



## Course syllabus

Faculty of Technology

NO VALUE DEFINED

1DV800 Datorgrafik, 7,5 högskolepoäng

Computer Graphics, 7.5 credits

### **Main field of study**

Computer Science

### **Subject Group**

Informatics/Computer and Systems Sciences

### **Level of classification**

First Level

### **Progression**

G1F

### **Date of Ratification**

Approved 2014-10-03

Revised 2018-06-08 by Faculty of Technology. Assessment methods are changed.

The course syllabus is valid from autumn semester 2018

### **Prerequisites**

Programming and Data Structures 7.5 credits (1DV507), and Vector Geometry 7.5 credits (1MA403) or equivalent.

## Objectives

Upon completion of the course, the student should:

- characterize all aspects of the computer graphics pipeline, i.e., the various steps and algorithms that occur from a geometric 3D object specification to the rendering of a corresponding 2D display image
- describe and implement rasterization algorithms for basic output primitives
- be able to perform and implement geometric, camera, projection and viewport transformations
- describe and implement different types of object representations
- explain various algorithms for identifying visible surfaces
- define basic color models typically used in computer graphics
- explain local illumination models
- implement basic 2D graphics solutions by using OpenGL

## Content

This course offers an introduction into the most important theoretical and practical aspects of computer graphics. We provide foundations such as illumination or color models as well as discuss basic techniques and algorithms used in 2D and 3D graphics. The content is exercised and deepened in context of theoretical and practical lab assignments by using OpenGL.

In more detail, the course covers:

- graphical equipment incl. display and interaction devices
- 2D output primitives and their rasterization
- filling algorithms and antialiasing
- 3D object representations
- geometric transformations
- camera, projection and viewport transformations
- visibility and clipping algorithms
- color models
- lighting and shading, especially local illumination
- introduction to OpenGL as part of the practical exercises

## Type of Instruction

Teaching consists of lectures, self-studies, exercises and/or practical work. All assignments are carried out individually or in fixed groups of two.

## Examination

The course is assessed with the grades A, B, C, D, E, Fx or F.

The grade A constitutes the highest grade on the scale and the remaining grades follow in descending order where the grade E is the lowest grade on the scale that will result in a pass. The grade F means that the student's performance is assessed as fail (i.e. received the grade F).

Written examination and/or assignments which are presented orally and/or in written form. The assessment method is decided at the start of the course.

Students who do not pass the regular examination are given the opportunity to do a resit examination shortly after the regular examination.

## Course Evaluation

During the course or in close connection to the course, a course evaluation is to be carried out. The result and analysis of the course evaluation are to be communicated to the students who have taken the course and to the students who are to participate in the course the next time it is offered. The course evaluation is carried out anonymously. The compiled report will be filed at the Faculty.

## Credit Overlap

The course cannot be included in a degree along with the following courses of which the content fully, or partly, corresponds to the content of this course: 1DV300 Computer Graphics, 7.5 credits

## Other

Grade criteria for the A–F scale are communicated to the student through a special document. The student is to be informed about the grade criteria for the course by the start of the course at the latest.

## Required Reading and Additional Study Material

### Required reading

Hearn, D. D., Baker, P., and Carithers, W., Computer Graphics with OpenGL, 4th Ed., Pearson, 2010. Pages 450 (812).

DV, Distributed material. Pages 310 (310).