COURSE DESCRIPTION CARD - SYLLABUS

Course name
Computer graphics

Course

Field of study
Electrical engineering
Year/Semester
2/3
Area of study (specialization)
Electrical mechatronics systems
Profile of study
general academic
Level of study
Second-cycle studies
Course offered in
polish
Form of study
full-time
Requirements
compulsory

Number of hours

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

Number of credit points

2

Lecturers

Responsible for the course/lecturer:
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Responsible for the course/lecturer:

Prerequisites

Basic knowledge of analytical and differential geometry, matrix calculus. Programming in C ++ or Delphi high level language.
The ability to effectively self-study in a field related to the chosen field of study, make the right decisions when solving simple tasks and formulate problems in the field of widely understood electrical engineering.
The student is aware of the need to expand their competences, readiness to cooperate as part of a team, the ability to comply with the rules in force during project classes.

Course objective

Acquaintance with modern methods of creating three-dimensional computer graphics. Learning the principles of operation of the discussed algorithms for creating graphics.

Course-related learning outcomes

Knowledge

The student has expanded knowledge in the field of high-level programming using object-oriented programming elements, algorithms for building three-dimensional computer graphics in a high-level language using the OpenGL library.
The student knows the principles of building a scene in computer graphics and the selection of transformations of basic objects, textures, colors and lighting appropriate to the scene.
The student has expanded knowledge in the field of computer-aided design in electrical engineering.

Skills

The student is able to characterize the principles of building a scene in computer graphics and to develop an algorithm for building three-dimensional computer graphics in a high-level language using the OpenGL library. Propose the selection of transformations of basic objects. Propose the selection of textures, colors and lighting appropriate to the scene. Formulate the problem of analysis of a fragment of reality and then the algorithm of creating a scene.
The student is able to prepare and present software for creating three-dimensional computer graphics, computer animation scenario, perform a fragment of the real world analysis in order to build their own computer graphics.

Social competences

Understands the importance of knowledge in solving problems and raising professional, personal and social competences; is aware that in technology knowledge and skills quickly become obsolete.
Student is able to think and act in an entrepreneurial manner in the field of electrical engineering.

Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:
Design exercises:
• test and rewarding of knowledge necessary to implement the problems posed in a given area of laboratory tasks,
• assessment in class - rewarding the increase in the ability to use known principles and methods,
• assessment of knowledge and skills related to the implementation of the exercise task, evaluation of the report of the exercise.

Getting extra points for activity during classes, especially for:
• proposing to discuss additional aspects of the issue,
• effectiveness of applying the acquired knowledge when solving a given problem,
• ability to work as part of a team that practically performs a specific task in a laboratory,
• comments related to the improvement of the teaching process,
• aesthetic care of prepared reports and tasks - as part of self-study.

Programme content

Drawing objects in three dimensions. Geometric transformations, rotation, moving, scaling. Perspective and orthograpic projection. Coloring and shading. Light and shadows. Texture mapping. Blending colors

and transparency. Antialiasing. Parametric curves and surfaces. Use of the OpenGL graphic library to present research results.

Teaching methods

1. Design exercises: multimedia presentation illustrated with examples given on the board and performance of tasks given by the teacher - practical exercises.

Bibliography

Basic

1. M. Jankowski, Elementy grafiki komputerowej, WNT 2006.
2. P. Kiciak, Podstawy modelowania krzywych i powierzchni. Zastosowania w grafice komputerowej, WNT 2005.
3. Graham Sellers, Richard S. Wright Jr., Nicholas Haemel, OpenGL Superbible: Comprehensive Tutorial and Reference (7th Edition), Helion 2016
4. A. Ross, M. Bousquet, 3ds max 5. Projekty i rozwiązania, Helion 2004.
5. Von Glitschka, Vector Basic Training: A Systematic Creative Process for Building Precision Vector Artwork (2nd Edition), Helion 2016

Additional

1. A. Marciniak, Grafika komputerowa w języku Turbo Pascal, seria Biblioteka Użytkownika Mikrokomputerów, Wydawnictwo NAKOM, Poznań 1998.
2. F. P. Preparata, M. I. Samos, Geometria obliczeniowa, Helion 2003.

Breakdown of average student's workload

	Hours	ECTS
Total workload	50	2,0
Classes requiring direct contact with the teacher	18	1,0
Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) [1]	32	1,0

[1] delete or add other activities as appropriate