Co-funded by the Erasmus+ Programme of the European Union

DESCRIPTION/Syllabi of Curricula/Module

Short Name of the University/Country code Date (Month / Year)	DSEA/P11 Sept 2020
TITLE OF THE MODULE	**Code**
IT in medicine	**2.2.19**

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

Study cycle (BA/MA)	Level of the module (Semester number)	Type of the module (compulsary/elective)
BA	7st semester for Bachelors	Elective

Form of delivery (theory/lab/exercises)	Duration (weeks/months)	Language(s)
Lectures, exercises	15 weeks	Ukrainian / English

Prerequisites	
Prerequisites: Discrete Mathematics, Systems Analysis, Human Anatomy and Physiology.	**Co-requisites (if necessary):**

ECTS (Credits of the module)	Total student workload hours	Contact hours	Individual work hours
7,0	210	75	135

Aim of the module (course unit): competences foreseen by the study programme		
Students should be able: - to provide extraction of models from data and support of engineering activities, including through data processing, by applying methods and algorithms of deep learning, including using machine learning methods to solve classification and forecasting problems.		
Learning outcomes of module (course unit)	**Teaching/learning methods** **(theory, lab, exercises)**	**Assessment methods** **(written exam, oral exam, reports)**
Knowledge: -main types of medical systems; - basics of organization and structure of modern artificial intelligence systems; - basic approaches, methods, technologies of artificial intelligence in medicine	Working with lecture notes and basic literature on relevant topics	Knowledge test
Skills: - design elements of mathematical and linguistic support of computer systems; - develop and apply models of knowledge representation, strategies for deriving from logic; - apply knowledge engineering technologies, technologies and tools for building intelligent systems; - develop and adapt application software, develop semantic knowledge portals.result of the study, including using artificial intelligence methods, and linking them with the relevant theory in the subject areas of technical, organizational, technical, medical appointments and the like.	Lectures, practical training, consultations	Active attendance of lectures, individual project and presentation
Competences: study subject literature, share knowledge, work in groups	Lectures, practical training, consultations	Individual project and presentation

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. Treatment process control systems	8			4			**12**	**21**	Study exam/ complete design of practical work
2 Medical instrument-computer systems. Monitoring systems	8			4			**12**	**21**	Study exam/ complete design of practical work
3. Medical diagnostics. Remote medicine. Personalized medicine	8			4			**12**	**21**	Study exam/ complete design of practical work
4. 3D bioprinting of organs.	3			4			**7**	**17**	Study exam/ complete design of practical work
5. Expert systems for disease diagnosis	6			4			**10**	**17**	Study exam/ complete design of practical work
6. The use of neural networks to solve problems in the medical field	6			4			**10**	**17**	Study exam/ complete design of practical work
7. Associative rules. Arriori method, construction of FP-trees of search of data templates	6			6			**12**	**21**	Study exam/ complete design of practical work
Total	**45**			**30**			**75**	**135**	

Assessment strategy	Weight in %	Deadlines	Assessment criteria
Written theory test	40%	during the semester / test	good response to questions
Practical test on a computer	60%	during the semester / test	the work is done completely without mistakes or minor errors

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 aplications of the self–organizing map",	vo1. 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	Se1f–Organization and Associative Memory	284 p.	New York: Springer–Verlag