Department of Technology
Savitribai Phule Pune University

Syllabus for
Diploma in Film Making & Visual Effects Technology (Technical)

Diploma in Film Making & Visual Effects Technology

Academic year 2023-2024

Duration: 18 Months

Intake: 40

Eligibility: Minimum 10th pass and Above

Savitribai Phule Pune University
(Formerly University of Pune)

Department of Technology
Board of Studies, Diploma in Film Making & Visual Effects Technology
Curriculum Structure for Diploma in Film Making & Visual Effects Technology

Sr. No.	Subject Code	Subject Name	Credits	Teaching Scheme (Theory)	Teaching Scheme (Lab)
Trimester (I)					
1	DVFX1	**Introduction to FilmMaking**	4	2	2
2	DVFX2	**Fundamentals of Art :Perspectives, Human anatomy, lighting and shading**	2	2	
3	DVFX3	**Introduction toPhotography**	4	2	2
4	DVFX4	**Principles of Animation**	4	2	2
5	DVFX5	**Digital Graphics for VFX**	4	2	2
6	DVFX6	**Storyboarding & Animatics**	4	2	2
			22		
Trimester(II)					
7	DVFX7	**Rotoscopy for VFX**	4	2	2
8	DVFX8	**Introduction toCompositing**	4	2	2
9	DVFX9	**Video & Sound Editing**	4	2	2
10	DVFX10	**Fundamentals of 3d**	2	2	
11	DVFX11	**Motion Graphic Art**	4	2	2
12	DVFX12	**Introduction to 3D Modelling**	4	2	2
			22		
Trimester(III)					
13	DVFX13	**Intro to 3d Shading/Texturing, Lighting and Rendering**	4	2	2
14	DVFX14	**3d Rigging & Animationbasics for Match moving**	4	2	2
15	DVFX15	**3d Fx& Dynamics**	4	2	2
16	DVFX16	**Camera Tracking & Match Moving**	4	2	2
17	DVFX17	**Shooting for Chroma using Lights, Camera. Conceptualizing a VFX Shot**	2	2	
18	DVFXMINIPROJ	**Synopsis & MINI Project**	4	2	2
			22		
Total Credits			**66**		

Trimester 1:

DVFX1**:**

Introduction to FilmMaking

Total Contact Hours: 90 Hrs Credit : 06 Total Marks : 100

Topic 1: **Introduction to Filmmaking:** History and evolution of filmmaking, Different types of films and genres, The role of a filmmaker and key personnel in the film industry

Topic 2: **Visual Storytelling**: Narrative structure and storytelling techniques, Scriptwriting essentials, Storyboarding and shot composition

Topic 3: **Cinematography:** Camera types and their functions**,** Framing, composition, and camera movements**,** Lighting techniques and their impact on the mood

Topic 4: **Film Editing:** Editing theory and principles, Introduction to editing software and tools

Techniques for creating rhythm and continuity

Topic 5: **Sound Design:** Importance of sound in filmmaking**,** Sound recording techniques**,** Sound editing and mixing

Topic 6: **Directing**: The director's role and responsibilities, Working with actors and crew, Establishing a creative vision

Topic 7: **Film Analysis**: Critical analysis of films from different genres, Understanding film language and techniques, Interpretation and evaluation of cinematic elements

Topic 8: **Personal Filmmaking:** Developing a personal filmmaking style, Pre-production planning, Execution and post-production processes

Assessment Methods: Written assignments and essays, Practical exercises, such as short film projects or scene analysis, Class discussions and participation, Film analysis papers, Final project showcasing students' filmmaking skills

Trimester 1:

DVFX2

Fundamentals of Art:Perspectives, Human anatomy, lighting andshading

Total Contact Hours: 60 Hrs Credit: 04 Total Marks: 100

Topic 1: **Introduction to Fundamentals of Art:** Course overview and objectives, Importance of perspectives, human anatomy, lighting, and shading in art, Overview of historical and contemporary artists who excel in these areas

Topic 2: **Perspective Drawing:** Understanding the concept of perspective**,** One-point, two-point, and three-point perspective**,** Foreshortening and distortion**,** Applying perspective in landscapes, architecture, and still life

Topic 3: **Human Anatomy :** Basic structure and proportions of the human body**,** Skeletal and muscular systems**,** Drawing the head, torso, limbs, hands, and feet**,** Capturing movement and poses, Emphasizing anatomical details in figure drawing

Topic 4: **Lighting and Shading:** Importance of light and shadow in creating form and depth Study of light sources and their effects, Understanding highlights, mid-tones, and shadows Techniques for rendering textures and materials, Creating mood and atmosphere through lighting

Topic 5: **Integration and Application:** Applying perspectives, human anatomy, lighting, and shading together**,** Still life compositions**,** Figure drawing with proper proportions, lighting, and shading**,** Landscape and architectural drawings with accurate perspectives and lighting

Topic 6: **Critique and Portfolio Development:** Group critiques of student artworks**,** Constructive

feedback and evaluation of artistic progress**,** Guidance on portfolio development and presentation
Topic 7: **Final Project:** Individual project combining all learned concepts**,** Demonstration of proficiency in perspectives, human anatomy, lighting, and shading

Trimester 1:
DVFX3
Introduction toPhotography
Total Contact Hours: 90 Hrs **Credit: 06** **Total Marks : 100**

Topic 1: **Introduction to Photography:** Course overview, objectives, and expectations, History and evolution of photography, Understanding different types of cameras and their features, Introduction to basic camera operations and controls
Topic 2: **Exposure Basics:** Introduction to exposure triangle: aperture, shutter speed, ISO, Understanding exposure and its impact on photographs, Metering modes and exposure compensation Practice exercises on achieving proper exposure
Topic 3: **Composition Techniques:** Rule of thirds and other compositional guidelines, Framing, leading lines, and symmetry**,** Understanding perspective and depth of field, Applying composition techniques in practical assignments
Topic 4: **Lighting and Color :**Natural lighting techniques: golden hour, blue hour, etc., Introduction to artificial lighting: flash, continuous lighting, Understanding color temperature and white balance, Practicing lighting setups and experimenting with color effects
Topic 5: **Photography Genres:** Exploring different genres of photography: landscape, portrait, macro, street, etc., Techniques and considerations for each genre, Guest speakers or field trips related to specific genres, Hands-on practice and portfolio building within chosen genres
Topic 6: **Post-Processing Basics:** Introduction to photo editing software (e.g., Adobe Lightroom), Basic adjustments: cropping, exposure, contrast, color correction, Retouching techniques: removing blemishes, adjusting skin tones, Developing a personal editing style
Topic 7: **Ethics and Legal Considerations :** Understanding copyright laws and intellectual property**,** Obtaining model releases and permissions for photography**,** Ethical considerations in photography: privacy, representation, consent**,** Discussions on responsible photography practices**,** Critique and Portfolio Development**,** Critiquing photographs: analyzing composition, lighting, and storytelling**,** Finalizing and presenting a portfolio of the student's best work**,** Reflection on personal growth and future directions in photography**,** Course conclusion and evaluation

Trimester 1:
DVFX4
Principles of Animation:
Total Contact Hours: 60 Hrs **Credit: 04** **Total Marks: 100**

Topic 1: Introduction to animation principles
Topic 2: Overview of the 12 basic principles of animation
Topic 3 : Importance of observation and reference in animation
Topic 4 : Timing and spacing
Topic 5 : Creating realistic motion through proper timing
Topic 6 :Understanding the concept of spacing and keyframes
Topic 7 :Squash and stretch
Topic 8 :Applying squash and stretch to add flexibility and impact to animations

Topic 9 :Techniques for maintaining volume during deformations
Topic 10 :Anticipation and follow-through
Topic 11 :Creating anticipation to make actions more believable
Topic 12 :Incorporating follow-through to add realism and weight to animations
Topic 13 :Overlapping action and staging
Topic 14 :Using overlapping action to create more natural and fluid movements
Topic 15 :Importance of staging in emphasizing the main action
Topic 16 :Straight-ahead and pose-to-pose animation techniques
Topic 17 :Advantages and considerations of each technique
Topic 18 :Blending straight-ahead and pose-to-pose methods for complex animations
Topic 19 :Exaggeration and appeal
Topic 20 :Applying exaggeration to add interest and appeal to animations
Topic 21 :Creating appealing characters through effective design and animation techniques
Topic 22 :Secondary action and timing
Topic 23 :Enhancing animations with secondary actions
Topic 24 :Understanding the impact of timing on the overall feel of animations
Topic 25 :Arcs and paths of action
Topic 26 :Utilizing arcs to create natural and fluid movements
Topic 27 :Planning and animating characters along proper paths of action
Topic 28 :Weight and balance
Topic 29 :Animating characters and objects with a sense of weight
Topic 30 :Balancing elements within animations to create visually pleasing results
Topic 31 :Project work and critiques
Topic 32 :Applying the principles of animation in practical projects
Topic 33 :Receiving feedback and critiques to improve animation skills
Topic 34 :Final project presentations
Topic 35 :Showcasing individual animation projects
Topic 36 :Reflecting on the progress and growth in animation abilities

Assessment Methods:

Topic 1 :Practical animation projects demonstrating the application of animation principles
Topic 2 :Written assignments and quizzes to assess theoretical knowledge
Topic 3 :Class participation and engagement in discussions and critiques
Topic 4 :Final project presentation and reflection

Trimester 1:

DVFX5

Digital Graphics for VFX

Total Contact Hours: 90 Hrs **Credit: 06** **Total Marks: 100**

Topic 1 : **Introduction to VFX and Digital Graphics :** Overview of the VFX industry and its applications, Introduction to the VFX pipeline and workflow, Exploring different types of digital graphics used in VFX

Topic 2 : **Digital Image Manipulation :** Advanced techniques in digital image manipulation using software like Photoshop**,** Color correction, image retouching, and matte painting**,** Working with layers and masks

Topic 3 : **2D Animation and Motion Graphics:** Principles of 2D animation for VFX**,** Creating motion graphics and titles**,** Keyframing and timing

Topic 4 : **Introduction to 3D Graphics:** Overview of 3D graphics and its role in VFX**,**

Understanding 3D modeling, texturing, and lighting**,** Introduction to 3D software (e.g., Autodesk Maya, Cinema 4D)
Topic 5 : 3D Modeling and Texturing, Advanced techniques in 3D modeling,UV mapping and texture painting, Creating realistic materials and shaders
Topic 6 : **Lighting and Rendering:** Principles of lighting in 3D graphics**,** Different types of lighting setups**,** Rendering techniques for photorealistic results
Topic 7 : **Introduction to Compositing**: Basics of compositing and its importance in VFX, Working with alpha channels and mattes, Introduction to compositing software (e.g., Nuke, Adobe After Effects)
Topic 8 : **Advanced Compositing Techniques:** Green screen keying and extraction**,** Tracking and match moving**,** Integration of 2D and 3D elements
Topic 9 : **Visual Effects Simulation:** Introduction to visual effects simulation techniques (e.g., particles, fluids)**,** Simulating natural phenomena (fire, smoke, water)**,**Using simulation software (e.g., Houdini, RealFlow)
Topic 10 : **Advanced 3D Animation**: Principles of character animation, Rigging and skinning techniques, Advanced animation tools and workflows
Topic 11 : **Advanced Rendering and Compositing:** Advanced rendering techniques for VFX**,** Render passes and multipass compositing**,** Optimizing render settings for efficiency
Topic 12 : **Final Project:** Applying the skills learned throughout the course to create a final VFX project, Project planning, execution, and presentation, Peer review and feedback

Trimester 1:
DVFX6
Storyboarding & Animatics :
Total Contact Hours : 60 Hrs. Credit : 04 Total Marks : 100

Topic 1 **: Introduction to Storyboarding:** Overview of storyboarding and its role in visual storytelling, Understanding the basic elements of a storyboard, Analyzing the relationship between script and storyboard

Topic 2: **Sketching Techniques and Composition:** Developing sketching skills for storyboarding, Composition principles and visual storytelling techniques, Establishing shot types, camera angles, and framing

Topic 3:**Storyboard Structure and Narrative Flow:** Sequencing and pacing in storyboards, Creating dynamic shot progressions and transitions, Utilizing thumbnails and rough sketches for planning

Topic 4: **Visualizing Characters and Environments:** Character design and expression in storyboards, Depicting different environments and locations, Conveying mood and atmosphere through visuals

Topic 5: **Cinematic Language in Storyboards:** Understanding camera movements and their impact, Shot types, camera angles, and their narrative significance, Storyboard continuity and visual coherence

Topic 6: **Animatics Bringing Storyboards to Life:** Introduction to animatics and their purpose, Basic principles of timing and motion in animatics, Adding sound, music, and basic effects to enhance animatics

Topic 7: **Critiquing and Iterating Storyboards:** Peer and instructor critiques for constructive feedback, Identifying strengths and weaknesses in storyboards, Refining and revising storyboards based on feedback

Topic 8: **Collaboration and Teamwork in Storyboarding:** Team dynamics and communication in collaborative projects, Roles and responsibilities in a storyboard production

pipeline, Effective collaboration tools and techniques

Topic 9: **Industry Applications and Portfolio:** Development, Exploring career opportunities in storyboarding and animatics, Building a professional storyboard portfolio, Presenting and showcasing storyboard work effectively

Topic 10: **Final Project:** Collaborative storyboard and animatic project, Applying all the skills and knowledge acquired throughout the course, Presentation and evaluation of the final project

Assessment Methods:

Topic 11: In-class participation and engagement

Topic 12: Individual and group assignments/projects

Topic 13: Peer critiques and feedback sessions

Trimester(II)

DVFX7**:**

Rotoscopy for VFX

Total Contact Hours : 90 Hrs. Credit : 04 Total Marks : 100

Topic 1: **Introduction to Rotoscoping:** Overview of rotoscoping in visual effects, Understanding the role of rotoscoping in VFX production, Historical context and evolution of rotoscoping techniques.

Topic 2: **Fundamentals of Rotoscoping:** Principles of animation and motion, Understanding keyframes and motion interpolation, Techniques for accurate tracing and outlining, Utilizing reference footage for rotoscoping.

Topic 3: **Tools and Software:** Introduction to industry-standard rotoscoping software (e.g., Silhouette, Mocha, Nuke), Familiarization with the user interface and basic tools, Workflow optimization and customization, Integration with other VFX software and pipelines.

Topic 4: **Rotoscoping Techniques:** Basic shape and spline creation, Handling complex shapes and objects, Rotoscoping for different types of footage (live-action, CGI, etc.), Working with motion blur and challenging elements (hair, fur, smoke, etc.), Matte creation and refinement.

Topic 5: **Advanced Rotoscoping:** Understanding edge behavior and anti-aliasing, Techniques for dealing with fine details and intricate motion, Problem-solving and troubleshooting common issues, Tracking and stabilization for rotoscoped elements, Rotoscoping for complex visual effects shots.

Topic 6: **Compositing and Integration:** Techniques for integrating rotoscoped elements into live-action footage, Color correction and matching, Utilizing alpha channels and blending modes, Layering and depth management, Fine-tuning and quality control.

Topic 7: **Project Work:** Hands-on assignments and projects to apply learned concepts, Rotoscoping exercises with increasing complexity, Collaboration with other VFX disciplines (compositing, tracking, etc.), Feedback and critique sessions for improvement.

Topic 8:**Industry Practices and Standards:** Best practices for efficient rotoscoping workflows, Time management and meeting deadlines, Working with supervisors and incorporating feedback, Understanding the role of rotoscoping in the overall VFX pipeline, Career opportunities and job prospects in the VFX industry.

Trimester (II)

DVFX8

Introduction to Composition

Total Contact Hours : 90 Hrs. Credit : 04 Total Marks : 100

Topic 1: **Introduction to Compositing:** Overview of the compositing process, Role of compositing in visual effects and post-production, Introduction to industry-standard compositing software
Topic 2: **Working with Layers and Masks:** Understanding layers and their properties, Creating and manipulating masks for selective editing, Blending modes and their applications
Topic 3: **Color Correction and Grading:** Introduction to color theory and color spaces, Techniques for color correction and grading, Creating mood and atmosphere through color
Topic 4: **Rotoscoping and Keying:** Rotoscoping techniques for creating matte elements, Green screen keying and spill suppression, Fine-tuning the key for realistic results
Topic 5: **Tracking and Matchmoving:** Motion tracking principles and workflows, Matchmoving techniques for integrating 3D elements, Camera and object tracking
Topic 5 : **Integration of 3D Elements:** Importing 3D elements into compositing software, Matching lighting and shading for seamless integration, Adding depth and realism to 3D integration
Topic 6 : **Advanced Compositing Techniques:** Advanced blending and layering techniques, Using alpha channels for complex compositing, Working with multiple passes and render layers
Topic 7 : **Particle Effects and Simulations:** Creating particle effects for explosions, fire, and smoke, Simulating natural phenomena like rain and snow, Combining particle simulations with live-action footage
Topic 8 : **Matte Painting and Set Extensions:** Digital matte painting techniques, Extending or creating new environments, Compositing live-action footage with matte paintings
Topic 9 : **Stereoscopic Compositing:** Introduction to stereoscopic compositing, Techniques for working with stereo footage, Depth grading and depth-based compositing
Topic 10 : **Final Project:** Application of learned techniques in a comprehensive project, Developing a professional-grade compositing shot
Topic 11 : **Industry Best Practices and Portfolio Development:** Overview of industry workflows and standards, Tips for creating an impressive compositing portfolio, Future prospects and career paths in compositing

Trimester(II)

DVFX9

Video & Sound Editing

Total Contact Hours : 90 Hrs. Credit : 04 Total Marks : 100

Topic 1 : **Introduction to Video Editing:** Overview of video editing principles and terminology**,** Introduction to different types of video editing software
Topic 2 :**Video Editing Software:** In-depth exploration of popular video editing software (e.g., Adobe Premiere Pro, Audition, DaVinci Resolve) Understanding the interface and basic functionalities of the chosen software
Topic 3 :**Video Editing Techniques:** Cutting and trimming video clips, Applying transitions and effects, Working with audio tracks and adding sound effects, Color correction and grading, Keyframing and animation, Creating titles and text overlays
Topic 4 :**Workflow and Organization:** Organizing and managing media assets**,** Importing and exporting files**,** Project organization and file management best practices
Topic 5 :**Storytelling and Narrative:** Understanding the importance of storytelling in video editing**,** Techniques for creating engaging narratives**,** Sequencing shots to build tension, emotion, or convey information
Topic 6 :**Advanced Editing Techniques:** Multi-camera editing**,** Chroma keying (green screen)**,**Motion tracking and stabilization**,** Advanced effects and compositing
Topic 7 :**Audio Editing:** Sound design principles**,** Editing and mixing audio tracks Syncing audio

and video
Topic 8 :**Output and Delivery:** Export settings for different platforms and formats (web, broadcast, social media)**,**Compression and encoding techniques**,** Exporting for different resolutions and aspect ratios
Topic 9 :**Project Work and Critiques:** Hands-on exercises and assignments to apply learned techniques**,** Group critiques and feedback sessions to improve editing skills

Trimester(II)
DVFX10
Fundamentals of 3D
Total Contact Hours : 60 Hrs. Credit : 02 Total Marks : 100

Topic 1 : **Introduction to 3D Design:** Overview of the course and its objectives, Introduction to 3D design principles and terminology, Introduction to 3D software and tools
Topic 2 : **3D Modeling Basics:** Introduction to 3D modeling techniques, Creating basic 3D shapes Working with polygonal modeling, Understanding mesh topology
Topic 3 : **Advanced 3D Modeling Techniques:** Subdivision modeling, NURBS modeling, Sculpting techniques, Model optimization and cleanup
Topic 4 : **Texturing and UV Mapping:** Understanding UV coordinates, UV unwrapping techniques, Applying textures to 3D models, Texture mapping and projection methods
Topic 5 : **Introduction to Lighting and Shading:** Basic principles of lighting in 3D, Different types of light sources, Introduction to shaders and materials, Understanding material properties and textures
Topic 6 : **Advanced Lighting and Rendering:** Global illumination techniques, Image-based lighting, Advanced rendering settings and options, Rendering for still images and animations
Topic 7 : **Composition and Color Theory in 3D:** Introduction to composition principles in 3D art, Color theory and its application in 3D design, Creating visually appealing 3D scenes
Topic 8 : **Visual Storytelling in 3D:** Understanding narrative and storytelling in 3D art, Creating scenes that communicate a story, Incorporating characters and props into 3D scenes
Topic 9 : **Project Work and Critique:** Students will work on individual 3D projects,Weekly project critiques and feedback sessions
Topic 10 : **Project Refinement and Texturing:** Refining and polishing 3D projects, Advanced texturing techniques,Material creation and customization
Topic 11 : **Lighting and Rendering for Projects:** Applying appropriate lighting setups to projects, Optimizing rendering settings for final output, Rendering final project images and animations
Topic 12 : **Final Project Presentation and Review:** Students will present their final 3D projects, Class discussion and review of the projects, Recap and conclusion of the course

Trimester(II)
DVFX11
Motion Graphic Art
Total Contact Hours : 90 Hrs. Credit : 04 Total Marks : 100

Topic 1 : **Introduction to Motion Graphics:** Overview of motion graphic art and its applications, Principles of animation and motion design, Introduction to industry-standard software tools
Topic 2 : **Storyboarding and Conceptualization:** Understanding the importance of storytelling in motion graphics, Storyboarding techniques and visual storytelling principles, Conceptualizing ideas and developing a creative brief
Topic 3 : **Designing Motion Graphics:** Design principles for motion graphics, Typography and color theory in motion design, Creating visually appealing compositions and layouts
Topic 4 : **Animation Techniques:** Keyframe animation and interpolation, Timing and easing in motion graphics, Creating smooth and fluid animations

Topic 6 : **Transitions and Effects:** Creating seamless transitions between motion graphics, Implementing dynamic effects and visual enhancements, Incorporating audio and sound design in motion graphics
Topic 7 : **Technical Considerations:** Resolution, aspect ratios, and formats for motion graphics, Optimizing file sizes and rendering settings, Understanding motion graphic production workflows
Topic 8 : **Advanced Motion Graphic Techniques:** Particle systems and simulations, 3D motion graphics and camera movements, Advanced animation techniques and expressions
Topic 9 : **Client Work and Collaboration:** Understanding client briefs and project requirements, Effective communication and collaboration in motion graphic projects, Managing revisions and feedback from clients
Topic 10 : **Project-Based Learning:** Students will work on individual or group projects to apply the concepts and techniques learned throughout the course. Projects may include title sequences, promotional videos, or animated infographics.

Topic 11 : **Project Presentations and Critiques:** Students will present their final projects to the class, followed by constructive critiques and feedback from the instructor and peers, Discussion on career opportunities and paths in motion graphic art.

Trimester(II)

DVFX12
Introduction to 3D Modelling
Total Contact Hours : 90 Hrs. Credit : 04 Total Marks : 100

Topic 1**: Introduction to 3D Modelling:** Overview of 3D modeling concepts and applications, Introduction to industry-standard 3D modeling software, Understanding the 3D modeling workflow
Topic 1: **3D Modeling Tools:** Overview of different 3D modeling tools and their functionalities, Understanding the user interface and navigation controls, Working with basic shapes and primitives
Topic 1: **Polygonal Modeling:** Introduction to polygonal modeling techniques, Creating and manipulating polygons, Extrusion, beveling, and subdivision techniques
Topic 1: **Surface Modeling:** Introduction to surface modeling techniques, Creating smooth surfaces using NURBS (Non-Uniform Rational B-Splines), Lofting, sweeping, and revolving surfaces
Topic 1: **Texturing and UV Mapping:** Applying textures to 3D models, UV mapping techniques for texture placement, Texture coordinates and mapping projections
Topic 1: **Lighting and Materials:** Understanding the importance of lighting in 3D rendering, Creating and manipulating light sources, Working with different material properties
Topic 1: **Rendering and Output:** Introduction to the rendering process, Setting up render settings and quality parameters, Exporting and saving rendered images and animations
Topic 1: **Project Work:** Applying learned techniques to complete a 3D modeling project, Incorporating texturing, lighting, and rendering into the project, Presenting and sharing the final project with the class

Trimester (III):

DVFX13**:**
Intro to 3d Shading/Texturing, Lighting and Rendering
Total Contact Hours : 90 Hrs. Credit : 04 Total Marks : 100

Topic 1 : **Introduction to 3D Shading, Texturing, Lighting, and Rendering**
Overview of the course, Introduction to shading, texturing, lighting, and rendering pipelines, Understanding the importance of realistic materials and lighting in 3D scenes.

Topic 2 : **Fundamentals of Shading**: Overview of shading models (Lambert, Phong, Blinn-Phong), Surface properties and shading calculations, Diffuse and specular reflections
Topic 3 : **Texturing Techniques:** Introduction to texture mapping, Texture coordinates and UV mapping, Procedural textures and texture synthesis
Topic 4 : **Advanced Texturing**: Bump mapping and normal mapping, Displacement mapping, Texture filtering and mipmapping
Topic 5 : **Lighting Basics**: Principles of light and color, Types of lights in 3D scenes (point lights, directional lights, spotlights), Light attenuation and falloff
Topic 6 : **Advanced Lighting Techniques**: Global illumination and ambient occlusion, Image-based lighting (IBL) and high dynamic range (HDR) lighting, Shadows and shadow mapping

Topic 7 : **Introduction to Rendering**: Rendering pipeline overview, Camera models and projections, Anti-aliasing and sampling techniques
Topic 8 : **Ray Tracing and Global Illumination**: Ray tracing basics, Reflection and refraction, Indirect lighting and global illumination algorithms
Topic 9 : **Shaders and Material Creation**: Introduction to shader programming languages (e.g., GLSL, HLSL), Shader properties and parameterization, Creating custom shaders for realistic materials
Topic 10 : **Project Work and Review**: Practical project assignments applying the learned concepts, Review and discussion of project results, Final assessment and conclusion

Trimester (III):

DVFX14 **:**
3d Rigging & Animation basics for Matchmoving
Total Contact Hours : 90 Hrs. Credit : 04 Total Marks : 100

Topic 1 : **Introduction to 3D Rigging and Animation:** Overview of match moving and its importance in visual effects, Introduction to 3D rigging and animation concepts, Understanding the role of rigging and animation in match moving.

Topic 2 : **3D Software Overview:** Introduction to popular 3D software used for match moving (e.g., Autodesk Maya, Blender, Cinema 4D), Familiarization with the user interface and basic navigation in the chosen software.
Topic 3 : **Rigging Fundamentals:** Understanding the role of rigs in animation and match moving, Anatomy of a rig: bones, joints, controllers, and constraints, Rigging techniques for characters and objects used in match moving, Creating a basic rig for a character or object.
Topic 4 : **Skinning and Weighting**: Introduction to skinning and weighting techniques, Understanding how skinning influences the movement of a rigged character or object, Applying proper weights to influence specific areas of the mesh, Refining skinning weights for realistic deformations during animation.
Topic 5 : **Animation Principles:** Introduction to fundamental animation principles (e.g., timing, spacing, arcs, squash and stretch), Applying animation principles to create believable motion, Techniques for animating characters and objects in the context of match moving.
Topic 6 : **Match Moving Workflow:** Overview of the match moving pipeline, Importing camera data into 3D software from match moving software (e.g., Autodesk MatchMover, The Foundry's Camera Tracker), Integrating 3D objects into match moving scenes using the camera data, Animating objects to match the movement of the camera.
Topic 7 : **Advanced Rigging Techniques:** Rigging techniques for facial animation in match moving, Implementing IK (inverse kinematics) and FK (forward kinematics) systems, Using expressions and scripts to automate rigging tasks.
Topic 8 : **Character Animation:** Introduction to character animation techniques for match moving, Keyframe animation and pose-to-pose animation approaches, Lip-syncing and facial

animation for characters, Refining animations for realistic motion.
Topic 9 : **Refinement and Integration:** Refining the 3D elements to seamlessly integrate them with the live-action footage, Matching lighting, shadows, and textures to the real-world environment, Fine-tuning the animation to improve the overall visual quality.
Topic 10 : **Project Work and Portfolio Development:** Applying the learned skills to complete a match moving project, Creating a demo reel or portfolio showcasing the completed work.

Trimester (III):

DVFX15**:**

3dFx&Dynamics

Total Contact Hours : 90 Hrs. Credit : 04 Total Marks : 100

Topic 1 : **Introduction to 3D FX & Dynamics**: Overview of the course and its objectives, Introduction to industry-standard 3D software (e.g., Maya, Houdini), Understanding the role of FX and dynamics in visual effects production
Topic 2 : **Particle Systems**: Introduction to particle systems, Creating and animating particles, Particle attributes and behaviors, Particle instancing and shading
Topic 3 : **Fluid Simulations**: Introduction to fluid simulations, Creating fluid emitters and containers, Controlling fluid behavior (viscosity, density, temperature), Meshing and rendering fluid simulations
Topic 4 : **Rigid Body Dynamics**: Understanding rigid body dynamics, Creating rigid body simulations, Constraints and interactions between rigid bodies, Optimizing simulations for performance
Topic 5 : **Cloth Simulations**: Introduction to cloth simulations, Creating cloth objects and constraints, Cloth properties (stretch, bend, shear), Collision handling and self-collision
Topic 6 : **Advanced FX Techniques**: Advanced particle system behaviors (fluid-like effects, explosions), Advanced fluid simulations (splashes, foam, bubbles), Complex rigid body interactions (destruction, fracture), Advanced cloth simulations (tearing, folding)
Topic 7 : **Integration and Workflow**: Integrating FX and dynamics into a production pipeline, Collaboration with other departments (modeling, animation, lighting), Asset management and version control, Problem-solving and troubleshooting common issues
Topic 8 : **Realistic Rendering Techniques**: Introduction to advanced rendering techniques, Shader networks for FX elements, Rendering volumetrics (smoke, fire, clouds), Optimizing render settings for FX scenes
Topic 9 : **Case Studies and Industry Examples**: Analyzing and deconstructing visual effects in films, animations, and games, Guest lectures from industry professionals, Discussion of real-world production challenges and solutions
Topic 10 : **Project Work**: Students work on individual or group projects, Applying learned techniques to create a portfolio-worthy visual effects sequence, Weekly critiques and feedback sessions, Final presentation of projects

Trimester (III):

DVFX16**:**

Camera Tracking & Match Moving

Total Contact Hours : 90 Hrs. Credit : 04 Total Marks : 100

Topic 1 : **Introduction to Camera Tracking and Match Moving:** Definition and purpose of camera tracking and match moving, Applications of camera tracking and match moving in the film, VFX, and gaming industries, Overview of the basic concepts and techniques involved.
Topic 2 : **Camera Tracking Fundamentals:** Understanding the camera tracking process, Types of camera tracks: 2D tracking, 3D tracking, and hybrid tracking, Camera tracking software overview: popular tools such as PFTrack, SynthEyes, and Blender's Camera Tracker.
Topic 3 : **Image Acquisition and Preparation:** Image acquisition techniques: capturing footage for tracking, Image preparation: cleaning up footage, optimizing for tracking accuracy, Lens distortion correction: techniques for correcting lens distortion in tracked footage.
Topic 4 : **2D Tracking Techniques:** Point tracking: manually tracking features in a scene, Planar tracking: tracking flat surfaces and textures in a scene, Tracking multiple points and their relationship over time.
Topic 5 : **3D Tracking Techniques:** Solving camera motion: reconstructing the camera's position and orientation in 3D space, Geometry tracking: tracking the movement of 3D objects in the scene, Object tracking: tracking specific objects or markers in the scene.

Topic 6 : **Match Moving and Integration:** Matching 3D virtual elements to the camera-tracked footage, Integrating CGI (Computer-Generated Imagery) elements into live-action footage, Techniques for achieving realistic lighting, shading, and perspective.
Topic 7 : **Advanced Topics:** Tracking difficult shots: handling challenging situations like fast camera movements, motion blur, and occlusions, Motion capture integration: combining camera tracking with motion capture data for enhanced realism, Tracking in complex scenes: dealing with multiple moving objects, dynamic lighting, and changing environments.
Topic 8 : **Case Studies and Project Work:** Analyzing real-world camera tracking and match moving examples, Working on practical projects to apply the learned techniques, Troubleshooting common issues and optimizing tracking results.

Trimester (III):

DVFX17**:**

Shooting for Chromausing Lights, Camera. Conceptualizing VFX Shot

Total Contact Hours : 90 Hrs. Credit : 02 Total Marks : 100

Topic 1 : **Introduction to Chroma Keying**: Understanding the concept and history of chroma keying, Different types of chroma key backgrounds, Exploring the importance of proper lighting and camera techniques
Topic 2 : **Lighting Fundamentals**: Basic principles of lighting for chroma key, Types of lights and their functions, Lighting setups for different scenarios (indoor, outdoor, etc.), Techniques for achieving even lighting and minimizing shadows
Topic 3 : **Camera Techniques**: Camera settings and considerations for chroma keying, Optimal camera positioning and angles, Selecting the right lens for your shot, Depth of field and focal length considerations
Topic 4 : **Shot Planning and Storyboarding**: Importance of shot planning and pre-visualization, Developing shot ideas for VFX integration, Techniques for creating storyboards and shot lists
Topic 5 : **Advanced Lighting Techniques**: Creating separation between the subject and the chroma key background, Lighting for transparency and reflections, Dealing with reflective surfaces and

shiny objects, Advanced lighting setups for complex shots
Topic 6 : **Camera Movements and Tracking**: Incorporating camera movements into chroma key shots, Introduction to camera tracking and match-moving, Techniques for achieving smooth camera movements, Tracking markers and their placement
Topic 7 : **Real-Time VFX Integration**: Introduction to real-time VFX software and tools, Live keying and compositing using real-time engines, Integrating live-action footage with virtual environments
Topic 8 : **Project Work and Critique**: Students will work on a final project to apply the concepts learned throughout the course, Critique sessions for project presentations, Feedback and guidance on improving the VFX shots

Trimester (III):

DVFXMINIPROJ**: Synopsis & MINI Project**

Total Contact Hours : 90 Hrs. Credit : 04 Total Marks : 100

Compulsory: Students, must provide portfolio in digital format during or after the course and this should be different than their assignments