Fundamental Computer Graphics

Grundläggande datorgrafik
6 credits

Programme course

TSBK11

Valid from: 2026 Spring semester

Determined by	**Main field of study**	
Board of Studies for Computer Science and Media Technology	Computer Science and Engineering	
Date determined	**Course level**	**Progressive specialisation**
2025-08-28	First cycle	G2F
Revised by	**Disciplinary domain**	
	Technology	
Revision date	**Subject group**	
	Computer Technology	
Offered first time	**Offered for the last time**	
Spring semester 2023		
Department	**Replaced by**	
Institutionen för systemteknik		

Specific information

The course can not be included in degree together with TSBK07.

Course offered for

- Bachelor of Science in Computer Engineering

Prerequisites

Linear algebra. Programming knowledge.

Intended learning outcomes

After completing the course, the student should be able to:

- Goal 1: describe the calculation models used in computer graphics for how a synthetic scene is built.
- Goal 2: construct synthetic three-dimensional scenes and generate images and animations of these.
- Goal 3: based on this knowledge, design and implement interactive 3D graphics like simpler virtual worlds, 3D games etc.
- Goal 4: implement shader programs (programming of graphics processors).

Course content

The course describes the principles and methods for computer generation of synthetic images, animations and interactive graphics applications.

Real-time animation with OpenGL 3.2 (or higher version if needed) including shader programming with GLSL. ulkan can be used as a more advanced option.

Three-dimensional graphics: geometric transformations, projection, perspective.

Object representation. Light models and shading, Gouraud and Phong shading. Texture mapping. Visible surface detection. Frustum culling, billboards. Animation, basic collision detection.

Teaching and working methods

Lectures, lab exercises and a project. The lecture series can be followed on Campus Valla but is also recorded in an older version.

The course runs over the entire spring semester.

Examination

TEN1	Written examination	2 credits	U, 3, 4, 5
LAB1	Laboratory work	2 credits	U, G
PRA1	Project, oral and written examination	2 credits	U, G

The laboratory course comprises assignments that should be solved and presented in the lab.

Grades for examination modules are decided in accordance with the assessment criteria presented at the start of the course.

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

About teaching and examination language

The teaching language is presented in the Overview tab for each course. The examination language relates to the teaching language as follows:

- If teaching language is “Swedish”, the course as a whole could be given in Swedish, or partly in English. Examination language is Swedish, but parts of the examination can be in English.
- If teaching language is “English”, the course as a whole is taught in English. Examination language is English.
- If teaching language is “Swedish/English”, the course as a whole will be taught in English if students without prior knowledge of the Swedish language participate. Examination language is Swedish or English depending on teaching language.

Other

The course is conducted in such a way that there are equal opportunities with regard to sex, transgender identity or expression, ethnicity, religion or other belief, disability, sexual orientation and age.

The planning and implementation of a course should correspond to the course syllabus. The course evaluation should therefore be conducted with the course syllabus as a starting point.

The course is campus-based at the location specified for the course, unless otherwise stated under “Teaching and working methods”. Please note, in a campus-based course occasional remote sessions could be included.