UNIVERSITI TEKNOLOGI MARA

CSC658: COMPUTER GRAPHICS

Course Name (English)	COMPUTER GRAPHICS APPROVED
Course Code	CSC658
MQF Credit	3
Course Description	Graphics is one of the most important elements in multimedia. Therefore, a study in multimedia would be incomplete without the study of computer graphics. This course will provide the students with the necessary knowledge on computer graphics such as concept, theory of computer graphics and colors and hardware devices required to produce a graphics. Basic scientific visualization and animation techniques will also be presented in this course.
Transferable Skills	2D & 3D based Computer Graphics Programming
Teaching Methodologies	Lectures, Blended Learning, Lab Work
CLO	CLO1 Construct the basic theories in computer graphics. CLO2 Display technical skills in computer graphics standard. CLO3 Identify the 2D and 3D computer graphic based on suitable method and techniques.
Pre-Requisite Courses	No course recommendations

Topics
1. FUNDAMENTAL TECHNIQUES IN GRAPHICS 1.1) Introduction 1.2) Graphics API 1.3) Simple color models (RGB, HSV, CMYK) 1.4) Homogeneous coordinates
2. GRAPHIC SYSTEMS 2.1) Software 2.2) Hardware 2.3) Issues and Challenges
3. GEOMETRIC MODELLING 3.1) Polygonal representation of 3D objects 3.2) Affine transformations (scaling, rotation, translation) 3.3) Viewing transformation 3.4) Clipping 3.5) Parametric polynomial curves and surfaces
4. BASIC RENDERING 4.1) Line generation algorithms (Bresenham) 4.2) Font generation: outline vs. bitmap 4.3) Light-source and material properties 4.4) • Ambient, diffuse, and specular reflections 4.5) • Phong reflection model 4.6) • Rendering of a polygonal surface; flat, Gouraud, and Phong shading 4.7) • Texture mapping, bump texture, environment map
5. COMPUTER ANIMATION 5.1) Key-frame animation 5.2) Camera animation 5.3) Scripting system 5.4) Animation of articulated structures: inverse kinematics 5.5) Motion capture 5.6) Procedural animation 5.7) Deformation

6. VISUALIZATION
6.1) Basic viewing and interrogation functions for visualization
6.2) Visualization of vector fields, tensors, and flow data
6.3) Visualization of scalar field or height field : isosurface by the marching cube method

Assessment Breakdown	%
Continuous Assessment	60.00%
Final Assessment	40.00%

Details of Continuous Assessment

Assessment Type	Assessment Description	% of Total Mark	CLO
Assignment	Assessing students understanding of the subject.	15%	CLO3
Group Project	Project and online video presentation	20%	CLO2
Online Quiz	Quiz online	5%	CLO1
Test	Test 1	10%	CLO1
Test	Test 2	10%	CLO1

Reading List

Recommended Text

- **V. Scott Gordon,John L. Clevenger 2017, *Computer Graphics Programming in OpenGL with Java*, Mercury Learning and Information [ISBN: 9781683920274]**

Reference Book Resources

- **John M. Blain 2014, *The Complete Guide to Blender Graphics, Second Edition: Computer Modeling and Animation*, 2 Ed., CRC Press Florida**
- **Sumantha Guha 2014, *Computer Graphics Through OpenGL: From Theory to Experiments, Second Edition*, 2 Ed., CRC Press Florida USA [ISBN: 978-148225839]**
- **Hongyu Guo 2014, *Modern Mathematics and Applications in Computer Graphics and Vision*, World Scientific Publishing Company [ISBN: 9789814449328]**
- **Dave Shreiner (Author), Graham Sellers, John M. Kessenich, Bill M. Licea-Kane 2013, *OpenGL Programming Guide: The Official Guide to Learning OpenGL, Version 4.3 (8th Edition)*, 8 Ed., Addison Wesley New Jersey**

Article/Paper List: This Course does not have any article/paper resources

Other References: This Course does not have any other resources