

## Skill Enhancement Course – 2 : Semester –VI

### **SEC-2 Multimedia Applications using Blender**

#### **BLOCK – I**

**Unit-1 :** Blender software tool : **Rendering** - Unidirectional path tracing with multiple importance sampling, Multi-core CPU rendering with SIMD acceleration, GPU rendering with NVidia CUDA & AMD OpenCL, Multi-GPU support, Unified rendering kernel for CPU and GPU. Redering- Geometry- Meshes, Hair curves, Volumes, Instancing, Multi-core BVH build, Fast BVH refit updates

**Unit-2:** Blender - Shading- PBR - Physically Based Rendering, Node based shades and lights, Principled BSDF, Production tricks, Open Shading Language (CPU only). Lighting - Global illumination, Point, sun, spot and area lights, Mesh lights, Environment light, Sky model, Light portals. Interactivity- Designed for interactive updates, Fast object, shader, light changes, Tiled and progressive rendering

**Unit-3 :** Blender : Layers and passes - Render layers for decomposing the scene, Render passes for geometry and lighting, Shadow catcher, Holdout mattes, Denoising. Camera & Effects - Perspective and orthographic cameras, Panoramic and fisheye cameras, Stereoscopic rendering, Depth of field with support for anamorphic bokeh. Motion blur – Cameras, Object transforms, Meshes and hair curves. Volumes - Absorption, scattering and emission, Smoke and fire, Subsurface scattering, Homogeneous and heterogeneous, Textures - Image textures, Environment maps, Procedural textures, Bump and normal maps

**Unit-4 :** Blender –Modelling - Keyboard shortcuts for a fast workflow, N-Gon support, Edge slide, collapse and dissolve, Grid and Bridge fill, Python scripting for custom tools and add-ons. Modifiers – Modify group, generate group, deform group, simulate group. Sculpting- 20 different brush types, Multi-res sculpting support, Dynamic Topology sculpting, Mirrored sculpting

#### **BLOCK-II**

**Unit-5 :** Blender –Animation and rigging- Automated walk-cycles along paths, Character animation pose editor, Non Linear Animation (NLA) for independent movements, IK forward/inverse kinematics for fast poses, Sound synchronization. Fast Rigging- Envelope, skeleton and automatic skinning, Easy weight painting, Mirror functionality, Bone layers and colored groups for organization, B-spline interpolated bones

**Unit-6** Blender –Visual Effects (VFX) – Compositing - Impressive library of nodes for creating camera fx, color grading, vignettes and much more, Render-layer support, Full compositing with images and video files, Ability to render to multiLayer *OpenEXR* files, Multi-threaded. Motion-Tracking Auto and manual tracking, Powerful camera reconstruction, Real-time preview of your tracked footage and 3d scene, Support for Planar tracking and Tripod solvers

**Unit-7: Blender-** Simulation – smoke and fire, fluids, hair, cloth, particles. Pipeline - **Image** JPEG, JPEG2000, PNG, TARGA, OpenEXR, DPX, Cineon, Radiance HDR, SGI Iris, TIFF, **Video** - AVI, MPEG and Quicktime (on OSX)., **3D** - Alembic, 3D Studio (3DS), COLLADA (DAE), Filmbox (FBX), Autodesk (DXF), Wavefront (OBJ), DirectX (x), Lightwave (LWO), Motion Capture (BVH), SVG, Stanford PLY, STL, VRML, VRML97, X3D.

**Unit-8: Blender** – Game-creation- Ability to port your models to any third-party game engine, Create or code your own game logic, Full **Bullet Physics** integration, Python scripting API for advanced control and AI, Support for all OpenGL™ dynamic lighting, toon shading, animated materials as well as Normal and Parallax Mapping, Playback of games inside Blender without compiling or pre-processing, 3D spatial audio using OpenA. Video-Editing - Live preview, luma waveform, chroma vectorscope and histogram displays, Audio mixing, syncing, scrubbing and waveform visualization, Up to 32 slots for adding video, images, audio, scenes, masks and effects, Speed control, adjustment layers, transitions, keyframes, filters and more

All Practical exercises listed and demonstrated in in <https://www.blender.org/support/tutorials/>