|  |  |
| --- | --- |
| The title of the course | Graphics & Computer Games I |
| Faculty | Faculty of Mechanical Engineering and Computer  Science |
| The level of studies | Undergraduate (BA) |
| Semester | Winter |
| The form of classes and number of hours | Lectures (15) and self-directed learning laboratories (30) |
| Language of instruction | English |
| The number of ECTS | 3 |
| Teacher | prof. dr hab. Vasyl Martsenyuk |
| The aims of the course (maximum 500 characters) | Computer graphics is a specific and multiple phenomenon that has arisen in the sphere of human-software-hardware interaction. The aim of the course is to present, in a monographic way, the issues underlying modern computer graphics systems and the basic fields of its applications, in particular computer games. The following issues are discussed: the structure of the graphic system, modeling of transformations and geometric shapes with dimensions of 2D, 2.5D, 3D, the principles of vector graphics, raster conversion, as well as selected aspects of photorealistic graphics, in particular color modeling, lighting and textures |
| The content of the course: main topics and key ideas | 1. Subject, discipline and application aspects of computer graphics 2. The evolution and contemporary face of computer graphics 3. Digital image parameters. Transformations of objects and/or in ortho-Cartesian space 4. Transformations of objects and/or in ortho-Cartesian space ́ 5. Perspective and parallel projection projections 6. Shape geometry analytical models 7. Curve Modeling 8. Modeling Surfaces and Objects 9. Fractals, as geometric objects with a non-integer dimension 10. Geometric Object Visibility Algorithms 11. Problems of representation of visual information. Texturing operations 12. Modelling of light propagation processes 13. Real-time graphics pipeline 14. The basics of creating shaders 15. Creation of graphic web applications and computer games |
| Didactics methods | Lectures with practical demonstrations, students write programs on computers. |
| Course requirements | Computer laboratory for self-directed learning |
| Literature (basic and supplementary) | 1. Alan Watt, 3D Computer Graphics, 2nd ed. ISBN 0-20-163186-5 . 2. Foley, van Dam, Feiner, and Hughes. Computer Graphics: Principles and Practice, 3rd edition in C. ISBN 02013985590. 3. Hearn and Baker, Computer Graphics, C Version, 2nd ed. ISBN 0-13-530924-7. 4. Angel, Interactive Computer Graphics. ISBN 0-201-85571-2. 5. Woo, Neider, and Davis. OpenGL Programming Guide,, 2nd edition. ISBN 0-201-46138-2. 6. Andrew S. Glassner et. al. ed., Graphics Gems I-V ISBN 0122861663 . 7. Andrew S. Glassner et. al. ed., An Introduction to Ray Tracing ISBN 0122861604. |
| The effects of the education - knowledge - skills - social competences | Knowledge: student has systematic knowledge of methods and techniques of programming with the use of appropriate API libraries of computer graphics, with particular emphasis on 2D and 3D graphics; student has structured knowledge in the field of creating computer graphics for the current state and prospects for the development of computer science in the field of computer graphics  Skills: student can use various communication techniques in the professional environment and in other environments. He uses IT tools. Applies health and safety principles in the work environment, is able to organize work in a way that is safe for themselves and the team.  Social competences: Student can set strategic and operational goals and priorities for the implementation of a task specified by themselves or others. |