5. Study programme objectives

The main area of education is informatics with a specialisation in data science (the science of designing and utilizing information systems for the extraction of knowledge from large volumes of data (“big data”)).

Objectives for Master’s Degree according to the Higher Education Ordinance

Knowledge and understanding

For a Degree of Master (120 credits) the student shall

- demonstrate knowledge and understanding in the main field of study, including both broad knowledge of the field and a considerable degree of specialised knowledge in certain areas of the field as well as insight into current research and development work, and
- demonstrate specialised methodological knowledge in the main field of study.

Competence and skills

For a Degree of Master (120 credits) the student shall

- demonstrate the ability to critically and systematically integrate knowledge and analyse, assess and deal with complex phenomena, issues and situations even with limited information,
- demonstrate the ability to identify and formulate issues critically, autonomously and creatively as well as to plan and, using appropriate methods, undertake advanced tasks within predetermined time frames and so contribute to the formation of knowledge as well as the ability to evaluate this work,
- demonstrate the ability in speech and writing both nationally and internationally to clearly report

and discuss his or her conclusions and the knowledge and arguments on which they are based in dialogue with different audiences, and
- demonstrate the skills required for participation in research and development work or autonomous employment in some other qualified capacity.

Judgement and approach

For a Degree of Master (120 credits) the student shall

- demonstrate the ability to make assessments in the main field of study informed by relevant disciplinary, social and ethical issues and also to demonstrate awareness of ethical aspects of research and development work,
- demonstrate insight into the possibilities and limitations of research, its role in society and the responsibility of the individual for how it is used, and
- demonstrate the ability to identify the personal need for further knowledge and take responsibility for his or her ongoing learning

Local Objectives for the Study Programme according to theUniversity of Skövde

After completion of the study programme, the student should be able to show:

- wide knowledge and understanding of fundamental theories, methods and techniques within data science, and various tools for data science including how these tools are utilized in different domains,
- considerable in depth knowledge regarding current research and development within intelligent data analysis,
- considerable in depth knowledge regarding current research and development within programming and system sciences for data science,
- considerable in depth knowledge regarding recent research and development within decision support for data science, and
- insight into the possibilities and limitations of informatics with regard to digitalisation for sustainable development.

6. Language of instruction

The teaching is conducted in English.

7. Degree qualification

Those who complete the programme's courses with a pass grade also comply with the requirements for Degree of Master of Science (120 credits) with a major in Informatics.

Degree certificates are issued after application. Information about how to submit an application can be found on the website of the University of Skövde.

8. Changes to the programme syllabus

The programme syllabus and its courses may be changed, within the framework of the objectives for the study programme.

9. Student influence

Student influence in the study programme is ensured by means of programme evaluations. The students are informed about the results of the evaluations and potential measures that have been taken or are planned, based on the course evaluations.

10. Additional information

Further information about the study programme, as well as national and local governing documents for higher education, is available on the website of the University of Skövde.