COURSE DESCRIPTION CARD - SYLLABUS

Course name
Virtual and Augmented Reality 1

Course

Field of study
Product Lifecycle Engineering
Area of study (specialization)

Level of study
Second-cycle studies
Form of study
full-time

Year/Semester
1/1
Profile of study
general academic
Course offered in
English
Requirements
compulsory

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
15	15	
Tutorials	Projects/seminars	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
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Faculty of Mechanical Engineering

Piotrowo Street No 3, 60-965 Poznań

Responsible for the course/lecturer:

Prerequisites

1. Knowledge

The students have knowledge of basic IT, computer graphics and CAD. They are familiar with stages of product lifecycle and understand the notion of design.

2. Skills

The students can build a solid 3D model of a part and an assembly in a CAD 3D system of their choice.

3. Social competences

The students are open to implementation of modern computer technologies in production process. They are able develop their knowledge and skills in a topic on their own.

Course objective

Getting familiarized with hardware and software used in interactive applications of virtual, augmented and mixed reality (VR, AR, MR), made to aid processes of design, production and use of new products during their lifecycle. Obtaining skills of designing and creating simple VR applications.

Course-related learning outcomes

Knowledge

1. Defines, distinguishes and classifies notions of VR, AR, MR.

2. Has knowledge on structure of VR/AR/MR systems: projection, interaction, software system classes.

3. Has knowledge on methodology of design and implementation of VR/AR/MR in a lifecycle of a new product and selection of an appropriate technique for a given stage and application.

4. Indicates possibilities and examples of applications of VR/AR/MR systems in development of a new product, on the stages of design, production and use.

5. Has knowledge on possibilities and limitations of available industrial VR/AR/MR systems.

Skills

1. Is able to develop 2D and 3D data for the needs of VR/AR/MR applications.

2. Is able to design an interactive VR application, useful in product lifecycle: a simulator, a configurator, an instruction.

3. Has a skill of programming simple interactions in VR applications in a selected 3D engine, with use of classic and visual programming.

4. Is able to analyze economics of VR/AR/MR solutions in a given application.

Social competences

1. Is aware of consequences of use of modern IT systems in public life.

2. Is open for application of VR, AR, MR in engineering activities.

3. Can properly present pros and cons of use of VR/AR/MR systems in product lifecycle.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formulating grade:

Laboratory: on the basis of current advancement in realization of laboratory tasks

Lecture: on the basis of answers to questions regarding material from previous lectures.

Final grade:

Laboratory: practical colloquium at half-time the course (at a computer, building a simple VR application in a given time, at given requirements)

Lecture: test (colloquium) of open and closed questions, passed after obtaining at least 51% score, results are being discussed. The colloquium takes place at the end of the course.

Programme content

Lecture:

1. Virtual technologies in product lifecycle.

2. Basic notions and definitions in VR/AR/MR, main applications.

3. VR/AR/MR systems: classes of hardware and software, projection, interaction systems, software engines.

4. Methodology of design, building and implementation of VR/AR/MR applications used in the product lifecycle.

Laboratory:

Basics of Unity3D software in building interactive XR applications in product lifecycle: data import and visualization, interaction programming, creating user interface.

Teaching methods

- informative lecture

- multimedia presentation

- case study

- laboratory method

Bibliography

Basic

1. B. Arnaldi, P. Guitton, G. Moreau,Virtual Reality and Augmented Reality: Myths and Realities, Wiley, 2018

2. S.K. Ong, A.Y.C. Nee, Virtual and Augmented Reality Applications in Manufacturing, Springer, London, 2004

Additional

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	30	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	20	1,0

1 delete or add other activities as appropriate