Welcome!
What is NOT this Course
So, What is this Course is about
Mechanics
Lectures
Labs
Resources
Schedule

Computer Graphics

Lecture - 01

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   - Course Description
   - Course Syllabus
2. What is NOT this Course
   - Adobe Photoshop
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3. So, What is this Course is about
   - Mathematics for Computer Graphics
   - Theory
   - Practice
4. Mechanics
   - Rules

- Guidelines
- Recipe for Success - If God Wishes

5 Lectures
- PLs, Tools, Libraries, and Frameworks

6 Labs
- Unity 3D
- Microsoft CSharp

7 Resources
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Objectives

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Computer Graphics

Computer Graphics

- **Course Code** IS223P

Computer Graphics

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- **Core / Elective** Core

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  - **Lab** 2

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  - **TOT** 3

Course Description

Offers an introduction to Computer Graphics, which has become an increasingly important area within computer science. Computer Graphics, particularly in association with multimedia aspects of the World-Wide Web, have opened up exciting new possibilities for the design of human computer interfaces

Course Syllabus - 01

- **Graphic Systems**
  - Raster and Vector Graphics Systems
  - Video Display Devices
  - Physical and Logical Input Devices
  - Issues facing the developer of Graphical Systems

Course Syllabus - 02

- **Fundamental Techniques in Graphics**
  - Hierarchy of Graphics Software
  - Using a Graphics API
  - Simple Color Models
  - Homogeneous Coordinates
  - Affine Transformations
  - Viewing Transformations
  - Clipping

Course Syllabus - 03

- **Graphical Algorithms**
  - Line Generation Algorithms
  - Structure and use of Fonts
  - Parametric Polynomial Curves and Surfaces
  - Polygonal Representation of 3D Objects
  - Introduction to Ray Tracing
  - Image Synthesis
  - Sampling Techniques
  - Anti-Aliasing

Course Syllabus - 04

- **Principles of Human-Computer Interaction**
  - Human-Centered Software Development and Evaluation

Course Syllabus - 05

- **Graphical-User Interface Design**
  - Choosing Interaction Styles and Interaction Techniques
  - HCI Aspects of Interface Design
  - Dynamics of Color
  - Structuring a View for Effective Understanding

Course Syllabus - 06

- **Graphical User Interface Programming**
  - Graphical Widgets
  - Event Management and User Interaction
  - GUI Builders and Programming Environments

Course Syllabus - 07

- **Computer Animation**
  - Key-frame Animation
  - Camera Animation
  - Scripting System
  - Animation of Articulated Structures
  - Motion Capture
  - Procedural Animation
  - Deformation

Course Syllabus - 08

- **Multimedia Techniques**
  - Sound, Video, and Graphics
  - Design of Multimedia Systems
  - Tools for Multimedia Development

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Mathematics for Computer Graphics

- Algebra and Trigonometry
- Linear Algebra
- Calculus
- Differential Geometry
- Numerical Methods
- Sampling Theory and Signal Processing
- Matrix Equations
- Physics
- Numerical Solutions of Differential Equations
- Optimization
- Probability and Statistics
- Computational Geometry

Theory

- Computer Graphics History and Evolution
- Making sense of Mathematics in Computer Graphics
- Basic Image Processing
- Image Compression
- etc.

Programming

Programming

- Lots of Programming!

Programming

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- Little GUI

Programming

- Lots of Programming!
- Little GUI
- Mainly Game Programming
  - Low Level (Pixel Level)
  - Graphics Libraries
  - Desktop and Web
  - Game Engines

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- Clearly, we need to follow some rules
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Rules to Follow..

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  - Do Not Disturb the Lecture
  - No Deliverable Timelines Excuses
  - No Exam / Assignments / Quizzes Retake
  - Avoid troubles with TAs; Talk to me

Guidelines to Follow..

- Eventually, you will find those guidelines useful
- Hopefully before the final exam
- Based on previous situations, experience

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  - Do Not Follow False Hope

Recipe for Success - If God Wishes

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- Run the Code Samples

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- Try to Modify the Code, and test your knowledge

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- Attend the Weekly Online Quiz

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- Do Not Pass Deadlines - ALL of Them

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PLs, Tools, Libraries, and Frameworks

- All are Necessary
- All were chosen for a Reason
- Not all of them included / covered in the Book
  - Makes Book size huge
  - Tough to Document the Steps
  - Must break down the step sequence into separate pages

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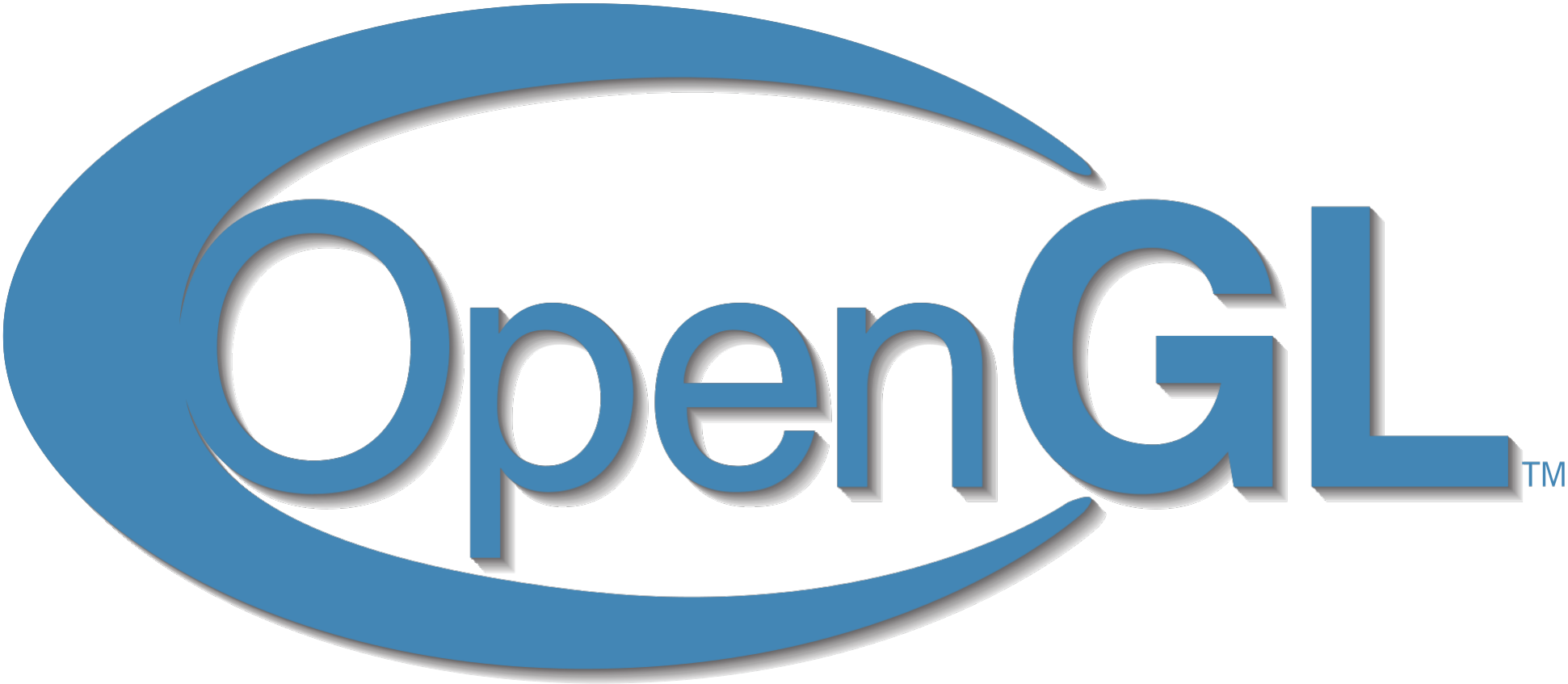
  - Must break down the step sequence into separate pages
  - However, we did our Best!

GIMP


OpenGL
TM

Visual Studio®
TM

GitHub

python™

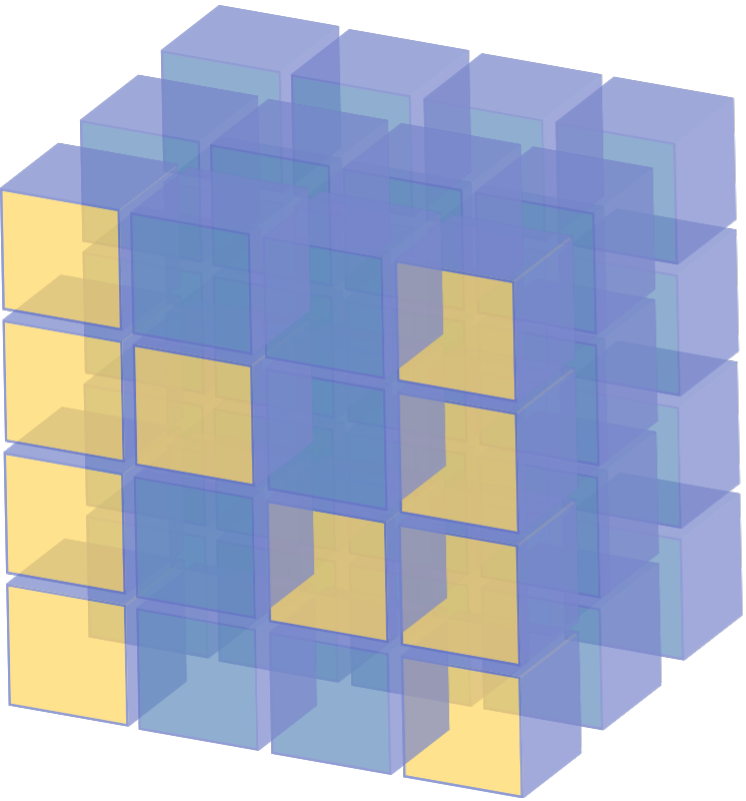
ANACONDA®

pygame

HTML

WebGL
TM

jupyter



NumPy

OpenCV

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unity

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Telegram Channel for Announcements and News

https://bit.ly/2UQKJ5B

Github

https://www.github.com/helghareeb/gfx19

Book Tour

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Lectures' Topics

- Welcome! - 1 Lecture
- Computer Graphics / Interactive Computer Graphics - 1 Lecture
- Mathematics for Computer Graphics - 1 Lecture
- Arcade 2D Game Programming in Python - 3 Lectures
- OpenGL 2D in C++ - 1 Lectures
- OpenGL 2D / 3D in Python - 1 Lecture
- Image Compression - 2 Lectures
- HCI and Computer Vision - 1 Lecture
- Image Processing in Python - 1 Lecture
- Computer Vision in Python - 1 Lecture