1. **Course title:** COMPUTER GRAPHICS

2. **Course code:** CG

3. **Validity of course description:** 2018/2019

4. **Level of studies:** first degree

5. **Model of studies:** stationary

6. **Field of study:** INFORMATICS

7. **Profile of studies:** general academic

8. **Programme:** ALL

9. **Semester:** 5, 6

10. **Faculty teaching the course:** Faculty of Automatic Control, Electronics and Computer Science, Institute of Informatics

11. **Course instructor:** Ph.D. Eng. Agnieszka Szczęsna

12. **Course classification:** general

13. **Course status:** obligatory

14. **Language:** english

15. **Pre-requisite qualifications:** Computer Programming (C, C++), Algebra and Analytic Geometry, Fundamentals of computer programming

16. **Course objectives:**

   The course aims to provide the theoretical basis and the resulting 3D computer graphics algorithms, and selected topics of 2D computer graphics as well as providing the necessary practical experience acquired in result of the implementation of algorithms in the laboratory exercises. The lecture will enable students to get in touch with modern solutions in the field photo-realistic and interactive 3D graphics offered in world literature, create their own solutions to the projects as well as understanding fundamental conditions of modern computer animation.

17. **Description of learning outcomes:**

<table>
<thead>
<tr>
<th>Nr</th>
<th>Learning outcomes description</th>
<th>Method of assessment</th>
<th>Teaching methods</th>
<th>Reference code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Student is aware of basic computer graphics algorithms.</td>
<td>Test (sem. 5)</td>
<td>Lecture</td>
<td>K1A_W09, K1A_W15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exam (sem. 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Knowledge of basic methods used in solving computer science tasks in the field of computer graphics algorithms.</td>
<td>Test (sem. 5)</td>
<td>Lecture</td>
<td>K1A_W09, K1A_W15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exam (sem. 6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Student understand graphical pipeline.</td>
<td>Test (sem. 5)</td>
<td>Lecture</td>
<td>K1A_W09, K1A_W15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Exam (sem. 6)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 należy wskazać ok. 5 – 8 efektów kształcenia
4. Student can solve problem related to 2D and 3D computer graphics.  |  Solution of laboratory task  |  Laboratory  |  K1A_U08, K1A_U12, K1A_U21, K1A_U22
5. Student can implement basics 2D and 3D graphics algorithms.  |  Solution of laboratory task  |  Laboratory  |  K1A_U08, K1A_U12, K1A_U21, K1A_U22

18. Teaching modes and hours

Lecture / BA / MA Seminar / Class / Project / Laboratory:
30/0/0/0/0/30

19. Syllabus description:

Lecture:
Introduction to Introduction to programing in graphical API based on OpenGL, graphical pipeline, programing shaders in GLSL.

Laboratory:
Introduction to OpenGL. Raster algorithms, Clipping and windowing, 3D Transformations, Hidden surface removal Illumination models, Raytracing, Object detection, Bone animation, Collision detection, Particle effects, Pixel and vertex shaders

20. Exam: yes (sem. 6)

21. Primary sources:
22. Secondary sources:
- A series of books: Graphics Gems
- Sumanta Guha: Computer Graphics Through OpenGL: From Theory to Experiments,
- Richard S. Wright Jr., Benjamin Lipchak: OpenGL. Księga eksperta. Helion
- OpenGL Programming Guide

23. Total workload required to achieve learning outcomes

<table>
<thead>
<tr>
<th>Lp.</th>
<th>Teaching mode</th>
<th>Contact hours / Student workload hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lecture</td>
<td>30/30</td>
</tr>
<tr>
<td>2</td>
<td>Classes</td>
<td>/</td>
</tr>
<tr>
<td>3</td>
<td>Laboratory</td>
<td>30/30</td>
</tr>
<tr>
<td>4</td>
<td>Project</td>
<td>/</td>
</tr>
<tr>
<td>5</td>
<td>Seminar</td>
<td>/</td>
</tr>
<tr>
<td>6</td>
<td>Other</td>
<td>10/20</td>
</tr>
<tr>
<td></td>
<td>Total number of hours</td>
<td>70/80</td>
</tr>
</tbody>
</table>

24. Total hours: 150

25. Numbers of ECTS: 5 (2 – sem. 5, 3 – sem. 6)

26. Number of ECTS credits allocated for contact hours: 3

27. Number of ECTS credits allocated for in-practice hours (laboratory classes, projects): 2

26. Comments:

Approved:

.............................................. ............................................................
(date, Instructor’s signature) (date, the Director of the Faculty Unit signature)