Blender 3D Studio Professional: Basic to Advanced

Target Audience

This course is designed for beginners, aspiring 3D artists, designers, architects, game developers, animators, visual effects artists, product designers, engineering professionals, educators, and creative enthusiasts who want to build professional skills in Blender. No prior experience with Blender is required, although basic computer literacy is recommended. The curriculum progressively develops learners from foundational concepts to advanced production workflows, enabling them to create production-ready 3D models, animated characters, visual effects, and portfolio-quality projects suitable for careers in animation, gaming, visualization, and digital content creation.

Course Outcomes

Upon successful completion of this course, participants will be able to:

- Understand Blender's interface, workspaces, and production workflow.
- Apply industry-standard modelling techniques using modifiers and non-destructive workflows.
- Design organic models using sculpting and retopology techniques.
- Develop professional PBR materials and procedural shaders.
- Perform UV unwrapping and texture painting for production assets.
- Configure realistic lighting using Eevee and Cycles rendering engines.
- Produce high-quality renders with optimized render settings.
- Design animation-ready characters with proper topology.
- Implement armatures, IK/FK systems, constraints, and weight painting.
- Create facial rigs using shape keys and corrective deformations.
- Animate objects and characters using professional animation principles.
- Refine animation curves using the Graph Editor and F-Curves.
- Simulate realistic cloth, fluids, smoke, fire, rigid body, soft body, and particle systems.
- Create procedural assets using Geometry Nodes.
- Perform compositing and post-processing inside Blender.
- Edit animation sequences using the Video Sequence Editor.
- Manage complete production pipelines from concept to final delivery.
- Build a professional animation portfolio through a capstone project.

Course Objectives

- The objectives of this course are to:
- Introduce learners to Blender's professional production environment.
- Build a strong understanding of 3D modelling principles and workflows.
- Develop proficiency in polygonal, hard-surface, and organic modelling.
- Teach efficient non-destructive modelling using modifiers.
- Enable learners to create production-quality materials and textures.
- Develop practical skills in UV mapping and texture painting.
- Train participants in professional lighting and rendering workflows.
- Build expertise in character creation, rigging, and deformation.
- Strengthen animation fundamentals through practical exercises.
- Introduce advanced animation, simulations, and procedural workflows.
- Teach compositing, post-processing, and video editing techniques.
- Reinforce learning through hands-on laboratory exercises.
- Prepare learners for real-world production environments.
- Enable participants to create a professional-quality animation portfolio.

Course Outline

The course comprises **40 hours** of theory and laboratory sessions and is divided into **10 modules**. Each module is followed by practical hands-on lab exercises designed to reinforce learning, strengthen production workflows, and evaluate participants' understanding through real-world projects.

Table of Contents (TOC)

- Object Modes
- Coordinate Systems
- Transform Tools

Lab

- Interface Customization
- Navigation Exercises
- Workspace Setup

Module 2 – Basic 3D Modelling

- Polygon Modelling Fundamentals
- Mesh Objects
- Edit Mode
- Vertices
- Edges
- Faces
- Extrude
- Inset
- Loop Cuts
- Knife Tool
- Bevel
- Bridge
- Mirror Modifier
- Array Modifier
- Basic Hard Surface Modelling

Lab

- Create:
- Table
- Chair
- Cup
- Simple Room

Module 3 – Advanced Modelling & Sculpting

- Production Modelling
- Clean Topology
- Edge Flow
- Non-destructive Workflow
- Modifier Stack
- Boolean Workflow
- Subdivision Surface
- Hard Surface Modelling

- Organic Modelling
- Sculpt Mode
- Dynamic Topology
- Retopology Basics

Lab

- Mechanical Asset
- Stylized Character Head

Module 4 – Materials, UV Mapping & Texturing

- Look Development
- Material Editor
- Shader Editor
- PBR Materials
- UV Unwrapping
- Smart UV
- Manual UV Mapping
- Texture Painting
- Procedural Materials
- HDRI Lighting
- Asset Library

Lab

- Texture an Interior Scene
- Character Material Setup

Module 5 – Lighting, Cameras & Rendering

- Rendering Pipeline
- Eevee Renderer
- Cycles Renderer
- Lighting Types
- Three-Point Lighting
- HDRI Environment Lighting
- Camera Setup
- Composition Techniques
- Depth of Field
- Render Settings
- Render Optimization
- Render Passes

Lab

- Product Visualization
- Interior Rendering

Module 6 – Character Modelling & Rigging

- Character Pipeline
- Character Proportions
- Face Topology
- Hands & Fingers
- Animation-friendly Mesh Design
- Armatures
- Bones
- Parenting
- Inverse Kinematics (IK)
- Forward Kinematics (FK)
- Constraints
- Weight Painting
- Shape Keys
- Facial Rigging
- Corrective Shapes

Lab

- Create a complete animation-ready character rig.

Module 7 – Animation Fundamentals

- Principles of Animation
- Timeline
- Dope Sheet
- Keyframes
- Interpolation
- Timing
- Spacing
- Squash & Stretch
- Anticipation
- Follow Through
- Arcs
- Secondary Motion
- Graph Editor
- F-Curves
- Motion Refinement

Lab

- Animate:
- Bouncing Ball
- Pendulum

- Walk Cycle

Module 8 – Advanced Animation & Simulation

- Advanced Animation Techniques
- Body Mechanics
- Character Acting
- Lip Sync
- Facial Animation
- Eye Animation
- Camera Animation
- Motion Paths
- Constraint-Based Animation
- Physics Simulation
- Cloth Simulation
- Soft Body Simulation
- Rigid Body Simulation
- Smoke Simulation
- Fire Simulation
- Fluid Simulation
- Particle Systems
- Hair Simulation

Lab

- Create a short animated scene using simulations.

Module 9 – Geometry Nodes, Compositing & Video Editing

- Modern Blender Workflow
- Geometry Nodes Introduction
- Procedural Modelling
- Scatter Systems
- Blender Compositor
- Color Correction
- Glare Effects
- Depth Effects
- Video Sequence Editor
- Audio Editing
- Motion Graphics
- Render Pass Compositing

Lab

- Produce a polished animated shot with post-processing.

Module 10 – Capstone Project & Portfolio Development

- End-to-End Production Pipeline
- Story Planning
- Scene Blocking
- Asset Management
- Character Animation
- Lighting Setup
- Rendering Workflow
- Video Editing
- Portfolio Presentation
- Scene Optimization
- Export Formats
- Portfolio Breakdown

Capstone Project

- Create a **30–60 second animated short film** including:
- Environment Creation
- Character Modelling
- Rigging
- Character Animation
- Lighting
- Camera Movement
- Rendering
- Compositing
- Final Video Export