



Syllabus of the course

«Methods and Technologies of Artificial Intelligence: Applied Aspects»

Specialty	<i>F3 Computer sciences</i>
Study Programme	<i>Computer sciences</i>
Study cycle (Bachelor, Master, PhD)	<i>second (Master)) level of higher education</i>
Course status	<i>mandatory</i>
Language	<i>English</i>
Term	<i>first year, 2 semester</i>
ECTS credits	<i>5</i>
Workload	<i>Lectures – 18 hours.</i>
	<i>Practical studies – 0 hours.</i>
	<i>Laboratory studies – 32 hours.</i>
	<i>Self-study – 100 hours.</i>
Assessment system	<i>Exam</i>
Department	<i>Department of Information Systems phone: (057) 702 18 31 (add. 3-16) website: https://kafis.hneu.net/</i>
Teaching staff	<i>Zadachyn Viktor Mykhailovich, Cand. Sc. (Physical and Math), Associate Professor</i>
Contacts	<i>viktor.zadachyn@hneu.net</i>
Course schedule	<i>Lectures: according to the current class schedule according to the current class schedule Laboratory studies: according to the current class schedule according to the current class schedule</i>
Consultations	<i>At the Department of Information Systems, offline, according to the schedule, individual, PNS chat.</i>
<i>The purpose of the discipline “Methods and technologies of artificial intelligence: applied aspects” is to form a system of theoretical knowledge and acquire practical skills in the theory, methods and technologies of artificial intelligence, focused on solving practical problems..</i>	
Structural and logical scheme of the course	
Prerequisites	Postrequisites
Distributed data warehouses	The course work: Development of computer information systems
High-performance systems of processing and analysis of big data	Complex training
	Diploma work



Course content

Module 1: Methods and technologies of artificial intelligence

Topic 1. General concepts of artificial intelligence. Artificial intelligence: yesterday, today, tomorrow.

Topic 2. Classification of tasks solved by AI. Data Mining.

Topic 3. Artificial neural networks (ANN) apparatus. Machine Learning, Deep Learning.

Topic 4. Methods for solving regression problems (classical and based on ANN).

Topic 5. Methods for solving classification problems (classical and based on ANN).

Topic 6. Methods for solving clustering problems (classical and based on ANN).

Topic 7. Methods of time series analysis. Recurrent neural networks (RNN).

Module 2: Applied Aspects

Topic 8. Computer vision. Convolutional neural networks (CNN).

Topic 9. Large Language Models (LLM). Models of generation with augmented sampling (RAG).

Topic 10. Application of agents in AI.

Teaching environment (software)

*Distance learning tools: Personalized learning systems website: <https://pns.hneu.edu.ua>
Library: <http://library.hneu.edu.ua> Repository: <http://www.repository.hneu.edu.ua> University
classrooms (Kharkiv, 9A Nauky Ave.)*

*Multimedia equipment: projector, laptop / computer, Internet access, software: ZOOM,
Python, R, Google Colab*

Assessment system

An university uses 100 ball story system of evaluation of results of studies of bread-winners of higher education. Current control comes true during realization of lecture and laboratory employments and has for an object verification of level of preparedness of bread-winner of higher education to implementation of concrete work and estimated by the sum of the collected points.

Final control includes semester control that is conducted in a form to examination.

Maximally possible amount of points for current control during a semester for discipline form of control of that examination - 60 and minimum possible amount of points – 35.

More detailed information on assessment and grading system is given in the technological card of the course.

Course policies

Teaching of the academic discipline is based on the principles of academic integrity.

Violation of academic integrity includes academic plagiarism, fabrication, falsification, cheating, deception, bribery, and biased assessment.

Education seekers may be brought to the following academic responsibility for breach of academic integrity: repeated assessment of the corresponding type of learning activity.

More detailed information about competencies, learning outcomes, teaching methods, assessment forms, self-study is given in the Course program