UNIVERSITY
OF SKÖVDE

COURSE SYLLABUS

Introduction to Data Science, third-cycle level
7.5 credits

Course code: IT0946F
Version number: 4.1
Valid from: 1 July 2024
Ratified by: Curriculum Committee for Third-cycle Studies
Date of ratification: 11 March 2024

1. General information about the course

The course is provided by the University of Skövde and is named Introduction to Data Science, third-cycle level (Introduktion till Data Science, forskarnivå). It comprises 7.5 credits .

The course is a part of the third-cycle subject area of Informatics.

2. Entry requirements

The prerequisites for this course are general entry requirements for third-cycle courses and study programmes, i.e. a second-cycle qualification or satisfied requirements for courses comprising at least 240 credits of which at least 60 credits were awarded in the second cycle (or the equivalent).

In order to fulfil the specific entry requirements, the applicant must have completed course requirements of at least 60 credits, including an independent project of at least 15 credits at the second cycle, within the subject Informatics, applicable areas of a similar kind or other fields assessed as directly relevant for thesis work in the subject Informatics.

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

3. Course content

At the University of Skövde Data Science is defined as the science concerned with the development and use of information systems for extracting knowledge from data. 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. This course is designed to provide a holistic perspective on data science and a solid understanding and competence over the whole range of Data Science sub-disciplines, their methods and application areas.

The sub areas addressed in the course may include:
Artificial Intelligence, Data Mining, Machine Learning, Visual Data Analysis, Analysis of Complex Data, Business Intelligence, Data Driven Decision-making, Information Fusion and Predictive Analysis.

Each sub-area will introduce the student to a selection of its most relevant theories and/or methods that are of specific usefulness to the data scientist. Possible examples are: knowledge representation, search algorithms, clustering, classification, regression, artificial neural networks, explainable AI, data visualization techniques, human decision making, information design, information visualization, human-computer interaction, transparent decision support, business intelligence solutions, probability

theory, evidence theory, demand forecasting and time series analysis. The list of sub areas, methods and theories presented will be revised periodically to reflect the evolution of research and teaching at the School. Through lectures and practical assignments, the doctoral students will acquire skills to apply data science methods, carry out data science experiments and evaluate and present their results.

4. Objectives

After completed course the PhD student should be able to:

- demonstrate a good understanding of different sub-areas of data science,
- identify actual and possible research questions within different application areas that potentially can be solved by methods representative of Data Science,
- design and carry out experiments for a given problem utilizing those methods,
- analyze, evaluate and present the results from such experiments, and
- explain the Data Science methods and their limitations.

5. Examination

The course is graded G (Pass) or U (Fail).

To receive the grade Pass on the course, all examination parts have to be graded Pass.

The examinations of the course consist of the following modes of assessment:

- **Assignment 1**
  2 credits, grades: G/U

- **Assignment 2**
  2 credits, grades: G/U

- **Assignment 3**
  2 credits, grades: G/U

- **Assignment 4**
  1.5 credits, grades: G/U

Doctoral students with a permanent disability who have been approved for directed educational support may be offered adapted or alternative modes of assessment.

6. Types of instruction and language of instruction

The form of teaching will be elected by the teacher responsible for the topic and may comprises lectures and seminars. Lecturers concentrate on delivery of knowledge within the different sub-areas of data science whereas seminars focus on analysis, discussion, and presentation.

The teaching is conducted in English.

7. Course literature and other educational materials

Course literature according to teachers' instructions on the page of the course on the learning platform.

8. Doctoral student influence

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

9. Additional information

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