Short Name of the University/Countrycode Date (Month / Year)	PSTU January 2019
TITLE OF THE MODULE	**Code**
Machine Learning and Artificial Intelligence	

Teacher(s)	Department
Coordinating: Dr.Vereskun Mykhailo. **Others:**	Department of biomedical engineering

Study cycle	Level ofthemodule	Type ofthemodule
MA	7th semester	compulsary

Form ofdelivery	Duration	Langage(s)
Lectures, seminars	17 weeks	Ukrainian

Prerequisites	
Prerequisites: Knowledge: "Programming", "Theory of Algorithms", "Theory of Complexity", "Mathematical Methods of Optimization and Operations Research", "Algorithms and Data Structures", "Mathematical Analysis", "Theory of Probabilities", "Mathematical Statistics" Skills: ability to search information Competences: team work on presentation	**Co-requisites (if necessary):** Students should have skills to work in basic computer software (eg. MS Word, MS PowerPoint)

ECTS (Credits of the module)	Total student workload hours	Contact hours	Individual work hours
1,5	45	24	21

Aim of the module (course unit): competences foreseen by the study programmes
Students should be able to: - Take part in a discussion on new trends in nanomaterials; - Find, analyze and compare information of new nanostructures;

- Make a presentation on a selected topic.		
Learning outcomes of module (course unit)	**Teaching/learning methods**	**Assessment methods**
Knowledge: - trends and prospects for the development of artificial intelligence systems; - principles of construction and technology of development of artificial systems intelligence; - models and methods for solving problems in poorly formalized industries; - basic concepts of knowledge engineering; - models of processing and presentation of knowledge; - principles of building neural networks and approaches to learning in neural networks; **Competences:** - use artificial intelligence systems to solve application problems in various subject areas; - design artificial intelligence systems, expert systems, knowledge bases; - apply problem solving methods in poorly-formulated industries; - formalize knowledge through different ways of presenting them; - use different teaching methods.	Lectures	Open questions test
Skills: Ability to analyze, compare and verify information on a selected topic. Proper project presentation.	Seminar	Project in the form of presentation

Themes	**Contact work hours**							**Time and tasks for individual work**	
	Lectures	Consultations	Seminars	Practicalwork	Laboratory work	Placements	Total contactwork	Individual work	Tasks
1. Introduction to machine learning. Basic concepts of machine learning.	2		2				**4**	**4**	Study of theoretical material, case study
2. Machine learning strategies and methods. Inductive and deductive learning strategies.	2		2				**4**	**6**	Study of theoretical material, case study
3. General provisions of artificial intelligence systems.	4		4				**8**	**2**	Study of theoretical material, case study
4. The apparatus of artificial neural networks	2		2				**4**	**5**	Study of theoretical material /case study/ presentations

5. Using different types of neural networks. Genetic algorithms	2		2				**4**	**4**	Study of theoretical material/case study/ presentations
Total	12		12				**24**	**21**	

Assessment strategy	**Weight in %**	**Deadlines**	**Assessment criteria**
Presentation	50	17thweek	Attendance, activity, presentation
Final test	50	17thweek	Open questions test

Author	**Year of issue**	**Title**	**No of periodical or volume**	**Place of printing. Printing house or internet link**
Compulsory literature				
Stephen Marsland	2015	Machine Learning: An Algorithmic Perspective		
Ethem Alpaydin	2009	Introduction To Machine Learning		
Tom M. Mitchell	2009	Machine Learning		[http://www.cs.cmu.edu/~tom/mlbook.html]
Alex Smola	2008	Introduction to Machine Learning		
Люгер Дж.Ф	2005	Искусственный интеллект: стратегии и методы решения слож-ных проблем		Москва: Вильямс
Б. В. Кузьменко, О. А. Чайковська	2006	Системи штучного інтелекту : Навч.посібник		Київ: Альтерпрес
М. М. Глибовець, О.В. Олецький.	2002	Штучний інтелект : підручник для студ. вищих навч. закладів		Київ: КМ Академія
Іванченко Г. Ф.	2011	Системи штучного інтелекту : навч. посібник		Київ: Альтерпрес
Additional literature				
Рутковская Д., Пилиньский М., Рутковский Л.	2004	Нейронные сети, генетические алгоритмы и нечеткие сис-темы		Москва: Горячая линия-Телеком,
Рассел С., Норвиг П.	2006	Искусственный интеллект. Современный подход		Москва: Вильямс

Andrej Karpathy	20	The unreasonable effectiveness of recurrent neural networks		http://karpathy.github.io/2015/05/21/ rnn-effectiveness