COMP410/510
Computer Graphics
Spring 2023 Syllabus

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Course Description and Objectives

This course aims to introduce theoretical and practical aspects of 3D computer graphics, with an emphasis on applications programming. After the course, students will be able to design and implement basic 3D interactive graphics applications.Topics include graphics systems and models; geometric representations and transformations; graphics programming; input and interaction; viewing and projections; compositing and blending; illumination and color models; shading; texture mapping; animation; rendering and implementation; hierarchical and object-oriented modeling; scene graphs; 3D modeling.

Course Prerequisites

Ability to write application programs in C or C++. Familiarity with data structures and matrix algebra.

Course Webpage

We will use Blackboard (https://ku.blackboard.com). Follow the course web page closely to catch up with reading assignments, homeworks, exams, projects and any other course related announcements.

Lectures

Monday & Wednesday 16:00-17:15, SNA-158

Textbook

No mandatory textbooks, but we will mostly be following the material of the following books. Students are expected to do the reading that will be assigned from these references:

Edward Angel, *Interactive Computer Graphics*: A Top-Down Approach With OpenGL, Addison-Wesley, 6th edition.

OpenGL Programming Guide, 8th edition, The Official Guide to Learning OpenGL, The Khronos OpenGL ARB Working Group.

Topics to be covered (tentative)

- Graphics systems and models
- Graphics pipeline
- Programming with Shader-based OpenGL
- Input and interaction
- Geometric objects and transformations
- Viewing & Projection
- Shading
- Building 3D models
- Buffers & Texture mapping
- Rasterization
- Hierachical and object-oriented modeling; scene graphs

Grading

There will be a single *exam* towards the end of the semester.

Homeworks will be given in a regular basis and will involve programming assignments in C/C++/OpenGL.

Quiz assignments will be given via Blackboard to get you prepared with the exam.

An important part of the course is the *term project*. By the end of the first month of the semester, each student will have chosen a topic for her/his project. Projects can be either research oriented or applications programming oriented, addressing one of the computer graphics problems/concepts/applications covered throughout the course. Depending on the chosen topic, students may be expected to do a literature survey on different techniques aiming at solving the specified problem and then to implement and test one of these techniques. A software implementation is mandatory, using C/C++/OpenGL or Java3D or similar graphics APIs.

There will be no final exam, but instead a project presentation and report will be required. In order to pass the course, in addition to midterm and term project, **students will be required to fulfill at least 50% of the homework grade total**.

Final grades will be composed of: (tentative)	
Homeworks	35%
Exam & Quizzes	30%
Project	35%

All code and documentation submitted in exams, assignments and projects must be your own work. In programming assignments, you can exchange ideas, but you should not ever share your code, even partly.

Enjoy the course!