Exchange programme Vrije Universiteit Amsterdam

Vrije Universiteit Amsterdam - Exchange programme Vrije Universiteit Amsterdam - 2024-2025

Exchange

Vrije Universiteit Amsterdam offers many English-taught courses in a variety of subjects, ranging from arts & culture and social sciences, neurosciences and computer science, to economics and business administration.

The International Office is responsible for course approval and course registration for exchange students. For details about course registration, requirements, credits, semesters and so on, please visit the exchange programmes webpages.

Knowledge and Data

Course Code	X_400083
Credits	6
Period	P1
Course Level	200
Language Of Tuition	English
Faculty	Faculty of Science
Course Coordinator	dr. V. de Boer
Examiner	dr. V. de Boer
Teaching Staff	dr. J. Chen, B.B. Kruit, drs. W.X. Wilcke MSc, dr. V. de Boer
Teaching method(s)	Seminar, Computer lab, Lecture

Course Objective

The objective of the Knowledge and Data course is to make students acquainted with methods and technologies used for expressing knowledge and data, in particular on the Web. By the end of this course, students will have built an intelligent web application that queries and reasons over integrated knowledge from various sources obtained from the Web. All of this will be based on formal logic theory.

Knowledge and understanding: at the end of the course, students will be familiar with:

- Theory of Data, Information and Knowledge
- Predictable inferencing and formal systems
- Linked Data and Knowledge Graphs
- Semantic Web technology stack (RDF, RDFS, OWL)
- Ontology Engineering
- Knowledge-driven Data Science

Application of Knowledge and Insights: students will be able to:

- Represent knowledge and data in various formalisms (RDF, RDFS, OWL)
- Implement basic (RDFS) reasoning,
- Develop advanced knowledge models in RDFS and OWL
- Work with SPARQL for querying (distributed) knowledge graphs
- Integrate acquired knowledge in an intelligent semantic data driven application.

Judgement: Students will be able to assess the value of available datasets and ontologies for web applications, and to choose the appropriate technology for a specific application.

Communication: Students are able to write a report about a developed application.

Learning skills: The skill to acquire and apply knowledge and skills about fundamental knowledge representation concepts as well as state-of-the art technology, both individually as in a group context.

Course Content

In this course, we study formalisms that are useful and necessary to represent knowledge and data, in particular when these knowledge and data are to be reused, e.g. published and consumed on the Web. We introduce the concept of Knowledge Graphs, the technologies and representation formats (RDF, RDFS, OWL) for expressing semantics and linked data in a web-accessible format, use the SPARQL query language to query over this data. We finally build a data science application that uses integrated data for some intelligent task.

Even though content on the web is generally produced from structured data sources (databases), its representation is in a form that is meant for human consumption. Linked Data allows to scale the walls of this siloed information space, by reusing identifiers and vocabularies across these datasets, and presenting that information in a way that is appropriate for machine consumption.

Additional Information Teaching Methods

The course consists of lectures where theory is discussed and Working group sessions in which exercises related

to the theory are discussed.

Students will work on individual practical assignments in the first half of the course and will be supported in computer practicals. Students will also collaborate in groups for a final project assignment.

Method of Assessment

The final grade will be determined by three components that each count for 1/3 of the final grade:

- Weekly individual practical assignments (in total 5 assignments of which the results are averaged)
- A final group project, assessed on the basis of a final document, application and (video) presentation
- An exam testing the theory

Each component should be passed (5.5 or higher) in order to pass the course. There will be a resit option for the exam, the practical assignments and project can not be re-taken.

Weekly intermediary quizzes will be used to provide formative feedback.

Literature

We will provide the (online) reading material through Canvas.

Recommended literature: A Semantic Web Primer (3rd edition) Grigoris Antoniou, Paul Groth, Frank van Harmelen and Rinke Hoekstra, MIT Press, September 2012

Additional Information Target Audience

Bachelor Artificial Intelligence year 2

Recommended background knowledge

- Basic programming (Python)
- Logic (Basic propositional and predicate logic)