

Image Processing and Computer Graphics
Computer Graphics

Matthias Teschner

Computer Science Department
University of Freiburg

Albert-Ludwigs-Universität Freiburg

**UNI
FREIBURG**

Outline

- organization
- research of the graphics group
- rendering pipeline

Organization

- class
 - 082 006: Monday 10-12, Tuesday 10-12
 - Prof. Matthias Teschner
- exercises
 - 082 021, 028, 029: Tuesday 10-12
 - Mostafa Morsy
- check web page for the exact schedule
 - <http://cg.informatik.uni-freiburg.de/teaching.htm>
- two parts
 - image processing
 - computer graphics (starts on Dec 5)

Contact

- Prof. Matthias Teschner
 - teschner@informatik.uni-freiburg.de
 - 052 / 01-005
- Mostafa Morsy
 - eng.m.m.a.morsy@gmail.com

Exercises / Exam

- exercises
 - Jan 10, Jan 17, Jan 24
 - practical exercises
 - check web page for information
 - processing is optional, but recommended
 - use of the provided source code is optional
- exam
 - written exam
 - test exam

Course Goals

- introduction to the fundamentals of rasterization-based image generation
- functionality of the graphics rendering pipeline
- advanced rendering effects
- introduction to the OpenGL graphics API
- requirements
 - C / C++
 - basics in linear algebra

Slide Sets

- slide sets, exercises and solutions on <http://cg.informatik.uni-freiburg.de/teaching.htm>

Material

- T. Akenine-Möller, E. Haines:
Real-time Rendering
A. K. Peters Ltd.,
<http://www.realtimerendering.com>



Further Readings

- D. F. Rogers:
Procedural Elements of Computer Graphics
McGraw-Hill, 1997
- A. Watt: **3D Computer Graphics**
Addison-Wesley, 1999
- J. Foley, A. van Dam, S. Feiner, J. Hughes:
Computer Graphics – Principles and Practice
Addison-Wesley, 1990
- J. Encarnacao, W. Strasser, R. Klein:
Graphische Datenverarbeitung
Oldenburg Verlag, 1996

Syllabus

- Dec 5 - Rendering Pipeline
- Dec 6 - OpenGL
- Dec 12 - Transformations
- Dec 13 - Projections
- Dec 19, 20 - Lighting
- Jan 9 - Rasterization
- Jan 10 - *Exercise*
- Jan 16 - Shadows
- Jan 17 - *Exercise*
- Jan 23 - Texturing
- Jan 24 - *Exercise*
- Jan 30 - Transparency, Reflection
- Feb 7 - Evaluation, Q & A

Course Information

- key course
 - pattern recognition and computer graphics (rasterization-based rendering)
- specialization courses
 - advanced computer graphics (ray tracing)
 - simulation in computer graphics (e.g., fluids)
- master project, lab course, Master thesis
 - two tracks: simulation, rendering

Seminars / Projects / Theses in Graphics

Semester	Simulation Track	Rendering Track
Winter	Rasterization Course Simulation Course	Rasterization Course
Summer	Lab Course - simple fluid solver Simulation Seminar	Raytracing Course Lab Course - simple raytracer
Winter	Master Project - PPE fluid solver	Master Project - Monte Carlo raytracer Rendering Seminar
Summer	Master Thesis - research-oriented topic	Master Thesis - research-oriented topic