COURSE DESCRIPTION CARD - SYLLABUS

Course name

INTRODUCTION TO MACHINE LEARNING

Course

Proposed by Discipline

Information and communication technology

Type of studies

Doctoral School

Form of study

full-time

Year/Semester

II/3, III/5

Course offered in

English

Requirements

elective

Number of hours

Lecture

4

Tutorials

Projects/seminars

Number of credit points

1

Lecturers

Responsible for the course/lecturer:

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Faculty of Computing and Telecommunications

Poznan University of Technology

ul. Piotrowo 2, 60-965 Poznan, Poland

Responsible for the course/lecturer:

Prerequisites

Knowledge: basic knowledge of university-level mathematics (calculus, linear algebra), probability calculus, basics of statistics, algorithmics and programming.

Skills: fluent English, ability to read and understand scientific articles, fluency in mathematics at a level taught at Computer Science faculty, programming skills.

Social competencies: integrity, ability to work systematically, scientific curiosity.

Course objective

The basics of machine learning from a theoretical perspective.

Course-related learning outcomes

Knowledge

A PhD student who graduated from doctoral school knows and understands:
1) global achievements, covering theoretical basis as well as general and selected specific issues, that are specific to machine learning specific to scientific disciplines studied at the doctoral school, [P8S_WG/SzD_W01]
2) key development trends in machine learning. [P8S_WG/SzD_W02]

Skills

A PhD student who graduated from doctoral school can:
1) use the knowledge from different branches of science to creatively identify, formulate and to innovatively solve complex problems or to execute research tasks in machine learning, [P8S_UW/SzD_U01]
2) critically analyze and asses scientific research results, work of experts and other creative activities together with their contribution into knowledge development. [P8S_UW/SzD_U02]

Social competences

A PhD student who graduated from doctoral school is ready to:
1) acknowledge the importance of knowledge in solving cognitive and practical problems. [P8S_KK/SzD_K03]

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

PQF code	Methods for verification of learning outcomes	Assessment criteria
W01, W02	A short test covering the lecture material at the end of the course	Over 50% of points to pass
U01, U02	A short test covering the lecture material at the end of the course	Over 50% of points to pass
K03	A short test covering the lecture material at the end of the course	Over 50% of points to pass

Programme content

1. Statistical decision theory (Supervised learning, Statistical learning framework, Making optimal decisions, Classification, regression, Learning paradigms).
2. Machine learning algorithms (Histogram-based methods, Decision trees, Nearest-neighbor methods, Naive Bayes, Linear models).

Teaching methods

Lecture: multimedia presentation including illustrations and examples.

Bibliography

Basic

1. Hastie, Tibshirani, Friedman: The Elements of Statistical Learning. Springer, 2009.

Additional

1. Abu-Mostafa, Magdon-Ismail, Lin: Learning from Data. AMLBook, 2012.

2. Shalev-Shwartz, Ben-David: Understanding Machine Learning: From Theory to Algorithms. Cambridge University Press, 2014.

Breakdown of average student's workload

	Hours	ECTS
Total workload	12	1.0
Classes requiring direct contact with the teacher	8	0.5
Student's own work (literature studies, preparation for tutorials, project preparation) [1]	4	0.5

[1] delete or add other activities as appropriate