

Rayat Shikshan Sanstha's

**YASHAVANTRAO CHAVAN INSTITUTE OF  
SCIENCE, SATARA**

**(An Autonomous College)**

**Reaccredited by NAAC with 'A+' Grade**

**New Syllabus For**

**Master of Science**

**Part – II**

**ANIMATION SCIENCE**

**Syllabus**

**To be implemented from June, 2023 onward**

Rayat Shikshan Sanstha's  
Yashavantrao Chavan Institute of Science, Satara  
(Autonomous)  
**Department of Animation Science**  
Scheme of Credit for  
M.Sc. Animation Science  
Under  
Choice Based Credit System (CBCS)  
W. e .f. (June 2022-23)

**1. SUBJECT:** Animation Science

**2. YEAR OF IMPLEMENTATION:** New Syllabi for the M.Sc. II Animation Science will be implemented from June 2023 onwards.

**3. PREAMBLE:**

Animation science is the most emerging and fast-growing industries in India and the whole world is taking notice of the efficiency, skill, and talent available in the country in these fields. The introduction of formal and professional level training programs and courses at the university and college levels is necessary to support the continued expansion of these industries and to produce highly qualified and trained professionals. This industry includes an important portion of animation, and this degree is being offered to train people in the field of animation, which is now an integral aspect of many different industries and finds applications in fields other than animation science. For this revolution in technology, scientific faculty students need also be prepared. The students from science faculty should also be competent for this change in the technology.

**4. OBJECTIVES:**

1. To develop competencies and skills needed for becoming an effective Animator.
2. To become master in traditional & digital tools to produce stills and moving images.
3. To explore different approaches in computer animation.
4. To enable students to manage Animation Projects from its Conceptual Stage to the final Product creation.
5. To train students in applying laws of human motion and psychology in 2D or 3D Characters.
6. To develop expertise in life-drawing and related techniques.
7. To apply Audio and Video Production Techniques to an Animation Project.

**5. DURATION: 02Years (Fulltime)**

**6. PATTERN: SEMESTER EXAM (CBCS)****7. MEDIUM OF INSTRUCTIONS: ENGLISH****8. STRUCTURE OF COURSE:****M. Sc. I Semester I**

<b>Level</b>	<b>Course Code</b>	<b>Title of the Course</b>	<b>Course Category</b>	<b>No. of Lectures Per Week</b>	<b>Credits</b>
<b>8</b>	<b>DSC(Compulsory)</b>				
	MAST- 101	Advanced Graphics Designing	Theory	4	4
	MAST- 102	Composting And Editing	Theory	4	4
	MAST- 103	Modern Art	Theory	4	4
	<b>CCS(Elective: Any one among two)</b>				
	MAST- 104 E1	Research Methodology	Theory	4	4
	MAST- 104 E2	Business Marketing			
	MASP- 105	Lab I: Advanced Graphics Designing and Composting And Editing	Practical	4	4
	MASP- 106	Lab II: Modern Art and Research Methodology/ Business Marketing	Practical	4	4
	AECC-I	English	Theory	2	2
	SEC-I	Information Technology	Theory	2	2
<b>Total</b>					<b>28</b>

## M. Sc. I Semester II

Level	Course Code	Title of the Course	Course Category	No. of Lectures Per Week	Credits
<b>8</b>	<b>DSC(Compulsory)</b>				
	MAST- 201	Typography	Theory	4	4
	MAST- 202	Elements of Designs	Theory	4	4
	MAST- 203	Motion Graphics	Theory	4	4
	MAST- 204	Digital Marketing	Theory	4	4
	<b>CCS(Elective: Any one among two)</b>				
	MAST- 205 E1	Advanced Blender Modeling	Theory	4	4
	MAST- 205 E2	Z Brush Modeling			
	MASP- 206	Lab III : Typography and Elements of Designs	Practical	4	4
	MASP- 207	Lab IV : Motion Graphics and Digital Marketing and Advanced Blender Modeling / Z Brush Modeling	Practical	4	4
	AECC-II	English	Theory	2	2
	SEC-II	Information Technology	Theory	2	2
<b>Total</b>					<b>32</b>

**[M: M.Sc., \*:First letter of subject name, T: Theory, P: Practical, AECC : Ability Enhancement Core Course (English), SEC : Skill Enhancement Course (Information Technology)]**

### M.Sc. II Semester III

Level	Course Code	Title of the Course	Course Category	No. of Lectures Per Week	Credits
<b>9</b>	<b>DSC(Compulsory)</b>				
	MAST- 301	3D Game design	Theory	4	4
	MAST- 302	Advanced 2D Production Process	Theory	4	4
	MAST- 303	Visual effects	Theory	4	4
	MAST- 304	Visual design	Theory	4	4
	<b>CCS(Elective: Any one among two)</b>				
	MAST- 305 E1	3D Production Process	Theory	4	4
	MAST- 305 E2	Advanced Scripting Language			
	MASP- 306	Lab V : 3D Game design and Advanced 2D Production Process	Practical	4	4
	MASP- 307	Lab VI : Visual effects , Visual design and 3D Production Process/ Advanced Scripting Language	Practical	4	4
	SEC-III	Startups and entrepreneurship	Theory	2	2
	SEC-IV		Theory	2	1
		Research Training (20 to 40 Working Days)	-	-	1
	<b>Total</b>				

**SEC- III: Start-ups and Entrepreneurship: An approach for Sustainable Economy**

### M.Sc. II Semester IV

Level	Course Code	Title of the Course	Course Category	No. of Lectures Per Week	Credits
<b>9</b>	<b>DSC(Compulsory)</b>				
	MAST- 401	3D Game Development	Theory	4	4
	<b>CCS(Elective: Any one among two)</b>				
	MAST- 402 E1	3D Post Production process	Theory	4	4
	MAST- 402 E2	3D Tracking and Match Move			
	MASP- 403	Lab V : 3D Game Development, 3D Post Production process / 3D Tracking and Match Move	Practical	4	4
	MASP- 404	Major Project	Practical		1
	SEC-V	CIII	Theory	2	2
	SEC-VI	Internship/Industrial Training (30 to 60 Working Days)	-	-	2
		MOOCs/SWAYAM/NPTEL			1
<b>Total</b>					<b>18</b>

## M.Sc. II SEMESTER III

### MAST- 301 3D GAME DESIGN

**Course Objectives:** Student will able to:-

1. understand the process of requirements elicitation of client's game ideas.
2. state the fundamental of Unity 5 and unity scripting.
3. understand advanced game design and interactive design concepts.
4. create game design document based on client needs.

Credits=4	<b>SEMESTER-III</b> <b>MAST- 301 3D GAME DESIGN</b>	<b>No. of hours per unit/ credits</b>
<b>Credit –1 UNIT I</b>	<b>Introduction to Unity Game Engine</b>	<b>(15)</b>
	Intro to Tools & navigation, Terrain system in Unity, Camera control in Unity, Scene Navigation, Project setting / Player setting, Game publishing using Unity	
<b>Credit –1 UNIT II</b>	<b>C# programming in Unity</b>	<b>(15)</b>
	Constants and variables, Integers, Floats and Strings, Arrays and Lists, Arithmetical operators, Using if statements, Writing while statements, Writing for statements, & all Other Basic C# Concept in Unity	
<b>Credit –1 UNIT III</b>	<b>Game Object in Unity</b>	<b>(15)</b>
	The Game Object, Components, The Main Camera, Light, Render Mod, Using Scripts and the Game Object, Moving the Game Object, Modelling, Rigging, and Skinning, Animation,	
<b>Credit –1 UNIT IV</b>	<b>Special Effects &amp; Sound in Unity</b>	<b>(15)</b>
	Starting with Coding Physics, Using Advanced Physics Concepts, Particle Emitters and Special Effects Game Design and Logic—The Blueprint, Implementing the Design, GUI and Sound	

**Course Outcomes:** Student should be able to:-

- 1) create multiple gaming applications, utilizing industry-standard tools and software.
- 2) analyze the difference in game genres in order to develop games that meet the needs of specific markets.
- 3) participate in an interdisciplinary team-oriented game production project.
- 4) engage himself with gaming industry best practices to enable an entrepreneurial position in the gaming marketplace.

## Reference Books: -

- 1) Plowman, Justin. *3D Game Design with Unreal Engine 4 and Blender*. Packt Publishing Ltd, 2016.
- 2) Flavell, Lance. *Beginning blender: open source 3d modeling, animation, and game design*. Apress, 2011.
- 3) Eberly, David. *3D game engine design: a practical approach to real-time computer graphics*. CRC Press, 2006.
- 4) Bycer, Joshua. *Game Design Deep Dive: Platformers*. CRC press, 2019.



## MAST- 302    ADVANCED 2D PRODUCTION PROCESS

**Course Objectives:** Student will able to:-

- 1) understand advanced 2D animation and compositing techniques.
- 2) study on classical and motion tweens of non-linear animation software.
- 3) understand procedure of publications design and animated video presentations.
- 4) summarize editing principles and video formats.

Credits=4	<b>SEMESTER-III</b> <b>MAST- 302    ADVANCED 2D PRODUCTION PROCESS</b>	<b>No. of hours per unit/ credits</b>
<b>Credit –1 UNIT I</b>	<b>Workspace and principles of animation</b>	<b>(15)</b>
	Introduction to Animate, What's New in Animate, Visual Glossary, Animate system requirements, Work with Multiple File Types in Animate, Animate position with a tween, use of anticipation, action and reaction, Methods of doping, writing exposure sheets, bar sheets, planning accents, beats, scene timing, spacing of drawings, holds, easing in and out Animating to music, Principles of Movement, Understanding the meaning of movement and, movement in nature.	
<b>Credit –1 UNIT II</b>	<b>Motion and Motion editor</b>	<b>(15)</b>
	Motion Editor, tween animation ,Manipulating motion tweens, Adding custom eases, Creating and applying Motion presets, Setting up animation tween spans, Working with Motion tweens, XML files, Motion tweens vs Classic tweens, Shape tweening and parameters, Bone tool animation ,character rigging in Animate, mask layers, work with scenes in, Create video files for use in Animate.	
<b>Credit –1 UNIT III</b>	<b>Multimedia and video</b>	<b>(15)</b>
	Add a video in Animate, Working with video cue points, Draw and create objects with Animate, Reshape lines and shapes, Strokes, fills, and gradients with Animate CC, Working with Adobe Premiere Pro Color Panels in Animate CC, Work with classic text in Animate Imported,3D graphics, Working with symbols, Draw lines & shapes Work with the libraries in Animate, Exporting Sounds, Working with Illustrator AI files in Animate, Applying blend modes Arranging objects, Automating tasks with the Commands menu Multilanguage text, Using camera in Animate Using Animate with Adobe Scout, Working with Fireworks files Graphic filters, Sound and Action Script	
<b>Credit –1 UNIT IV</b>	<b>Exporting and publishing</b>	<b>(15)</b>
	Process of export files from Animate CC, OAM publishing, Exporting SVG files, Export graphics and videos, Publishing AS3 documents,	

	Export animations for mobile apps and game engines,Exporting Sounds Export QuickTime video files Controlling external video playback with ActionScript , ActionScript publish settings,Specify publish settings, Exporting projector files, Export Images and Animated GIFs, HTML publishing templates, Working with Adobe Premiere Pro and After Effects	
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**Course Outcome:** Student should able to

- 1) understand concept of animation and Compositing.
- 2) classify work with non-linear animation editing in Adobe Animate cc .
- 3) understand the concept of transition and effects in Adobe animate cc 2022.
- 4) create vector and raster graphics animated videos.

**Reference Books:**

- 1) Ishak, Mohamad Izril, and Mohd Aswad Amat Mushim. "Digital 2D Animation for Educational Visualization in Secondary School: A Development Courseware of Bintang Hati PT3 Novel."
- 2) O'Hailey, Tina. *Hybrid animation: Integrating 2D and 3D assets*. Taylor & Francis, 2010.
- 3) Rall, Hannes. *Animation: From concepts and production*. CRC Press, 2017.
- 4) Shaw, Susannah. *Stop motion: craft skills for model animation*. Taylor & Francis, 2012.

## MAST- 303 VISUAL EFFECTS

**Course Objectives:** Student will able to-

- 1) classify tracking techniques.
- 2) recognize camera extraction.
- 3) understand the procedure of 2d & 3d tracking.
- 4) interpret the process of compositing packages.

Credits=4	<b>SEMESTER-III</b>  <b>MAST- 303 VISUAL EFFECTS</b>	<b>No. of hours per unit/ credits</b>
<b>Credit –1 UNIT I</b>	<b>Working with Interface</b>	<b>(15)</b>
	Understanding workflow of software, working with multiple image file format, compositing in 3D, Nuke Studio environment, customizing workspace, Preferences, Using the Compositing Environment, Toolbar, Menu Bar, and Content Menus, Working with Nodes, Customizing the Node Display, Using the Tab Menu, Navigating Node Graph, Properties Panels, Customizing a Node’s Presets, Animating Parameters, Dope Sheet.	
<b>Credit –1 UNIT II</b>	<b>Assembly in Nuke</b>	<b>(15)</b>
	Compositing Viewers, Viewer Controls, Viewer Selection Modes, Soft Selection, Pixel Aspect Ratio, Full-frame processing, Region of Interest (ROI), Viewer Overlays and Input Processes, File Browser, Nuke Studio's Timeline Environment, Shots, Clip and Shot Properties, Setting Clip Frame Rates, Ingesting Media, Color-coding Source Clips and Shots, Reconnecting and Refreshing Clips, Timeline Playback Tools, Playback Controls, Timeline Viewer Tools, In and Out Markers.	
<b>Credit –1 UNIT III</b>	<b>Compositing with Nuke</b>	<b>(15)</b>
	Working with Colorspaces, Scopes, Histogram, Waveform, Vector, Proxy Mode, Reformatting Image Sequences, Reformatting Elements, Cropping Elements, Understanding Channels and Layers, Selecting Masks, Merging Images, Merge Operations, Generating Contact Sheets, Removing Noise with Denoise, Fine Tuning, Keying with ChromaKeyer, Improving Mattes, Color Replacement, Keying with Cryptomatte, Keying with Keylight, Advanced Keying, View.	
<b>Credit –1 UNIT IV</b>	<b>Rendering in Nuke</b>	<b>(15)</b>
	Biasing, PreBlur and Tuning, Screen Processing, Clean BG Noise, using RotoPaint, Drawing Paint Strokes, Drawing Shapes, Tracking and Stabilizing, Automatic vs. Keyframe Tracking, Transforming Elements,	

	Wrapping images, working with color, Filtering and Spatial effects, creating effects, analyzing and matching clips, classic 3D composition, importing objects from other application, USD in nuke, deep compositing, Audio in Nuke, previews and rendering, script editor and python, Advanced composition.	
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**Course Outcomes:** Student should be able to: -

- 1) design promotional Products .
- 2) understand Film Criticism and reviews.
- 3) demonstrate Photographic Principles.
- 4) understand visual effects.

**Reference Books:**

- 1) Brinkmann, Ron. *The art and science of digital compositing: Techniques for visual effects, animation and motion graphics*. Morgan Kaufmann, 2008.
- 2) Freeman, Heather D. *The Moving Image Workshop: Introducing animation, motion graphics and visual effects in 45 practical projects*. Bloomsbury Publishing, 2015.
- 3) Christiansen, Mark. *Adobe After Effects CC Visual Effects and Compositing Studio Techniques*. Adobe Press, 2013.
- 4) Goulekas, Karen. *Visual Effects in a Digital World: A Comprehensive Glossary of over 7000 Visual Effects Terms*. Elsevier, 2001.

## MAST- 304: VISUAL DESIGN

**Course Objectives:** Student will able to: -

- 1) describe professional advertising.
- 2) Explain brand identity design.
- 3) understand the basics of typography, grids in layout design, colour.
- 4) analyze the design concepts of Virtual Reality.

<b>Credits=4</b>	<b>SEMESTER-III MAST- 304: VISUAL DESIGN</b>	<b>No. of hours per unit/ credits</b>
<b>Credit –1 UNIT I</b>	<b>Types of advertising</b>	<b>(15)</b>
	Broadcast media - print media - social media - Basic elements of visual design - Principles of visual design - Creating - Headlines and Body content - Pre-press technology and post-press technology- Prepress processes - Press - Post press technology	
<b>Credit –1 UNIT II</b>	<b>Grids in layout design</b>	<b>(15)</b>
	Anatomy of a grid - Types of layout design - Mixed design - Design process - Brand Management - Branding - Brand identity design - Design thinking process	
<b>Credit –1 UNIT III</b>	<b>Designing for VR</b>	<b>(15)</b>
	Visual aid - UI depth and eye strain - Constant velocity - Maintaining head tracking - Guiding with light - Leveraging scale - Spatial audio - Gaze Cues Image Size and resolution - Pixel density - Eye buffers - Optimal resolution Creating Panoramic Images	
<b>Credit –1 UNIT IV</b>	<b>Color Modes</b>	<b>(15)</b>
	Changing color mode - Type tool options - Work path from type - Layers panel - Types of layers - Features of layers - Shape tools and Painting Tools - Brush tools - Gradient tools - Effects panel - Graphics panel - Photo effects	

**Course Outcomes:** Student should be able to:-

- 1) understand typography and grids in layout design.
- 2) acquire skills to use various color modes.
- 3) analyze preliminary design process.
- 4) create rollover states.

**Reference Books:**

- 1) Rall, Hannes. *Animation: From concepts and production*. CRC Press, 2017.
- 2) Katatikarn, Jasmine, and Michael Tanzillo. *Lighting for animation: The art of visual storytelling*. CRC Press, 2016.
- 3) Kenney, Keith. *Visual communication research designs*. Routledge, 2010.
- 4) Wells, Paul. *The fundamentals of animation*. Ava Publishing, 2006.

## MAST- 305 E1: 3D PRODUCTION PROCESS

**Course Objectives:** Student will be able to:-

- 1) understand the concepts of 3D.
- 2) demonstrate the ability to map detailed textures to 3D objects in theoretical way.
- 3) study theoretical knowledge on Lighting and Rendering for the 3D objects and 3D environment.
- 4) understand the Basics of Animation.

Credits=4	<b>SEMESTER-III</b> <b>MAST- 305 E1: 3D PRODUCTION PROCESS</b>	<b>No. of hours per unit/ credits</b>
<b>Credit –I UNIT I</b>	<b>Introduction to 3D</b>	<b>(15)</b>
	Types of 3D Modelling - Digital Sculpting - Procedural Modelling - Image Based Modelling - Tool-Box - Navigate the Camera - Show or Hide - Change the Display of Objects - Display Scene Information - Level of Detail (LOD) - Walk Through The Scene - Create and Edit Objects - Types of Objects - Create Basic 3D Objects and Curves- Duplicate - Cut, Copy, Paste - Delete, Undo, Redo & Repeat - Edit Components Numeric Values Directly - Component Editor - Transform Objects and Components - Change The Pivot Point - Align and Snap - Matching object attribute values.	
<b>Credit –1 UNIT II</b>	<b>Modelling</b>	<b>(15)</b>
	Polygonal Modelling - Editing Polygons - Transforming Polygonal Components - Combining, Separating, and Splitting - Smoothing polygons - Colouring Polygons - Retopology - Polygonal Modelling Reference - Modelling Menu Set - Polygonal Modelling Tools - Nurbs Modelling - Creating NURBS Surfaces - Editing NURBS - UV's - Mapping UV's - Editing UV's - Sculpt a mesh - Sculpt using symmetry.	
<b>Credit –1 UNIT III</b>	<b>Shading and Texturing</b>	<b>(15)</b>
	Surface material Attributes - Surface Material Specular Shading Attributes Surface Materials- Displacement Materials - Volumetric Materials - Shading - Assign Materials To The Surface - Create Layer - Shaders - Reflect Or Refract Light - Overview of texture nodes - 2D textures - Environment Texture - Layered Texture - File Textures - Procedural Textures - Shading Editor – Hypershade.	
<b>Credit –1 UNIT IV</b>	<b>Animation</b>	<b>(15)</b>
	Animation Basics - Animated rotation - Create Time Warping Effects - Edit animation preferences - Playback Animation - Keyframe Animation	

- Edit Curves - Driven Keys - Breakdowns – In Between - Time Editor - Character Animation - Skeletons - Skeleton components - Skinning - IK handles overview - HumanIK - Constraints - Graph Editor - Animation Layers And Animation File Formats - Base Animation - Animation Layer Editor.
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**Course Outcomes:** Student should be able to:-

- 1) understand the concept of 3D Three Dimension in General.
- 2) understand the 3D Industrial Pipeline process and ability to apply the pipeline in their 3D projects.
- 3) illustrate Tools and Techniques.
- 4) develop 3D models and its animation.

**Reference books:**

- 1) Beane, Andy. *3D animation essentials*. John Wiley & Sons, 2012.
- 2) Rall, Hannes. *Animation: From concepts and production*. CRC Press, 2017.
- 3) Chandramouli, Magesh. *3D Modeling & Animation: A Primer*. CRC Press, 2021.
- 4) Watkins, Adam. *Creating games with Unity and Maya: how to develop fun and marketable 3D Games*, Taylor & Francis, 2011.



## MAST- 305 E2: ADVANCED SCRIPTING LANGUAGE

**Course Objectives:** Student will be able to:-

- 1) illustrate the process of structuring the data using lists, tuples and dictionaries.
- 2) learn how to identify Python object types.
- 3) understand how to use indexing and slicing to access data in Python programs.
- 4) understand the structure and components of a Python program.

Credits=4	SEMESTER-III MAST- 305 E2: ADVANCED SCRIPTING LANGUAGE	No. of hours per unit/ credits
Credit –1 UNIT I	<b>Introduction</b>	(15)
	Introduction to python Language, Download and install Python, Syntax, Variables, Data Types, Built in data types (Numeric, Boolean, Text, Sequence, Set, Mapping, None)	
Credit –1 UNIT II	<b>Numpy</b>	(15)
	Introduction, Installation of Numpy, NdArray, NdArray Attributes, Indexing and Slicing, Mathematical Functions, Arithmetic Operators, String Functions, Matrix Library, Linear Algebra	
Credit –1 UNIT III	<b>Pandas</b>	(15)
	Introduction, Installation of pandas, Data structure(Series, Data frames), Basic functionality, Descriptive statistics, Function applications, Pandas indexing	
Credit –1 UNIT IV	<b>Loop and Matplotlib</b>	(15)
	For loop, While loop , Nested loop, Loop control statements(If statement, Break statement, Continue statement, Pass statement), Function(Built in function, User defined function), Lambda function, Pyplot, Plotting, Markers, Line, Lables, Grid, Subplot, Scatter, Bars, Histogram, Pie chart.	

**Course Outcomes:** Student should be able to:-

- 1) interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements.
- 2) express proficiency in the handling of data structure and function.
- 3) determine the methods to create and manipulate Python programs.
- 4) articulate the programming concepts like loop, control structure and graph analysis in Python.

**Reference books:**

- 1) Lutz, Mark. *Programming python*. " O'Reilly Media, Inc.", 2001.
- 2) Gowrishankar, S., and A. Veena. *Introduction to Python programming*. CRC Press, 2018.

- 3) Kuhlman, Dave. *A python book: Beginning python, advanced python, and python exercises*. Lutz: Dave Kuhlman, 2009.
- 4) Ceder, Naomi. *The quick Python book*. Simon and Schuster, 2018.

## MASP- 306 PRACTICAL COURSE III: LAB V

**Course Objectives:** Student will be able to:-

- 1) understand the standards and innovative techniques for game programming.
- 2) develop creativity and individuality in problem solving and in performing tasks.
- 3) develop computer game design.
- 4) construct ideas and techniques and get them ready to develop games that are more inventive, entertaining, and satisfying.

Credits=2	<b>SEMESTER-III</b> <b>MASP- 306 PRACTICAL COURSE III: LAB V</b>	<b>No. of hours per unit/ credits</b>
<b>Credit –1 UNIT I</b>	<b>3D GAME DESIGN</b>	<b>(15)</b>
	<ol style="list-style-type: none"> <li>1) Create Player Movement in Unity for 3D Game.</li> <li>2) Create Grounding Check in Unity for 3D Game.</li> <li>3) Create Moving Platforms in Unity for 3D Game.</li> <li>4) Create Walking Enemies in Unity for 3D Game.</li> <li>5) Apply Sounds &amp; Music in Unity.</li> <li>6) How to create Animation Transitions in Unity.</li> <li>7) How to make Smoke in unity using Particle System.</li> <li>8) How to create Unity Shader Graph - Waterfall Effect.</li> <li>9) How to create CONTROLLER INPUT in Unity.</li> <li>10) Create a scene using Terrain Tools to Create 3D Landscapes.</li> </ol>	
<b>Credit –1 UNIT II</b>	<b>ADVANCED 2D PRODUCTION PROCESS</b>	<b>(15)</b>
	<ol style="list-style-type: none"> <li>1) Create Character Vector &amp; Rig</li> <li>2) Create Head rotation animation</li> <li>3) Create Windmill animation with background</li> <li>4) Create Boy on scooter animation</li> <li>5) create side view Character Walk Cycle</li> <li>6) create 3/4 th view Character Run cycle</li> <li>7) Crete Animation of Skiing Man</li> <li>8) create side view Animal Walk Cycle</li> <li>9) create 3/4 th view Animal Run cycle</li> <li>10) Create scene using dialog and compiling all scenes.</li> </ol>	

**Course Outcome:** Student should be able to:-

- 1) study on games types and Acquire the skills to enhance, re-touch images/photographs, creative effects to images & use Colour Mixer.

- 2) understand procedure of making games using games engines.
- 3) create game models using autodesk amaya and 3D unity applications.
- 4) create Advance 2D animations with various outputs.

## MASP- 307 PRACTICAL COURSE III: LAB VI

**Course Objectives:** Student will be able to:-

- 1) learn and understand the basics of digital electronics.
- 2) design basic logic, combinational and sequential circuits.
- 3) develop skills for creating 3D assets.
- 4) implement Lighting and Rendering process.

Credits=2	<b>SEMESTER-III MASP- 307 PRACTICAL COURSE III: LAB VI</b>	<b>No. of hours per unit/ credits</b>
<b>Credit –1 UNIT I</b>	<b>VISUAL EFFECTS</b>	<b>(15)</b>
	<ol style="list-style-type: none"> <li>1) Reading in footage and project setting in Nuke</li> <li>2) Remove green screen using nuke software.</li> <li>3) Creating a Tornado effect in Nuke.</li> <li>4) Creating a live action torch shot with animated meshes.</li> <li>5) Compositing fire in nuke</li> <li>6) Rotoscoping with Nuke</li> <li>7) Create a tools with blinksript in Nuke</li> <li>8) Basic of CG compositing in Nuke.</li> <li>9) 3D camera tracking in Nuke Studio.</li> <li>10) Remove unwanted elements with nuke’s cleanup tool.</li> </ol>	
<b>Credit –1 UNIT II</b>	<b>VISUAL DESIGN</b>	<b>(15)</b>
	<ol style="list-style-type: none"> <li>1) Create posters using principles like Positive &amp; Negative space, Emphasis, Repetition and contrast.</li> <li>2) Design Icons for the given concepts.</li> <li>3) Color the given Images with Mono chromatic colors scheme.</li> <li>4) Color the given Image with triadic colors scheme.</li> <li>5) Color the given Image with minimalistic colors scheme</li> <li>6) Shade the given image as per instructions</li> <li>7) Paint textures as per given instruction</li> <li>8) Design posters with Dots and lines for the given themes</li> <li>9) Create patterns for gift wrapping paper.</li> <li>10) Create Expressive poster using text for the given concepts.</li> </ol>	
	<b>3D PRODUCTION PROCESS</b>	
	<ol style="list-style-type: none"> <li>1) Create 3D model Surface of mud pot set using the given reference.</li> <li>2) Create A Model of Dining Table set using basic polygon modeling tools.</li> <li>3) Make a model of soda can and apply the given texture using UV Unwrapping techniques.</li> <li>4) Create 3D model of Wine Bottle and Glass, Render it using Maya mental ray Glass Materials.</li> </ol>	

	<ol style="list-style-type: none"> <li>5) Create 3D model of Reading Table and props required on it and set up the Lighting for the same and render it.</li> <li>6) Set up a 3-point light setup for Given product model and take Render Images for product modeling.</li> <li>7) Create Simple Cartoon Character and Give appropriate Texture and Render it.</li> <li>8) Make Realistic Ball Bounce Animations For Different Balls using Keyframe Animation.</li> <li>9) Set up Interior and Exterior Lighting For The Given 3D Building model Using Background Shader and Surface Shaders.</li> <li>10) Make a 3D model of ROBO, Set up Rig and Controls for it and make Walk cycle Animation.</li> </ol>	
	<b>ADVANCED SCRIPTING LANGUAGE</b>	
	<ol style="list-style-type: none"> <li>1) Write python program to Hello World using string variable.</li> <li>2) Write python program to store data in list and then try to print them.</li> <li>3) Write python program to do basic trim and slice on string.</li> <li>4) Write python program to print list of numbers using range and for loop.</li> <li>5) Write python program to store strings in list and then print them.</li> <li>6) Write python program to check whether the given number is even or not.</li> <li>7) Write python program to convert the temperature in degree centigrade to Fahrenheit</li> <li>8) Study on Channel flow, channel role &amp; membership.</li> <li>9) Study on technological impact on marketing.</li> <li>10) Study on Marketing Channels.</li> </ol>	

**Course Outcome:** Student should be able to:-

- 1) explore the visual design process for a digital product from initial concept to comprehensive design.
- 2) develop autonomy in selecting and applying visual design conventions and procedures to make visual design artworks.
- 3) create basic 3D models and animations.
- 4) create a 3D environment featuring lighting and textures.

## M.Sc. II SEMESTER IV

### MAST- 401 3D GAME DEVELOPMENT

**Course Objectives:** Student will able to:-

- 1) memorize programming and flash gaming pre-production pipeline.
- 2) understand use of adobe flash for real time applications.
- 3) remember Keyboard Input and Audio Output.
- 4) understand apply the concepts for game development.

Credits=4	SEMESTER-IV MAST- 401 3D GAME DEVELOPMENT	No. of hours per unit/ credits
<b>Credit –1 UNIT I</b>	<b>Basics of 3D Game Development</b>	<b>(15)</b>
	3D game -project setup in unity ,importing the toy car ,making the world in blender ,making textures in gimp ,materials in unity, improving the car gameplay , creating buildings with the array modifier sound.	
<b>Credit –1 UNIT II</b>	<b>3D Coordinates</b>	<b>(15)</b>
	3D in blender,3d in unity ,camera views , 3D assets ,designing a 3D remake , 3D game: dot game , remaking dot game ,controls , the camera ,First Playable ,moving the camera , three levels , arrows in unity: arrow movement and direction , arrows in unity: collision detection for arrows .	
<b>Credit –1 UNIT III</b>	<b>Game Structure</b>	<b>(15)</b>
	Game state ,game over, More Game Objects and a Large Level, Sound and Music, GUI and cutscene , title screen ,menus ,scoring ,hiding the mouse cursor ,ending cutscene and timeline ,cinemachine , integrating the ending cutscene .	
<b>Credit –1 UNIT IV</b>	<b>3D Adventure</b>	<b>(15)</b>
	Character Controller ,importing a character from the asset store , character movement, idle, walk, and run animations 3D gravity, enemies ,enemy movement, a 3D puzzle room ,puzzle design rules , puzzle room graphics ,building the puzzle room.	

**Course Outcomes:** Student should be able to:-

- 1) design characters, background, colour scheme, Game storyboards and basic audio requisites for Gaming industry
- 2) analyze the concepts of programming for game development.
- 3) apply camera views for game development.
- 4) create game for PC and mobile (Android).

**Reference Books:**

- 1) Menard, Michelle, and Bryan Wagstaff. *Game development with Unity*. Boston, MA, USA: Course Technology, 2012.
- 2) Plowman, Justin. *3D Game Design with Unreal Engine 4 and Blender*. Packt Publishing Ltd, 2016.
- 3) Goldstone, Will. *Unity game development essentials*. Packt Publishing Ltd, 2009.
- 4) Blackman, Sue. *Beginning 3D Game Development with Unity 4: All-in-one, multi-platform game development*. Apress, 2013.



## MAST- 402 E1 3D POST PRODUCTION PROCESS

**Course Objectives:** Student will be able to:

- 1) understand physics behind dynamics and its implementation.
- 2) develop dynamics with soft bodies and experiment with different fields and goal.
- 3) understand how these cellular components are used to generate and utilize energy in cells.
- 4) apply 3d Dynamics technology effectively in the field of animation.

Credits=4	<b>SEMESTER-IV</b> <b>MAST- 402 E1 3D POST PRODUCTION PROCESS</b>	<b>No. of hours per unit/ credits</b>
<b>Credit –1</b> <b>UNIT I</b>	<b>Introduction to dynamic Animation</b>	<b>(15)</b>
	About Dynamics, Particles, Particle objects, Creating particles, Set display attributes, Animate the particles, Render the particles Advanced particle topics, Scale the effect of dynamics, Combine keyed transform attributes and dynamics, Parent an object to dynamic motion.	
<b>Credit –1</b> <b>UNIT II</b>	<b>Effects</b>	<b>(15)</b>
	Dynamics Effects, Fire, Work with effects, Use smoke effects, Lightning , Curve Flow, Surface Flow shatter , to fields , Surface Flow procedures, Avoid twists in the flow manipulators, Menus. Cloth Workflow, Cloth Settings, Material, Damping, Pinning, Cloth Pinning to an Armature, Dynamic Mesh, Collisions, Troubleshooting, Using Simulation to Shape/Sculpt a Mesh.	
<b>Credit –1</b> <b>UNIT III</b>	<b>Particles Animation</b>	<b>(15)</b>
	Particle collisions, Emitters, Goals, Particle collisions , Rendering particles, Windows and Editors, Nodes, Particle nodes, Motion Path Animation, Animation Using Expressions.	
<b>Credit –1</b> <b>UNIT IV</b>	<b>Rendering and Compositing</b>	<b>(15)</b>
	How Materials Works, Animated Mesh/Export, Volume Initialization Type, Fluid Domain, Resolution, Display quality, Time, Generate Speed Vector, Reverse fluid frames, Viscosity Presets, Fluid Boundary, Fluid Particles, Fluid Object Fluid Obstacle, Fluid Inflow / Outflow, Fluid Control, Baking, Eevee, cycle, workbench, camera, lights, material, shader node, color management, restyle, layer and passes, sidebar, realbar compositor, output.	

**Course Outcomes:** Student should be able to:-

- 1) understand and use basic terms for motion of particles, vector functions.
- 2) apply physical simulation to 3D Objects in your scene.
- 3) create Passive Body and Active Body.
- 4) design and control the flow of the fluid.

**Reference Books:**

- 1) Derakhshani, Dariush. *Introducing Autodesk Maya 2013*. John Wiley & Sons, 2012.
- 2) Liu, Jun, and Cheng Mao Li. "The application of Maya in film 3D animation design." In *Key Engineering Materials*, vol. 480, pp. 998-1002. Trans Tech Publications Ltd, 2011.
- 3) Watkins, Adam. *Getting Started in 3D with Maya: Create a Project from Start to Finish—Model, Texture, Rig, Animate, and Render in Maya*. CRC Press, 2012.
- 4) Roy, Kenny. *Finish Your Film! Tips and Tricks for Making an Animated Short in Maya*. CRC Press, 2014.

## MAST- 402 E2      3D TRACKING AND MATCHMOVE

**Course Objectives:** Student will be able to:-

- 1) classify tracking techniques.
- 2) execute camera extraction.
- 3) understand 2d & 3d tracking, exporting data for 3d.
- 4) interpret the process of compositing packages.

Credits=4	<b>SEMESTER-IV</b> <b>MAST- 402 E2      3D TRACKING AND MATCHMOVE</b>	<b>No. of hours per unit/ credits</b>
<b>Credit –1 UNIT I</b>	<b>Overview of Matchmove</b>	<b>(15)</b>
	The basics of matchmoving, matchmoving process, Evaluate the Footage, gathering data , Applying Information, Define the Camera, matchmove in the production pipeline, 3D equalizer Interface, interface components, importing image sequences, exporting buffer compression file, lens distortion, motion blur, importing models, creating cameras, adding rough geometry and refining camera, 2D tracking, 3d calibration, 3D Nulls, calibration and camera moves, environment in 3d equalizer.	
<b>Credit –1 UNIT II</b>	<b>2D tracking</b>	<b>(15)</b>
	attribute editor, object browser, point browser, deviation browser, Timeline editor, image controls window, manual tracking controls , 3Dequalizer preferences, navigating with navigation pane, tracking, point objects, point groups, search patterns, working with timeline editor, camera curves, 3d orientation, parameter adjustments, distortion grid, overview controls, 3d models, basics of 2d tracking, tracking and its features, tracking direction, Marker Tracker, Edge/Corner tracker, pattern tracker, tracking box size, view options, Reference pattern, creating keyframes, stereo tracking, gaps.	
<b>Credit –1 UNIT III</b>	<b>Rotomation</b>	<b>(15)</b>
	Concept of Parallax for Camera Tracking, Solving Lens Grids, Distortion, types of distortion, working with distortion, camera solve, Automatic tracking, motion capture, image warp tool, custom attribute editor, Root paint, Chind points and bones, animation carves, alternative solvers Child point mode, color correcting plates, camera solvers.	
<b>Credit –1 UNIT IV</b>	<b>Generating Output</b>	<b>(15)</b>
	Fine-Tuning object, Curves Setting, Track Distort Footage, Solve Distort Footage, working with lineup in 3DE4, exporting to Maya, add tracker point in Maya, Camera Setting and Attributes, Track using camera, Model Creation, Applying Texture, Render Setting for Footage, Basic Object Tracking, Tracking Background, adjusting tracker in Foreground,	

Middle and Background, Placing and rendering Cones, Wireframe Mode, Final Output Setup and Export
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**Course Outcomes:** Student should able to:-

- 1) design publicity designing, promotion of Projects/Products which plays an important role in the success of the Project.
- 2) understand about the Film Criticism /developing reviews.
- 3) demonstrate Photographic Principles.
- 4) understand visual effects.

**Reference Books:**

- 1) Hornung, Erica. *The Art and Technique of Matchmoving: Solutions for the VFX Artist*. Taylor & Francis, 2013.
- 2) Dinur, Eran. *The Filmmaker's guide to visual effects: the art and techniques of VFX for directors, producers, editors and cinematographers*. Taylor & Francis, 2017.
- 3) Okun, Jeffrey A., and V. E. S. Susan Zwerman, eds. *The VES handbook of visual effects: industry standard VFX practices and procedures*. Routledge, 2020.
- 4) Gress, Jon. *[digital] Visual Effects and Compositing*. New Riders, 2014.

## MASP- 403 PRACTICAL COURSE IV: LAB V

**Course Objectives:** Student will be able to

- 1) develop Particles, Fluid Stimulation, paint Effects, MASH, Cloth Stimulation.
- 2) analyze dynamic bodies based on physics and their collisions.
- 3) create the specific effect of forces on the motion of an element by applying the laws of motion and conservation of energy and momentum.
- 4) understand how these cellular components are used to generate and utilize energy in cells.

Credits=2	<b>SEMESTER-IV MASP- 403 PRACTICAL COURSE IV: LAB V</b>	<b>No. of hours per unit/ credits</b>
<b>Credit –1 UNIT I</b>	<b>3D GAME DEVELOPMENT</b>	<b>(15)</b>
	<ol style="list-style-type: none"> <li>1) Creating basic terrain in unity.</li> <li>2) Sculpting, adding textures, adding trees and grass to the terrain using unity.</li> <li>3) Creating a 3D character for your game.</li> <li>4) Create a racing track for a 3D racing game.</li> <li>5) Create a speed level design in unity.</li> <li>6) Create a forest in unity.</li> <li>7) Create awesome third person shooter controller.</li> <li>8) Design perfect weapon aiming for your shooting game.</li> <li>9) Make a mechanical walking creature.</li> <li>10) Creating a 3D puzzle game in unity.</li> </ol>	
<b>Credit –1 UNIT II</b>	<b>3D POST PRODUCTION PROCESS</b>	<b>(15)</b>
	<ol style="list-style-type: none"> <li>1) How to create mash dynamic.</li> <li>2) How to create Dynamic text.</li> <li>3) How to create Maya hair and dynamic simulation.</li> <li>4) How to create snow.</li> <li>5) How to make dynamic Ocean and floting boat..</li> <li>6) Dynamic fan animation in maya and annold render.</li> <li>7) How to create Particle simulation.</li> <li>8) How to create Cloth simulation.</li> <li>9) How to make rain animation.</li> <li>10) How to render out your animation sequence.</li> </ol>	

	<b>3D TRACKING AND MATCH MOVE</b>	
	<ol style="list-style-type: none"> <li>1) Autotracking in 3D equalizer.</li> <li>2) Working with 2D tracks tools in 3D equalizer.</li> <li>3) Working with lineup controls in 3D equalizer.</li> <li>4) Lens distortion in 3d equalizer.</li> <li>5) Working with multiple point group in 3d equalizer.</li> <li>6) Reconstructing a set from Reference frames.</li> <li>7) Motion capture in 3d equalizer.</li> <li>8) Set up the render setting of the footage.</li> <li>9) Create a modeling set up using polygon.</li> <li>10) Working with rotomation editor.</li> </ol>	

**Course Outcome:** Student should be able to

- 1) understand the rotomotion editor.
- 2) discover the significance of tools and technique in 3D dynamics.
- 3) appraise the strategies for analyzing Special Effect.
- 4) understand and use basic terms for the description of the motion of particles, vector functions and the fundamental laws of Newtonian mechanics.

# **MASP- 404 MEJOR PROJECT**