

The dramatic increase in data availability opens the possibility of inferring new knowledge and the development of predictive models for all areas of society and industry: smart cities with autonomous vehicles, forensics that learn from online activity, support for medical decisions, etc. The data science field encompasses principles and methods for collecting, storing and analyzing data, in order to manage, organize, analyze and understand large sets of a variety of data types. To be a data scientist, a deep understanding of methods and tools in the fields of computer science, statistics and information systems is required.

The program is targeted at outstanding students and leverages the strengths of three departments: matching the task of data exploration to organizational needs and managing big data (information systems); development of computational algorithms for large data (computer science); and production of knowledge from large data (statistics). The program provides broad theoretical knowledge and practical experience in a plethora of methods and tools of data science. It is open for registration in each of the three departments. Most of the courses are joint, and four courses are taught in the chosen focus, where emphasis is placed on: computational modeling and operating systems; matching the data exploration task to organizational needs and managing large data; or stochastic models and multivariate analysis.

Overview of the courses in the Data Science Program

80% of the courses are mandatory and common to all three tracks

| \Track Course category | Computer Science (credits) | Information Systems (credits) | Statistics (credits) |
|---|-------------------------------|----------------------------------|----------------------|
| A1. Basic Mathematics the Department | 32 | | |
| A2. Core Data Science Courses | 65 | | |
| B1. Courses required to complete the degree in one of the three tracks | 10 | 8 | 8 |
| B2. Elective courses to complete the degree in the track | 8 | 8 | 8 |
| Elective courses common to all tracks From categories B1 and B2 below | 8 | | |
| Total credits | 123 | 121 | 121 |

A. Courses common to all 3 tracks

Calculus 1

Linear algebra

Probability A

Introduction to computer science and programming

Calculus 2

Discrete Mathematics

Probability B

Object Oriented Programming

Statistical Models

Statistical Inference

Data structures

Computational Methods in Statistics A

Computational Methods in Statistics B

Statistical Models

Algorithm design and analysis

Database design

Visualization of information

Big data management

Machine learning

Laboratory in data science

Ethics and privacy

Information retrieval

Big data analysis

B1. Courses required to complete the degree in one of the three tracks

Computer Science:

Operating Systems

Computational Models

Information Systems:

Design and development of information systems

Requirements Elicitation for data sciences

Statistics:

Stochastic models

Multivariate analysis

B2. Elective courses to complete the degree in the track

Computer Science Electives:

Robotics and real-time data reduction lab

Deep learning

Image processing and computer vision

Computational Linguistics

Computer and network security

Safe computing

Information Systems Electives:

User Interfaces

Seminar on Knowledge Representation and Decision Support Systems

Text mining seminar

Business Process Mining Seminar

Seminar in graph analysis and networks

Introduction to Artificial Intelligence

Linked Data Management

Statistics Electives:

Time series analysis

Survival analysis