COURSE DESCRIPTION CARD - SYLLABUS

Course name

Product prototyping

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

15

Laboratory classes

Other (e.g. online)

Tutorials

Projects/seminars

15

Number of credit points

3

Lecturers

Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

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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

Obtaining knowledge and skills in scope of planning and realization of process of prototyping of a new product with use of modern computer technologies: virtual reality (VR) and rapid prototyping (RP) with use of additive manufacturing technologies.

Course-related learning outcomes

Knowledge

1. Has knowledge on need for prototyping and basic notions.

2. Has knowledge on working in a team realizing prototyping of a new product.

3. Has knowledge on methodology of implementation of VR and RP technoologies in a process of prototyping of a new product.

Skills

1. Is able to develop a prototyping process for a given product.

2. Is able to design an interactive VR application presenting a new product.

3. Is able to plan and realize a process of rapid prototyping with use of additive manufacturing technologies.

Social competences

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

2. Is open for application of VR and RP in the process of prototyping of a new product.

3. Can properly present pros and cons of use of VR and RP systems in prototyping of a new product.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Formulating grade:

Project: on the basis of current advancement in realization of project tasks

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

Final grade:

Project: on the basis of assessment of obtained physical and virtual prototype of a selected product, as well as prepared report of the project.

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. Design and prototyping of new products and processes - basic notions.

2. Conventional and modern technologies of manufacturing physical prototypes.

3. Virtual and digital prototyping: mathematical models, simulations, virtual reality.

4. Planning of prototyping for selected product classes.

Project:

1. Creation of project teams, assigning roles, selection of project topic (a specific, exemplary product).

2. Planning of prototyping process for the selected product.

3. Creation of virtual prototype: building VR application (configurator).

4. Creation of physical prototyping: additive manufacturing of selected parts of the product.

5. Assessment of prototypes and the product, writing a report.

Teaching methods

- informative lecture

- multimedia presentation

- case study

- project method

Bibliography

Basic

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

2. Chua C. K., Leong K. F., and Lim C. S., 2010, “Rapid Prototyping: Principles and Applications”, World Scientific Publishing Co. Pte. Ltd., Singapore

Additional

1. Killi Steiner, 2013, "Designing for Additive Manufacturing: Perspectives from Product Design", Arkitektur- og designhørgskolen, Oslo, Norway

Breakdown of average student's workload

	Hours	ECTS
Total workload	75	3,0
Classes requiring direct contact with the teacher	38	1,5
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	37	1,5

1 delete or add other activities as appropriate