

Detailed course description (SUBJECT CARD)

Course title: Development of Computer games

Course code:

Classification of a course group:

Course type: basic / field-related/ general/ **specialty-related***
obligatory / **elective***

Field of study:

Level of study: first-cycle / **second-cycle***

Profile of study: general academic / **practical***

Mode of study: full-time programme / **part-time programme***

Specialty (specialisation):

Year of study: from 2019

Semester: autumn

Teaching modes and teaching hours:

lectures –;
classes –; etc.

Language/s of instruction:

Number of ECTS credits (*according to the study programme*):

* – *leave the appropriate option*

1. Course objectives:

Course aims to familiarize a student with the level design, architecture, programming, AI, Physics, audio integration and other main principles of computer games.

2. Relation of the field-related learning outcomes to modes of teaching and methods of verification as well as to assessment of student's learning outcomes:

symbol	assumed learning outcomes a student who completed the course:	teaching modes	verification methods and learning outcomes assessment
Knowledge: a student knows and understands			
...	How a computer game is organized in the game engine, how it works (mechanics) and how to implement various modern interactivity features	Lectures/hands on practice	Exam, practical task on a computer
...	More indepth knowledge of computer graphic and physics necessary for modern game development	Lectures/hands on practice	Exam, practical task on a computer
...	...		
Skills: a student can			
...	Develop a game	Lectures/hands on practice	Exam, practical task on a computer
...	Develop game "mechanics" (AI, physics, etc.)	Lectures/hands on practice	Exam, practical task on a computer
...	...		
Social competences: a student is prepared to			
...	...		
...	...		
...	...		

3. The content of study programme ensuring learning outcomes (*according to the study programme*):

The content is structure as theory (lecture) and practice (on computer) and separated by the "/" symbol:

- I. *Introductory lecture; Game Planning and Design / Tutorial on the basics of Unity 3D – building your first game*
- II. *Discussion on possible individual tasks (what game would you want to create)*
- III. *Game resource mechanics; Assets and Tools / Tutorial on fundamental scripts*
- IV. *Game architecture & Loop / Game Engines / Tutorial on interactive graphics*
- V. *Graphics pipeline and shaders / Tutorial on shaders*
- VI. *Lighting & Optimization / Tutorial on lights*
- VII. *Individual tasks finalized and set (every student will have to develop a computer game). Individual*

- project development starts.*
- VIII. *Remote consultations (email, skype)*
- IX. *Animation and GUI / Tutorial on Character animation*
- X. *Environment elements, particles and special effects / Tutorial on Interactive particles*
- XI. *Sounds / Tutorial on Interactive sounds*
- XII. *Game physics & Collisions / Tutorial on forces*
- XIII. *"AI" and path-finding in computer games / Tutorial on simple AI and nav meshes*
- XIV. *Individual project development continues*
- XV. *Remote consultations (email, skype)*
- XVI. *Evaluation of individual project and Exam*

4. Description of methods of determination of ECTS credits:

Type of activity	Number of hours / ECTS credits
Number of course hours regardless of a teaching mode	32 „theory“ lectures 32 computer practice
Student's workload(individual project – a proprietary game)	96
Total hours:	160
Number of ECTS credits allocated to a course	6

Explanation:

* – student's workload - fill in the types of activities, e.g. *preparation for a course, interpretation of results, making a course report, preparation for an exam, studying sources, making a project, presentation and report, doing written assignment, etc.*

** – the other e.g. *extra course hours*

5. Summary indexes:

- number of course hours and ECTS credits at the course with a direct participation of academic teachers or other persons running the course and supervising students;
- *160 hrs (6 ECTS)*
- number of course hours and ECTS credits at the course related to the scientific activity conducted at the Silesian University of Technology in a discipline or in disciplines to which a field of study is assigned - in the case of studies with a general academic profile;
- number of course hours and ECTS credits at the course developing practical skills- in the case of practical studies;
- *32 computer practice + 96 student own practice*
- number of course hours conducted by academic teachers employed by the Silesian University of Technology as their primary workplace.
- *32 hrs theory lectures + 32 hrs practical lectures (on computer)*

6. Persons conducting particular modes of courses (name, surname, academic degree or degree in arts, title of professor, business e-mail address):

Prof. Dr. Rytis Maskeliunas

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+37061631389

7. Detailed description of teaching modes:

1) lectures:

- detailed programme's content:
- *The content is structure as theory (lecture) and practice (on computer) and separated by the “/” symbol:*
- *I. Introductory lecture; Game Planning and Design / Tutorial on the basics of Unity 3D – building your first game*

- II. *Discussion on possible individual tasks (what game would you want to create)*
- III. *Game resource mechanics; Assets and Tools / Tutorial on fundamental scripts*
- IV. *Game architecture & Loop / Game Engines / Tutorial on interactive graphics*
- V. *Graphics pipeline and shaders / Tutorial on shaders*
- VI. *Lighting & Optimization / Tutorial on lights*
- VII. *Individual tasks finalized and set (every student will have to develop a computer game). Individual project development starts.*
- VIII. *Remote consultations (email, skype)*
- IX. *Animation and GUI / Tutorial on Character animation*
- X. *Environment elements, particles and special effects / Tutorial on Interactive particles*
- XI. *Sounds / Tutorial on Interactive sounds*
- XII. *Game physics & Collisions / Tutorial on forces*
- XIII. *"AI" and path-finding in computer games / Tutorial on simple AI and nav meshes*
- XIV. *Individual project development continues*
- XV. *Remote consultations (email, skype)*
- XVI. *Evaluation of individual project and Examteaching methods, including distance learning:*
- teaching methods, including distance learning:
 - Slides and live hands on practice in computer room*
 - Also possible to do remote streaming on any platform installed*
 - Remote consultations on skype, email or other media.....*
- form and criteria for semester completion, including retake tests, as well as conditions for admission to the examination:
 - All students must make their own individual project – create their own working game and do the presented practical tasks. Failure of the completion of the above – means no admission for the examination.*
- course organisation and rules of participation in the course, with an indication whether a student's attendance is obligatory
 - Students can work on their own, course provides tutorial materials*

2) description of other teaching modes:

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8. Description of the method for determining the final grade (rules and criteria for evaluation, as well as the final grade calculation method in the case of a course comprising more than one teaching mode, taking into account all teaching modes and all exam dates and credit tests including retake exams and tests):

All students will receive a practical task (to code a game feature) during a defence of a project and also a more difficult one during the exam.

Final grade is composed like so: 50% individual project; 20% practical skills (laboratory works); 30% Exam task.

9. Method and procedure for making up for

- student's absence from the course,
- differences in study programmes for students changing their field of study, changing university or resuming studies at the Silesian University of Technology,

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10. Prerequisites and additional requirements, taking into account the course sequence:

Objective programming, understanding of 3D graphics, c# intermediate

11. Recommended sources and teaching aids:

Dr. Edward Lavieri - Getting Started with Unity 2018 - Third Edition: A Beginner's Guide to 2D and 3D game development with Unity - 2018

Mike Geig - Unity 2018 Game Development in 24 Hours, Sams Teach Yourself (3rd Edition) - 2018
Description of teachers' competences (e.g. publications, professional experience, certificates, trainings etc. related to the programme contents implemented as a part of the course):

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12. Other information:

All course material will be in English language

This course is given to students at Kaunas University of Technology and is one of the most popular free elective module (150+ enrolments per year)

The following my publications directly related to game development and also showcase my collaboration with Silesian university with technology:

- Danevičius, Edvinas; Maskeliūnas, Rytis; Damaševičius, Robertas; Połap, Dawid; Woźniak, Marcin. A soft body physics simulator with computational offloading to the cloud // Information. Basel : MDPI AG. eISSN 2078-2489. 2018, vol. 9, iss. 12, art. no. 318, p. 1-12. DOI: 10.3390/info9120318. [Emerging Sources Citation Index (Web of Science); Scopus; DOAJ]
- Buzys, Rytis; Maskeliūnas, Rytis; Damaševičius, Robertas; Sidekerskienė, Tatjana; Woźniak, Marcin; Wei, Wei. Cloudification of virtual reality gliding simulation game // Information. Basel : MDPI AG. eISSN 2078-2489. 2018, vol. 9, iss. 12, art. no. 293, p. 1-15. DOI: 10.3390/info9120293. [Emerging Sources Citation Index (Web of Science); Scopus; DOAJ]
- Blažauskas, Tomas; Maskeliūnas, Rytis; Bartkute, Reda; Kersiene, Vitalija; Jurkeviciute, Indre; Dubosas, Mindaugas. Virtual reality in education: new ways to learn // Information and software technologies: 23rd international conference, ICIST 2017, Druskininkai, Lithuania, October 12–14, 2017 : proceedings /Robertas Damaševičius, Vilma Mikašytė (Eds.). Cham : Springer, 2017. ISBN 9783319676418. eISBN 9783319676425. p. 457-465. (Communications in computer and information science, ISSN 1865-0929, eISSN 8650-0937 ; vol. 756). DOI: 10.1007/978-3-319-67642-5_38. [Conference Proceedings Citation Index – Science (Web of Science); Scopus]
- Maskeliūnas, Rytis; Blažauskas, Tomas; Damaševičius, Robertas. Depression behavior detection model based on participation in serious games // Rough sets: international joint conference, IJCRS 2017, Olsztyn, Poland, July 3–7, 2017: proceedings / Polkowski L., ... [et al.] (eds). Cham : Springer, 2017. ISBN 9783319608396. eISBN 9783319608402. p. 423-434. (Lecture notes in computer science: Lecture notes in artificial intelligence, ISSN 0302-9743, eISSN 1611-3349 ; vol. 10314). DOI: 10.1007/978-3-319-60840-2_31. [Conference Proceedings Citation Index - Science (Web of Science); Scopus]
- Rutkauskienė, Danguolė; Gudonienė, Daina; Maskeliūnas, Rytis; Blažauskas, Tomas. The gamification model for e-learning participants engagement // Smart innovation, systems and technologies : Smart education and e-learning 2016: [3rd international KES conference on smart education and e-learning, Puerto de la Cruz, Tenerife, Spain, 15–17 June 2016 / editors: Vladimir L. Uskov, Robert J. Howlett, Lakhmi C. Jain. Cham : Springer, 2016. ISBN 9783319396897. eISBN 9783319396903. ISSN 2190-3018. 2016, Vol. 59, p. 291- 301. DOI: 10.1007/978-3-319-39690-3_26. [Conference Proceedings Citation Index - Science (Web of Science) Scopus; SpringerLink]