

# **School of Information Technology International Business College**

7 Greenfield Parade  
Bankstown 2200 NSW Australia

## **Computer Graphics with OpenGL**

**Subject Coordinator and Lecturer:** Professor Minh Hung Le

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### **Aim of Unit:**

In the last few years, Computer Graphics have become increasingly important for a variety of fields, from movie making to medical imaging. This unit covers concepts in computer graphics including interactive graphics, visual realism, graphics hardware, scene rendering, graphics primitives, geometric transformations, visible surface determination, illumination and shading, color specification, viewing in 3D, modeling and animation. Students will learn to create and manipulate 3-dimensional computer graphics using the programming language, C++ and the library of graphics functions known as OpenGL. OpenGL is a cross-platform set of functions that is increasingly used as a standard for creating computer graphics.

### **Unit Outline:**

- Describe graphics systems, models.
- Explain OpenGL in programming.
- Demonstrate 2D, 3D graphics systems and animating 3D objects.
- Illustrate the rendering and viewing techniques of 3D objects.
- Express Geometric Objects and Transformations.
- Explain Discrete Techniques.
- Describe Programmable Shaders.

**Mode of Delivery:**

Two hours lecture per week.  
One hour tutorial per week.  
Two hours practical per week.

**Unit Assessment:**

Assignment – OpenGL/C++	30 %
Mid-Semester Test	10 %
Final Examination	60 %

**Assessment Requirements:**

Students must receive 50% or more for each part of Unit Assessment in order to pass the subject.

**Student Workload:**

Students will have 5 hours per week face-to-face learning during semester.  
Students are expected to work at least 5 hours per week out of class.

**Text Book:**

1. Edward Angel, "Interactive Computer Graphics: A Top-Down Approach Using OpenGL", 4<sup>th</sup> edition, Addison-Wesley, 2006

**Recommended References:**

1. Shreiner, Woo, Neider, Davis, "OpenGL Programming Guide: The Official Guide to Learning OpenGL", Version 1.4, 4<sup>th</sup> edition, Addison-Wesley, 2004
2. Dave Astle, Kevin Hawkins, "Beginning OpenGL Game Programming", Thomson Course Technology, 2004
3. Donald Hearn, M. Pauline Baker, "Computer Graphics with OpenGL", 3<sup>rd</sup> edition, Prentice Hall, 2004
4. Alan Watt, "3D Computer Graphics", 3<sup>rd</sup> edition, Addison-Wesley, 2000

## Subject Schedule

<b>Weeks</b>	<b>Lecture/Tutorial Topics</b>	<b>Assignments/ Laboratories</b>	<b>Reading from Text Book</b>
1	Graphics Systems and Models	Assignment OpenGL Tutorial #1	Chapter 1
2	Graphics Programming	Tutorial #2	Chapter 2
3	Input and Interaction	Tutorial #3	Chapter 3
4	Geometric Objects and Transformations	Tutorial #4	Chapter 4
5	Viewing	Tutorial #5	Chapter 5
6	Shading	Tutorial #6	Chapter 6
7	<b>Mid-Semester Test</b>		
8	From Vertices to Fragments	Tutorial #7	Chapter 7
9	Discrete Techniques	Tutorial #8	Chapter 8
10	Programmable Shaders	Tutorial #9	Chapters 9
11	Modeling	Tutorial #10	Chapter 10
12	Curves and Surfaces, Advanced Rendering	<b>Assignment Due</b> Tutorials #11,#12	Chapters 11,12
13	Revision		
14	<b>Final Examination</b>		