SYLLABUS

Name: Virtual and augmented reality

Name in Polish: Wirtualna i rozszerzona rzeczywistość Name in English: Virtual and augmented reality

Information on course:

Faculty of Organisation and Management
Silesian University of Technology
Bachelor's degree, Full-time
VII semester, academic year 2026/27 (cycle from 2023)
Dr Kinga Stecuła

Default type of course examination report: zal / passed Language: English Course homepage: https://platforma.polsl.pl/roz/ ECTS 2 ECTS Short description: The sime of the source is to provide students with knowledge in the field of without reality (//D) and sugmented reality (/D) and their applications in a

The aim of the course is to provide students with knowledge in the field of virtual reality (VR) and augmented reality (AR) and their applications in a modern production company.

Description:

Lectures include the following content and issues:

- definition of basic concepts such as virtual reality, augmented reality, mixed reality, metaverse, immersion, etc.

history of virtual and augmented reality,

- characteristics of different types of goggles (virtual, augmented and mixed reality) and their manufacturers

- characteristics of virtual and augmented reality applications available on the market

- characteristics of programs for creating 3D environments
- indication of the connection between production engineering and virtual and augmented reality

- characteristics of the use of virtual and augmented reality in industry, with an emphasis on production engineering, including design, prototyping and employee training

- description of virtual and augmented reality in the context of marketing, customer service and business

- description of the directions of development of virtual and augmented reality in the context of management and production engineering
- discussion of the threats related to the use of virtual and augmented reality

The laboratory includes:

- familiarizing students with selected models of virtual and/or augmented reality goggles

- familiarizing students with selected virtual and/or augmented reality applications

- performance of tasks in a virtual environment

- preparing work related to virtual and/or augmented reality and its application in production engineering

- providing to know selected models of virtual and/or augmented reality goggles

getting to know selected virtual and/or augmented reality applications

-performance of tasks in a virtual environment

-preparing work related to virtual and/or augmented reality and its application in production engineering

Full-time studies: 15 hours of lectures 15 hours of laboratory

ECTS points: 2.

NUMBER OF HOURS

Number of hours of classes with direct participation of academic teachers or other people conducting classes and students

- Lecture: 15 h

- Laboratory: 15 h

Number of hours allocated to the student's own work: 30 h, including:

- Acquaintance with literature: 10 h

- Preparation for laboratory classes and preparation of a final paper: 20 h Total number of hours: 60 h

Bibliography:

- Angelov, V.; Petkov, E.; Shipkovenski, G.; Kalushkov, T. Modern virtual reality headsets. In Proceedings of the 2020 International Congress on Human-Computer Interaction, Optimization and Robotic Applications (HORA), Ankara, Turkey, 26–27 June 2020; IEEE: Piscataway, NJ, USA, 2020; pp. 1–5.
- Arnaldi B., Guitton P., Moreau G., Virtual Reality and Augmented Reality: Myths and Realities, Wiley, 2018
- Aukstakalnis S., Practical Augmented Reality: A Guide to the Technologies, Applications, and Human Factors for AR and VR. Addison-Wesley, 2017.
- Górski F., Metodyka budowy otwartych systemów rzeczywistości wirtualnej: zastosowanie w inżynierii mechanicznej, Wyd. Politechniki Poznańskiej, 2019.
- Lanier, J. Virtual reality: The promise of the future. Interact. Learn. Int. 1992, 8, 275–279.
- Schmalstieg D., Hollerer T., Augmented Reality: Principles and Practice. Addison-Wesley, 2016.
- Sherman, W.R.; Craig, A.B. Understanding Virtual Reality; Morgan Kauffman: San Francisco, CA, USA, 2003.
- Smutny, P. Learning with virtual reality: A market analysis of educational and training applications. Interact. Learn. Environ. 2022, 1–14.
- Stecuła, K. Wirtualna rzeczywistość na uczelni—Potencjał, korzyści i zagrożenia. In Wirtualna Rzeczywistość w Perspektywie Prawnej, Bezpieczeństwa Cyfrowego i Technologii Informacyjnych; Akademia Handlowa Nauk Stosowanych w Radomiu: Radom, Poland, 2022; pp. 130–143.
- Stecuła, K. "Virtual Reality Applications Market Analysis—On the Example of Steam Digital Platform." Informatics. Vol. 9. No. 4. MDPI, 2022.

Learning outcomes:

KNOWLEDGE: knows and understands

Basic engineering processes and technologies in the life cycle of technical equipment, objects and systems and ways of solving typical engineering tasks, particularly in relation to the organization of production processes and production management – in connection with virtual and augmented reality. K1A _W3

Fundamental problems of contemporary civilization relevant to the production engineering – in connection with virtual and augmented reality. K1A _W7

SKILLS: is able to

Plan and conduct experiments, including measurements and computer simulations, visualize data and interpret the obtained results and draw conclusions – in connection with virtual and augmented reality. K1A _U3

Work individually and in a team, assuming different roles in it, plan and organize this work, as well as interact with other people as part of teamwork (also of an interdisciplinary nature) using specialist terminology and modern information and communication technologies, and take part in the debate – in connection with virtual and augmented reality. K1A _U7

Select and use appropriate techniques, skills and modern engineering tools – in connection with virtual and augmented reality. K1A _U9

SOCIAL COMPETENCE: is ready for

Responsible performance of professional roles, compliance with the rules of professional ethics and requiring it from others, care for the achievements and traditions of the profession; is aware of the importance and understands non-technical aspects and effects of engineering activities – in connection with virtual and augmented reality. K1A_K3

Assessment methods and assessment criteria:

Attendance at the laboratory is mandatory.

Requirements to pass the course:

-Completing and passing all tasks from the laboratory part.

-Preparing work related to virtual and/or augmented reality and its application in production engineering.

Practical placement: