

Branch Name:	Certificate Course in Graphics Design and Video Editing
Program Code:	CS001
Course Title:	3D Modeling & Animation Foundation (Blender) - I
Course Code:	1CS0010105
Pre-requisite Course:	3D Modeling & Animation Foundation (Blender) – I is Vector Graphics & Illustration (Adobe Illustrator).

Course Objective (CO):

This course is intended to make the students to equip students with mathematical tools for precise specification, analysis, and reasoning in computer science.

- To introduce students to the fundamentals of 3D computer graphics and Blender software.
- To develop proficiency in 3D modeling techniques for creating objects, environments, and assets.
- To understand the principles of 3D animation, transformation, and scene creation.
- To equip students with skills in lighting, materials, rendering, and workflow management.
- To prepare learners for advanced studies in animation, Modelling, Texturing, Lighting

Teaching and Examination Scheme:

Teaching Scheme (Hours. per week)				Evaluation Scheme (Marks)								
Lecture (L)	Tutorial (T)	Practical (P)	Credit	Theory				Practical				Total
				University Assessment		Continuous Assessment		University Assessment		Continuous Assessment		
				Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	Min. Marks	Max. Marks	
-	-	4	2	-	-	-	-	09	25	09	25	50

Course Contents:

Sr. No	Topic	Total Hours	Weightage (%)
1.	Introduction to Blender and 3D Graphics Fundamentals: Overview of 3D production pipeline, Blender interface, workspace customization, navigation tools, object manipulation, transformations, coordinate systems, scene management, collections, and project organization techniques.	15	25
2.	3D Modeling Techniques and Asset Creation: Polygon modeling fundamentals, edit mode operations, extrusion, beveling, loop cuts, modifiers, mesh editing, hard surface modeling, organic modeling concepts, prop creation, and environment asset development.	15	25
3.	Materials, Lighting and Rendering Fundamentals: Material creation, shader editor, texture mapping basics, lighting techniques, HDRI lighting, camera setup, composition principles, rendering fundamentals, render engines, and image output settings.	15	25
4.	Animation Fundamentals and Scene Development: Principles of animation, keyframing, timeline management, graph editor basics, object animation, camera animation, scene assembly, animation workflow, rendering animated sequences, and final project development.	15	25

Course Learning Outcomes (CLO):

At the end of this course, the student would be able to:

- CLO1:** Understand the fundamentals of 3D graphics and Blender workflows.
- CLO2:** Create and edit 3D models using professional modeling techniques.
- CLO3:** Apply materials, lighting, and rendering principles to produce realistic visual outputs.
- CLO4:** Develop animated scenes using keyframe-based animation techniques.
- CLO5:** Produce portfolio-ready 3D assets and animation projects using industry-standard workflows.

List of Textbooks:

- Blender For Dummies – Jason van Gumster.
- Blender Master Class – Ben Simonds.
- Introduction to 3D Modeling Using Blender – John M. Blain.

List of Reference Books:

- The Art of 3D Computer Animation and Effects – Isaac Kerlow.
- Digital Modeling – William Vaughan.
- Blender Foundations – Roland Hess.

E-Resource / Web Links:

- Blender Official Documentation
- Blender Studio Training
- Blender Guru Tutorials
- CG Cookie Learning Platform
- CG Boost
- LinkedIn Learning – Blender

Assignment Description:

- Create basic geometric objects and scene setup.
- Model household objects using polygon modeling techniques.
- Create a hard-surface mechanical model.
- Design and model an interior environment asset.
- Create a low-poly environment scene.
- Apply materials and shaders to 3D objects.
- Develop a realistic lighting setup.
- Create camera compositions and rendered still images.
- Animate object movements using keyframes.
- Create a camera animation sequence.
- Build and render a complete 3D scene.
- Develop a final 3D modeling and animation portfolio project.

Mapping of CLO, PO and PSO

Course Learning Outcomes	Program Outcomes (POs)												Program Specific Outcomes (PSOs)		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CLO1	H	M	L										H	M	
CLO2	H	H	M	M									H	M	
CLO3	H	M	H	M									M	H	
CLO4	M	H	M	H	M								H	H	

H: High, M: Medium, L: Low