SUBJECT DESCRIPTION FORM

Subject title: Computer Image Generation and Applications

Subject code: COMP5514

Credit value: 3

Pre-requisite: (Subject title and code no, if any)

> Nil

Recommended background knowledge:

> Basic knowledge in Programming

Mutual exclusions: Computer Image Generation and Applications (COMP523)

Learning approach:

> 42 hours of class activities including - lecture, tutorial, lab, workshop seminar where applicable.
>
> Lectures supplemented with tutorials and small projects

Assessment:

Continuous Assessment	45%
Test, and Examination	55%

Objectives:

1. To learn some fundamental techniques in Computer Graphics;
2. To learn the basic concepts and algorithms in Image Processing; and
3. To understand some of the important applications of Computer Graphics and Image Processing.

Learning outcomes:

After completing this subject, students should be able to:

> 1. design interesting and interactive graphics;

The Department reserves the right to update the syllabus contents. Please note that the learning approach for the same subject could vary slightly due to different delivery modes.

2. get familiar with OpenGL or other graphics related programming languages for software development;
3. understand the relationship between computer graphics and image processing; and
4. apply visual information technology to various applications.

Keyword Syllabus:

Basic Computer Graphics Techniques
Pixels, frame buffers, input/output devices, 2D primitive drawing, 2D transformation, 3D transformation, 3D projection, Clipping, Object modeling.

Image Generation Techniques
The three image generation techniques: polygon scan-conversion, ray-tracing and radiosity. Realistic image generation techniques including shading, anti-aliasing, depth cueing and texture mapping. Computer animation.

Basic Concepts in Image Processing
Digital image acquisition and representation, basic techniques and algorithms for image enhancement, image feature extraction, representation and classification.

Computer Graphics and Image Processing Applications
Window systems and a brief introduction to X11. Image Processing including image editing and morphing. Virtual Reality including techniques and applications. Multimedia.

Indicative reading list and references:

Angel, 2004, *Interactive Computer Graphics: A Top-Down Approach Using OpenGL*, 4th Ed., Addison Wesley
Hearn and Baker, 2003, *Computer Graphics with OpenGL*, 3rd Ed., Pretince Hall.
Watt Policarpo, 2005, *The Computer Image*, Addison Wesley.
Fisher, Y., Ed., 1995, *Fraetal Image Compression*, Springer-Verlag.
Foley, J., Dam, A. van, Feiner, S. and Huges, J., 1990, *Computer Graphics: Principles and Practice*, 2nd ed., Addison Wesley.
Hodges, M. and Sasnett, R., 1993, *Multimedia Computing*, Addison Wesley.
Laurel, B., 1993, *The Art of Human-Computer Interface*, Addison Wesley.
Pimental, K. and Teixeira, K., 1993, *Virtual Reality: Through the New Looking Glass*, McGraw Hill.
Watkins, C. and Marenka, S., 1994, *Virtual Reality Excursions*, AP Professional.