# DESCRIPTION/Syllabi of Curricula/Module

| Short Name of the University/Country code<br>Date (Month / Year) | DSEA/ P11<br>September 2020 |
|---|---|
| **TITLE OF THE MODULE** | **Code** |
| Virtual and augmented reality technologies | **2.2.6** |

| Teacher(s) | Department |
|---|---|
| **Coordinating:** Ph.D. Mikhieienko D.Y.<br><br>**Others:** | Department of Computer and Information Technology (CIT) |

| Study cycle | Level of the module | Type of the module |
|---|---|---|
| MA | 2<sup>th</sup> semester | selective |

| Form of delivery | Duration | Language (s) |
|---|---|---|
| Lectures, seminars | 15 weeks | Ukrainian/English |

| Prerequisites | |
|---|---|
| **Prerequisites:**<br><br>studying the disciplines "Algorithmization and programming ", "Computer Graphics", " Object-oriented programming " | **Co-requisites (if necessary):** |

| ECTS<br>(Credits of the module) | Total student workload hours | Contact hours | Individual work hours |
|---|---|---|---|
| 5,5 | 120 | 54 | 66 |

| Aim of the module (course unit): competences foreseen by the study programmes |
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| Students should be able to:<br>- Develop and implement software using 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:<br>– getting acquainted with the principles, methods, algorithms of virtual and augmented reality;<br>– introduction to virtual and augmented reality systems. | Lectures | Test |
| Skills:<br>– formation of theoretical knowledge and practical skills for working with virtual and augmented reality;<br>– developing 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 Basic concepts, principles and tools for the development of VR and AR systems, as well as equipment for the implementation of VR and AR. | 4 | | | | 4 | | 8 | 10 | Study of theoretical material, case study |
| 2. The difference between AR, Virtual Reality (VR) and Mixed Reality. Equipment. Leading companies developing VR / AR projects | 4 | | | | 4 | | 8 | 10 | Study of theoretical material, case study |
| 3. Virtual and augmented reality as a tool of psychotherapy. Virtual reality for the diagnosis of neurological diseases. Additional and virtual reality for brain stimulation. Augmented reality in medical education | 4 | | | | 4 | | 8 | 10 | Study of theoretical material, case study |
| 4. Stages and technologies of VR systems creation, structure and components. | 4 | | | | 4 | | 8 | 10 | Study of theoretical material /case study/ presentations |
| 5. Review of modern 3D engines. Basic concepts, possibilities, conditions of use. Comparative analysis. | 4 | | | | 4 | | 8 | 10 | Study of theoretical material/case study/ presentations |
| 6. Basics of working with SDK Unity 3D. Create a VR application using the Unity SDK. Sensors, manipulators, gesture recognition devices. | 4 | | | | 4 | | 8 | 10 | Study of theoretical material /case study/ presentations |
| 7. Augmented reality application architecture. Scopes of augmented reality | 4 | | | | 4 | | 8 | 11 | Study of theoretical material /case study/ presentations |
| 8. Limitations of augmented reality technology. Overview of augmented reality application development tools | 4 | | | | 4 | | 8 | 11 | Study of theoretical material /case study/ presentations |
| 9. Platforms for AR application development. Stages of development: selection of the environment taking into account features (mobile application, industrial or corporate context), | 4 | | | | 4 | | 8 | 11 | Study of theoretical material /case study/ presentations |

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|---|---|---|---|---|---|---|---|
| choice of tools, design development, coding (display, interaction, support), testing | | | | | | | |
| **Total** | **36** | | | **36** | **72** | **93** | |

| Assessment strategy | Weight in % | Deadlines | Assessment criteria |
|---|---|---|---|
| Presentation | 40 | 15<sup>th</sup>week | Attendance, activity, presentation |
| Final test | 60 | 15<sup>th</sup>week | 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 |