POZNAN UNIVERSITY OF TECHNOLOGY

EUROPEAN CREDIT TRANSFER AND ACCUMULATION SYSTEM (ECTS)

pl. M. Skłodowskiej-Curie 5, 60-965 Poznań

COURSE DESCRIPTION CARD - SYLLABUS

Course name

Zaawansowane modelowanie geometryczne

Course

Field of study	Year/Semester
Mechatronics	2/3
Area of study (specialization)	Profile of study
Mechatronic design of machines and vehicles	general academic
Level of study	Course offered in
Second-cycle studies	Polish
Form of study	Requirements
full-time	elective

Number of hours

Lecture	Laboratory classes	Other (e.g. online)
	30	
Tutorials	Projects/seminars	

Number of credit points

2

Lecturers

Responsible for the course/lecturer:

Associate Prof. PhD Eng. Piotr Krawiec

email: piotr.krawiec@put.poznan.pl

tel. 61 665 2242

Faculty of Mechanical Engineering

Piotrowo 3 Street, 61-138 Poznań

Responsible for the course/lecturer:

PhD Eng. Maciej Berdychowski

email: maciej.berdychowski@put.poznan.pl

tel. 61 665 2053

Faculty of Mechanical Engineering

Piotrowo 3 Street, 61-138 Poznań

Prerequisites

A student starting this course should be able to use the Windows operating system efficiently. Have

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basic knowledge of solid, surface and hybrid modeling. He should also have the ability to obtain information from the indicated sources and be ready to cooperate as part of the team.

Course objective

Learning the methodology of advanced geometric modeling by students. Acquiring the ability to make complex solid, surface and hybrid models, as well as visualization of designed products with the use of professional computer systems. Expanding the skills in the field of geometric modeling useful for the development of tool patterns, prototypes, etc.

Classes will be carried out using Autodek Inventor Professional, Solid Works, NX CAD

Course-related learning outcomes

Knowledge

1. Has knowledge of computer structure analysis including advanced operations in the CAD environment, regarding 3D visualization and analysis of the cooperation of mechanical elements.

2. Has an extended knowledge of mechatronics, knowledge of the analysis and design of complex mechatronic systems, systems theory and technology, and the application of modeling and simulation in mechatronic design.

3. Has knowledge of industrial property protection, copyright, intellectual property management and is able to use patent property resources.

Skills

1. He can visualize a mechanical element in a 3D environment and analyze the cooperation of elements shown in the drawing.

2. Can prepare and present, in Polish and English or another foreign language recognized as the language of international communication, a presentation on a detailed design or research task and conduct a discussion on the presented issues.

3. Can define the directions of further learning and implement the process of self-education.

Social competences

1. Student is able to set priorities for the implementation of the specified or other tasks.

2. Student understands the need for lifelong learning; He can inspire and organize the learning process of other people.

3. Student can interact and work in a group, taking various roles in it.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

Credit for the laboratory on the basis of a 3D modeling task.

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Evaluation criteria

less than 50% inadequate

51%-60% sufficient

61%-70% sufficient plus

71%-80% good

81%-90% good plus

91%-100% very good

Programme content

Classes 1. Advanced solid modeling, part 1

Reminder of the methods used in solid modeling

Classes 2. Advanced solid modeling, part 2

Learning the advanced functions of solid modeling

Classes 3. Modeling with the use of surfaces

Surface modeling of machine and vehicle elements

Classes 4. Editing the surface

Understanding the possibilities of modifying surface models

Classes 5. Modeling of free shapes, part 1

Learning the principles of modeling free shapes

Classes 6. Modeling of free shapes, part 2

Performing an original task with the use of freeforms

Classes 7. Application of the shape generator in CAD modeling, part 1

Learning about the functionality of the shape generator in 3D CAD modeling

Classes 8. Application of the shape generator in CAD modeling, part 2

Performing a task optimizing the geometry of an element used in vehicle construction

Classes 9. Hybrid modeling, part 1

Understanding the principles of using hybrid models

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Classes 10. Hybrid modeling, part 2

Preparation of a hybrid model of a machine element, a vehicle

Classes 11. Application of point clouds in CAD modeling, part 1

Acquisition of point clouds used in 3D modeling

Classes 12. Application of point clouds in CAD modeling, part 2

Make a 3D CAD model based on the point cloud

Classes 13. Advanced visualizations in CAD systems, part 1

Getting to know the procedures and possibilities of advanced renderings in 3D CAD systems

Classes 14. Advanced visualizations in CAD systems, part 2

Performing the visualization of the selected assembly or vehicle in the 3D CAD system

Classes 15. Summarizing of course effects and evaluation

Teaching methods

Laboratory: multimedia presentation illustrated with examples and carrying out the tasks given by the teacher - practical exercises

Bibliography

Basic

1. Anupam Saxena, Birendra Sahay, Computer Aided Engineering Design, Springer 2005.

2. Kiciak P., Podstawy modelowania krzywych i powierzchni: zastosowania w grafice komputerowej, Warszawa, WNT 2000.

Additional

1. Krawiec Piotr (red.), Grafika komputerowa (wyd. VI rozszerzone) wyd. Politechniki Poznańskiej, 2020.

2. Dudziak Marian, Krawiec Piotr, Wspomaganie projektowania i zapisu konstrukcji, Wydawnictwo PWSZ w Kaliszu, 2012.

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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, solving the individual/group tasks) [1]	20	1,0

[1] delete or add other activities as appropriate