GHENT UNIVERSITY

Course Specifications

From the academic year 2024-2025 up to and including the academic year

Data Visualization (C004041)

Course size *(nominal values; actual values may depend on programme)*

Credits 3.0 **Study time 90 h**

Course offerings and teaching methods in academic year 2024-2025

A (semester 2)	Dutch	Gent	lecture

Lecturers in academic year 2024-2025

Mesuere, Bart	WE02	lecturer-in-charge

Offered in the following programmes in 2024-2025	**crdts**	**offering**
Master of Science in Teaching in Science and Technology(main subject Computer Science)	3	A
Master of Science in Teaching in Science and Technology(main subject Mathematics)	3	A
Master of Science in Computer Science	3	A
Master of Science in Mathematics	3	A

Teaching languages

Dutch

Keywords

data, data visualization, data analysis

Position of the course

Contents

Introduction
- Why data visualization
- Historical perspective
- Principles of data visualization
  - Perceiving, Interpreting, Comprehending
  - Trustworthy, accessible, elegant

Data
- Working with data
- Recognizing and naming the different data types

Visual encoding of data
- Representing data using marks and properties
- Knowing when to use which property
- The use of color: saturation, hue and luminance

Chart fundamentals
- An overview of 50+ existing graph types to represent categorical, hierarchical, relational, temporal and spatial data

Technical skills
- Introduction to Observable notebooks
- Introduction to Vega Lite and the Grammar of Graphics
- Introduction to D3.js

Assigments and project
- Discussing existing visualisations and finding ways to improve them
- Creating a complete visualisation project from raw data to a finalized end result

Initial competences

Students are expected to be able to program in a *high-level* programming language such as Java, JavaScript, Python, ...

Final competences

1 Use standard APIs and tools to create visual displays of data, including graphs, charts, tables, and histograms.
2 Have familiarity with several approaches to using a computer as a means for interacting with and processing data.
3 Extract useful information from a dataset.
4 Analyze and select visualization techniques for specific problems.
5 Describe issues related to scaling data analysis from small to large data sets.
6 Describe the tradeoffs of visualization algorithms in terms of accuracy and performance.
7 Propose a suitable visualization design for a particular combination of data characteristics and application tasks.
8 Analyze the effectiveness of a given visualization for a particular task.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

Access to this course unit via an exam contract is unrestricted

Teaching methods

Lecture

Extra information on the teaching methods

Interactive lectures consisting of theory, analyzing and discussing examples, and discussing the case studies made by the students as home work.

Study material

Type: Handbook

Name: Data Visualisation - A handbook for data driven design (Andy Kirk)
Indicative price: € 30
Optional: yes
Language : English
Author : Andy Kirk

Type: Slides

Name: Slides
Indicative price: Free or paid by faculty
Optional: no

References

Optional books:
- Data Visualisation - A handbook for data driven design (Andy Kirk)
- Interactive Data Visualization for the Web (Scott Murray)

Course content-related study coaching

Assessment moments

continuous assessment

Examination methods in case of periodic assessment during the first examination period

Examination methods in case of periodic assessment during the second examination period

Examination methods in case of permanent assessment

Assignment

Possibilities of retake in case of permanent assessment

examination during the second examination period is possible in modified form

Extra information on the examination methods

Students will be evaluated by reporting about a number of case studies they analyzed as home work assignment. Additionally, they will work on a project in team.

Calculation of the examination mark

100% permanent evaluation
If the student does not pass in the first examination period, a new assignment will be provided for the second examination period.

Facilities for Working Students

Mogelijkheid tot vrijstelling van aanwezigheid met vervangende opdracht na overleg met verantwoordelijke lesgever