# STUDY MODULE DESCRIPTION FORM

| Name of the module/subject | | Code |
|---|---|---|
| **Computer graphics** | | **1010325341010320116** |

| Field of study | Profile of study (general academic, practical) | Year /Semester |
|---|---|---|
| **Electrical Engineering** | **general academic** | **2 / 4** |

| Elective path/specialty | Subject offered in: | Course (compulsory, elective) |
|---|---|---|
| **Electrical Systems in Mechatronics** | **Polish** | **obligatory** |

| Cycle of study: | Form of study (full-time,part-time) |
|---|---|
| **Second-cycle studies** | **part-time** |

| No. of hours | | | | No. of credits |
|---|---|---|---|---|
| Lecture: **-** | Classes: **-** | Laboratory: **-** | Project/seminars: **9** | **1** |

| Status of the course in the study program (Basic, major, other) | (university-wide, from another field) |
|---|---|
| **other** | **university-wide** |

| Education areas and fields of science and art | ECTS distribution (number and %) |
|---|---|
| **technical sciences** | **1 100%** |
| **Technical sciences** | **1 100%** |

## Responsible for subject / lecturer:

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## Prerequisites in terms of knowledge, skills and social competencies:

| | | |
|---|---|---|
| 1 | **Knowledge** | Basic knowledge of analytical and differential geometry, matrix calculations. |
| 2 | **Skills** | Programming in C + + or Delphi. |
| 3 | **Social competencies** | Is aware of the need to broaden their competence, willingness to work together as a team |

## Assumptions and objectives of the course:

Getting familiar with modern methods of creating three-dimensional computer graphics. Understanding the principles of these algorithms to create graphics.

## Study outcomes and reference to the educational results for a field of study

### Knowledge:

1. Develop an algorithm to create a three-dimensional computer graphics in high-level language using the OpenGL library. - [K_W07+++]
2. Describe the principle of building a scene in computer graphics. Offer a selection of basic object transformations. - [K_W01+, K_W18++]
3. Offer your choice of textures, colors and lighting appropriate to the scene. - [K_W13+]
4. Formulate the problem of analyzing a fragment of reality and then an algorithm to create a scene - [K_W01+]

### Skills:

1. Creating software to create three-dimensional computer graphics. - [K_U15++, K_U16++]
2. Prepare a script computer animation. - [K_U08+]
3. Perform an analysis of a fragment of the real world in order to build their own computer graphics. - [K_U06++]

### Social competencies:

1. Ability to act in an entrepreneurial manner in the area of ??mechatronics, electrical systems. - [K_K04+++]

## Assessment methods of study outcomes

project:

- test and favoring knowledge necessary for the accomplishment of the problems in the area of ??laboratory tasks,
- to evaluate the classroom - rewarding gain skills they met the principles and methods
- assessment of knowledge and skills related to the implementation of the tasks your practice, the assessment report performed exercise.

Get extra points for the activity in the classroom, and in particular for:

- propose to discuss additional aspects of the subject;
- the effectiveness of the application of the knowledge gained during solving the given problem;
- ability to work within a team practice performing the task detailed in the laboratory;
- subsequent to improve the educational process;
- developed aesthetic diligence reports and jobs - in the self-study.

## Course description

Drawing objects in three dimensions. Geometric transformations, rotation, translation, scaling. Perspective projection and perpendicular. Coloring and shading. Light and shadows. Texture mapping. Mixing color and transparency. Anti-aliasing. Parametric curves and surfaces. The use of OpenGL graphics library for presentation of research results.

## Basic bibliography:

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

## Additional bibliography:

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

## Result of average student's workload

| Activity | Time (working hours) |
|---|---|
| 1. Participation in project activities | 9 |
| 2. Consultation on design activities | 4 |
| 3. Preparation for laboratory exercises | 10 |
| 4. Develop reports | 8 |

## Student's workload

| Source of workload | hours | ECTS |
|---|---|---|
| Total workload | 31 | 1 |
| Contact hours | 13 | 1 |
| Practical activities | 27 | 1 |