AC –
Item No. –

As per NEP 2020

Tolani College of Commerce (Autonomous)

Knowledge is Supreme

Title of the Course: <u>Computer Graphics & Animation</u>

Programme: B.Sc.(Information Technology)
Semester IV

Syllabus for 2 credits
From the academic year- 2025-2026

Sr. No.	Heading	Particulars
1	**Description of the course :**	Computer graphics refers to a technology that generates images on a computer screen. It's used in digital photography, film and television, video games, and on electronic devices and is responsible for displaying images effectively to users.
2	**Vertical :**	Skill Enhancement Course
3	**Type :**	Theory and Practical
4	**Credit**:	2 credits (1 credit = Theory and 1 credit = Practical)
5	**Hours Allotted :**	30 Hours
6	**Marks Allotted**:	50 Marks Continuous Evaluation: 20 Semester-End: 30
7	**Course Objectives**: **1.** To learn about pixels, resolution, color models and basic algorithms for drawing graphics. **2.** To understand the principles and techniques for rendering 2D and 3D graphics.	
8	**Course Outcomes**: **1.** Learners should be able to understand the fundamental concepts, principles and algorithms of computer graphics. **2.** Learners should be able to apply techniques to solve various graphics-related problems, such as rendering, animation and image processing.	

9	**Module 1: Introduction to Computer Graphics, Viewing in 3D and Two-Dimensional Transformations (15 hours)**
	• Overview of Computer Graphics, Computer Graphics Application and Software, Description of somegraphics devices, Input Devices for Operator Interaction, Active and Passive Graphics Devices, Display Technologies, Storage Tube Graphics Displays, Calligraphic Refresh Graphics Displays, Raster Refresh (Raster-Scan) Graphics Displays, Cathode Ray Tube Basics, Video Basics, The Video Controller, LCD displays. • Stages in 3D viewing, Canonical View Volume (CVV), Specifyingan Arbitrary 3D View, Examples of 3D Viewing, The Mathematics of Planar Geometric Projections, Combined transformation matrices for projections and viewing, Coordinate Systems and matrices, camera model and viewing pyramid. • Transformations and Matrices, Transformation Conventions, 2D Transformations, Homogeneous Coordinates and Matrix Representation of 2D Transformations, Translations and Homogeneous Coordinates, Rotation, Reflection, Scaling, Combined Transformation.
	Module 2: Visible-Surface Determination, Image Manipulation and Storage and Three-Dimensional Transformations (15 hours)
	• Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal, The z-Buffer Algorithm, Scan-line method, Painter's algorithms (depth sorting), Area sub-division method, BSP trees, Visible-Surface Ray Tracing, comparison of the methods. • What is an Image? Digital image file formats, Image compression standard – JPEG, Image Processing - Digital image enhancement, contrast stretching. • Three-Dimensional Scaling, Three-Dimensional Shearing, Three-Dimensional Rotation, Three-Dimensional Reflection, Three-Dimensional Translation, Multiple Transformation, Rotation about an Arbitrary Axis in Space, Reflection through an Arbitrary Plane, Affine and Perspective Geometry, Vanishing Points, Orthographic Projections, Axonometric Projections, Oblique Projections.
10	**Reference Books:** 1. **Author:** Steve Marschner, **Title:** Fundamentals of Computer Graphics ,**Publisher:** - CRC Press, Pea **Edition:**4th Edition,**Year:**2016

11 **Internal Continuous Assessment: 20%** **Semester End Examination : 30%**

12	**Continuous Evaluation through:** Practical Assessment	
13	**Format of Question Paper:**	

Scheme of Evaluation Pattern

Table 1A: Scheme of Continuous Evaluation (CE/Practical)

Scheme of Evaluation Pattern

Sub-components	Maximum Marks	Conditions for passing
1) Practical exam	15	A learner must be present for eachof the sub-components.
2) Journal and Viva	5	
Total	20	

Table 1B: Scheme of Semester End Examination (SEE) Evaluation

Question Paper Pattern for Semester End Examination (SEE)

Maximum Marks: 30 **Duration: I Hrs.**

Note: All questions are compulsory. Each question has an internal choice.

Question Number		Nature of Questions	Maximum Marks
1)	**Attempt any 3**		
	a)		15
	b)		
	c)		
	d)		
	e)		
2)	**Attempt any 3**		
	a)		15
	b)		
	c)		
	d)		
	e)		