



DESCRIPTION/Syllabi of Curricula/Module

Short Name of the University/Country code Date (Month / Year)	DSEA/P11 Jan 2019
TITLE OF THE MODULE	Code
IT in medicine (BS)	

Teacher(s)	Department
Coordinating: Lina Bohdanova, PhD Others:	Department of Computer and Information Technology (CIT)

Study cycle	Level of the module	Type of the module
Bachelor	7th semester	compulsory

Form of delivery	Duration	Langage(s)
Lectures, laboratory work	15 weeks	Ukrainian / English

Prerequisites	
Prerequisites: Discrete mathematics, System analysis, Human anatomy and physiology.	Co-requisites (if necessary):

ECTS (Credits of the module)	Total student workload hours	Contact hours	Individual work hours
4	120	60	60
Aim of the module (course unit): competences foreseen by the study program			
Study of the methods of artificial intelligence as well as theoretical principles of task formulating, evaluating and solving and obtaining practical skills for the development of artificial intelligence systems			
Learning outcomes of module (course unit)	Teaching/learning methods	Assessment methods	
<p>Knowledge:</p> <ul style="list-style-type: none"> – basics of organization and structure of modern artificial intelligence systems; – basic approaches, methods, technologies of artificial intelligence; - theoretical foundations of the construction of expert systems, neural networks, genetic algorithms; – principles of the development of expert systems, neural networks, programs using genetic algorithms.. 	Lectures	Test	
<p>Skills:</p> <ul style="list-style-type: none"> – to design elements of mathematical and linguistic support for computing systems; – to develop and apply knowledge representation models, logic withdrawal strategies; - to apply knowledge engineering technologies and tools for building intelligent systems; – to design and adapt application software, develop semantic knowledge portals 	Laboratory work	Performance during laboratory practice	
<p>Competences:</p> <ul style="list-style-type: none"> - ability to solve standard tasks of professional activity on the basis of information and bibliographic culture using information and communication technologies and taking into account basic requirements of information security, ethical and legal aspects of the use of information in various subject areas (technical, organizational and technical, medical); - mastering the skills of analysis, application of mathematical methods for statistical processing, verification of adequacy and interpretation of data obtained from the research, including using artificial intelligence methods, and linking them with relevant theory in subject areas of technical, organizational and technical, medical spheres; - ability to carry out a formalized description of the tasks of operations research in organizational, technical and socio-economic systems of various 	Project, consultation	Individual projects	

<p>purposes, to determine their optimal solutions using methods of machine learning and artificial intelligence;</p> <p>- ability to conduct intelligent multidimensional analysis of data and provide their rapid analytical processing with visualizing results of the analysis in the process of solving applied computer science problems.</p>		
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Themes	Contact work hours						Time and tasks for individual work		
	Lectures	Consultations	Seminars	Practical work	Laboratory work	Placements	Total contact work	Individual work	Tasks
1 Classification of medical information systems. Systems of management of medical process	4				2		6	6	Creating a ThingConnect application in a RAD studio to receive data from a Polar H7 device (heart rate sensor)
2 Medical instrumentation and computer systems. Monitoring systems	4				2		6	8	Creating a ThingConnect application in a RAD studio to receive data from a Polar H7 device (heart rate sensor)
3 Medical diagnostics. Remote medicine. Personalized medicine	4				4		8	10	Creating a ThingConnect application in a RAD studio to receive data from a Polar H7 device (heart rate sensor)
4 3D-bioprinting organs	4				4		8	8	Використання 3D принтера для друку макетів внутрішніх органів

5 Expert systems for the diagnosis of diseases Експертні системи для діагностики захворювань	4				6		10	10	Expert systems for the diagnosis of diseases
6 Use of neural networks to solve problems in the medical field	6				6		12	9	Prediction of epidemic development by neural network. Error back propagation method
7 Association rules. Arriori method, building FP-trees to find data templates	4				6		10	9	Search for associative rules based on precedents in medical databases
Total	30				30		60	60	Екзамен/залік

Assessment strategy	Weight in %	Deadlines	Assessment criteria
Test	40	15 th week	Exam
Individual Projects	60	15 th week	Individual projects

Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or internet link
Compulsory literature				
Haykin, Simon	1999	Neural networks and learning machines	904 p.	Pearson Prentice Hall
Kohonen T., E., et al	1996	"Engineering applications of the self-organizing map",	vol. 84, p. 1358 – 1384	Proceedings of the IEEE
Witten I.H., et al	2016	Data Mining: Practical machine learning tools and techniques	654 p.	Morgan Kaufmann
Additional literature				
Kohonen T., E.	1988	Self-Organization and Associative Memory	284 p.	New York: Springer-Verlag