UNIVERSITY OF GOTHENBURG

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

DIT572 Game Engine Architecture, 7.5 credits

Spelmotorarkitektur, 7,5 högskolepoäng

Second Cycle

Confirmation

This course syllabus was confirmed by Department of Computer Science and Engineering on 2022-02-03 and was last revised on 2022-11-23 to be valid from 2024-01-15, spring semester of 2024.

Field of education: Science 100%
Department: Department of Computer Science and Engineering

Position in the educational system

The course is compulsory within the Game Design & Technology Master's Programme. It is also a single subject course at the University of Gothenburg.

The course can be part of the following programmes: 1) Computer Science, Master's Programme (N2COS), 2) Computer Science, Bachelor's Programme (N1COS) and 3) Game Design & Technology Master's Programme (N2GDT)

Main field of studies	*Specialization*
Interaction Design	A1F, Second cycle, has second-cycle course/s as entry requirements
Computer Science-Interaction Design	A1F, Second cycle, has second-cycle course/s as entry requirements

Entry requirements

To be eligible for this course, students must have either:

- successfully completed the course Computer Graphics, 7.5 credits, or equivalent, or
- have 15 credits of programming experience, of which 7.5 of those credits should be in an object-oriented context.

Applicants must prove knowledge of English: English 6/English B or the equivalent level of an internationally recognized test, for example TOEFL, IELTS.

Learning outcomes

After completion of the course the student should be able to:

Knowledge and understanding

- Describe the typical structure of game engines and the design decisions associated with specific parts of such engines

Competence and skills

- Develop extensions to an example game engine to augment and optimise functionality
- Identify faults and deficiencies in an example game engine, and outline solutions for those faults

Judgement and approach

- Compare and contrast existing game engines to determine functionality and extendibility
- Plan several parallel extensions of an example game engine to meet game related goals

Course content

The design and implementation of the fundamental components of a game engine is the core of the Game Engine Architecture course. The course focuses mainly upon 2-dimensional engines although other types of game engines are discussed, and students wishing to explore 3D game engines can do so as part of the assignment.

During the course we will go over the development and construction of our own game engine. This engine (called Shard) is specific to this course, and is thus fully open to expansions and modifications. During the course students will take the source code of Shard and improve upon it to address perceived inadequacies and develop new functionality. They will also build an example game that makes use of their modified engine to deliver a representative game experience.

The course will cover timing regulation, game object architecture, collision action, collision responses, and some simple physics. It will also discuss relevant design decisions and design patterns. It is not expected during this course that you will develop a feasible competitor for what is on the market. Rather, the process of exploring and expanding a bespoke game engine is intended to be illuminating for those developing games in more robust engines.

Sub-courses

1. **Project** *(Projekt),* 7.5 credits

Grading scale: Pass with distinction (5), Pass with credit (4), Pass (3) and Fail (U)

Form of teaching

The course is based on a series of technical teardowns and a project within the field of game engine development. This is complemented by lectures and project supervision sessions. The work in the project takes place as supervised groups or individuals with the goal of providing practical training in the development and evaluation of game engines.

Language of instruction: English

Assessment

The course is graded by two technical artefacts (a modified game engine and an example game) along with an oral presentation. The overall grade for the course comes from a weighted average of these elements.

If a student, who has failed the same examined component twice, wishes to change examiner before the next examination, a written application shall be sent to the department responsible for the course and shall be granted unless there are special reasons to the contrary (Chapter 6, Section 22 of Higher Education Ordinance).

In cases where a course has been discontinued or has undergone major changes, the student shall normally be guaranteed at least three examination occasions (including the ordinary examination) during a period of at least one year from the last time the course was given.

Grades

The grading scale comprises: Pass with distinction (5), Pass with credit (4), Pass (3) and Fail (U).
The final grade is based on the weighted average grade of the submissions.

Course evaluation

The course is evaluated through meeting after the course between teachers and student representatives. Further, an anonymous questionnaire is used to ensure written information. The outcome of the evaluations serves to improve the course by indicating which parts could be added, improved, changed or removed.

Additional information

The course is a joint course together with Chalmers.

Course literature to be announced the latest 8 weeks prior to the start of the course.

The course replaces the course DIT455, 7.5 credits. The course cannot be included in a degree which contains DIT455. Neither can the course be included in a degree which is based on another degree in which the course DIT455 is included.