



Course Syllabus: Computer Graphics - CS 248

Division	Computer, Electrical and Mathematical Sciences & Engineering
Course Number	CS 248
Course Title	Computer Graphics
Academic Semester	Fall
Academic Year	2018/2019
Semester Start Date	08/26/2018
Semester End Date	12/11/2018
Class Schedule (Days & Time)	02:30 PM - 04:00 PM Mon Thu

Instructor(s)				
Name	Email	Phone	Office Location	Office Hours
Peter Wonka	Peter.Wonka@kaust.edu.sa	+966128080235		flexible, please make an appointment via email

Teaching Assistant(s)	
Name	Email
TBD	TBD

Course Information	
Comprehensive Course Description	The first part of the course teaches the fundamentals of computer graphics: basic linear algebra, data structures for 3D meshes, three-dimensional transformations, three-dimensional viewing, projection, interpolation, rasterization, and shading. The second part of the course teaches selected advanced topics of computer graphics, e.g. ray tracing, global illumination, texture synthesis, geometry, ...
Course Description from Program Guide	Basic topics: linear algebra for computer graphics, 2D and 3D transformations, mesh data structures, viewing and camera models, local shading models, texturing, shader programming. Advanced topics: color, radiometry, real-time rendering, bump mapping, environment mapping, bounding volumes, hierarchical data structures, collision detection, parametric curves, ray tracing, photon mapping, path tracing, anti-aliasing, reaction-diffusion, scanning, normal estimation, ransac, quaternions, displays.
Goals and Objectives	There are three main learning objectives: learning the fundamentals of computer graphics; learning to program computer graphics algorithms; learning the mathematics behind computer graphics;
Required Knowledge	Linear algebra and calculus; programming; writing medium sized programs in C++ (500 - 2000 lines of code);
Reference Texts	Fundamentals of Computer Graphics, Shirley et al.
Method of evaluation	90.00% - Course Project(s) 10.00% - Homework /Assignments
Nature of the assignments	5 projects are the core of the course. The project together are 90% of the grade. The remaining 10% are various smaller homework assignments, e.g. reading book chapters, reading articles, small homework problems, ...
Course Policies	Late assignments will receive a grade penalty.
Additional Information	A more detailed syllabus will be presented in the first class

Tentative Course Schedule

(Time, topic/emphasis & resources)

Week	Lectures	Topic
1	Mon 08/27/2018 Thu 08/30/2018	Applications
2	Mon 09/03/2018 Thu 09/06/2018	Linear Algebra Review
3	Mon 09/10/2018 Thu 09/13/2018	2D Transformations
4	Mon 09/17/2018 Thu 09/20/2018	3D Transformations
5	Mon 09/24/2018 Thu 09/27/2018	Quaternions, Perspective Projection
6	Mon 10/01/2018 Thu 10/04/2018	Mesh data structures
7	Mon 10/08/2018 Thu 10/11/2018	Shader programming and local shading models
8	Mon 10/15/2018 Thu 10/18/2018	Ray Tracing
9	Mon 10/22/2018 Thu 10/25/2018	Global Illumination
10	Mon 10/29/2018 Thu 11/01/2018	Reaction-Diffusion
11	Mon 11/05/2018 Thu 11/08/2018	Texture Synthesis
12	Mon 11/12/2018 Thu 11/15/2018	Scanning and Ransac
13	Mon 11/19/2018 Thu 11/22/2018	Radiometry
14	Mon 11/26/2018 Thu 11/29/2018	Special Topics
15	Mon 12/03/2018 Thu 12/06/2018	Special Topics
16	Mon 12/10/2018	
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Note

The instructor reserves the right to make changes to this syllabus as necessary.