Technology
Arts Sciences
TH Köln

Course Manual CG

Computer Graphics

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General information

Long name	Computer Graphics
Approving CModule	CG_BaMT, CG_BaTIN
Responsible	Prof. Dr.-Ing. Arnulph Fuhrmann Professor Fakultät IME
Valid from	summer semester 2022
Level	Bachelor
Semester in the year	summer semester
Duration	Semester
Hours in self-study	78
ECTS	5
Professors	Prof. Dr.-Ing. Arnulph Fuhrmann Professor Fakultät IME
Requirements	Programming Mathematics 1 and 2
Language	German
Separate final exam	Yes

Literature

P. Shirley, S. Marschner: Fundamentals of Computer Graphics, AK Peters, 2016

T. Akenine-Möller, et al.: Real-Time Rendering, Taylor & Francis Ltd., 2018

R. Rost, B. Licea-Kane: OpenGL Shading Language, Addison-Wesley, 2010

Final exam

Details	Students must demonstrate the following competences in a written examination: - mastering the concepts of CG (proven by answering questions on these concepts) - applying the mathematical basis of computer graphics (proven by arithmetic tasks) - developing computer graphics applications (proven by developing short programs to solve CG problems)
Minimum standard	At least 50% of the total number of points.

Exam Type	EN Klausur

− Lecture / Exercises

Learning goals

Goal type	Description
Knowledge	Geometric Modeling Polygonal meshes subdivisional surfaces
Knowledge	Transformations coordinate systems fundamental transformations projections
Knowledge	Graphics Hardware raster displays video cards input devices
Knowledge	Rendering Pipeline rasterization clipping shading visibilty shader programming
Knowledge	Local reflection models light sources reflection transparency BRDFs
Knowledge	Textures texture mapping generation of texture coordinates filtering normal maps environment maps displacement maps
Knowledge	Global illumination rendering equation raytracing spatial data structures shadows
Skills	- Comparison of different reflection models - Decide which method is suitable to solve a particular problem of computer graphics

Special requirements

none

Accompanying material	electronic lecture slides
Separate exam	No

Expenditure classroom teaching

Type	Attendance (h/Wk.)

Lecture	2
Tutorial (voluntary)	1

− Practical training

Learning goals

Goal type	Description
Skills	- Developing computer graphics applications - Create interactive 3D programs - Using a 3D API - Applying the mathematical basis of Computer Graphics - Applying the fundamental algorithms of Computer Graphics - Testing and debugging of own applications - Capturing and understanding textual instructions

Expenditure classroom teaching

Type	Attendance (h/Wk.)
Practical training	2
Tutorial (voluntary)	1

Special requirements

none

Accompanying material	electronic laboratory exercises
Separate exam	Yes

Separate exam

Exam Type	EN praxisnahes Szenario bearbeiten (z.B. im Praktikum)
Details	Development of different 3D applications with tasks to the topics of the lecture. During the laboratory the students work on the tasks with the help of the lecturer. Afterwards the independent completion takes place in self-study.
Minimum standard	More than 80% of all exercises submitted. A task is deemed to have been completed if it has been solved predominantly and independently.