#### card of course

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| Subject name | 3D graphics general part 1 |

1. The placement of the subject in the study system

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| 1.1. Field of study | Computer science |
| 1.2. Form and path of study | Full-time/Part-time |
| 1.3. Level of education | First-cycle studies |
| 1.4. Study profile | Practical |

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| 1. 5. Specialty | Computer graphics and game design |
| 1.6. Subject Coordinator | Mgr inż. Michał Brogowski |

2. General characteristics of the subject

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| 2.1. Belonging to a subject group | Optional/practical |
| 2.2. Number of ECTS | 5 |
| 2.3. Language of lectures | English |
| 2.4. Semesters in which the subject is taught | III |
| 2.5.Criteria for selecting course participants | For specializations: Computer graphics and game design |

1. Learning outcomes and course delivery
   1. Subject Objectives

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| No. | Subject Objectives |
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| C1 | Learning basic concepts in 3D graphics |
| C2 | Learning the basics of 3D graphics programs |
| C3 | Learning the basics of modeling, texturing, and rendering 3D objects |

* 1. Subject-specific learning outcomes, divided into knowledge , skills and competences , with reference to the directional learning outcomes

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| --- | --- | --- | --- | --- | --- | --- |
| No. | Description of subject  learning outcomes | Reference to  directional effects  learning (symbols) | Method of implementation (mark "X") | | | |
| ST | | NST | |
| Classes at the University | Activities on  the platform | Classes at the University | Activities on  the platform |
| After passing the course, the student knows and understands **the knowledge** | | | | | | |
| W1 | What is 3D graphics, how to create it, in which programs | INF\_W09 |  | X |  | X |
| W2 | What are the basic techniques for creating and manipulating 3D objects in scenes? |  | X |  | X |
| W3 | What are textures and what is the process of texturing 3D objects? |  | X |  | X |
| W4 | What is rendering and how is it done? |  | X |  | X |
| W5 | What is post production of graphic renders |  |  |  |  |
| After passing the course, the student is **able** to: | | | | | | |
| U1 | Navigating Blender | INF\_U12 | X |  | X |  |
| U2 | Model 3D objects using various techniques (Mesh, Curve) | X |  | X |  |
| U3 | Unfold UVs, apply textures to models and manipulate them | X |  | X |  |
| U4 | Set up scenes built from 3D models, light them and render them | X |  | X |  |
| U5 | Perform basic graphic processing of the resulting renders | X |  | X |  |
| After completing the course, the student is ready to take part in **social competences.** | | | | | | |
| K1 | Presenting and defending your projects | INF\_K01 | X |  | X |  |
| K2 | Actively consult projects in case of difficulties or doubts | X |  | X |  |

3.3. Forms of teaching and their number of hours - Full-time studies (ST), Part-time studies (NST)

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Path | Lecture | Exercises | Design | Workshop | Laboratory | Seminar | Lecturer | Classes conducted using distance learning methods and techniques in the form of a lecture. | Other | **ECTS points** |
| **ST** |  |  |  |  | 30 |  |  | 20 |  | 5 |
| **NST** |  |  |  |  | 15 |  |  | 10 |  | 5 |

3.4. Content of education (separately for each form of classes: (W, ĆW, PROJ, WAR, LAB, LEK, OTHER). It should be marked (X) how the given content will be implemented (classes at the university or classes on the e-learning platform conducted using distance learning methods and techniques)

TYPE OF CLASS: LECTURE

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| --- | --- | --- | --- | --- | --- | --- |
| No. | Content of the course | Reference to subject-specific learning outcomes | Method of implementation (mark "X") | | | |
| ST | | NST | |
| **Classes at the University** | **Activities on  the platform** | **Classes at the University** | **Activities on  the platform** |
| 1. | Blender Basics | W1 | X |  |  | X |
| 2. | Fundamentals of solid modeling using various techniques | W2 | X |  |  | X |
| 3. | Basics of texturing 3D solids using painting techniques and PBR materials | W3 | X |  |  | X |
| 4. | Basics of arranging scenes, lighting, cameras and atmosphere using photo references | W4 | X |  |  | X |
| 5. | Basics of post-production renders, color correction, applying filters, final export | W5 | X |  |  | X |
| 6. | Summary of classes and discussion of grades. |  | X |  |  | X |

TYPE OF CLASS: LABORATORY

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| --- | --- | --- | --- | --- | --- | --- |
| No. | Content of the course | Reference to subject-specific learning outcomes | Method of implementation (mark "X") | | | |
| ST | | NST | |
| **Classes at the University** | **Activities on  the platform** | **Classes at the University** | **Activities on  the platform** |
| 1. | Blender Scene Building Exercises - Basic Objects, Axes, Views | U1, K2 | X |  | X |  |
| 2. | Exercises in 3D solid modeling - types of finished objects, types of objects (mesh curve), parameters of 3D objects | U2, K2 | X |  | X |  |
| 3. | Exercises in texturing 3D solids - developing UV models, preparing textures and material shaders | U3, K2 | X |  | X |  |
| 4. | Scene rendering exercises – scene setup, cameras, lights and atmosphere. Rendering to file | U4, K2 | X |  | X |  |
| 5. | Exercises in render post-production methods – graphic processing of finished renders, correction of colors, brightness, saturation, application of renders in the context of other projects (e.g. in a magazine cover) | U5, K2 | X |  | X |  |
| 6. | Summary of classes and discussion of grades. Presentation and defense of projects | K1 | X |  | X |  |

3.5. Methods of verifying learning outcomes (indication and description of methods of conducting classes and verification of achievement of learning outcomes and method of documentation)

LECTURE – The lecture is an informative introduction to the student's own work in the laboratory. The laboratories and lectures are thematically linked so that the student can use the knowledge from the lecture in creating a semester project.

Assessment of lectures in the form of a 10-question test, single choice, each question worth 2 points.

Grade 3 (sufficient): 11 – 12 points

Grade 3.5 (sufficient plus): 13 – 14 points

Rating 4 (good): 15 – 16 points

Rating 4.5 (good plus) 17 – 18 points

Rating 5 (very good): 19 – 20 points

LABORATORY – The lab starts with general exercises related to navigating the Blender program and learning individual functions. Then, work begins on the semester project, which must be defended at the last meeting. The project is to create a 3D scene and a final render according to the instructor's guidelines. The student must present how he built the scene, show the techniques and tools used, create lighting, render and post-production.

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| Subject Effects | Teaching methods | Methods of verifying learning outcomes | Documentation methods |
| KNOWLEDGE | | | |
| W1-W5 | Lectures – detailed description of work techniques in the form of lectures | Grading in the form of a test | Test results collected on the PUW platform |
| SKILLS | | | |
| U1-U5 | Laboratories – working on a semester project in the computer lab | Preparation and defense of the semester project (described above) | Projects in the form of renders collected on the PUW platform |
| SOCIAL COMPETENCES | | | |
| K1-K2 | Laboratories – working on a semester project in the computer lab | Preparation and defense of the semester project (described above) | Projects in the form of renders collected on the PUW platform |

3.6. Assessment criteria for the achieved learning outcomes

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| Learning effect | For a grade of 3 or "pass."  the student knows and understands/is able to/is ready to | For a grade of 3.5, the student knows and understands/is able to/is ready to | For a grade of 4, the student knows and understands/is able to/is ready to | For a grade of 4.5, the student knows and understands/is able to/is ready to | For a grade of 5, the student knows and understands/is able to/is ready to |
| W | 51-60% of knowledge indicated in learning outcomes | 61-70% of knowledge indicated in learning outcomes | 71-80% of knowledge indicated in learning outcomes | 81-90% of knowledge indicated in learning outcomes | 91-100% of knowledge indicated in learning outcomes |
| U | 51-60% of skills indicated in learning outcomes | 61-70% of skills indicated in learning outcomes | 71-80% of skills indicated in learning outcomes | 81-90% of skills indicated in learning outcomes | 91-100% of skills indicated in learning outcomes |
| K | 51-60% of skills indicated in learning outcomes | 61-70% of skills indicated in learning outcomes | 71-80% of skills indicated in learning outcomes | 81-90% of skills indicated in learning outcomes | 91-100% of skills indicated in learning outcomes |

3.7. Literature

**Basic**

[**https://docs.blender.org/manual/en/latest/**](https://docs.blender.org/manual/en/latest/)

**Supplementary:**

[**https://www.cgchannel.com**](https://www.cgchannel.com) **– CG Channel Magazine**

[**https://www.cgw.com**](https://www.cgw.com) **– CGW Magazine**

[**https://blenderartists.org**](https://blenderartists.org) **– Forum użytkowników Blendera**

[**https://max3d.pl**](https://max3d.pl) **– Magazyn 3D**

4. Student workload - ECTS points balance

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| **Types of student activity** | **Student Load** | |
| **ST** | **NST** |
| **Classes requiring direct contact between the student and the academic teacher at the university premises** | **50** | **25** |
| Classes included in the study plan | 50 | 25 |
| **Student's own work** | **75** | **100** |
| Ongoing preparation for classes, preparation of project work/presentations/etc. | 40 | 50 |
| Preparation for passing classes | 35 | 50 |
| **TOTAL STUDENT HOURLY LOAD** | **125** | **125** |
| **Number of ECTS points** | **5** | **5** |

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| Last change date | 30/09/2024 |
| The changes were introduced | INF Education Quality Team |
| The changes were approved | Arkadiusz Gwarda, M.A. |