

UNIVERSITY OF MYSORE
Established: 1916

Vishwavidyanilaya Karyasoudha
Crawford Hall, Mysore-570 005
Dated: 18.08.2021

No.AC.2(S)/151/2021-22

NOTIFICATION

Sub: Change of nomenclature from the existing "M.S Animation to M.Sc in Animation" from the academic year 2021-22.



- Ref:** 1. Decision of Board of Studies in Information Technology and Multimedia (CIST) (PG) meeting held on 27.11.2020.
2. Decision of the Faculty of Science & Technology Meeting held on 08.02.2021.
3. Decision of the Academic Council meeting held on 07.04.2021.

The Board of Studies in Information Technology and Multimedia (CIST) (PG) which met on 27.11.2020 has recommended to Change the nomenclature from "M.S Animation to M.Sc in Animation" for the PG Program.

The Faculty of Science and Technology and Academic Council meeting held on 08.02.2021 and 07.04.2021 respectively have approved the above said proposal and the same is hereby notified.

The detailed Syllabus and Curriculum of Information Technology and Multimedia (CIST) (PG) course is annexed. The contents may be downloaded from the University Website i.e., www.uni-mysore.ac.in.

DRAFT APPROVED BY THE REGISTRAR


DEPUTY REGISTRAR (ACADEMIC)
Deputy Registrar (Academic)
University of Mysore
Mysore-570 005


To:

1. The Registrar (Evaluation), University of Mysore, Mysore.
2. The Dean, Faculty of Science & Technology, DoS in Psychology, MGM.
3. The Chairperson, BoS in Information Technology and Multimedia (CIST) (PG), Manasagangotri, Mysore.
4. The Director, Centre for Information Science & Technology (CIST), MGM.
5. The Deputy/Assistant Registrar/Superintendent, AB and EB, UOM, Mysore.
6. The P.A. to the Vice-Chancellor/Registrar/Registrar (Evaluation), UOM, Mysore.
7. Office file.

UNIVERSITY OF MYSORE

**REGULATIONS AND SYLLBUS
FOR
M.Sc. (ANIMATION)**

Choice Based Credit System

Effective from the Academic Year 2021-22

UNIVERSITY OF MYSORE

GUIDELINES AND REGULATIONS LEADING TO M.Sc. IN ANIMATION

(TWO YEARS - SEMESTER SCHEME UNDER CBCS)

Program Details

Name of the Department	: Center for Information Science and Technology (CIST)
Subject	: Animation
Faculty	: Science and Technology
Name of the Course	: MSc (Animation)
Duration of the Course	: 2 years- divided into 4 semesters

Programme Outcomes

- Be aware of various concepts of Animation and its relevance as a distinct discipline.
- Know the conceptual and functional/practical knowledge in the field of Animation, including various theories/ techniques/tools related to modern development.
- Demonstrate proficiency in unique aspects related to the core concepts
- Have an in-depth understanding of various aspects of this subject and acquire mastery of course contents by utilizing the popular literature sources.
- Work ethically and professionally individually or as a part of a team by complying with the information resources efficiently and effectively.
- Be able to carry out research work in this and allied disciplines.

Programme Specific Outcome

- Create animated sequences from the development of the original concept through design to final film or video production.
- Communicate ideas, believable action, and emotion effectively by employing principles of animation and performance in all aspects of drawing.
- Integrate the concepts, principles, and theories involved in the physics of animation in all aspects of drawing.
- Refine personal narrative voice that holistically integrates the elements of storytelling and performance to actively engage the audience.
- Create 2D and 3D characters and environments that reflect the integration of graphic clarity, design principles, performance principles, and theoretical constructs.
- Design layouts and backgrounds that incorporate principles of composition, perspective, and colour, with speed, accuracy, and dexterity, using a variety of media.
- Create an animated film incorporating a range of artistic styles and techniques, reflecting the principle that form follows function.

- Coordinate and manage the production of a student film, including the aspects of cinematography, art direction, and editing.
- Collaborate effectively with peers on film projects.
- Use critical thinking skills and problem-solving strategies in all dimensions of development and production.
- Manage targets within the production schedule to effectively achieve completion of required tasks.
- Communicate ideas, emotions, and intent effectively in visual, oral, and written forms.
- Generate work that reflects initiative, creativity, adaptability, and personal style.
- Create an animation that incorporates the basic principles of constructive anatomy and drawing using the economy of expression.
- Incorporate technology effectively in the development of animation projects.

Programme Pedagogy

- Involves meaningful incorporation of teaching and learning materials in addition to the use of textbooks and reference works.
- Standardized curriculum with a centralized examination under an excellent CBCS regulation influences the teacher to help students to learn almost all aspects of the subject.
- The teaching learning involves three components.
- Lectures with intellectual inputs form the first component.
- This method provides Receptive Instructions to students.
- The second component is the tutorials.
- This method provides Directive Instruction to students.
- The third major component is the practical orientation with skills and participatory learning works.
- This method involves exploratory Instructions.

UNIVERSITY OF MYSORE
Programme Pattern and Scheme of Examination under CBCS (2021-22)
MSc (ANIMATION)

Semester	Hardcore	Credit Pattern	Softcore	Credit Pattern	Open Elective	Minimum Total Credits per semester
I	Basics of Animation	2:0:2	Digital Image Editing	0:0:2	-	5 x 4 = 20 2 x 2 = 04 24
	Principles of Drawing and Anatomy	2:1:1	Graphic Design Techniques	0:0:2		
	Visual Communication	3:1:0	3D Modeling	0:0:2		
	Basics of 3D Designing	2:0:2	Clay Modeling	0:0:2		
	2D Animation	2:0:2	---	---		
II	Script Writing, Story, Story Boarding	2:0:2	3D Modeling and Texturing	1:0:1	4:0:0	4 x 4 = 16 2 x 2 = 04 1 x 4 = 4 24
	Surfacing, 3D Lighting, Rendering	2:0:2	3D Animation	1:0:1		
	Art of Film Making	2:1:1	Motion Graphics	1:0:1		
	Character Setup and 3D Character Animation	2:0:2	Digital Sculpting	1:0:1		
III	Match Moving	2:0:2	Rotoscopy	1:0:1		4 x 4 = 16 2 x 2 = 04 20
	3D Character Effects	2:0:2	Digital Editing	1:0:1		
	3D Visual Effects/VFX	2:1:1	Toony Animation	1:0:1		
	Compositing Techniques	2:0:2	Sound Editing	1:0:1		
IV	3D Animation- Project, Project Report/Dissertation, Presentation and Viva	0:1:3	Internship	0:0:4		1 x 4 = 4 1 x 4 = 4 08
			Research Methods-Dissertation (Report, Presentation and Viva)	1:1:2		

I Semester

Sl. No.	Title of the Paper	Course Type	Credit Pattern			Total Credits
			L	T	P	
1	Basics of Animation	HC	2	0	2	4
2	Principles of Drawing and Anatomy	HC	2	1	1	4
3	Visual Communication	HC	3	1	0	4
4	Basics of 3D Designing	HC	2	0	2	4
5	2D Animation	HC	2	0	2	4
5	Digital Image Editing	SC	0	0	2	2
6	Graphic Design Techniques	SC	0	0	2	2
7	3D Modeling	SC	0	0	2	2
8	Clay Modeling	SC	0	0	2	2

II Semester

Sl. No.	Title of the Paper	Course Type	Credit Pattern			Total Credits
			L	T	P	
1	Script Writing, Story, Story Boarding	HC	2	0	2	4
2	Surfacing,3D Lighting, Rendering	HC	2	0	2	4
3	Art of Film Making	HC	2	1	1	4
4	Character Setup and 3D Character Animation	HC	2	0	2	4
5	3D Modeling and Texturing	SC	1	0	1	2
6	3D Animation	SC	1	0	1	2
7	Motion Graphics	SC	1	0	1	2
8	Digital Sculpting	SC	1	0	1	2

III Semester

Sl. No.	Title of the Paper	Course Type	Credit Pattern			Total Credits
			L	T	P	
1	Match Moving	HC	2	0	2	4
2	3D Character Effects	HC	2	0	2	4
3	3D Visual Effects	HC	2	1	1	4
4	Compositing Techniques	HC	2	0	2	4
6	Rotoscopy	SC	1	0	1	2
7	Digital Editing	SC	1	0	1	2
8	Toony Animation	SC	1	0	1	2
9	Sound Editing	SC	1	0	1	2

IV Semester

Sl. No.	Title of the Paper	Course Type	Credit Pattern			Total Credits
			L	T	P	
1	3D Animation-Project, Project Report and Viva	HC	0	1	3	4
3	Internship	SC	0	0	4	4
4	Research Methods-Dissertation (Report, Presentation and Viva)	SC	1	1	2	4

Open Elective papers for the students of other departments						
II SEMESTER	Digital Image Editing Using Photoshop	OE	3	1	0	4
III SMESTER	Audio-Video Editing Tools & Technology	OE	3	1	0	4

DETAILED SYLLABUS FOR M. Sc. (ANIMATION) PROGRAMME

FIRST SEMESTER

HARD CORE

HC- 1.1 : BASICS OF ANIMATION (2:0:2)

COURSE OUTCOME:

On the successful completion of this program, each student will be able to:

- Understand the value of reflection and critical judgment in creative work.
- Have thorough knowledge of animation techniques to prepare the groundwork to take on actual projects with ease.
- Build their confidence and prepare for tougher jobs.
- Develop competencies and skills needed for becoming an effective animator.
- Emphasize conceptualization, visual aesthetics, and creativity.

COURSE CONTENT:

UNIT – I:

Introduction to animation, Heritage of Animation, Dawn of Digital Animation, Digital effects of 3D Animation, Rotoscope to Motion Capture, Becoming an Animator, Becoming an Actor, Becoming a Storyteller, Becoming a Creative Practitioner, Applications of Animation- Entertainment, Advertisement, Education, Medical Practice and Engineering.

UNIT – II:

Basic Principles in animation, Squash and stretch, Anticipation, Staging, Straight ahead and pose to pose, Follow through and overlapping action, Slow in and slow out, Arcs, Secondary action, Timing, Exaggeration, Solid drawing, Appeal, Mass and weight, Character acting, Volume, Line of action, Path of action, Walk cycles-animal and human.

UNIT – III (Tools of Animation)

The use of Live Action in Animation Humans and Animals-Quick Studies from real life, Sequential movement drawing, Caricaturing the Action, Thumbnails, Drama and psychological effect, Motion Studies, Drawing for motion, The Body language, Facial expressions and Lip sync, Introduction to traditional and digital equipment- The animator's drawing tools, The animation table (light box, Field charts, Exercises and warm ups on pegging sheet, Line tests, The exposure sheet ("X" sheet),.

UNIT – IV (Animation Pipeline)

Preproduction- Idea, Story, R&D, Script to screenplay, Storyboards. Production Layout, 3D Model, Texturing(Surfacing), Rigging/setup, Animation, 3D Visual effects, Lighting and Rendering and Post production – Colour Correction, Audio Video Editing, Final Output.

Selected Readings:

1. Thomas, F., Johnston, O., & Thomas, F. (1995). *The illusion of life: Disney animation* (pp. 306-312). New York: Hyperion.
2. Laybourne, K., Canemaker, J., & Griffin, G. (1998). *The animation book: a complete guide to animated filmmaking--from flip-books to sound cartoons to 3-D animation*. New York: Three Rivers Press.
3. Goldberg, E. (2008). *Character Animation Crash Course!*. Silman-James Press, U.S.
4. Patmore. (2003). *Complete Animation Course*. Barron's Educational Series.
5. Shukla, A. S. (2009). *Handbook of Multimedia and Animation*. Rajat Publications.
6. Whitaker, H., & Halas, J. (2013). *Timing for animation*. CRC Press.
7. Canemaker, J. (1982). *Treasures of Disney animation art*. Artabras.
8. White, T. (1988). *The Animator's Workbook: Step-By-Step Techniques of Drawn Animation* (Reprint edition). Watson-Guption.
9. Williams, R. (2009). *The Animator's Survival Kit: A Manual of Methods, Principles and Formulas for Classical, Computer, Games, Stop Motion and Internet Animators* (3rded.). Faber.
10. School, Cgt.-A. & V. O. (n.d.). *The 12 principles of animation*.
11. Williams, R. E. (2021). *The Animator's Survival Kit: Runs, Jumps and Skips*. Faber & Faber.

List of Practicals:

Sl.No.	Practicals
1	Bouncing Ball
2	Bouncing Ball (Heavy and Light Ball)
3	Bouncing Ball Obstacle course

4	Pendulum
5	Ball and Tail Animation
6	Vanilla Walk cycle

HC- 1.2: PRINCIPLES OF DRAWING AND ANATOMY (2:1:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Understand visual analysis.
- Design layouts and backgrounds that incorporate principles of composition, perspective, and colour, with speed and accuracy.
- Design characters in different perspectives according to the story and scene.
- Plan and draw the storyboard based on the movie scripts.
- Improve hand-eye coordination.

COURSE CONTENT:

UNIT – I:

Introduction to sketching and drawing- Introduction to basic drawing techniques including proportions and Line, Using Pencils for shading, Sketching of Moving Objects - People And Animals, Proportion in portrait drawing, Highlighting and shadows, Drawings with the help of basic shapes, Understanding of the relationship of bones and muscles at rest and in the movement to able to translate and maintaining correct volumes.

UNIT – II:

Introduction to Perspectives: Perspective in 1 point, Perspective in 2 point, Perspective in 3 point, Eye levels, Vanishing point, Significance of Perspective in animation and composition, Humans and animal forms in perspective, Perspective- blocks, boxes and shapes, Scale diagrams in perspective, Different viewpoints, Importance of eye level.

UNIT – III:

The first steps in colour drawing, Understanding the Colour theory by studying the colour wheel, Illusion drawings, communicating with colour, Colour and mood, Colour and painting

styles, Colour and compositions, Colour in action, Realism, immersion and believability in colour scheme, Digital colour correction.

UNIT – IV:

Studying Human and animal movement through sequential drawings, gesture drawing,– fundamentals, Different muscles in Arms, Legs, Upper body, Face, Exaggeration, Attitude, Silhouettes, Boundary breaking exercises and warm ups, gesture drawing, Line drawing and quick sketches, Caricaturing, Drawing from observation, memory and imagination.

Selected Readings:

1. Stanchfield, W. (2013). *Drawn to Life: 20 Golden Years of Disney Master Classes Volume 1: Volume 1: The Walt Stanchfield Lectures (Vol. 1)*. Taylor & Francis.
2. Edwards, B. (2012). *Drawing on the Right Side of the Brain: The Definitive (4thed.)*.
3. Morris, D. (1979). *Manwatching: A Field Guide to Human Behavior*. Harry N Abrams Inc.
4. Stanchfield, W. (2009). *Drawn to Life: 20 Golden Years of Disney Master Classes: Volume 2*
5. Wainwright, G. (2010). *Understand Body Language: Teach Yourself*. Teach Yourself.
6. Nicolaides, K. (1941). *The natural way to draw: A working plan for art study*. Houghton Mifflin Harcourt.

List of Practicals:

Sl.No.	Practicals
1	1 point, 2 point and 3 point perspective drawings
2	Multi point perspective drawings
3	Anatomical drawing: Arms and hands, lower body (legs and foot), Facial features, Ears.
4	Body in motion- flexing stretching and Relaxing
5	Portrait
6	Caricature

HC- 1.3: VISUAL COMMUNICATION (3:1:0)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Obtain a significant knowledge on fundamental and advanced aspects of Visual Communication.
- To demonstrate the ability to apply communication theories to analyze contemporary problems.
- To demonstrate an understanding of the history, development, and practice of the print media, electronic media, and the new media.
- Gain in-depth knowledge of fundamentals of design.
- Gain proficiency in studio techniques.

COURSE CONTENT:

UNIT – I:

Need for and the Importance of Human and Visual Communication. Visual Literacy, Communication a expression, skill and process, Understanding Communication: SMRC-Model. Types of Media – Traditional media, Print media, Electronic media and any other new media, Theoretical explanations and presentations on color wheel, color species, Usage of Painting materials & Results mixing, colors, Primary, Secondary, Tertiary colours.

UNIT – II:

Communication as a process. Message, Meaning, Connotation, Denotation Culture/Codes,etc Levels of communication: Technical, Semantic, and Pragmatic. The semiotic landscape: language and visual communication, narrative representation. Principles of Visual and other Sensory Perceptions.Colour psychology and theory (some aspects) Definition.

UNIT – III:

Fundamentals of Design: Definition. Approaches to Design, Centrality of Design, Elements/Elements of Design: Line, Shape, Space, Colour, Texture. Form Etc. Principles of Design: Symmetry. Rhythm, Contrast, Balance Mass/Scale, etc.Design and Designers (Need, role, process, methodologies, etc.). Basics of Graphic Design: Definition, Elements of

Graphic Design, Design process-research, a source of concept, the process of developing ideas-verbal, visual, combination & thematic, visual thinking, associative techniques, materials, tools (precision instruments etc.) design execution, and presentation, Virtual reality.

UNIT – IV:

Information Design case studies (Choose any one) : (1) department stores, (2) grocery stores, (3)museums, (4)shopping malls, (5)city centres, (6)hospitals, or (7)Food joints (8)Educational institutions (9) any other public space. Case studies based on: Design categories(Print, Merchandise, Web,etc), Design content and locations, Evidence of branding and placemaking, typography and layout of information, Colours, Symbols and maps used, Forms, materials, and media chosen for communication, Elements that evoke visceral, behavioural, and reflective reactions to the environments, Elements used to evoke sentiments of pleasure, play, and fun (if any)

Selected Readings:

1. Hayward, P., & England, A. C. of. (1996). *Picture This: Media Representations of Visual Art and Artists* (2nd Rev ed.). University of Luton Press.
2. Lester, P. M. (2013). *Visual Communication: Images With Messages* (6th ed.). Wadsworth Pub Co.
3. Palmer, F. (1972). *Visual Awareness*. Batsford.
4. Palmer, F. (1989). *Visual Elements of Art and Design*. Longman.
5. Porter, T., & Goodman, S. (1982). *Manual of Graphic Techniques 2; for Architects, Graphic Designers, and Artists*. Charles Scribner's Sons.
6. Schildgen, T. (1997). *Pocket Guide to Digital Color: Reproduction and Printing with Digital Applications*.

List of Practicals:

Sl.No.	Practicals
1	Infographics on KG Cardboard
2	Instruction book
3	Visual Analysis essay
4	Colour wheel chart and Color schemes in KG card board
5	Metaphor log
6	Case study presentation

HC- 1.4 : BASICS OF 3D DESIGNING (2:0:2)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Create 3D works that reflect the integration of graphic clarity, animation, and design principles along with the performance principles.
- Work within 3-D virtual space and build volumetric objects including: polygon models, NURBS models, Subdivision Models.
- Create architectural walkthroughs, 3D game models.
- Understand props requirement in the set and create it according to the storyboard.
- Create low poly and high poly models matching the end requirement.

COURSE CONTENT:

UNIT – I:

The Workspace-User Interface Elements-Menu Sets, menus, status bar, shelf, view compass, toolbox, channel box, layers, quick layout buttons, time sliders, range slider, helpline, command line, characters, playback controls, Simplifying the User Interface, Hotkeys, Common Menus, Panel Menus, Marking Menus, Recent Commands, Menu Sets, Hotbox Controls, Mouse Buttons.

UNIT – II:

Creating primitive objects, Moving Objects in the 3D Space, Maya View Tools, Layouts, Saved Layouts, Channel Box and Manipulators, Grouping and Parenting, Spline Modelling, About Nurbs (Non-uniform rational B-spline), Creating Curve and Surfaces, Attaching and closing Surfaces, Duplicating curves, Lofting and revolving surfaces, Fast work of importing Adobe Illustrator files into Maya for text and Logo treatments.

UNIT – III:

Type of lights – usage of each, techniques for each, Light Linking, New linking to Objects (and sets) workflow, Reason for light linking – matching live footage lighting, Light attributes – adjusting and show manipulators, Light Fog, Intensity Curves.

UNIT – IV:

Rendering Overview, Maya renders, Shader Networks, Shading Groups, Materials, Lights, Maya architecture, Nodes and Attributes, HyperGraph, IPR (Interactive Photorealistic Rendering), Motion Blur-OptiFX Techniques and Tips-Occlusion – as applies to light glow, Auto – exposure – as applies to Shader Glow.

Selected Readings:

1. Tickoo, S. (2016). *Autodesk Maya 2017: A comprehensive guide*. Schererville, IN: CADCIM Technologies.
2. Tickoo, S. (2015). *Autodesk Maya 2016: A comprehensive guide*. Schererville, IN: CADCIM Technologies
3. Murdoch, K. (2015). *Autodesk Maya 2016 Basics Guide* (1st ed.). SDC Publications.
4. Palamar, T. (2015). *Mastering Autodesk Maya 2016: Autodesk Official Press* (1st ed.). Sybex.

List of Practicals:

Sl.No.	Practicals
1	Apple
2	Strawberry
3	Coffee cup
4	Soda Can
5	Sword
6	Treasure chest

HC- 1.5:2D ANIMATION(2:0:2)**COURSE OUTCOME:****COURSE CONTENT:****UNIT 1**

Introduction to 2D animation: The Flash Start Page, The Flash Screen, The Flash Workspace, The Properties Panel, Other Panels, The Tools Panel, The Timeline Panel, The Panel Group, Rulers, Grids and Guides, Rulers, Grids, Guides, Using the Drawing Tools, The Brush Tool, The Flash Workspace, The interface Colour,

Drawing Tools: Cookie Cutting, Selecting Shapes, The Selection Tool, Rounded Rectangles, The Pencil Tool,

The Brush Tool, Normal Brushes, Custom Brushes, The Ink Bottle, and Paint Bucket Tools, Drawing Some Rectangles, The Ink Bottle Tool, The Paint Bucket Tool, The Eyedropper Tool, The Eraser Tool, Object Drawing, Snap to Object, Symbols, Libraries, and Layers: Creating a Simple Logo, Drawing a Circle, Adding a Rectangle, Placing the Rectangle Over the Circle, Adding Text to the Logo, Duplicating the Logo, Using Symbols and the Library Panel, Creating a Symbol, The Library Panel, Exporting Graphics, Layers, Importing the Graphics, Adding the Background to the Stage, Adding a Second Layer, Adding an Image to the Image Layer, Adding the Logo, Using the Layers, Changing the Stacking Order, Turning Layers Off, Locking Layers, Image Outlines,

UNIT 2

Motion Tween Animations: Creating a Motion Tween, Setting the Symbol, Setting the Motion Tween, Understanding the Timeline Panel, Adjusting Animations, Adjusting the Motion Path, Rotating Objects, Scaling Objects in an Animation, Inserting Another Keyframe, Clearing Property Keyframes, Adjusting the Duration of the Animation, **Multiple Object Animations:** The Background Layer, Setting the Background Layer, Locking the Layer, The Ball Layer, Adding the Background Frames, Animating the Ball, Drawing the Ball, Converting the Circle to a Symbol, Setting the Motion Tween, Creating the Bounce, Adjusting the Animation, Increasing the Time of the Animation, Adjusting the Easing, Adjusting Paths With the Subselection Tool, **Other Tweening Types:** Shape Tweening, setting the Start Shape, Setting the End Shape, Setting the Shape Tween, Adjusting Shapes, Using Shape Hints, Removing Shape Hints, Reversing the Shape Tween, Classic Tweening, Inserting a Symbol, Inserting the End Keyframe, Setting the Classic Tween, Adjusting the Animation, Easing,

Fixed Point Animations: Loading the Prepared File, Adding Layers, Inserting the Clockface Frames, Adding Guides to the Screen, Animating the Big Hand, Adding the Symbol to the Animation, Editing the Big Hand Symbol, Animating the Big Hand, Animating the Small Hand, Inserting the Small Hand

Symbol, Editing the Small Hand Symbol, Creating the Motion Tween,

Setting the Motion Tween, Adjusting the Motion Path, Orient to Path, Animating the Blue Beetle, Setting the Motion Tween, Adjusting the Motion Paths, Setting the Orient to Path, Copying Frames, Stopping the Animation, Adjusting the Race.

UNIT 3

Frame By Frame Animations: Drawing an Eyeball, Adding the Eye Shape, Copying the Eye, Adding Layers, Animating the Eyelid, Duplicating the Keyframes

Creating Movie Clips: Creating a Movie Clip, Setting a Movie Clip Symbol, Drawing the First Position of the Bird, Drawing the Second Position of the Bird, Setting the Third Position of the Bird, Setting the Fourth Position of the Bird, Using the Movie Clip, Adjusting the Flight Path, Adding Another Instance of the Bird, Instance Names,

Creating Buttons: Creating a Simple Button, Setting the Button Symbol, The Button States, Testing the Button, Adding Text to the Button, Other Adjustments, The Hit Area, Creating a Button, Setting the Over and Down States, Setting the Hit Area, Creating a Navigation Bar, Loading the Global Page File, Adding the Button Layer, Creating the First Button, Adding Some Text to the Button, Setting the Button States, Copying the Buttons, Altering the Text, Testing the Buttons.

UNIT 4

Using Masks: Creating a Mask over a Background, Creating the Background Layer, Inserting the Mask Layer, Creating the Mask, Background Colours, Editing the Mask, Animating Masks, Movie Clip Masks, Importing the Image, Creating the Movie Clip Symbol, Animating the Movie Clip, Adjusting the Motion Path,

Adding Sounds to Animations: Loading an Animation and Sound, Adding Sounds to the Timeline, Synchronising Sounds, Event, Stream, Stop, Sound Effects, Removing the Extra Sounds, Using the Fade in Effect, Editing Sound Effects, Adding Sounds to Buttons, Placing the Button on the Stage, Adding the Sound to the Library, Adding the Sound to the Button,
Publishing a Flash File: Publish as scene, Bone Tool Basics, Creating a Mobile Application

Selected Readings:

1. Green, T., & Labrecque, J. (2017). *Beginning Adobe Animate CC: Learn to Efficiently Create and Deploy Animated and Interactive Content*. Apress.
2. *C01_flash_cs6_eval.pdf*. (n.d.).
3. Brooks, S. (2016). *Traditional Animate CC: 12 Principles of Animation in Adobe Animate*. CRC Press.

SOFTCORE COURSES**SC- 1.6: DIGITAL IMAGE EDITING (0:0:2)****COURSE OUTCOME:**

On the successful completion of this programme, each student will be able to:

- Gain knowledge of common computer graphics software and differentiate between raster and vector graphics.
- Have proficiency in a broad range of design skills pertaining to publication design.
- Navigate the software, to set up a document and work with multiple pages.
- Make efficient use of colour models.
- Create multipage brochures, pamphlets, digital paintings, matte paintings, visiting cards, etc., and other forms of graphic works.

COURSE CONTENT:

SOFTWARE PACKAGE: (Adobe Photoshop / GIMP)

List of Practical:

Sl.No.	Practicals
1	Simple text effects
2	Image Restoration
3	Image Manipulation
4	Movie Poster
5	Creating digital storyboard
6	Digital scenery creation

7	Digital Painting (Object)
8	Digital Painting (Architecture)
9	Digital Painting (Portrait)
10	Creating a website layout
11	Set extension
12	Digital Matte painting

SC- 1.7: GRAPHIC DESIGN TECHNIQUES (0:0:2)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Have sufficed knowledge about the entire software.
- Will be well versed with drawing grids, segments, using rulers, coloring, manipulating effects, moderating shapes, etc.
- Work with objects, lines, shapes, layers, tables, etc.
- To create and modify objects for graphic design purposes.
- To comprehend the advancement in designing graphics etc.

COURSE CONTENT:

SOFTWARE PACKAGE: (Corel DRAW / Adobe Illustrator / Inkscape)

List of Practicals:

Sl.No.	Practicals
1	Symbols, Icons in Corel draw
2	Business Card
3	Logo/Identity design
4	Pamphlet Design
5	Brochure design
6	Product packagingdesign
Adobe Illustrator	

7	3D Revolve
8	Infographics
9	Character Designs
10	Perspective Art
11	Isometric Designs
12	Graph Designs

SC- 1.8: 3D MODELING (0:0:2)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Work with and navigate the unique features of the digital 3D modeling workspace to create 3D objects.
- Manipulating objects quickly in perspective, top, side and front views simultaneously.
- Create 3D models.
- Create a 3D environment featuring lighting and textures.
- Evaluate digital 3D projects, identify items for improvement, and implement changes.

COURSE CONTENT:

SOFTWARE PACKAGE: (Autodesk Maya)

List of Practicals:

Sl. No.	Practicals
1	Fire Hydrant
2	Metal Prop for interior Set
3	Wooden furniture for interior Set
4	Caustic Prop for interior Set
5	Leather/Cloth Prop for interior Set
6	Interior Set Space Design, Assemble with Texture
7	Simple Exterior Elevation
8	Simple Robot
9	Robotic Arm

10	Locomotive Engine
11	Automobile
12	Ancient/Historical Monument

SC- 1.9: CLAY MODELING (0:0:2)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Acquires a sense of his/her body by creating representative models.
- Understand geometrical shapes intersections.
- Understand the textures.
- Create different body parts of the human body.
- Create a fantasy character.

COURSE CONTENT:

SOFTWARE PACKAGE : (ZBRUSH)

List of Practicals:

Sl. No.	Practicals
1	Geometrical shapes (Sphere, Pyramid, Cube)
2	Geometrical shapes intersection
3	Fruits or Vegetables(Scaled model upto min 5 times with details)
4	Human parts- Nose (Scaled model upto min 5 times with details)
5	Human parts- Ear (Scaled model upto min 5 times with details)
6	Human parts- Lips (Scaled model upto min 5 times with details)
7	Human parts- Hand (Scaled model upto min 5 times with details)
8	Human parts- Foot (Scaled model upto min 5 times with details)
9	Human head study- Basic
10	Animal studies- Eg: Hen/Rabbit etc
11	Animal studies- Animal Standing Eg: Dog
12	Project work: Fantasy character

SECOND SEMESTER

HC- 2.1: SCRIPT WRITING, STORY WRITING AND STORY BOARDING (2:0:2)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Convert the ideas/story to a script effectively.
- Write a script in a standard format, which conveys the story visually when read.
- Do storyboard according to the demand of the story.
- Plan and execute the type of shot and angle of the camera, in which a particular scene would be captured.
- Create both script and storyboard manually and digitally.

COURSE CONTENT:

UNIT – I:

Basics of story: Exploring ideas, Concept, Plot, Structure, Character Theme, Conflicts, Storytelling outline, Building a character, delivering a precise message through the story, Story pacing. Animation story for Children, Adults, Basics of story and Basics of Scriptwriting Action, Scene Headings, Character Name, Screenplay, Titles, and End Credits.

UNIT – II:

Scriptwriting terminology: Action, Angle, BG close up, Exterior, Fade in fade out, Pan, Parenthetical, POV, Scene Heading, Slugline, SFX, Sotto voce, Track with, Voice over, Character name, Cast List, Dialogue, Script Length, Action Description, Extension, Dual Column Dialogue, Act numbers, Scene numbers, Short lines, Dialogue paragraphs, Character Arc.

UNIT – III:

Story boarding: Introduction to storyboards, Steps of creating a storyboard, Beat board, Story boarding overview, Contents, Pose, Scenes, Camera, Colour scheme, Sound, Lighting, Special fx, Applications, Focus the story and the timing in several keyframes, Animatics-Lica reel.

UNIT – IV:

Choosing content from the script for storyboarding frames, Setting establishing shots, Introducing characters, Drawing dialogues, Camera angles, Explaining actions with arrows, Character poses, walking poses, sitting poses, inking storyboards, Shading storyboards.

Selected Readings:

1. Whitehead, M. (2004). *Animation*. Old Castle.
2. Harrington, S. (2008). *Computer graphics*. Tata McGraw-Hill Education.
3. Mullen, T. (2007). *Introducing Character Animation with Blender*. Wiley India Pvt Ltd.
4. Neuhahn, C., & Book, J. (2005). *Professional Short Films with Autodesk 3ds Max*. Charles River Media.
5. Whitaker, H., & Halas, J. (2013). *Timing for animation*. CRC Press.
6. Marx, C. (2007). *Writing for animation, comics & games*. Taylor & Francis.
7. *3D Animation Software / Tools and Free Resources / Autodesk*. (n.d.).
8. Clark, K. (2002). *3D character animation*. Rocklin, CA: Premier.
9. Singh, S., & Wilson, J. (1987). *Computer graphics and animation*. Vancouver: Vancouver School Board.
10. Cantor, J., & Valencia, P. (2004). *Inspired 3D Short Film Production (Inspired)*. Course Technology Press.
11. Gilbert, W. (2014). *Simplified Drawing for Planning Animation* (4th ed.). Anamie Entertainment Ltd.

List of Practicals:

Sl.No.	Practicals
1	Rapid sketches 100Nos
2	Appealing poses of protagonist, antagonist, Fantasy creatures
3	Comic book
4	Presenting instruction sets through Storyboard
5	Advertisement Storyboard
6	Storyboard for Animation

HC- 2.2: SURFACING, 3D LIGHTING AND RENDERING (2:0:2)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Create 3D models using meshes effectively by poly modeling, NURBS modeling, and digital sculpting.
- Sculpt 3D models using primitive elements.
- Unwrap and texture any model and apply various blending maps according to the type of the model.
- Create animations for humans (biped) and animals (quadruped) using principles of animation.
- Apply the knowledge of body mechanics to animation of the characters.

COURSE CONTENT:

UNIT – I:

Introduction to texturing, Unfolding/Unwrapping UV mesh, Smoothing and relaxing a mesh interactively, Fixing problem areas, Applying textures, Introduction to Maya Hypershade, Texturing, Materials, Normal mapping, Ramp textures, Procedural textures and bump maps, Layered textures, 3D Textures, File textures, Color space and Color management, Baking maps.

UNIT – II:

3D Lighting Introduction, Directional lights, Spotlights, Types of lights in 3D space, Light attributes, 3 Point lighting, 2 Point lighting, Butterfly lighting, Rembrandt lighting, Shadows, Direct illumination, Raytracing, reflections, Creating photo real environmental lighting.

UNIT – III:

Studio listing principles, Lighting plugins/ Path tracing engines- Vray, Arnold, Cycle render, Eevee render, Octane, etc..., Lighting product, Lighting glass, handling reflections, Photons, Caustic photons, Caustic color attribute.

UNIT – IV:

Rendering - Introduction to 3D rendering, Introduction to advance lighting effects, Shading material for objects: Anisotropic, Blinn, Lambert, Pong, Pong E, Layer Shader, Ocean Shader, Hair tube shader, Ramp shader, Shading Map, Surface shader, Refining shading materials, Mental ray rendering, and Toon shade rendering. IPR rendering, Software, Hardware rendering, Batch rendering, Multipass rendering, Render Layers, Override with Render Layers, Render tokens, SSS Shaders, Creating various output as per the end-user requirements and maintaining the resolution.

Selected Readings:

1. Derakhshani, D. (2015). *Introducing Autodesk Maya 2016: Autodesk Official Press* (1st ed.). Sybex.
2. Tickoo, S. (2016). *Autodesk Maya 2017: A comprehensive guide*. Schererville, IN: CADCIM Technologies.
3. Gilbert, W. (2014). *Simplified Drawing for Planning Animation* (4th ed.). Anamie Entertainment Ltd.
4. Meade, T., & Arima, S. (2007). *Maya 8: The Complete Reference*. McGraw-Hill Education TAB.
5. Patmore. (2003). *Complete Animation Course*. Barron's Educational Series.
6. Watkins, A. (2003). *Maya: A Professional Guide*. Dreamtech Press.
7. Watkins, A. (2006). *Introduction to 3D Graphics & Animation Using Maya* (1st ed.). Charles River Media.

List of Practicals:

Sl.No.	s
1	Surfacing –Tyre
2	Surfacing- Leaf
3	Surfacing- Fruits
4	Surfacing- Tree
5	Surfacing- Cloth
6	Caustic lighting and rendering

HC- 2.3 : ART OF FILM MAKING (2:1:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Engage in the creation of short and full length movies.
- Have ideas regarding cinematography, resulting in the best outputs.
- Handle DSLR and SLR cameras.
- Handle post - production works such as, video and audio editing.
- Start the movie work from the idea followed through scripts and resulting in the final output.

COURSE CONTENT:

UNIT – I:

Basic art of filmmaking, Types of Film Production, Development- Selection of concept, Film budget justification, Green-light. Pre-production- Area of research, Script development - types, Draft preparation. Shot, scene, Story board, Copy right (Law/Ethics), Hiring actors or models, Crew members Role of Director & procedures. Art Director, Cinematographer, Director of Lighting, Floor Manager, Production Manager. Preparing Production board/Management, Planning and Budgeting for Production, Location scouting. Set direction & colour correction, Equipments required and tests, Finalizing props, shooting schedule, Script breakdown,

UNIT – II:

Introduction to Digital Video Equipments: Digital Video Camera- Types – Format Major Components - Operation and Functions. Lens – Types – Aperture - Shutter. Focussing Methods. Focal Length. Depth of Field. Video signal- Types and Functions. Tripod Types. Clapboard- Usage. Light meter. Other useful accessories. Digital Camera Movements- Composition-Shots-Angles. Single & multi-camera operations.

UNIT – III:

Production- Shooting on location, Shooting script, Visualization, Selection of Dialogue, Rehearsing, Basic and Special Lighting Usage. Setup - Atmospheric Lighting, Cinematography, Principal photography, Mic arrangements. Camera placement. Tool and techniques. Online, offline, recorded & live programmes, Schedule alterations, Changes in relation to artists date / location problems. Daily call sheet, Daily progress report, Cost report.

UNIT – IV:

Post-production- Video Capturing and Footage review. Final scripting. Basic software & hardware. Editing, Video Editing-types. EDL Preparations, Editing Techniques Continuity-Sequence-Dynamic. Linear and Non-Linear Editing. A-B roll & its advantage, Method of Video Effects and Video Transition, Chromo-Keying. Rerecording Video. Voice-over, Sync sound, audio mixing, Role of audio & effects, Mix and composite, Finding Music. Special effect. (Sound, Visual, Graphics and Animation), Titles, Film Screening, FT (Fit for Telecast) certificate, Certificate Approving, Marketing-getting sponsors. Publicity, Film Releasing. VIDEO & AUDIO CODECS Definition and use of codecs. Codec formats & types. Storage devices CD/DVD/BD (Blue-ray Disc). Montage, promos, special promos.

Selected Readings:

1. Watkinson, J. (2002). *An introduction to digital audio*. Taylor & Francis.
2. Ohanian, T. A., & Ohanian, H. C. (1998). *Digital nonlinear editing: Editing film and video on the desktop*. Butterworth-Heinemann.
3. Nobel, P. S. (2005). *Placing shadows: lighting techniques for video production*. Taylor & Francis.
4. Owens, J. (2015). *Television production*. CRC Press.
5. Gross, L. S., Foust, J. C., & Burrows, T. D. (2005). *Video Production: Disciplines and Techniques*. McGraw-Hill.
6. JARVIS, P. (1998). *The Essential TV Director's Handbook* (1st ed.). Focal Press.
7. Millerson, G. (1990). *The Technique of Television Production, 12th, Twelfth Edition* (12thed.). Focal Press.
8. Wheeler, P. (2001). *Digital Cinematography*. Focal Press.

List of Practicals:

Sl. No.	Practicals	
	Shots	Types
1	Camera Shot Size	Extreme Wide Shot (ELS) Long Shot (LS) / Wide Shot (WS) Full Shot (FS) Medium Long Shot (MLS) / Medium Wide Shot

		(MWS) Cowboy Shot Medium Shot (MS) Medium Close Up (MCU) Close Up (CU) Extreme Close Up (ECU) Establishing Shot
2	Camera Framing	Single Shot Two Shot Three Shot Over-the-Shoulder Shot (OTS) Point-of-View Shot (POV)
3	Camera Shot Focus	Rack Focus / Focus Pull Shallow Focus Deep Focus Tilt-Shift
4	Camera Angles	Eye Level Shot Low Angle Shot High Angle Shot Hip Level Shot Knee Level Shot Ground Level Shot Shoulder-Level Shot Dutch Angle Shot Birds-Eye-View Shot / Overhead Shot Aerial Shot / Helicopter Shot
5	Camera Movement	Static / Fixed Shot Dolly Shot Zoom Shot Dolly Zoom Shot Pan Shot Tilt Shot Whip Pan Shot Whip Tilt Shot Tracking Shot Crab Shot Arc Shot
6	Joseph Campbell's Hero's Journey- Three-Act Structure Short Film	Act 1: Departure Act 2: Initiation Act 3: Return

HC- 2.4 : CHARACTER SETUP AND 3D CHARACTER ANIMATION (2:0:2)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Create the skeletal setup for the characters given.

- Understand the differences between forward and inverse kinematics.
- Apply constraints and set driven keys to control the controllers of the character.
- Understand the basic light setup available in the software and apply it to the project.
- Render the scenes using different render sources and render engines

COURSE CONTENT:

UNIT – I:

Introduction to Character Setup Introduction to Character setup, Riggers role, Criteria for a good rig, Joints, and skeletons, Creating skeleton hierarchy, Constraints, Forward(FK) and Inverse kinematics(IK), FK, IK joint structures, Animation controllers, Blend shapes, Clusters, Biped Rig- Analysing reference, Anatomy of human body, Bone placements, Setting up Torso, Biped Arms, Fingers, Legs/Foot controls, Skinning, Facial Rig- Anatomy of a face, The Facial Action Coding System (FACS), Mouth shapes, Phone mes, Animation controllers for Face, Character GUI.

UNIT – II:

Muscle systems - Introduction to 3D Muscle system, Components of Muscle, Capsules, Spline based muscle system, Stretch based muscle systems, Muscle Objects, and skins, Assigning weights to Muscle skin, Muscle Builder, Muscle Parameters, Custom muscle systems, Wrinkles, fold, jiggle, Slide, Collide, Muscle control.

UNIT – III:

Physics in Animation, Timing and Spacing, Law of inertia, Locomotion, Posing Forceful forms in Animation, Centre of Gravity in character animation, Action and reaction in Animation

UNIT – IV:

Introduction to Walks with Personality, Locomotion, Body mechanics- Weight and balance, Techniques behind Planning and blocking methods, Understanding Hips, In-depth look of principles of animation, Splining and Polishing methods, Phrasing or bets in a shot, Force and forms, Animating Physicality workflow.

Selected Readings:

1. *16 Best Maya Books for Beginners & Professionals Alike in 2021*. (n.d.).
2. Akenine-Möller, T., Haines, E., & Hoffman, N. (2018). *Real-Time Rendering, Fourth Edition* (4 ed.). A K Peters/CRC Press.
3. Allen, E., Murdock, K. L., Fong, J., & Sidwell, A. G. (2008). *Body Language: Advanced 3D Character Rigging*. Sybex.
4. Alton, J., & McCarthy, T. (1995). *Painting With Light* (1st ed.). University of California Press.
5. Birn, J. (2013). *Digital Lighting and Rendering* (3rd ed.). New Riders.
6. *Buy 5 Learning Maya™: Character Rigging and Animation (Learning Maya 5) Book Online at Low Prices in India | Learning Maya™ 5: Character Rigging and Animation (Learning Maya 5*
7. Hughes, J. F., Van Dam, A., Foley, J. D., McGuire, M., Feiner, S. K., & Sklar, D. F. (2014). *Computer graphics: principles and practice*. Pearson Education.
8. Dunn, F. (2011). *3D Math Primer for Graphics and Game Development* (2nd ed.). A K Peters/CRC Press.
9. Ford, M., & Lehman, A. (2002). *Inspired 3D Character Setup* (1st ed.). Course Technology PTR.
10. Grandy. (2005). *Inspired 3D Advanced Rigging and Deformations*. Course Technology Inc.
11. Hughes, F. / V. D. / F. /. (2013). *Computer Graphics: Principles and Practice* (1sted.). Pearson Education India.
12. Maraffi, C. (2003). *Maya Character Creation: Modeling and Animation Controls*. New Riders.
13. O’Hailey, T. (2013). *Rig it Right! Maya Animation Rigging Concepts* (1st ed.). Routledge.
14. O’Hailey, T. (2018). *Rig it Right! Maya Animation Rigging Concepts*. (2nd ed.). Routledge.
15. Pharr, M., & Humphreys, G. (2010). *Physically Based Rendering: From Theory to Implementation* (2nd ed.). Morgan Kaufmann.
16. *Rigging and animating a book—Support / Animation and Rigging—Blender Artists Community*. (n.d.).
17. *The art of effective rigging in Blender—Blender Market*. (n.d.).
18. Yot, R. (2011). *Light for Visual Artists: Understanding & Using Light in Art & Design*. Laurence King Publishing.

List of Practicals:

Sl. No.	Practicals
1	Simple vehicle rigging
2	Cartoon character rigging- Upper body

3	Cartoon character rigging- Arms
4	Cartoon character rigging- Legs
5	Cartoon character rigging- Face
6	Cartoon character rigging- High poly to low poly switching

SOFTCORE COURSES

SC- 2.5: 3D MODELING AND TEXTURING (1:0:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Work with the unique features of the digital 3D modeling workspace to create 3D objects.
- Create a 3D environment featuring lighting and textures.
- Create 3D models and animations.
- Evaluate digital 3D projects, identify items for improvement, and implement changes.
- Create low and high poly models.

COURSE CONTENT:

SOFTWARE PACKAGE: (Autodesk Maya/Blender)

List of Practicals:

Sl.No.	Practicals
1	Rusty Automotive Modeling- Concept and Idea
2	Rusty Automotive Modeling- Blocking
3	Rusty Automotive Modeling- Adding details
4	Rusty Automotive Texturing
5	Modeling Alley- Concept and Idea
6	Modeling Alley- Blocking
7	Modeling Alley- Adding details
8	Texturing Alley

9	Low poly game asset Modeling- Concept and Idea
10	Low poly game asset Modeling
11	Low poly game texturing
12	Rendering and compositing the above practical

SC- 2.6: 3D ANIMATION (1:0:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Understand the 3D animation software and create animations.
- Learn the phases of creating animations.
- Differentiate different types of walks and animate them.
- Create walk, run, and jump animations.
- Plan a pantomime shot and animate it.

COURSE CONTENT:

SOFTWARE PACKAGE:(Autodesk Maya)

List of Practicals:

Sl. No.	Practicals
1	Progressive Personality Walk (Planning and Blocking)
2	Progressive Personality Walk (Max Blocking)
3	Progressive Personality Walk (Polishing)
4	Animating Run or Jump (Planning and Blocking) Run/Jump
5	Animating Run or Jump (Max Blocking)
6	Animating Run or Jump(Polishing)
7	Body Mechanics (Planning and Blocking)
8	Body Mechanics (Max Blocking)
9	Body Mechanics (Polishing)
10	Pantomime(Planning and Blocking)

11	Pantomime(Max Blocking)
12	Pantomime(Polishing)

SC- 2.7: MOTION GRAPHICS (1:0:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Compose & articulate conceptual solutions, which appropriately utilize motion graphics.
- Measure the effectiveness of solution based on appropriate use of technology.
- Measure effectiveness of solution based on audience factors.
- Create typography and other types of animations.
- Understand the requirements of various platforms and create videos according to it.

COURSE CONTENT:

SOFTWARE PACKAGE:(Adobe Photoshop, After Effects)

List of Practicals:

Sl. No.	Practicals
1	Logo Animation
2	Typography Animation
3	News Channel Lower third Animation
4	Simple Broadcast Opener
5	3D Simple Broadcast Opener
6	Phone Screen replacement
7	Track Moving footage to replace digital screen
8	Futuristic Menu
9	InfographicMograph(Planning)
10	InfographicMograph(Asset preparation)
11	InfographicMograph(Animation)
12	InfographicMograph(Polishing & Rendering movie)

SC- 2.8: DIGITAL SCULPTING (1:0:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Learn sculpting using digital software.
- Understand various brush techniques.
- Create parts of the human body using sculpting techniques.
- Retopologise the model.
- Understand the phases of model sculpting.

COURSE CONTENT:

SOFTWARE PACKAGE: (ZBRUSH)

List of Practicals:

Sl. No.	Practicals
1	Human Nose Sculpting
2	Human Eyes Sculpting
3	Human Mouth Sculpting
4	Human Ears Sculpting
5	Biological organ- Planning (Example: Heart)
6	Biological organ- Blocking
7	Biological organ- Finishing
8	Human Character- Planning
9	Human Character- Blocking and base sculpt
10	Human Character body sculpting
11	Human Character-Face sculpting
12	Human Character- Retopology

THIRD SEMESTER

HARDCORE COURSES

HC-3.1: MATCH MOVING (2:0:2)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Match computer-generated (CG) scenes with shots from live-action
- Recreate live-action backgrounds (plates) on a computer in a way that mirrors the camera on the set in every way.
- Understand auto and manual user tracking and their uses.
- Track the camera movement.
- Mask the footage to isolate the track areas.

COURSE CONTENT:

UNIT – I:

Analyzing and Preparing the live footage, Camera tracker node, solving and calibrating camera, Dealing with lens distortion, tracking footage, solving tracks for the camera, refining solve, creating 3D scene and scene orientations.

UNIT – II:

Exporting file from 3D application to match move application, Ground plane, various export techniques from 3D application and Match move application Fitting the solved camera to the geometry, Solving nodal pan shots.

UNIT – III:

Advance matchmaking techniques, Matchmaking workflows, Image modelling, tracking object, solving rolling shutter problems, test objects, Removing plate distortion, Survey data.

UNIT – IV:

Track and Composting, Safe Overscan Resolution, creating overscan to camera, fixing geometry overlap, colour and colour correction nodes, shadows, motion blurs, depth of field, chromatic aberration, ground occlusion, light wrap, glows.

Selected Readings:

1. *3DEqualizer and Syntheyes and PFMatchIt, etc. (And, of course, CameraTracker).* (n.d.).
2. *Art of Tracking Part 1: History of Tracking – fxguide.* (n.d.).
3. BenCarew. (n.d.). *3DEqualizer. Intraware Australia.*
4. Chris. (n.d.). *Matchmoving a Stereo Project using 3DEqualizer and Maya.*
5. Mirpour, S. (n.d.). *A Comparison of 3D Camera Tracking Software.* 34.
6. *Nuke, NukeX & Nuke Studio | VFX Software | Foundry.* (n.d.). *SynthEyes—Andersson Technologies LLC.* (n.d.).
7. *VFX and motion graphics software | Adobe After Effects.* (n.d.).

List of Practicals:

Sl. No.	Practicals
1	Intro to 3d equalizer, Lens, footage, camera and parallax course.
2	Free camera -Tracking 2d points, detecting features, examining the footage and solve. Creating proxy geometry in Maya or 3D application to match footage
3	Nodal shot/locked off camera exercise. Creating proxy geometry in Maya or 3D application to match footage
4	Object tracking exercise. Building proxy geometry in Maya or 3D application to match footage
5	Free camera with object track exercise. Building proxy geometry in Maya or 3D application to match footage
6	Focal shift Shot exercise Lidar matching and surveying shots.

HC- 3.2: 3D CHARACTER EFFECTS (2:0:2)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Understand the cloth simulations and apply it to the characters.
- Apply fashionable details to the characters.

- Create hair and fur details to the characters.
- Work on various attributes of the hair system.
- Create deformers and work on it.

COURSE CONTENT:

UNIT – I:

Illustrative eg: Forms and folds for clothing, viewing body forms as simple shapes, applying clothing edges and hemlines, establish form for clothing, pipe folds, zig-zag folds, spiral folds, Half-lock folds, diaper folds, drop folds, fashionable details.

UNIT – II:

Introduction to cloth simulations, Building joints with cloth simulation, wrap deform, cloth simulation to rig, stretching and joint pulling, rope and curves for deformers, inherited cloth nodes, lag problems.

UNIT – III:

Introduction to hair system, nucleus nodes, paint hair follicles tool, hair clumps, hair collisions, hair dynamics and settings, caching simulations, introduction to nHair, curve types and deforming hair, creating hairs with curves, paint texture tool, introduction to Xgen, grooming brushes, adding beard, adding noise and primitives, Painting density and physical hair shaders, eyebrows.

UNIT – IV:

Long hair, hair splines, hair utilities, curves to guides, hairstyle refining and hair modifiers, animating hair, lighting rendering hair, Interactive Grooming tools, adjusting hair density, rendering hair.

Selected Readings:

1. Animation and Visual Effects Resources Blog | Tips & Techniques |JcTools.(n.d.).
2. *ArtStation—HAIR MAYA XGEN CORE GROOMING PROCESS WORKFLOW.* (n.d.). ArtStation
3. *Hair and Clothing - Mastering Autodesk Maya 2016: Autodesk Official Press [Book].* (n.d.).

4. *Cloth / Maya 2016 / Autodesk Knowledge Network*. (n.d.).
5. *Create hair and fur using interactive grooming splines / Maya 2020 / Autodesk Knowledge Network*. (n.d.).
6. *How to Draw Clothes: Wrinkles and Folds*. (n.d.).
7. *Industrial Design—Generative Design, 3D Product Rendering / Altair*. (n.d.-a).
8. *Introduction to Maya nCloth*. (2007). Oklahoma, OK: PL Studios.
9. England, W. (n.d.). *Introduction to sculpting fluid dynamics: Real flow techniques*. Gnomon Workshop.
10. *Maya Getting Started: Creating joints*. (n.d.).
11. *Maya Tutorial: Understanding and Creating nCloth Simulations / Pluralsight*. (n.d.).
12. *NCloth / Maya 2020 / Autodesk Knowledge Network*. (n.d.).
13. *NCloth Dynamic Properties Explained*. (n.d.).
14. *NHair> Create Hair*. (n.d.).
15. Palamar, T. (2016). *Mastering Autodesk Maya 2016*. Sybex, a Wiley brand.
16. *Phoenix FD Advanced Water FX Course – RedefineFX*. (n.d)
17. *Real flow, Finix FD , Xgen, Yethi software books*
18. *RealFlow: Soft Body Simulation for Motion Graphics*. (2015). linkedin.com.
19. *Realistic Dog Grooming for Production with Xgen / The Gnomon Workshop*. (n.d)
20. Reussner, R. H., Becker, S., Happe, J., Heinrich, R., Koziolk, A., Koziolk, H., Kramer, M., &Krogmann, K. (2016). *Modeling and Simulating Software Architectures: The Palladio Approach*. The MIT Press.
21. *Sybex.Introducing.Maya.2008.pdf*. (n.d.).
22. Watkins, A. (2012). *Getting Started in 3D with Maya: Create a Project from Start to Finish—Model, Texture, Rig, Animate, and Render in Maya* (1st ed.).

List of Practicals:

Sl. No.	Practicals
1	Female Cloth Simulation
2	Female Cloth: Setting up lights
3	Female Cloth rendering
4	Short Hair
5	Fur
6	Animating Hair & Rendering Long Hair

HC- 3.3: 3D VISUAL EFFECTS/ VFX (2:1:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Creating Particle fx.
- Create collisions and destruction.
- Create Fluid, Fire and pyro elements.
- Create and control fluid simulations
- Utilise Houdini's powerful Solver to simulate and render.

COURSE CONTENT:

UNIT – I:

Introduction to particles, Particle operator or POP, Force, Life of Particle, Life attributes, Birth of Particle, Particles in motion, Sourcing, Basic Particle collisions, Particle specific collisions, Sprites, VEX Expressions

UNIT – II:

Introduction to Rigid body and Soft body, RBD Simulation, Bullet solver, Simulating multiple objects, Fracturing Basics, Clustering, Fracture geometry prep, Concave geometry, Constraint and Constraint network, Cluster constraints, Build constraints, In-Between constraints, Breaking constraint network by force, caching, Piece resolution, Noise, Load instancing, Pieces transforming, Material, Rendering simulation

UNIT – III:

Fluids: Introduction to Flip Fluid, Adding pop forces to simulation, Emitting fluids from source, controlling fluid source with volumes, Flip Tank, Fluid shelf tool, Simulation speed and Particle separation, Pump and Sink tools, Viscosity attributes

UNIT – IV:

Pyro simulation, Fluid source node, Pyro simulation, Exporting pyro data, Rendering Pyro data, Additional source and collisions, Adding embers, Emitter geometry, Velocity calculation, Simulating particle based emitter, Particle simulation, Sim Bounds, Pyro shaping, Fields, Pyro Material, Setting lights for Simulation, Meshlights for simulations, Mantra node, Improvising

Selected Readings:

1. *Clustering smoke and pyro simulations*. (n.d.).
2. Pagano, S. (n.d.). *Learning Houdini*. Carpinteria, CA: Lynda.com.
3. *Particles | Maya | Autodesk Knowledge Network*. (n.d.).
4. *Phoenix FD for Maya Help—Phoenix FD 4 for Maya—Chaos Group Help*. (n.d.).
5. *Pyro effects (smoke and flames)*. (n.d.).
6. *PyroFX | Fire & Flames | SideFX*. (n.d.).
7. Saario, V. (n.d.). *Visual Effects in SideFX Houdini*. 32.
8. *Sybex.Introducing.Maya.2008.pdf*. (n.d.).
9. *Vfx Learning Tutorials—Visymo Search*. (n.d.).

List of Practicals:

Sl. No.	Practicals
1	Fire extinguisher simulation
2	Building destruction
3	Candle flame simulation
4	Floating object in fluid/ocean waves
5	Campfire
6	Rocket/ Missile thrust simulation

HC- 3.4: COMPOSITING TECHNIQUES (2:0:2)**COURSE OUTCOME:**

On the successful completion of this programme, each student will be able to:

- Motion track the objects to a three-dimensional space.
- 2D track various elements into a scene.
- Composite any CG element into a scene effectively.
- Completely handle the process of Chroma Keying from scratch to completion.
- Analyze images and physical sets to digitally re-create lights, cameras, locations, and objects.

COURSE CONTENT:**UNIT – I:**

Introduction to compositing, HDR Images, RGBA Channels, Z Pass, Depth of field, Chroma Keying, Layer and node-based compositing, Specularity, Rotoscoping, ID Passes, Motion Blur, Motion vector passes, Set Extension, Chromatic Aberration, Matchmoving, Stereoscopy, Light wraps, Premultiply, Gamma, Stereo displays, Premultiply, Histogram, colour depth, Chrominance subsampling

UNIT – II:

Footage analysis, linear footage, Basics of nodes, understanding compositing nodes, Filter nodes, Mix Nodes, Distort node, Render layers, Glow effects, Recreating Linear lights, Grade node, Color correction with grade node, Hue correct, Manual colour management, Passes, Black ad whites matching, Shadow pass

UNIT – III:

Introduction to deep compositing, History of Deep Compositing, Slap Comps using both single and multiple sample images, Deep Image Data, Additive and subtractive compositing approaches, Lighting rendering and breaking 3d work into deliverables for comp, Compositing CG assets, Colour matching, optical enhancements and integration using CG data from 3d for complex interaction, Creating IBL asset, Open EXR, Deep holdouts, deep pre comps, deep scanlinerender, Coverting image to deep, pgBokeh, focal distance in pgBokeh

UNIT – IV:

Infrastructure, R&D as VFX supervisor, open Color IO (OCIO), OCIO for colour management, OCIO nodes, concepts: linear workflow, scene referred linear, OCIO and texture creation. Converting log and scene linear images for text and reference, Linear workflow for IBL, Mental Ray and colour management in Maya, Creating view LUTs, using OCIO CDLs and baking LUTs for Maya and integrating OCIO in Maya 2013 and Nuke, RenderMan, Nvidia's mental ray, Solid Angel's Arnold, and Chaos Group's V-Ray.

Selected Readings:

1. Brinkmann, R. (2008). *The art and science of digital compositing: Techniques for visual effects, animation and motion graphics*. Morgan Kaufmann.
2. Mattingly, D. B. (2011). *The digital matte painting handbook*. John Wiley & Sons.
3. Foster, J. (2014). *The green screen handbook: real-world production techniques*. CRC Press.
4. Okun, J. A., & Susan Zwerman, V. E. S. (Eds.). (2020). *The VES handbook of visual*

effects: industry standard VFX practices and procedures. Routledge.

List of Practicals:

Sl. No.	Practicals
1	Sky replacement
2	Day to night technique
3	Summer to winter conversion
4	Chroma keying
5	Color correction
6	Explosion composition

SOFTCORE COURSES

SC--3.5: ROTOSCOPY (1:0:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Correct the lens distortions.
- Create camera tracking.
- Create different shapes around an object and animate those shapes to match the movement on each frame.
- Understand animal motion and track them.
- Apply various background plates to the given footages.

COURSE CONTENT:

SOFTWARE PACKAGE :(Adobe After Effect / Blender/ NUKE/ Fusion/ Silhouette FX)

List of Practicals:

Sl. No.	Practicals
1	Rotoscoping Sports activity-Scene setup, fixing Grains and Lens distortion
2	Rotoscoping Sports activity- Camera tracking

3	Rotoscoping Sports activity-Cleaning Plate
4	Rotoscoping Sports activity- Rotoscope footage
5	Rotoscoping Dance - Scene setup, fixing Grains and Lens distortion
6	Rotoscoping Dance-Camera tracking
7	Rotoscoping Dance-Cleaning Plate
8	Rotoscoping Dance-Rotoscope footage
9	Rotoscoping Bug/Animal-Scene setup
10	Rotoscoping Bug/Animal-Camera tracking
11	Rotoscoping Bug/Animal-Cleaning Plate
12	Rotoscoping Bug/Animal-Rotoscope footage

SC--3.6: DIGITAL EDITING (1:0:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Plan, design, and create digital video projects incorporating graphic and audio elements.
- Transfer and capture digital video and audio from various cameras and external devices.
- Edit and compress video for use in various delivery modes of digital media using standard digital video editing software.
- Evaluate digital video projects, identify items for improvement, and implement changes.
- Shoot and edit documentary videos.

COURSE CONTENT:

SOFTWARE PACKAGE : (Audacity, Ardour)

List of Practicals:

Sl. No.	Practicals
1	Creating Titles using text and images
2	Sub-titles
3	Storytelling with images
4	Editing using video effects

5	Sound Design and Audio Editing
6	180 degree dialogue shot editing
7	Editing a Montage
8	Explainer video editing
9	Shooting and Editing short(2-25Mins) documentary- Shoot/Acquiring footage
10	Shooting and Editing short documentary-Rough cuts
11	Shooting and Editing short documentary-Syncing Audio and Video
12	Shooting and Editing short documentary-Final cut and Media export

SC--3.7: TOONY ANIMATION (1:0:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Create appropriate actions.
- Create concepts and build it accordingly.
- Understand the line of action and create animations.
- Create animatics.
- Create a 2D animation following the principles of animation.

COURSE CONTENT:

SOFTWARE PACKAGE:(Blender Grease Pencil, 3D Application)

List of Practicals:

Sl. No.	Practicals
1	Concept- Choosing and Analysing Scenario of a character
2	Concept- Building and Acting Appropriate actions
3	Concept- Planning flexibility, force and squash and stretch
4	2D Animation- Simplify complex action
5	2D Animation- Short breakdown for Dynamic action
6	2D Animation- 2D Animatics
7	3D Animation- Animation Blocking pass
8	3D Animation- Pushing shapes

9	3D Animation- Pushing Lines of Action
10	3D Animation- Max Blocking
11	3D Animation- Spline pass
12	3D Animation- Polish pass

SC--3.8: SOUND EDITING (1:0:1)

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

- Understand software and creative editing.
- Master the dynamic file linking.
- Understand and create sound designs for commercials.
- Reduce noise and correct pitch of the audio.
- Understand the placement of microphones for recording.

COURSE CONTENT:

SOFTWARE PACKAGE: (Sound booth/Wave Studio)

List of Practicals:

Sl. No.	Practicals
1	Mastering Audio tracks- Noise Reduction
2	Mastering Audio tracks- Dynamic file linking
3	Mastering Audio tracks
4	Sound Design for Commercials- Compression, Equalisation, reverb
5	Sound Design for Commercials- Modulation and Noise reduction
6	Sound Design for Commercials- Special effects
7	Sound Design for Commercials- Stereo imagery
8	Sound Design for Commercials- Pitch correction
9	360 D audio production for VR- Object based sound design
10	360 D audio production for VR- Connecting with Dialogue and Music

11	360 D audio production for VR- Ambisonics audio
12	360 D audio production for VR- HRTF and Localization

FOURTH SEMESTER

HARDCORE COURSES

HC- 4.1: PROJECT (0:1:3)

3D Animation-Project, Project Report/ Dissertation, Presentation and Viva

COURSE OUTCOME:

On the successful completion of this programme, each student will be able to:

The student will work as an intern in an animation studio and will create an animated film using all the academics skills learnt in the three semesters. Follows the complete production pipeline, pre-production, production and post-production stages and submits the animated film for the successful completion of the course.

SOFTCORE COURSES

SC- 4.2: INTERNSHIP(0:0:4)

Student should visit Animation Industry, get the hands on experience as well as assist in corporate project works, get the attendance time to time and completion internship with certificate from the corporate sector.

COURSE OUTCOME:

By visiting and working in corporate sector by students, will help to understand the market demand, upcoming technology as well as acquisition of new skills regarding different softwares which are used by people of Animation industry.

SC- 4.3:RESEARCH METHODS-DISSERTATION

(REPORT, PRESENTATION AND VIVA)-(1:1:2)

Unit 1

Introduction to Research Methodology: Meaning of Research, Objectives of Research, Motivations in Research, types of Research, Research Approaches, Significance of Research,

Research Methods v/s Methodology, Research and Scientific Methods, Research Process, Criteria of Good Research. Defining the Research Problem: Concept and need, Identification of Research problem, defining and delimiting Research problem.

Unit 2

Research Questions and Hypothesis: Variables and their linkages, characteristics of good Hypothesis. Research question and formulation of hypotheses-directional and non-directional hypotheses, Basis for hypotheses. Research design: Meaning, Need, Features of Good Design, Concepts, Types. Basic principles of Experimental Design, various methods of Research. Survey, Philosophical, Historical, Experimental, Causal Comparative, Genetic, Case Studies.

Unit 3

Tools for Data Collection: Collections of Primary Data, Collection of Data through questionnaire and Schedules, other Observation Interview Methods, Collection of Secondary Data, Selection of appropriate method for data collection, Case Study, Focus Group Discussion, Techniques of developing research tools, viz. Questionnaire and rating scales etc. Reliability and validity of Research tools.

Unit 4

Sampling: Probability and Non Probability sampling- types and criteria for selection. Developing sampling Frames. Descriptive Statistics: Measurement Scales, Sources of error in measurement. Measures of central Tendency (Mean, median, Mode), Measures of dispersion (range, mean deviation, standard deviation) Graphical representation of Data.

Inferential statistics: Normal Probability Curve- Meaning, characteristics and applications. Standard error. Confidence Intervals and Fiduciary limits. Type I and Type II errors. Estimating Population Means.

Section B-(Practical)

Word Processing: Word features, Creating, Saving and Opening Documents in Word, Interface, Toolbars, Ruler, Menus, Keyboard shortcut, Editing, Previewing, Printing and

Formatting a Document, Advanced Features of MS Word, Find and replace, using thesaurus, using Auto-Multiple Functions, Mail Merge, Handling Graphics, tables and Charts, Covering a word Document into various Formats like- text ,Rich Text format, WordPerfect, HTML,PDF etc.

Worksheet: Excel: Worksheet Basics, Working with single and multiple workbook, working with formula & cell referencing, Auto sum, Copying formulae, Absolute & relative addressing, Worksheet with ranges, Formatting of worksheet, Previewing and printing Worksheet, Graphs and charts, Database, Creating and using Macros, Multiple Worksheets-concepts, Creating and using, data analysis and display.

Presentation: PowerPoint: Creating Slide show with animations. Auto Wizard, Creating a Blank presentation, auto layout, Screen layout and views, insert a new slide, applying design template, changing slide layout, recording and hiding a slide4s, slide show and editing custom slide, resizing a text box, Text Box Properties, Delete a text Box, Bulleted Lists, numbered lists, adding notes, video and audio, Adding text editing options, Formatting text, Replace fonts, Line spacing, change case spelling check, color schemes, Adding clip art, Adding an image form a file, Editing graphic, Auto Shapes, Word Art, backgrounds, Action Buttons, Slide Animation, Preview Slide transactions, Slide Show options, Slide Master, Header and Footer, Slide Numbers, Date and Time. Education and Research Resource son Net: Encyclopedia, Wikipedia, On-Line Tutorials and lectures, Virtual labs, Open Course- wares, Electronic Journals, E-Books, Digital Libraries, Searching research Information. Professional Written Communication: Students prepare E-mails, Letters, memos, proposals, formal and informal reports. Oral Communication: Impromptu and Extemporeaneous methods of delivery. Oral Presentations using usual aids such as handouts, overhead transparencies and presentation software such as PowerPoint.

Note: 1. Assignment should be hand written. **2.** Insert front page of your synopsis with the signature of Student and supervisor.

Selected Readings:

1. Guthrie, G. (2010). *Basic research methods: An entry to social science research*. SAGE Publications India.
2. Marder, M. P. (2016). *Research methods for science*. Cambridge: Cambridge University Press.

- Prathapan, K. (2014). *Research methodology for scientific research*. New Delhi, Bangalore: I.K. International Publishing House Pvt.

Open Electives: II Semester/IV Semester

DIGITAL IMAGE EDITING USING PHOTOSHOP

Unit-I

Introduction of PhotoShop : Creating a New File, Main Selections, Picking color, Filling a selection with color, More ways to choose colors and fill selections,

Unit-II

Painting with paintbrush tool, Using the magic wand tool and applying a filter, Saving your document Color Mode, Gray Scale Color Mode, RGB Color Mode, CMYK Color Mode, Bitmap Mode, Open a file, Preference

Unit-III

Foreground & background, Changing Foreground and Background colors, Using the Large color selection Boxes and small color swathes, Using the Eyedropper tool to sampleImagecolor,ChangingtheForegroundColorWhileusingaPaintingTool,Using Brushes, Selecting the Brush Shape.

Unit-IV

Drawing a vertical and Horizontal Straight lines with any brush, Drawing connecting Straight Lines (at any angle) with any brush, Creating a New Brush, Saving Brushes, Loading Brushes, Creating a Custom Brushes, Using the Painting Modes, Fade, Airbrush Options, Pencil Options

Selected Readings:

- 5 Tips for Multimedia Enhanced Teaching and Learning—Technology Enhanced Learning*. (n.d.).
- Laskevitch, S. (2020). *Adobe Photoshop: A complete course and compendium of features*. San Rafael, CA: Rocky Nook.
- Carlson, J. (2020). *Adobe photoshop elements 2020 classroom in a book*. ADOBE Press.

4. Concepcion, R. (2021). *Adobe photoshoplightroom classic classroom in a book*. S.l: adobe press.
5. Anil Madan *Graphics Design in Delhi—Justdial*. (n.d.).
6. Nichols, R. (2020). *Mastering Adobe Photoshop Elements 2020: Supercharge your image editing using the latest features and techniques in Photoshop Elements*. Brimingham, UK: Packt Publishing.
7. Mayer, R. E. (2002). *Multimedia learning*. In *Psychology of learning and motivation* (Vol. 41, pp. 85-139). Academic Press.
8. Team, A. C. (2013). *Adobe Photoshop CC Classroom in a Book*. Adobe Press.
9. Gyncild, B. (2012). *Adobe Photoshop CS6: classroom in a book*. Peachpit.

Open Electives: III Semester

AUDIO-VIDEO EDITING TOOLS & TECHNOLOGY

Unit-I

DIGITAL TELEVISION PRODUCTION: Basic art of filmmaking using currently available digital software/hardware tools. Overview of preproduction planning- program ideas, production models,

Unit-II

Preproduction&Post-Productionactivities–Writingtheprogramproposal,preparing a budget, presenting the proposal, Writing the script, Director’s roles & procedures, Visualization & sequencing, Shooting, Aesthetics of Editing, Role of audio & effects, Mix and composite, source material into a finished fine editproduct.

Unit-III

Digitization, AV data from tape to computer hard disk.Understanding the playback deck, understanding signal processing of S-video, fire wire and composite video. Editing Work Station management – disk space & speed requirement. Broadband and streaming video technology.

Unit-IV

UsingEditingSoftware–editingbasicsandimplementationofvarioustechiniquesused in non-linear editing. Mastering final edit line – audio levels, colour correction, audio mixing, mixed and un-mixed versions, importing and applying compatible graphics files.

Understanding compression and its affects along with various methods

Selected Readings:

1. Foley, Bridget (2015). *Hugo & Rose: A Novel*. St. Martin's Press
2. *Read Pixologic ZBrush 4R7: A Comprehensive Guide Online* by Sham Tickoo | Books. (n.d.).
3. Savage, S. (2011). *The Art of Digital Audio Recording: A Practical Guide for Home and Studio* (Illustrated edition). Oxford University Press.
4. Self, D. (2010). *Small Signal Audio Design*. Taylor & Francis.
5. Reisz, K., & Millar, G. (1971). *The technique of film editing*.
6. Team, A. C. (2012). *Adobe Audition CS6 Classroom in a Book*. Adobe Press.
