GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2023-2024

Applied Machine Learning (E735090)

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

Credits 6.0 **Study time 180 h**

Course offerings and teaching methods in academic year 2023-2024

A (semester 1)	Dutch	Gent	lecture
			practical

Lecturers in academic year 2023-2024

Van Hoecke, Sofie	TW06	lecturer-in-charge

Offered in the following programmes in 2023-2024	**crdts**	**offering**
Master of Science in Electrical Engineering Technology(main subject Automation)	6	A
Master of Science in Electrical Engineering Technology(main subject Electrical Engineering)	6	A
Master of Science in Electronics and ICT Engineering Technology(main subject Electronics Engineering)	6	A
Master of Science in Electronics and ICT Engineering Technology(main subject Embedded Systems)	6	A
Master of Science in Electronics and ICT Engineering Technology(main subject ICT)	6	A

Teaching languages

Dutch

Keywords

data mining, data analysis, machine learning, clustering, classification, regression, predictive maintenance

Position of the course

The goal of this course is to give students an in-depth knowledge and hands-on experience in machine learning. To do so, an overview is given of the principles, techniques and best-practices in machine learning. The course covers both clustering, classification and regression methods, and the student applies these techniques on real-life data sets, mostly from the domain of predictive maintenance. The data extraction techniques to retrieve these data sets, as well as data cleaning techniques, are also covered. Within the course, guest lecturers will present their machine learning research.

Contents

1 Introduction
2 Data extraction
3 Unsupervised methods: Clustering
4 Supervised methods: Classification, Regression
5 Advanced methods such as Neural Networks, Ensemble techniques, Anomaly detection
6 Guest lectures on capita selecta (reinforcement learning/robotics, use cases from industry, ...)

Initial competences

Informatics, Software development, Mathematics, Statistics

Final competences

1 Understands advanced machine learning methods

2 Understands the functioning of and choice between supervised and unsupervised systems
3 Is able to choose and to use, for a given machine learning problem, the most appropriate method to achieve the defined goals

4 A comprehensive knowledge of Python and being able to use this knowledge in real machine learning projects
5 The construction and cleaning of datasets

Conditions for credit contract

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

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Group work, Lecture, Practical

Learning materials and price

Slides on the electronic learning platform

References

Course content-related study coaching

Assessment moments

end-of-term and continuous assessment

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

Written assessment with open-ended questions

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

Written assessment with open-ended questions

Examination methods in case of permanent assessment

Participation, 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

Exam is closed book, written exam, open questions
Permanent evaluation: graded on participation, reports for practical assignments and project, and project presentation. The evaluation of the according deliverables is based on the accuracy, completeness, efficiency and critical attitude of the source code and the reports submitted for the practical assignments and the project.

Calculation of the examination mark

PGE 50% + NPGE 50%
In order to pass the course, the student must obtain at least 8/20 for the PE (exam) and the NPE (handing in all reports for the practical assignments and project deliverables + project presentation, with at least an average score of 8/20). If this condition is not met, the final score will deviate from the calculated score if 10 or more was obtained and the student will receive score 9/20.