COURSE DESCRIPTION CARD - SYLLABUS

Course name
DESIGN AUTOMATION OF CUSTOMIZED PRODUCTS USING KNOWLEDGE ENGINEERING [S5IMECH>APWZ]

Course

Proposed by Discipline
–

Year/Semester
3/5

Level of study
Doctoral School

Course offered in
English

Form of study
full-time

Requirements
elective

Number of hours

Lecture
8

Laboratory classes
0

Other
0

Tutorials
0

Projects/seminars
0

Number of credit points

2,00

Coordinators

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Lecturers

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Prerequisites

Knowledge in scope of information technologies and technical drawing, CAD/CAM, manufacturing technologies. Social competences: cooperation in a project team, awareness of responsibility for assigned tasks, understanding the need for new knowledge.

Course objective

Getting familiarized with techniques and methods of automated design of individualized industrial and medical products, with use of knowledge engineering and intelligent CAD models.

Course-related learning outcomes

Knowledge
1. The student describes the design place in the modern design and construction process (P8S_WG/SzD_W01).
2. The student describes the possibilities of designing individualized industrial and medical devices using knowledge and reconstruction engineering techniques (P8S_WG/SzD_W02).
3. The student describes the possibilities of automating design of individualized products using knowledge engineering and CAD autogenerating models (P8S_WG/SzD_W02).

Skills
1. The student uses knowledge engineering, CAD autogenerating models and reconstruction engineering techniques (P8S_UW/SzD_U01).

Social competences
1. The student is open to the implementation of advanced CAD systems in engineering (P8S_KK/SzD_K03).
2. The student is able to independently develop knowledge in the subject and critically evaluate the novelty and potential of design automation cases in various branches of mechanical engineering (P8S_KK/SzD_K01).

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Assessment based on the final pass - a study in the form of an essay and/or a final test - after obtaining at least 51% of points.

Programme content

Customized products and their types. Knowledge engineering. Intelligent models and design automation systems. Examples of products.

Course topics

- mass customization - the production of individualized products,
- types of customization, classification of individualized products, examples of products
- design of individualized products based on medical imaging techniques and 3D scanning,
- Design automation techniques - basics of KBBE (Knowledge Based Engineering) and autogenerating models in industrial and medical applications, with examples

Teaching methods

- informative lecture
- multimedia presentation
- case study

Bibliography

Górski, F. (2025). Computer Aided Design of 3D Printable Anatomically Shaped Medical Devices: Methodologies and Applications. CRC Press.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,00
Classes requiring direct contact with the teacher	8	0,00
Doctoral student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation)	42	2,00