DOCTORAL SCHOOL OF WROCŁAW UNIVERSITY OF SCIENCE AND TECHNOLOGY

SUPERVISOR/TEAM/ DECLARING/CONDUCTING COURSE: Marek Sawicki
DEPARTMENT: Mechanical Department
SCIENTIFIC DISCIPLINE: Mechanical Engineering

COURSE CARD

Course name in Polish: Sztuczna Inteligencja: Wprowadzenie i zastosowania w inżynierii mechanicznej
Course name in English: Artificial Intelligence: Introduction and application in Mechanical Engineering
Course language: English
The course is intended for all PhD students: YES / ~~NO~~
~~1) basic course~~
~~2) specialist course~~
~~3)~~ seminar
~~4) humanistic course~~
~~5) language~~
~~6) research skills~~

Subject code: MEQ100265S

* delete as applicable

	Lecture	Foreign language course	Seminar	Mixed forms
Number of hours of organized classes in university (ZZU)			15	
Grading			Presentation, activity	
Number of ECTS points				

PREREQUISITES RELATING TO KNOWLEDGE, SKILLS AND OTHER COMPETENCES

1. Basic knowledge in:
   a) Information Technology
   b) Programming
   c) Mathematics
2. Pre-defined research topic of PhD
3. General knowledge in Mechanical Engineering at the second level of studies

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COURSE OBJECTIVES
C1. To gain basic knowledge related to artificial intelligence. C2. To gain skills to determine problems possible to solve with artificial intelligence in student PhD work. C3. To gain skills to program basic models with implemented artificial intelligence. C4. To gain skills related to search information about artificial intelligence methods, algorithms and best practices. C5. To gain up-to-date knowledge about achievements in Mechanical Engineering with usage of artificial intelligence

Form of classes – mixed forms (mix)		Number of hours
Mix1	Introduction to Artificial Intelligence: Basic concepts, history of AI, trends and direction of AI development. Ethics of AI. Lecture.	2
Mix2	Introduction to regression, classification and clustering. Discission about basic concepts and challenges of AI. Lecture.	2
Mix3	Presentation of current Integrated Developer Environments, AI platforms, and programming packages for implementation of AI algorithms. Lecture and self work.	4
Mix4	Review of methods, models and algorithms. Discussion about implementation and application. Lecture.	2
Mix5	Application of AI in Mechanical Engineering: Review of current state of the art achievements in Mechanical Engineering based on literature review. Lecture and group discussion.	2
Mix6	Application of neural network in Mechanical Engineering: Detail case study. Lecture and group discussion.	2
Mix7	Presentation on a possible application of AI in area related to the planned PhD thesis. Seminar.	3
	Total hours	15

TEACHING TOOLS USED
N1. Lecture N2. Presentation N3. Discussion N4. Self work

ACHIEVED SUBJECT LEARNING OUTCOMES		
Type of learning outcome	Code of learning outcome	Assessment of learning outcome
Knowledge	P8S_WG	Presentation, participation in discussion

Knowledge	P8S_WK	Presentation, participation in discussion
Skills	P8S_UW	Report, participation in discussion
Skills	P8S_UK	Presentation, report, participation in discussion
Skills	P8S_UO	Report, participation in discussion
Social competence	P8S_KO	Presentation, participation in discussion
Social competence	P8S_KR	Presentation, participation in discussion

PRIMARY AND SECONDARY LITERATURE

PRIMARY LITERATURE:

[1] I. Goodfellow, Y. Bengio, and A. Courville, Deep Learning. MIT Press, 2016.
[2] C. M. Bishop, Pattern Recognition and Machine Learning. Springer New York, 2016.
[3] A. Zhang, Z. C. Lipton, M. Li, and A. J. Smola, Dive into Deep Learning. 2020.

SECONDARY LITERATURE:

SUBJECT SUPERVISOR (NAME AND SURNAME, E-MAIL ADDRESS)

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