Short Name of the University/Country code Date (Month / Year)	DSEA January 2019
TITLE OF THE MODULE	**Code**
Virtual and augmented reality technologies in medicine	**P11**

Teacher(s)	Department
Coordinating: Mikhieienko D.Y., Ph.D. **Others:**	Department of Computer and Information Technology (CIT)

Study cycle	Level of the module	Type of the module
MA	2nd semester	Compulsory

Form of delivery	Duration	Language (s)
Lectures, seminars	8 weeks	Ukrainian/English

Prerequisites	
Prerequisites: studying the courses "Algorithmization and programming", "Computer graphics", " Object-oriented programming".	**Co-requisites (if necessary):**

ECTS (Credits of the module)	Total student workload hours	Contact hours	Individual work hours
4,0	120	54	66

Aim of the module (course unit): competences foreseen by the study programmes		
Students should be able to: - develop and implement software that provides more virtual and augmented reality technologies, use virtual and augmented reality tools to solve medical problems.		
Learning outcomes of module (course unit)	**Teaching/learning methods**	**Assessment methods**

Knowledge of: - principles, methods, algorithms of virtual and augmented reality; - virtual and augmented reality systems.	Lectures	Test
Skills: - formation of theoretical knowledge and practical skills for working with virtual and augmented reality; - formation of the ability to develop virtual and augmented reality applications, in particular for medical purposes.	Seminar	Presentation

Themes	**Contact work hours**							**Time and tasks for individual work**	
	Lectures	Consultations	Seminars	Practicalwork	Laboratory work	Placements	Total contact work	Individual work	**Tasks**
1 Definition of key terms. Difference between AR and VR.	5		2				**7**	**9**	Study of theoretical material/ case study
2. A brief history of the evolution of AR and VR. Key devices in AR and VR.	4		3				**7**	**8**	Study of theoretical material/ case study
3. Application development tools for augmented and virtual reality.	5		3				**8**	**9**	Study of theoretical material/ case study
4. VR and AR in surgery. Augmented reality as an anesthetic.	4		2				**6**	**8**	Study of theoretical material /case study/ presentation
5. VR and AR as a tool of psychotherapy. VR for the diagnosis of neurological diseases.	5		2				**7**	**8**	Study of theoretical material/case study/ presentations
6. Augmented reality for invasive procedures. VR glasses for exoskeleton control.	4		2				**6**	**8**	Study of theoretical material /case study/ presentations
7. Augmented and virtual reality for brain stimulation.	5		2				**7**	**8**	Study of theoretical material /case study/ presentations
8. Augmented reality in medical education	4		2				**6**	**8**	Study of theoretical material /case study/ presentations
Total	**36**		**18**				**54**	**66**	

Assessment strategy	**Weigh t in %**	**Deadlines**	**Assessment criteria**
Presentation	40	8thweek	Participants, activity, presentation
Final test	60	8thweek	Open questions test

Author	Year of issue	Title	No of periodical or volume	Place of printing. Printing house or internet link
Compulsory literature				
Stephanie Lackey, Jessie Chen	2017	Virtual, Augmented and Mixed Reality		Springer
Terry M. Peters, Cristian A. Linte, Ziv Yaniv, Jacqueline Williams	2018	Mixed and Augmented Reality in Medicine		CRC Press
Additional literature				
Тимур Машнин	2018	Разработка Android-приложений с Augmented Reality		Litres