

<b>ITE1011</b>	<b>Computer Graphics</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>J</b>	<b>C</b>
		<b>3</b>	<b>0</b>	<b>0</b>	<b>4</b>	<b>4</b>
<b>Pre-requisite</b>	<b>MAT 3003</b>	<b>Syllabus version</b>				
		<b>1.0</b>				
<b>Course Objectives:</b>						
<ul style="list-style-type: none"> <li>To provide a comprehensive introduction to computer graphics.</li> <li>To understand basic terminology, progress, issues, and trends in Computer Graphics.</li> <li>To study the various applications of computer graphics.</li> </ul>						
<b>Expected Course Outcome:</b>						
1) Understand computer graphics and interactive computer graphics architecture.						
2) Analyze different algorithms for the construction of graphic models.						
3) Understand the technical aspects of computer graphics and various transformations.						
4) Enhance the perspective of modern computer system using modeling, analysis and interpretation of 2D and 3D visual information.						
5) Develop skills with respect to various clipping algorithms in computer graphics						
6) Design and implement advanced algorithms for curves and modeling with Illumination models and shading techniques.						
7) Understand and implement the various visible surface and shading algorithms.						
8) Apply and implement the various algorithms on computer graphics for the real time application.						
<b>Student Learning Outcomes (SLO): 1, 14</b>						
[1] Having an ability to apply knowledge of mathematics, science, and engineering.						
[14] An ability to design and conduct experiments, as well as to analyze and interpret data						
<b>Module:1</b>	<b>Introduction</b>	<b>5 hours</b>				
Basic Elements of computer graphics and its Applications, Graphics Rendering Pipeline, Input/output Devices, Raster graphics system, vector graphics system.						
<b>Module:2</b>	<b>Graphics primitives generation algorithms</b>	<b>7 hours</b>				
Line drawing algorithms, Circle drawing algorithms, Ellipse drawing algorithms and filling algorithms. Attributes of Output Primitives. Colour models.						
<b>Module:3</b>	<b>Two dimensional and Three dimensional transformations</b>	<b>5 hours</b>				
Translation, rotation, scaling, reflection and shearing, Homogenous Coordinates, Composition of Transformations.						

<b>Module:4</b>	<b>Two dimensional viewing</b>	<b>6 hours</b>	
2D viewing pipeline, Window to viewport transformation. Three dimensional viewing transformations: 3D viewing pipeline, Projection, Types of projection, Transformation matrix for parallel and perspective projection.			
<b>Module:5</b>	<b>2D Clipping algorithms</b>	<b>7 hours</b>	
Point clipping, line clipping and polygon clipping algorithms. 3D clipping algorithms: point and line clipping algorithms.			
<b>Module:6</b>	<b>Curves and Modelling</b>	<b>6 hours</b>	
Parametric Curves: Cubic Splines, Bezier Curves and B-Splines. Solid modelling: Representing solids regularised Boolean set operations, primitive instancing. Object representation techniques: Sweep, Boundary, spatial-partitioning, constructive solid geometry and its comparison.			
<b>Module:7</b>	<b>Visible surface determination, Illumination and shading</b>	<b>6 hours</b>	
Visible line determination algorithms: Area-subdivision, BSP tree, octrees and Ray Tracing. Illumination Models: Diffuse, Specular and Ambient Reflection. Polygon Shading: Flat Shading, Gouraud Shading and Phong Shading.			
<b>Module:8</b>	<b>Contemporary issues:</b>	<b>3 hours</b>	
	<b>Total Lecture hours:</b>	<b>45 hours</b>	
<b>Text Book(s)</b>			
1.	James D.Foley, Andries Van Dam, Steven K.Feiner and F.Hughes John, Computer Graphics principles and Practice in C , Second edition, Pearson Publication, 2012.		
<b>Reference Books</b>			
1.	Hearn, Donald D. and Baker, M. Pauline, Computer Graphics using C, Third edition, Prentice Hall Professional Technical Reference, 2010		
2.	Steve Marschner and Peter Shirley, Fundamentals of Computer Graphics, CRC Press, 2015.		
3	Hearn, Donald D. and Baker, M. Pauline, Computer Graphics using OpenGL, Fourth edition, Prentice Hall Professional Technical Reference, 2011.		
Total Laboratory Hours			30 hours
Recommended by Board of Studies		05-03-2016	
Approved by Academic Council		No. 40	Date 18-03-2016