CPIT-285 Syllabus

Catalog Description

CPIT-285 Computer Graphics
Credit: 3 (Theory: 3, Lab: 0, Practical: 1)
Prerequisite: CPCS-204
Classification: Department Required

The objective of this course is to study the hardware and software principles of interactive raster graphics. Topics include an introduction to the basic concepts of computer graphics, vector and pixel displaying system, basic computer graphics techniques, graphical software, the use of API(s) for computer graphics, color models, coordinates homogeneous, transformation, rotation, clipping, representation of objects through polygons, two-dimensional and three-dimensional computer graphics techniques, coordinate transformations, drawing curves and surfaces, shading and lighting models, graphics devices, animation techniques, ray tracing, and the design and drawing of two-dimensional and three-dimensional graphics objects in OpenGL in C++.

Class Schedule

Meet 50 minutes 3 times/week or 80 minutes 2 times/week

Lab/Tutorial 90 minutes 1 times/week

Textbook

Donald Hearn, M. Pauline Baker, Warren R. Carithers, , "Computer Graphics with OpenGL", Pearson College Division; 4 edition (2011)

ISBN-13 9780136053583 **ISBN-10** 0136053580

Grade Distribution

Week	Assessment	Grade %
1	Graded Lab Work	5
3	Homework Assignments 1	5
5	Exam 1	15
5	Homework Assignments 2	5
7	Homework Assignments 3	5
10	Exam 2	15
15	Group Project	20
16	Exam	30

Last Articulated

April 12, 2018

Relationship to Student Outcomes

a	b	c	d	e	f	g	h	i	j	k	l	m	n
x		x						x					

Course Learning Outcomes (CLO)

By completion of the course the students should be able to

1. Describe graphical system history, basic components, applications, graphical architecture and programmable pipelines. (i)
2. Identify the structure and function of application programmer's interface API using OpenGL. (c)
3. Apply graphics primitives, attributes, color, viewing and control functions using OpenGL to develop simple 2D and 3D graphics. (c)
4. **Apply event-driven input programming, and animation using input devices, interaction, client server and display lists with OpenGl (c)**
5. Apply interactive program using picking and rubberbanding. (c)
6. Apply basic geometric transformations: affine transformations (translation, rotation, scaling, shear), homogeneous coordinates, concatenation, current transformation and matrix stacks to simple 2D objects. (a)
7. **Design 3D models using vertex array and applying coordinate transformations including translation rotation, scaling, shearing, and reflection with OpenGl in C++. (c)**
8. Identify different classical and computer views. (c)
9. **Perform the perspective and orthographic projections on points and scenes in three-dimensional space. (c)**
10. **Apply 2D and 3D viewing and rendering process. (c)**
11. Identify the roles played by color, lighting, and material parameters in the progression of increasingly sophisticated shading models - at, smooth, Gouraud, Phong, ray-tracing, radiosity, and photon-mapping (c)
12. Apply light and shading to simple 3D objects (c)
13. Implement variety of transformations used in texture mapping to identify a point in texture space with a point in world coordinate space. (c)
14. Integrate light and texture to 3D objects (c)
15. Discuss the mathematics underlying two- and three-dimensional interpolating curves and surfaces (a)
16. **Design and implement a graphical project in groups in order to show integrating spatial reasoning and problem-solving, demonstrating an ethical behavior toward software copyrights and relationship emphasis a successful with other students (i)**

CPIT-285 Syllabus

Topics Coverage Durations

Topics	Weeks
Introduction to Computer Graphics	1
Graphic System	2
Introduction to OpenGL	1
Graphics primitives	1
Input and Interaction and Animation	3
Geometric Transformation	3
Viewing	1
Rendering	2

Coordinator(s)

Dr. Wafaa Shalash, Assistant Professor