

1.	Name of Course/Module	Computer Graphics
2.	Course Code	TCS2111
3.	Status of Subject	Major for B.IT Artificial Intelligence
4.	MQF Level/Stage	Bachelor Degree – MQF Level 6
5.	Version (state the date of the last Senate approval)	June 2012
6.	Requirement for Registration	TCP1241 Computer programming II
7.	Name(s) of academic/teaching staff	Md Shohel Leow Meng Chew Pang Ying Han
8.	Semester and Year offered	Trimester 2 (Gamma Level)
9.	Objective of the course/module in the programme :	
	To provide a good understanding of computer graphics algorithms and their applications.	
10.	Learning Outcomes :	
	At the completion of the subject, students should be able to:	
	LO1: To know and to be able to describe the components of a typical computer graphic system (Cognitive, Level 1)	
	LO2: To explain the concepts, theories and algorithms of 2D and 3D computer graphics (Affective, Level 4)	
	LO3: To apply appropriate techniques for developing computer graphic application (Cognitive, Level 3)	
	LO4: To evaluate the performance of computer graphic applications (Cognitive, Level 6)	
11.	Synopsis:	
	This course provides an introduction of the fundamental algorithms in computer graphics, their theoretical as well as implementation aspects. The course includes important topics on two and three dimensional transformations, projections, viewing functions, and advanced topics on three dimensional modeling and rendering.	
	Kursus ini menawarkan kepada para pelajar tentang teknik kreativiti yang digunakan untuk pengkalan data dengan teknik–teknik yang betul.	
12.	Mapping of Subject to Programme Outcomes :	
	Programme Outcomes	% of Contribution
	PO1: Apply soft skills in work and career related activities	50.00
	PO7: Demonstrate knowledge and understanding of essential facts, concepts, principles, and theories relating to artificial intelligence	25.00
	PO8: Apply principles and knowledge of artificial intelligence in relevant areas	25.00

13.	Assessment Methods and Types :		
	Method and Type	Description/Details	Percentage
	Midterm Test	Written Exam	20.00%
	Laboratory Test	Programming Test	10.00%
	Assignment	Report & Presentation	20.00%
	Final Exam	Written Exam	50.00%
14.	Details of Subject		
	Topics	Mode of Delivery	
		Lecture	Laboratory
	1. A Survey Of Computer Graphics Computer-Aided Design; Graphs, Charts, and Models; Computer Art; Computer Animation; Graphical User Interface; Image Processing.	2	1
	2. Overview of Graphics Systems Display Devices; Hardcopy Devices; Interactive Input Devices, Display Processors; Graphics Software.	2	1
	3. Output Primitives :Points and Lines; Line-Drawing Algorithms; Anti-aliasing Lines; Line Command; Fill Areas; Circle-Generating Algorithms; Other Curves; Character Generation; Instruction Sets for Display Processors; Attributes of Output Primitives: Lines Styles; Color Intensity; Area Filling; Character Attributes; Inquiry Functions; Bundled Attributes.	6	3
	4. 2-D Transformations Basic Transformations: Translation; Scaling; Rotation. Matrix Representations and Homogeneous Coordinates; Composite Transformations.	2	1
	5. Windowing AND Clipping Windowing Concepts; Clipping Algorithms; Window-to-Viewport Transformation	2	1
	6. Segments Segments Concepts; Segments Files; Segments Attributes. Multiple Workstation	2	1

	7. Interactive input methods Physical Input Devices; Logical Classification of Input Devices; Locator Devices; Stroke Devices; String Devices; Valuator Devices; Choice Devices; Pick Devices; Interactive Picture-Construction Techniques; Input Functions		4	2
	8. 3-D Modelling Concepts: Coordinates Systems; Display Techniques; Graphics Packages. Representations: Polygon Surfaces; Curved Surfaces; Fractal-Geometry Methods; Sweep Representations; Solid-Geometry. Transformations: Translation; Scaling; Rotation; Rotation about an arbitrary Axis; Other Transformation; Commands. Viewing: Projections; Transformation. Hidden-Surface and Hidden-Line Removal		4	2
	9. Rendering Illumination Model: Modeling and Displaying Light Intensities; Surface-Shading Methods; Color Models; Ray Tracing. Transparency; Shadow.		4	2
	Total		28	14
15.	Laboratory			
	<ol style="list-style-type: none"> 1. Introduction to Graphics Packages. 2. 2D Drawing, Colour Attributes. 3. Interactive Graphics: Call-back Functions. 4. Window-To-Viewport Transformations. 5. Line Drawing Algorithm, Fill Algorithm. 6. Line and Polygon Clipping. 7. Two Dimensional Transforms. 8. Constructing 3D Objects. 9. Parallel and Perspective Projections. 10. Three Dimensional Transforms. 11. Hidden Surface Removal Methods. 12. Shading Algorithms. 13. Animating 3D Graphics Objects. 			
16.	Total Student Learning Time (SLT)	Face to Face (Hour)	Total Guided and Independent Learning	
	Lecture	28	28	
	Laboratory/Practical	28	14	
	Laboratory Test	1	2	
	Assignment	-	10	
	Mid Term Test	1	3	
	Final Exam	2	20	
	Sub Total	60	77	
	Total SLT	$137/40 = 3.42 \Rightarrow 3$		
17.	Credit Value	3		
18.	Reading Materials :			
	Textbook	Reference Materials		

	Hearn and Baker, Computer Graphics with OpenGL, 3 rd Ed., Prentice-Hall (2004).	<ol style="list-style-type: none"> 1. F.S. Hill, Jr and Stephen M. Kelley, Computer Graphics using OpenGL, 3rd Edition, 2007. 2. R. Mukundan, <i>Computer Graphics Algorithms in Java</i>, Prentice Hall 2000. 3. Leen Ammeraal, <i>Computer Graphics for Java Programmers</i>, John Wiley & Sons, 1998. 4. Edward Angel, <i>Interactive Computer Graphics</i>, Addison Wesley, 1997.
19.	Appendix (to be compiled when submitting the complete syllabus for the programme) : <ol style="list-style-type: none"> 1. Mission and Vision of the University and Faculty 2. Mapping of Programme Objectives to Vision and Mission of Faculty and University 3. Mapping of Programme Outcome to Programme Objectives 4. Programme Objective and Outcomes (Measurement and Descriptions) 	