**BSc Animation & VFX**

**Duration of the Programme: 3 Years Full-time (6 semesters)**

**Program Description:**

The program aims to help the students understand fascinating world of Animation, VFX and Motion Graphics for film, broadcast and other media pads. This program offers Degree Certification in Animation & VFX. The duration of this program is 3 years (6 Semester). In addition to introducing students to the world of 3D digital art and VFX visualization, this program exposes students to Industry relevant software’s. On successful completion of the program, students can continue their learning further to a professional level within Digital Art and VFX production design.

**Program Objectives:**

VFX is an integral part of media in these modern times. This program offers wide career options in film, broadcast, gaming, video content development, Ad creation to name the few. This specialized program is practical oriented to achieve in depth learning at accelerated pace to suit immediate industry requirement.

**Growth in the media & entertainment industry:**

* Media & Entertainment Industry in India to reach Rs1457 Billion by 2016.
* Average time spent watching television in India is 2.55 hrs/day. One of the highest in the world.
* Indian film industry is pegged at 83.3 Billion INR and produces more movies than Hollywood every year.
* 3 Billion Movie goers annually across 12,000 movie screens.
* 20%films released in India are Hollywood films.
* Animation, VFX and post production industry to reachRs23.6 Billion by 2015.

**Career Opportunities:**

* Production Designer
* Concept Artist
* Character Artist
* BG Artist
* Effects Artist
* 3D Artist
* Asset Lead
* Technical Artist
* Asset TD
* 3d Generalist
* Software Engineer/Developer/Programmer
* Character Modeler
* Sound Designer
* User Experience Designer
* Producer
* User Interface Designer
* User Experience Lead
* Marketing Director
* Senior Layout Artist
* Cinematics
* Cinematics Training Manage
* Junior VF Artist
* Matte Painters
* 3D Compositor & Editing Artist
* Rotoscopy Artist
* Match Move Artist

**Semester I**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Mode of Examination** | **Subject** | **Credits** | | **Internals** | **Externals** | **Total** |
| **T** | **P** |
| BSCAVFX101 | Theory | English I | 3 | 0 | **40** | **60** | 100 |
| BSCAVFX102 | Theory | Environmental Studies | 3 | 0 | **40** | **60** | 100 |
| BSCAVFX111 | Practical | Foundation Art I | 1 | 3 | **20** | **60** | 100 |
| BSCAVFX112 | Practical | Material Animation | 2 | 2 | **20** | **60** | 100 |
| BSCAVFX113 | Practical | Digital Art I | 1 | 3 | **20** | **60** | 100 |
| BSCAVFX114 | Practical | 2D Digital Animation I | 1 | 3 | **20** | **60** | 100 |
| BSCAVFX115 | Practical | 3D Animation I | 1 | 3 | **20** | **60** | 100 |
|  |  | **Total** | **26** | |  |  | **600** |

**Semester II**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Mode of Examination** | **Subject** | **Credits** | | **Internals** | **Externals** | **Total** |
| **T** | **P** |
| BSCAVFX201 | Theory | English II | 3 | 0 | **40** | **60** | 100 |
| BSCAVFX202 | Theory | Film Appreciation and Analysis | 3 | 0 | **40** | **60** | 100 |
| BSCAVFX203 | Theory | Storytelling | 3 | 0 | **40** | **60** | 100 |
| BSCAVFX211 | Practical | Foundation Art II | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX212 | Practical | Digital Art II | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX213 | Practical | 2D Digital Animation II | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX214 | Practical | 3D Animation II | 1 | 3 | **40** | **60** | 100 |
|  |  | **Total** | **25** | |  |  | **800** |

**Semester III**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Mode of Examination** | **Subject** | **Credits** | | **Internals** | **Externals** | **Total** |
| **T** | **P** |
| BSCAVFX301 | Theory | History of VFX | 3 | 0 | **40** | **60** | 100 |
| BSCAVFX311 | Practical | 3D Lab I | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX312 | Practical | Photography | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX313 | Practical | Pre Production I | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX314 | Practical | Character Design Concepts | 0 | 3 | **40** | **60** | 100 |
| BSCAVFX315 | Practical | Layout Design Concepts | 0 | 3 | **40** | **60** | 100 |
| BSCAVFX316 | Practical | Compositing Techniques | 1 | 3 | **40** | **60** | 100 |
|  |  | **Total** | **25** | |  |  | **700** |

**Semester IV**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Mode of Examination** | **Subject** | **Credits** | | **Internals** | **Externals** | **Total** |
| **T** | **P** |
| BSCAVFX411 | Practical | 3D Lab II | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX412 | Practical | Pre production II | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX413 | Practical | Lighting & Rendering | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX414 | Practical | Advanced Compositing Techniques | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX415 | Practical | Cinematography | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX416 | Practical | 3D Dynamics | 1 | 3 | **40** | **60** | 100 |
|  |  | **Total** | **24** | |  |  | **600** |

**Semester V**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Mode of Examination** | **Subject** | **Credits** | | **Internals** | **Externals** | **Total** |
| **T** | **P** |
| BSCAVFX501 | Theory | Project Management | 4 | 0 | **40** | **60** | 100 |
| BSCAVFXE511 | Practical | Elective 1 | 1 | 3 | **40** | **60** | 100 |
| BSCAVFXE512 | Practical | Elective 2 | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX513 | Practical | Match Moving | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX514 | Practical | Rotoscopy & Paint | 1 | 3 | **40** | **60** | 100 |
| BSCAVFX515 | Practical | Stereoscopic Techniques | 1 | 3 | **40** | **60** | 100 |
|  |  | **Total** | **24** | |  |  | **600** |

**Semester VI**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Course Code** | **Mode of Examination** | **Subject** | **Credits** | | **Internals** | **Externals** | **Total** |
| **T** | **P** |
| BSCAVFX621 | Practical | Final Project [Portfolio & Thesis] |  | 10 | 80 | **220** | 100 |
| Viva |  | 2 |  |  | 100 |
| Project Report |  | 4 | 20 | **80** | 100 |
|  |  | **Total** | **16** | |  |  | **300** |

**Total Credits: 140**

|  |  |  |
| --- | --- | --- |
| **LIST OF ELECTIVE OFFERED** | | |
| **Course Code** | **Subject** | |
| BSCAVFXE502 | **Elective 1** | 3D Animation & Rigging |
| Modeling and Texturing |
| Lighting, Shading and Rendering |
| Fluid Simulation and Plugins |
| BSCAVFXE503 | **Elective 2** | Sound Design |
| Motion Graphics |

**SEMESTER I**

Course with Credit: **English I (Assam Downtown University Syllabus)**

Course with Credit: **Environmental Studies (Assam Downtown University Syllabus)**

Course with Credit: **Foundation Art I (3)** Code: BSCAVFX103

Programme: BSc Animation & VFX Semester: **I**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** This course enables the students to learn the medium of Drawing and its importance in visualization. This course allows students to learn, observe, analyze and visualize. The program allows the student to strengthen the drawing skills to support later part of Animation design.

**Catalog Description**: The course Introduces to drawing and its materials, helping in understanding the available medium, style and method, Drawing from Nature, Perspective drawing, Lighting & Shading, Figure Drawing.

**Pre-requisites:** Enthusiasm to draw, no prior drawing skill required and a lot of hard work.

**Course Outline:**

1. **Introduction to Drawing Materials (10 Hours)**
2. Introduction of Unit
3. Papers-Different pencils.
4. Color pencils-Crayons and poster colors.
5. Introduction to drawing the objects, figures from the surroundings.
6. To learn, observe, analyzing, and drawing the mechanical objects, utensils, objects from everyday life.
7. **Perspective drawing (10 Hours)**
8. Introduction of Unit
9. To learn the importance of Perspective
10. Rules of perspectives – To learn one point – two point perspectives- Learn to draw from different eye levels and different angles.
11. **Drawing from Nature (15 Hours)**
12. Introduction of Unit
13. Location drawing and learning to represent trees, plants, bushes, shrubs, insects, birds, and animals with attention to structure and morphology, proportion, volume, and behavior.
14. Dramatizing what has been recorded
15. **Lighting & Shading (15 Hours)**
16. Introduction of Unit
17. To introduce to the concept of light in visualization.
18. To study objects in Lighting and learn to draw them with proper shading
19. To study photographs of well known photographers to understand the tonal variations.
20. Learning Lab: (1) Drawing inorganic and Organic objects from life. (2) Drawing figures/ sketching figures from live [Outdoor and Indoor study]. (3) Drawing plants, trees, flowers, fruits [Outdoor and Indoor study]. (4) Drawing perspective; one point and two point perspective views of furniture, interior and exteriors of buildings. [Outdoor and Indoor study]. (5) Lighting and shading of objects and furniture [Class room]. (6) To create a project on visual elements [ line/shape/form/texture] [ Class room]

1. **Figure Drawing (20 Hours)**
2. Introduction to Figure Drawing
3. Learning Stick Figures
4. Practice with Lines and Stick Figures
5. Mannequin Drawings
6. Drawing Figures in Blocks
7. Drawings from different eye-levels.
8. Basic Anatomical Study
9. Creative Forms of Aliens with Balanced Anatomy;
10. Drawings of Human Figures from Different Backgrounds
11. Drawing Props and Costumes

**Reference Book(s):**

1. Perspective Drawing Handbook, Joseph D'Amelio
2. Fun with the Pencil, Loomis
3. Dynamic Figure Drawing, Burne Hogarth
4. Complete Book of Drawing Technique, Peter Stanyer

Course with Credit: Material Animation **(4)** Code: BSCAVFX104

Programme: BSc Animation & VFX Semester: **I**

**Total No. of Lecture / Practical Hrs: 60**

**Rationale:** To introduce various techniques and styles of Animation, to provide the students hands on experience of simple ideas for animation using the materials available in the immediate surroundings.

**Catalog Description:** The course cover’s different style and techniques available for material animation, creation of different process and methods of material animation.

**Pre-requisites:** Beginner-level proficiency in Art, storytelling and ideation.

**Course Outline:**

1. **Introduction to Material Animation (10 Hours)**

Introduction to material animation, different styles and techniques, popular material animation filmmakers and their Films.

1. **Different Techniques (15 Hours)**

Different techniques – sand, clay, cut out, pin screen, model animation, pixilation, time lapse and other techniques

1. **Process and methods of Material Animation (15 Hours)**

Visualization, methods and production processes of sand, clay, cut out, pin screen, model animation, pixilation, time lapse and other techniques

1. **Material Animation in Action (20 Hours)**

Story and Visualization for material animation films

**References: (Film Screenings)**

1. Quays
2. Films done by Jan Svankmajer
3. Plasticine Animation Caroline leaf
4. Bead Game, Afterlife - Ishu patel
5. Mindscape, Jacques Drouin
6. Papageno, the Adventures of Prince Achmed, Lotte Reiniger

Course with Credit: Digital Art I **(4)** Code: BSCAVFX105

Programme: BSc Animation & VFX Semester: **I**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The purpose of this subject is to provide the students with training methodologies and specific industry skills that will assist them in developing creative ideas into digital art with emphasis on image manipulation, matte painting and image creation and editing. The students will receive information that will enable them to:

* Understand the design principles used in the creation of digital art.
* Familiarize with the terminologies and concepts for creating and manipulating digital images.

**Catalog Description:** The course cover’s the theory of Art and its, different Digital art methods, tools and technique and available formats.

**Pre-requisites:** Beginner-level proficiency in Art and the basic idea of using a computer.

**Course Outline:**

1. **Theories of Perception (10 Hours)**
2. Introduction of Unit
3. Electromagnetic Spectrum
4. Analog and Digital Colors
5. Symbolism Additive and Subtractive Colors
6. Mixing Colors.
7. Colors for Painting.
8. **Digital Tools, Hardware for Digital Painting (10 Hours)**
9. Introduction of Unit
10. Image Format and Color Representations
11. Image and File Formats
12. File Compressions.
13. Properties of Bitmap Image.
14. Resolutions for Print and Display, Digital color Representation.
15. **Introduction to Raster Graphics Tools (10 Hours)**
16. Introduction of Unit
17. Layers
18. Adjustment Tools
19. Painting
20. Creating raster artworks.
21. Image Manipulation.
22. Color Manipulation.
23. Layer Blending, Masking, Export Parameters.
24. **Introduction to Vector Graphics Tools (15 Hours)**
25. Introduction of Unit
26. Creating Vector Arts
27. Paths and Shapes
28. Vector brushes and colors
29. Layers, Transparency, Grouping, Blending Modes, Managing Artwork, Single and Multipage Illustrations.
30. **Applications (25 Hours)**
31. Digital Painting
32. Images Restoration
33. Images manipulation and collages
34. Vector Art – Graphics and Illustrations
35. Print and Web graphics

**Reference Books:**

1. Adobe Photoshop Cs6 Bible: The Comprehensive, Tutorial Resource, Lisa Danae Dayley, Brad Dayley
2. Adobe Photoshop CC Classroom in a Book with Access Code, ADOBE CREATIVE TEAM Principles of Form and Design by Wucius Wong

Course with Credit: 2D Digital Animation I **(4)** Code: BSCAVFX106

Programme: BSc Animation & VFX Semester: **I**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The students will receive information that will enable them to: Creating digital animation using Key frame and Tweening Animation Techniques. Understand the workflow to create 2D Digital Animation. Creating and Managing Scenes. Create background art for Animation.

**Catalog Description:** The course cover’s introduction to the tools and software, the methods and technique of Staging, timing, tweening.

**Pre-requisites:** Basic understanding of drawing, volume and animation.

**Course Outline:**

1. **Tools and Interface (10 Hours)**
2. Introduction to Tools and Interface
3. Drawing for Animation
4. Shape Manipulation
5. Working with Strokes and Fills
6. Grouping Shapes, Frames per Second, Stage Size, Background color, Key frames Animation.
7. **Tween Animation (15 Hours)**
8. Introduction of Unit
9. Motion and Shape Tween
10. Guide Paths.
11. Path Animation, Masking, Animating Masks, Gradients and Effects.
12. **Staging and timing (10 Hours)**
13. Introduction of Unit
14. Animation Staging and timing
15. Static Background Scenes
16. Animated Background Scenes, Scene Management, Duplicating and Editing Scenes.
17. **Export Movie (05 Hours)**
18. Introduction of Unit
19. File Management
20. Library Management
21. Workspace customization
22. Compressions.

Learning Lab: 1) Key frame Animation Exercise: Principles of Animation. 2) Key frame Animation Exercise: Key frame Animation, Character Animation. 3) Key frame Animation Exercise: Stick Figure Cycles Animation. 4) Creating Scenes for animation

1. **Applications (30 Hours)**
2. Key frame Animation Exercise: Principles of Animation.
3. Key frame Animation Exercise: Key frame Animation, Character Animation.
4. Key frame Animation Exercise: Stick Figure Cycles Animation.
5. Creating Scenes for Animation.

**Reference Books:**

1. Adobe Flash Professional CS6 Classroom in a Book 1st Edition, Adobe Creative Team
2. How to Cheat in Adobe Flash CS5: The Art of Design and Animation, Chris Georgenes,

Course with Credit: 3D Animation I **(4)** Code: BSCAVFX107

Programme: BSc Animation & VFX Semester: **I**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** when animation started it was on paper (2D Animation) People had a perception that it was restricted to only drawing and cartoons. As the industry matured with computers being introduced, the perception changed to flashy, Photo-realistic or Cartoonish productions for Web games, Movies, Video games etc. The program will enable student to dive in the world of 3d from its evolution, tools used to create animation, animation principles and its application.

**Catalog Description:** The unit start’s with the basics of using a 3d software and introduces to tools and methods, the principles of animation and its application in 3d.

**Pre-requisites:** Basic computer knowledge to start with.

**Course Outline:**

**I. 3D Animation (10 Hours)**

The Art of 3d animation. Importance of classical Animation principles and Implementing in a 3d Space or Area. Evolution and rapid development of 3d animation films globally – to the current scenario

**2. Maya Software (10 Hours)**

Introduction to Maya User interface, Navigation, Tools, Menu Bar, Introduction to Maya Basic Animation Tools.

**3. Graph Editor (10 Hours)**

Graph Editor Tool Bar Buttons, Selecting and modifying keys, Navigating the graph, Selecting items in the graph (curves, keys, tangents), Buffer curves and swap curves, Cycles and holds, Repeating curve segments, Pre – Infinity, Post – Infinity, Modifying animation curves, Modifying tangents, Weighted/Non weighted Tangents, Free, Lock tangent weights, Break, Unify, Spline, Clamped, Linear, Flat, Step, Working with keys, Covert to Break Down, Copying, Pasting and scaling Keys/curve segments.

**4. Dope Sheet (05 Hours)**

Dope Sheet, Moving Keys in Dope Sheet, Time Line, Setting up output file size and resolution, Previewing Animation using Play blast.

1. **Understanding of the Animation Principles (35 Hours)**

**Understanding of the Animation Principles**

**Stretch and Squash**

Basic Exercise to truly understand the Animation Principles- Simple Bouncing Ball

**Timing and Spacing**

Animating a ball/ made of different material/s, surface/s and texture/s – Metal, Rubber, Plastic, Wood.

**Arcs**

Animating different ball/ made of different material/s, surface/s and texture/s – Wood, Ping Pong, at the same time

**Exaggeration**

Animating collision between two or more different bouncing ball in a environment in side view

**Follow Through, overlap**

Animate a Ball with a tail (like a Squirrel)

**Wave Motion**

**SEMESTER II**

Course with Credit: English II **(Assam Downtown University Syllabus)**

Course with Credit: Film Appreciation and Analysis **(3)** Code: BSCAVFX202

Programme: BSc Animation & VFX Semester: **II**

**Total No. of Lecture / Practical Hrs: 30**

**Rationale:** The subject imparts the basic understanding of the process involved in analyzing films through the language and grammar. It also provides the history of cinema and its various genres and documents their evolution.

**Catalog Description:** The unit deals with the history of cinema, film genres, story, film language to implement in one’s own film and taking it to the next level.

**Pre-requisites:** Interest in movies of different directors from a different time and the idea of the set would be beneficial.

**Course Outline:**

1. **History of Cinema (03 Hours)**

History of Cinema and Genre Studies. A brief history of early evolution of cinema; Era of silent films –

Introduction to different approaches in story telling as seen from Live Action, Documentary and Animation.

1. **Film Genres (03 Hours)**

Film Genres –Definition - Introduction to various film genres – Categories - Film Noir.

1. **Story structure (10 Hours)**

Story structure: Story / script / Story boarding; Developing Story ideas, designing the Plot, Plot development and Plot devises, Story narration, Character development in the story.

1. **Film Grammar & Language (10 Hours)**

Film Grammar & language - Mise-En Scene, Elements of Mise en scene: Representation of space. Set designing –colour design and symbolism in sets – lighting – costume designing - Acting and types of acting.

1. **Case Studies (04 Hours)**

Case studies/Film viewing and analysis.

**Reference Books:**

1. The Analysis of Film by Raymond Bellour and Constance Penley (Editor).
2. How to Read a Film: Movies, Media, and Beyond by James Monaco.
3. Film Art: An Introduction - Paperback (Nov. 25, 2009) by David Bordwell and Kristin Thompson.
4. Film Form: Essays in Film Theory - Paperback (Mar. 19, 1969) by Sergei Eisenstein and Jay Leyda.

Course with Credit: Storytelling (**3)** Code: BSCAVFX203

Programme: BSc Animation & VFX Semester: **II**

**Total No. of Lecture / Practical Hrs: 30**

**Rationale:** This course enables the students to learn the art of storytelling. It enables student edited and imaginative the concepts for Animation. It provides knowledge in narrative and non narrative techniques of communication as applied in Animation films and television advertisements.

**Catalog Description:** The Course cover’s Ideation of the story, its arrangement in cinematography as plots and action, type of character, place and period of the event narrated.

**Course Outline:**

1. **What is Story (05 Hours)**
2. Introduction:
3. Relevance in society Introduction to ideation and Imagination of storytelling
4. Resources and Text –Oral – and performance – film as different mediums. Story genres and different audience.
5. **Story -Plot & sub plots (10 Hours)**
6. Introduction of Unit
7. Plot devices – Other Devices
8. Dramatic structure –Conflict - Setting mood
9. Rising action -Falling Action –Dénouement – Resolution
10. Narrative point of view - Linear & non linear – linear story structures
11. **Characters (05 Hours)**
12. Introduction of Unit
13. Characters from the story- to explore different aspects of a character.
14. Character driven stories.
15. Different characters from the story. Characters from various contexts and cultural and class backgrounds
16. **Environment of the story (05 Hours)**
17. To study the environment of the story, Characters and their relations to the place, geographical, historical and any other associations with places.
18. To learn to understand and construct different events. Events – driven stories.
19. **Visual narration through Illustration (05 Hours)**
20. Single panel to multiple panels Storytelling in Comics.
21. To learn various attributes of Comics – Visualization – Narration – Dialogue writing etc. for comics.
22. Assignments: 1) To create story ideas - To tell a story through text. 2) To create story ideas - To tell a story through single visual. 3) To create a character and Events driven story. 4) To create an illustration for a story. 5) Project: To create a comic panel for a story.

**Reference Books:**

1. **Story: Substance, Structure, Style and the Principles of Screenwriting. Robert McKee**
2. **The Way of the Storyteller. Ruth Sawyer**
3. Facial Expressions: A Visual Reference for Artists. Mark Simon
4. The Animation Book: A Complete Guide to Animated Filmmaking--From Flip-Books to Sound Cartoons to 3-D Animation, Three Rivers Press.
5. Making Comics: Storytelling Secrets of Comics. Scott McCloud

Course with Credit: Foundation Art II (**4)** Code: BSCAVFX204

Programme: BSc Animation & VFX Semester: **II**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** Develop an ability to understand materials, behavior, and movement of objects. Understand kinetics and learn to recreate structure, force, and body language of any subject/object on a two-dimensional surface. Know how to interpret from the real world for representation, Develop methods to record the motion of objects with their inherent qualities as a series of static positions, To be able to draw from imagination based on the above learning.

**Catalog Description:** This is an extension of Foundation art I which gets deeper as it gets inside as we advance and as we deal with detailed anatomy, camera angles, lighting and shading from the real world.

**Pre-requisites:** Good hand at drawing and successful completion of Foundation art I.

**Course Outline:**

1. **Drawing Principles (10 Hours)**
2. The Evolution of drawing style in Animation
3. Animation Aesthetics - Shape and Form, Line and Silhouette, Tension, Direction, Straight against Curve, Logic in Drawing, Planes, Solidity, Depth and Volume
4. **To draw from life- observational Drawings of human forms (20 Hours)**
5. Introduction of Unit
6. Stick Drawings – in various pose actions
7. Mannequin Drawings – in a different pose and actions, Learn to draw from different angles and eye levels.
8. **Human anatomy (15 Hours)**
9. Introduction of Unit
10. Different parts of human body and functional aspects of hands, legs etc and the proportions in relation to each other
11. Male female and children, Gods and Super Humans, Creative forms of aliens with balanced anatomy

1. **Life study (15 Hours)**
2. Realistic style drawings of Human figure
3. Life study in Class room using live models
4. Learn to simplify the human drawing in Cartoonist style.
5. Learn to use simple shapes like circle, oval and curves to exaggerate the human figures.
6. Assignments: 1) To draw various shapes and forms from life and imagination. 2) To draw stick drawings in various pose and actions. 3) To draw mannequin drawings in various pose and actions. 4) To Draw Anatomy drawings of Male female and children. 5) To draw Gods and Super Humans. 6) To draw Cartoonist style figures/ objects / Interiors –Exteriors. 7) Creating animated sequences from the drawings studies and quick sketches. 8) Creating animated sequences from drawings of buildings, cityscapes
7. **Art Representation and Art History (10 Hours)**
8. Composition ( Memory Drawing)
9. Human or Animal Drawings with Background
10. The History of Art
11. Relationship between Art and Society.
12. Western Art, Indian art, Oriental Art, Aesthetics Of Art, Analysis and Criticism.

**Reference Books:**

1. Creating animated sequences from drawings of buildings, cityscapes. by H V Carter
2. Figure Drawing for all its worth, Andrew Loomis
3. Dyanmic Figure Drawing, Burne Hogarth.
4. Dynamic Life Drawing for Animators, Mike Mattesi.

Course with Credit: Digital Art II (**4)** Code: BSCAVFX205

Programme: BSc Animation & VFX Semester: **II**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The students will receive information that will enable them to: Understand the concept of creating textures, brushes, abstract and thematic designs. Create effective typography designs used for raster and vector illustrations and designs. Creating Matte Paintings to be used as concept arts and Parallax scenes.

**Catalog Description:** This is an extension of Digital art I which get deeper with tools and technique preparing the student for advanced and more challenging task in matte painting, character design and concept art.

**Pre-requisites:** Good hand at drawing in the computer and successful completion of Digital art I.

**Course Outline:**

1. **Digital Color (10 Hours)**
2. Digital Color mixing, Custom Brushes, Custom Palette for Painting
3. Digital Character Painting
4. Concept art – Environment.
5. **Ink and Painting (10 Hours)**
6. Colorizing
7. Artistic Filters
8. Texture Painting
9. Painting for 3D, creating passes.
10. **Typography Fundamentals (10 Hours)**
11. Introduction Typography Fundamentals
12. Fonts
13. Designing Type
14. Typography Design and Art
15. Special Effects for Typography.
16. **Background (15 Hours)**
17. Introduction of Unit
18. Digital Ink and Paint
19. Background Composition
20. Art of Collages, Creating Digital Collages.
21. Learning Lab: 1) Using Photoshop as an artistic tool-Colour, Symbolism, Ink and Painting, Colorizing, Artistic Filters. 2) Abstract Design-Creating Abstract and Thematic Designs, Creating Abstract Brushes, Multilayered Background Design using Blend Modes. 3) Typography (Text Design), Perspective Transformation, Color Corrections, Color Blend, Concept Art, Vector art, Character Vector art. 4) Creating Texture painting including passes.
22. **Matte and Texture Painting**  **(25 Hours)**
23. Visualizing the matte scene.
24. Resources for Matte Painting.
25. Techniques for Effective Matte Painting.
26. Creating Tiled and Seamless Textures.
27. Creating texture maps for textures.

**Reference Books:**

1. Adobe Photoshop Cs6 Bible: The Comprehensive, Tutorial Resource, Lisa Danae Dayley, Brad Dayley
2. Beginner's Guide to Digital Painting in Photoshop: Volume 1, Richard Tilbury, Nykolai Aleksander
3. Digital Painting Techniques, 3dtotal. Com Ltd.

Course with Credit: 2D Digital Animation II (**4)** Code: BSCAVFX206

Programme: BSc Animation & VFX Semester: **II**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The students will receive information that will enable them to: Construct characters using flash symbols and rig it for animation. Animate background layouts and characters using 2D animation principles. Creating basic scripted animation. Animating complete scenes from start to finish, including sound.

**Catalog Description:** The course cover’s Creating Assets and its use to create basic animation.

**Pre-requisites:** Good hand at drawing and successful completion of digital art I.

**Course Outline:** Symbol construction and animation

1. **Flash symbols (08 Hours)**
2. Nested Symbols
3. Rigging Symbols
4. Animating Symbols, Layout Composition Cycles and Holds.
5. **Character animation using Symbols (12 Hours)**
6. Walk cycles, Run Cycles
7. Camera Angles, Lip Sync, Creating Symbols for Lip sync
8. Creating Effects for scenes
9. **Animate background layouts (10 Hours)**
10. Digital Ink and Paint
11. Inking Scanned Drawings
12. Painting Techniques
13. Creating Background Composition
14. Layering Artwork for Animation.
15. **Color Styles and Techniques (15 Hours)**
16. Colorizing, Color Styles and Techniques
17. Cleanup Work
18. Basics of Scripting, Scripted Animation
19. Loop and Condition based scripted animation
20. Interactive elements for scripting, Scene Management.
21. Learning Lab: 1) Character Construction, Character Rigging, Symbol Construction, Symbol Animation, Symbol Library Management. 2) Character animation in Flash using both Key frame & Symbols. 3) Layout Design and Animation-Background Composition, Background coloring. 4) Working with Animation techniques outputs, Importing the footage, Colorizing, Cleanup Work. 5) Creating animation using scripting.

1. **Mini Project (25 Hours)**
2. Story or Gag Ideation
3. Media Selection [Mobile,Web,HD]
4. Pre Production
5. Planning and Timeline
6. Adding Sound [ BG and Foleys ]
7. Review and final edit, exporting for different Medias.

**Reference Books:**

1. Adobe Flash Professional CS6 Classroom in a Book 1st Edition, Adobe Creative Team
2. How to Cheat in Adobe Flash CS5: The Art of Design and Animation, Chris Georgenes

Course with Credit: 3D Animation II (**4)** Code: BSCAVFX207

Programme: BSc Animation & VFX Semester: **II**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** This subject gives an insight into complete animation principles, tools,

more character animation techniques due to the increase demand for 3d animation content and different style produced 3d animation is getting complex and intense, there is a need to bridge with lot of realistic and believable animation there is a demand for mechanics in motion.

**Catalog Description:** This is an extension of 3d animation I and goes deeper into 3d commonly known as CGI animation, the animation principles in detail with its application, tools controlling, poses, the mechanics of motion and its propagation.

**Pre-requisites:** Hands on 3d animation I and basic animation drawing.

**Course Outline:**

1. **Exclusive animation Principles understanding and application - using 3d /Maya Space (15 Hours)**

Weight, Posing (+ anatomy), Non-symmetrical Posing and Performing. Visual styling. Blend motion. Cinematography. Facial animation. User-controlled animation., Plan Ahead, Blocking & Refining, Intentionality, Snap, Isolation, Solid Modelling and Rigging Skills

1. **Graph editor (05 Hours)**

**Other important areas of Graph editor -** Change Rotation, Interpolation, Mute/Unmute Bake Channel, Resample Curves Simplify curves.

1. **Path animation (10 Hours)**

Creating a Path Animation, The Attach To Path Options Window, Character Animation – Creating Poses, Posing - Normal and Extreme poses - Old people, Martial artist, Dancer, Skater

1. **Basic Body Mechanics and Motion (20 Hours)**

Walk Cycles and Holds – Bipeds Walk cycle, Normal, Double bounce, Characterized, Limping. Run cycles, Jog, Sprint, Full Run, Jumping, Diving from a Springboard,

1. **Understanding the importance of Weight and Balance, movement of Hips (20 Hours)**

Kicking a football, Stepping from one Side to another Side, Jump over a small ditch/hole

Climbing a wall, A simple Dance Move

**SEMESTER III**

Course with Credit: History of VFX (**3)** Code: BSCAVFX301

Programme: BSc Animation & VFX Semester: **III**

**Total No. of Lecture / Practical Hrs: 30**

**Rationale:**

We look into early films, evolution and men who lead the way. Throw light on interesting facts about the history of VFX in cinema, how it all began and evolved. Model Hollywood – how Hollywood pioneered the change & created a new breed of profession. How the development of visual effects has changed popular cinema’s vision.

**Catalog Description:** The course cover’s the Evolution of VFX, Pioneers in VFX, VFX then and now and its future.

**Pre-requisites:** Interest in movie making.

**Course Outline:**

1. **The Evolution of the Art (06 Hours)**

The Evolution of the Art – Theoretical Analysis – Hollywood – Pioneers of Vfx.

1. **Things to Come (06 Hours)**

The Shaping of Things to Come – Warfare Impact – The Continued Innovation - Dashing Spaceships.

1. **People in Making (06 Hours)**

1970s - George Lucas - Stephen Spielberg – Industrial Lights & Magic – Indian Vfx history.

1. **Development of Vfx of Films (06 Hours)**

Development of Vfx of Films - Rise of Computers Systems – 1980s a Slow evolution with Highlights.

1. **Digital World (06 Hours)**

Putting Digital Realm on the Map – 1990s Enthralling CGI – Changing the Lingo – Massive Lords - Avatar Box - The State of the Art.

**Reference Books:**

1. Digital Storytelling: The Narrative Power of Visual Effects in Film – McClean, Shilo T. I (2007) I The MIT Press I
2. Compositing Digital Images – T. Porter and T. Duff.I Proceedings of SIGGRAPH '84, 18 (1984)

Course with Credit: 3D Lab I (**4)** Code: BSCAVFX302

Programme: BSc Animation & VFX Semester: **III**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** This subject will provide a detailed introduction to Autodesk Maya Software and helps the student understand the concepts of observation, timing, and motion in the real art of animation and helps in creating strong and believable animation pieces. The students will also understand the importance and application of Basic Rigging.

This course also emphasizes artistic and aesthetic creativity, intending to push the boundaries of the imagination and to familiarize students with acting, developing different kind of personality of characters and to explore character rigging for animation, expressions and particle manipulation. The subject ensures that the students will be familiarized with the Maya interface and tools

**Catalog Description:** The course gives an inside of Modeling, Texturing, Rigging and Animation introducing to 3D software and its usage.

**Pre-requisites:** Intermediate in Drawing and perspective, Basic maths and science is definitely helpful but not necessary.

**Course Outline:**

1. **Interface and Concept of 3D modeling. (05 Hours)**

Being familiar with Maya viewport, user interfaces, status line, shelf, layers, channel box, etc; Understanding the 3 Dimensions, Isometric & Orthographic projection, 3D space, difference between 2D & 3D and xyz coordinates.

1. **Introduction to modeling tools (10 Hours)**

Introducing tool box, basic primitives, Mesh, edit mesh, outliner, pivot point etc; Establishing different type of geometries, nature of difference meshes, and advantage and disadvantage of these geometries.

1. **Concepts of UV unwrapping (05 Hours)**

Understanding the concept of UVs, UV texture space and how to map them to a surface, and subsequently lay them out accurately is essential for producing textures on polygonal and subdivision surfaces when working in Maya.

1. **Working with UV tools & techniques (05 Hours)**

Understanding the UV Texture editor and technique of how to cut, merge, relax, unfold, and layout the UVs. Experimentexerciseon unwrapping techniques using a simple model.Explaining UV resolution settings, and how to capture a UV snapshot from maya UV, texture editor, and getting in to paint software.

1. **Animation (20 Hours)**

Applying the principles of animation using standard cycles -Timing the animation, Adding weight. Mastering the use of Graph editor and Dope sheet, Morph or Animate - Universal Expressions, Other Expressions, Constraining and parenting for animation. Object Character interaction. Character - Character Interaction. Telling a story – Mime. Attitude/Personality – Human Figure Walk cycles. Adding personality and appeal. Acting out a scene/referencing. Thumb nailing. Staging a shot/scene/sequence. Animation Blocking

1. **Rigging (15 Hours)**

Deformers – Nonlinear, Bend, Flare, Sine, Squash, Twist and Wave, Concept of Animating the Envelope, Lattice, Cluster, Sculpt, Jiggle, Wire, Wrap, Edit membership (Including, Excluding, Pruning members) Painting memberships/Weights, Cluster Curve, Deformers – Blend Shape, Creating the Shapes. Rigging Basics - Bones and Joints Skin, Binding Kinematics (IK & FK), Requirements for a clean Model, Clean UVs.

1. **Skinning (10 Hours)**

Binding - Smooth Binding. Concept of a single cluster. Max Influence & Drop-off rate. Rigid Binding Concept of a Multiple cluster, Practice of Rigid and Smooth Binding, Editing the Smooth Skin, Adding influence objects, Painting of skin weights, Editing Skin weights, Mirror Skin Weights Copy skin weights Resetting, Skin weights, Pruning small weights, Normalize Weights, Export / import skin weight maps, Editing Rigid Skin, Creating and Editing Flexors, Lattice, Sculpt, joint Cluster, Painting Cluster weights, Rigid Binding Practice. Rigging the controls - IK and FK, Joints and hierarchies Concept of Skeleton, Connect Joint, Remove, joint, Insert joint, Re-root joint Mirror, Joint, Set preferred angle, Assume preferred angle

**Learning Lab:**

1. Model minimum of 30 scene elements props with textures.
2. Model and texture an cartoon character and environment with detail
3. Rig a cartoon vehicle for animation
4. Rig a vehicle for animation
5. Path animation- Creating a Path Animation -The Attach To Path Options Window
6. Posing - Normal and Extreme poses - Old people, Martial artist, Dancer, Skater

**Reference Books:**

# Understanding 3D Animation Using Maya - John Edgar Park

* Basics Animation: Digital Animation - Andrew Chong
* The Animator's Survival Kit--Revised Edition: A Manual of Methods, Principles and Formulas for Classical, Computer, Games, Stop Motion and Interne - Richard Williams

I Publisher: Faber Faber I

Course with Credit: **Photography** (**3)** Code: BSCAVFX303

Programme: BSc Animation & VFX Semester: **III**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** To impart knowledge in Photography as an artistic medium. To impart knowledge in techniques of photography. To impart awareness about the Camera, its function and application.

**Catalog Description:** The course cover’s various topics in Photography like History of Early Photography, its evolution, Lighting and its characteristics and its Accessories.

**Pre-requisites:** Knowledge of Light, using Camera and its feature would be helpful but not necessary.

**Course Outline:**

1. **History of Photography (15 Hours)**
2. Introduction of Unit
3. Principle of the camera obscure
4. To study few photographers like Ansel Adams, Dorothea Lange, Robert Capa etc.
5. Aesthetics of Photography both in documentary and Creative photography.
6. **Characteristics of light (15 Hours)**
7. Introduction of Unit
8. Spectrum
9. Color Temperature
10. Camera - structure and function of camera Types of cameras, Lenses and their function
11. Types of lenses and their use, Characteristics of lens, lens speed, covering power and other features.
12. **Lighting techniques (15 Hours)**
13. Introduction of Unit
14. Practical Understating and practice of Lighting techniques ,Kinds or lights indoor and outdoor.
15. Electronic flash and artificial lights, Light meters
16. Different kinds B & W and color photography
17. **Accessories used in photography (10 Hours)**
18. Introduction of Unit
19. photography, optical system, power system, memory storage, resolution
20. Understanding exposure and controls
21. Flash and lighting.
22. Transferring images to PC file formats, managing digital pictures.
23. Learning Lab: 1) Photography still objects and scenes. 2) Photography Moving objects and scenes. 3) . Indoor and Outdoor Photography. 4) 4. Time-lapse and Light Painting Photography.
24. **Creative Photography (15 Hours)**
25. Macro Photography
26. Freeze Frame Photography
27. Light Painting
28. HDRI and Panoramas

**Reference Books:**

1. Digital Photography Step by Step, Tom, Ang
2. The Complete Digital SLR Handbook: Master Your Camera to Take Pictures Like a Pro [With CDROM, COMP DIGITAL SLR HANDBK
3. Scott Kelby's Digital Photography Boxed Set, Parts 1, 2, 3, and 4 , Scott Kelby

Course with Credit: **Pre Production I** (**4)** Code: BSCAVFX304

Programme: BSc Animation & VFX Semester: **III**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** To impart skills on writing stories/ script and visualization for Animation Films and the ability to plan an animation film

**Catalog Description:** The course cover’s the basic of Film and Format, Script, Storytelling Techniques, Storyboarding and sound in Storytelling techniques.

**Pre-requisites:** Good hands at drawing, interest in sound editing, interest in novels all the above list will definitely be helpful but not necessary.

**Course Outline:**

1. **Film Format and its Ratios (10 Hours)**

Medium and Formats - Film, Frame Rate, Size and Gauge, Tele Cine and Reverse Tele Cine. Television, Frame Rate, PAL, NTSC, SECAM. Aspect Ratio, Camera, Lens and Projection Systems, TV Safe. Emerging Trends and Digital Films, High Definition Imaging

1. **Scripts (15 Hours)**

Anatomy of a Script, Script Elements and Scene Heading , Action, Characters. Dialogue - Parenthetical - Extension - Transition - Shots - Page Breaking, Finer Points, Dual Dialogue, and Adlibs - Abbreviations and Montages - A Series of Shots and Short Lines/Poetry/Lyrics – transitions, continuity etc.. Titles or Opening Credits, and Superimpose or Title -Title Page -Production Drafts, Top Continued and Bottom Continued - Locking Script Pages and Locking Scenes -Header, Do's and Don'ts - Other Script Formats, Reading Scripts from Popular Television Shows and Animation Films.

1. **Story telling Techniques (15 Hours)**

Research - Period - Historic / Scientific facts, Society Costumes Props, Food etc. Illustration, Anatomy, Rendering your drawings, Techniques and styles, Inking – Graphic styles, Text – as image, Page Elements and Composition, Projecting figures in Deep space, Framing and Composition, Perspective and Camera. Concept Art and Matte Painting (using Advanced Photoshop Technique)

1. **Storyboarding (15 Hours)**

What is Storyboard, Importance of Story Board, difference between storyboard and Graphic Comic, Difference between Storyboard and Presentation Board. Advantages of Storyboard in Animation, Anatomy of a Storyboard, Thumbnail Storyboard, Preparing Storyboards using Digital software. Advanced Storyboard Techniques, Various Camera Shots and Camera Moves and their meaning, Transitions, Aspects of the story board.

1. **Sound editing and Design (15 Hours)**

Sound Effects Music and Foleys – Dialogue. Dialogue writing. Recording of dialogue, The spoken language Dialect and Accent. Voice acting/ modulation. Cast, Scratch Audio Track, Shooting the Storyboard, Slugging the Storyboard, Animatics.

**Reference books:**

1. The Art of story board by John Hart
2. 'How to Write for Animation' by Jeffrey Scott's book

Course with Credit: Character Design Concepts (**3)** Code: BSCAVFX305

Programme: BSc Animation & VFX Semester: **III**

**Total No. of Lecture / Practical Hrs: 60**

**Rationale:** Thisis a course aims to develop an understanding, keen sense of observation and the aspects that establish one's environment and the people that live in it as being inseparable and interdependent. Understanding the symbiotic relationship in order to be able to conceptualize and visualize personalities and locations for animated films. Sensitizing students to the world we live in and develop a keen sense of observation of human behavior and their worlds. The course also lays emphasis on body language, mime, theatre and other aspects that contribute to a better understanding of the above. Body language and how we communicate – between persons and individually, between persons and the animal world, between the human and the object world, between real and the imagined – behavior. Theatre and acting – its relevance and power in animated films. Bringing to life and establishing believability

**Catalog Description:** The course deals with Character and its development, types, its importance in storytelling.

**Pre-requisites:** Good hands at Drawing, Digital art and Preproduction.

**Course Outline:**

1. **Character Bible**  **(12 Hours)**

Biography of character – Visualizing the Character – Creating Characters from life study. Story and the role of characters. The role, symbolism and significance of all sorts of characters in animated films – human, imaginary – fantasy, Creating Characters from Life.

1. **Character Design (12 Hours)**

Elements of Character Design, - personality, attitude, role, function. Character Bible and model sheets, Stereotypes**.** Characters in animated films – models, drawing etc…

1. **Anthropomorphic Character (12 Hours)**

Design of Anthropomorphic Animals and Objects   Anthropomorphic and alien characters, animals, birds, objects etc…Examples from films.

1. **Costume and Props (12 Hours)**

Costume with character – Costume and color - Character Inspiration from costume – Imaginative design. Pets and props - Character styles - Anime Style – Aesthetics in anime characters

1. **Handouts (12 Hours)**

Various Elements of Handouts, Model Sheet, Turnaround Sheet, Proportion Chart, Scale Sheet, Expression and Mouth Chart, Colour Reference Sheet, Prop Sheet.

**Reference books:**

1. Animation Techniques - Roger Noake, Publisher: Booksales,
2. Cartooning: The Ultimate Character Design Book - Christopher Hart (Author)
3. Creating Characters with Personality: For Film, TV, Animation, Video Games, and Graphic Novels - Tom Bancroft (Author), Glen Keane (Introduction)

Course with Credit: **Layout Design Concepts** (**3)** Code: BSCAVFX306

Programme: BSc Animation & VFX Semester: **III**

**Total No. of Lecture / Practical Hrs: 60**

**Rationale:** Field work - how to go about it - understanding cultural specificity

* To learn the power of observation and re-telling – interpretation – exploration and experiment
* To learn how to represent this analysis through images – methods, styles and mediums
* Visualizing the geography of the environment in which the characters perform
* To explore the development of characters and personalities and their environments for imaginary worlds and establish relationships between the imagined characters and the worlds that they inhabit.
* Exploring the imaginary world – reality, imagination and visualization
* To learn the process and apply it in any context

**Catalog Description:** The course deals with Environment, time, its visualization and the final result of the content with the camera aspect in the film.

**Pre-requisites:** Good hands at Drawing, Digital art and Preproduction.

**Course Outline:**

1. **Building environments**  **(15 Hours)**

Building environment for characters, Study and analysis of context – geography, environments, cultural aspects, and situations. Story, - Setting the stage - Translation of script. Visualizing an idea - storyboard - set the stage for the film, Creating a clear working plan – plan of action and the framework for the animator. Film language, visualization, and film sense

1. **Visualization (20 Hours)**

Visualization dramatization of space, exaggerated perspectives. Laying out a scene - Space and time, framing, camera, and other kinds of spaces and timing. Aspect Ratio, field guides. Laying out the Animation. Camera movement calculation to animation – matching speeds. Multiplane. Colour Notations Combining action of the character within the layout.

1. **Rendering (10 Hours)**

Rendering styles and techniques - Inking – Graphic styles, Text – as image, Elements and Composition, Projecting figures in Deep space, Framing and Composition, Perspective and Camera

1. **Camera movement**  **(15 Hours)**

Camera movement and calculations, exposure sheets. Movement of the character within a shot. Tracking every frame on a dope sheet according to the storyboard. Rough visualization of shot and movements and final defined art works in colour.

**Reference Books:**

### The Animator's Eye: Adding Life to Animation with Timing, Layout, Design, Color and Sound - Francis Glebas (Sep 24, 2012)

### Walt Disney Animation Studios The Archive Series #4: Layout & Background (Walt Disney Animation Archives) - Walt

Course with Credit: Compositing Techniques (**4)** Code: BSCAVFX307

Programme: BSc Animation & VFX Semester: **III**

**Total No. of Lecture / Practical Hrs: 60**

**Rationale:** The students will receive information that will enable them to:

* Familiarize the tools and techniques to create standard VFX shots
* Learn Problem solving techniques to rectify the errors during compositing.
* Create content for broadcast, feature film and web animation.

**Catalog Description:** The course deals with Compositing and its history, elements involved in compositing, Keying, tracking, roto, stabilizing and layer management, and finalizing a scene.

**Pre-requisites:** Image editing and knowledge of Film format’s is beneficial.

**Course Outline:**

1. **History of Compositing (10 Hours)**

History of Compositing, Terminologies, Physical Compositing, Multiple exposure, Background Projection, Matting, Digital Compositing, Node based and Layer Based Compositing. Visual information and the camera, The Camera and Parameters, Resolution Limits, Focus, Depth of field, Motion blurs Lens correction

1. **Digital Image (10 Hours)**

Digital Image Generation, Pixels, Components and Channels, Bit Depth, Floating point and High Dynamic Range Imagery, HSV Color, YUV color, Digital Image file formats, Channels, Compression. Color Manipulation, Levels, Variations, Multiply, Add, Gamma Correction, Exposure Correction, Invert, Contrast, HSV manipulations

1. **Layers**  **(10 Hours)**

Layer and Node based compositing, Blending layers, Matte Image, Masking, Morphing - Chroma Keying, Garbage Mattes, Edge Mattes, Luminance Keying, Chrominance Keying, Difference Matting, Plug-ins and tools for keying. Tracking and Stabilization, Tracking an element, 2D tracking, Perspective tracking, Stabilizing footage, Limitations of tracking and stabilizing tools, Tools for advanced tracking and match moving. Digital Imagery, Color Correction

1. **Lighting and Composition (10 Hours)**

Creating elements, Lighting in compositing tool, Matching live and virtual cameras. 3D Compositing, Vanishing point conversion, creating 3D compositing using 2D images, Working with camera and lighting, effects, Working with Multipass Rendering, Alpha and Luma mattes, Z depth maps, Blending passes and effects . Animation, 2D and 3D transformation, Temporal and spartial interpolation, speed graph, optimizing key frames, expressions for animation, Time Remapping

1. **Theory and Practice of Video Art (20 Hours)**

History of Video Art, Contemporary video style, culture and emotion reference - Video synthesizer, realtime video art, tools and techniques, applications - music visualization and media art, automation to music, applications and tools - Video art as art form, Interactive film, display and projection, case studies.

**Learning Lab:**

1. Create 2.5D Animation of an exterior and interior scene.
2. Animate a slideshow using images imported into compositing.
3. Track and composite chroma footage to a background, color correct the scene for film.
4. Animate and composite 3D rendered passes with 2D footages.

**Reference Books:**

* Compositing Digital Images - T. Porter and T. Duff I Proceedings of SIGGRAPH '84, 18 (1984) I
* The Art and Science of Digital Compositing - Ron Brinkmann
* Wright'sCompositing Visual Effects: Essentials for the Aspiring Artist [Paperback]2007) - Paperback (2007) - S.Wright
* Compositing Visual Effects – Essentials for aspiring artists - Steve Wright

**SEMESTER IV**

Course with Credit: 3D Lab II (**4)** Code: BSCAVFX401

Programme: BSc Animation & VFX Semester: **IV**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** This course is extension of 3D Lab I and dives into artistic and aesthetic creativity, intending to push the boundaries of the imagination and to familiarize students with acting, developing different kind of personality of the characters and to explore character rigging for animation, expressions and particle manipulation. The subject ensures that the students will be familiarized with the Maya interface and tools

**Catalog Description:** This course cover’s various Modeling, Texturing, Animation, Rigging and Dynamics Creation and editing Techniques.

**Pre-requisites:** Good hands on 3D Lab I, space and volume , geometry and drawing.

**Course Outline:**

1. **Working with Polygon, Nurbs and Sub division modeling tools & techniques**

**(15 Hours)**

Understanding nature of polygons, learning different polygon mesh editing tools, components, converting from Polygon to nurbs and sub-divisions, normals etc;Understanding nature of Nurbs surface, curves, components, learning nurbs mesh, editing tools, creating mesh through the curves, converting from nurbs to polygon and sub-division etc; Understanding nature of Sub-division mesh, components, learning different Sub-division mesh editing tools, converting from Sub-division to Nurbs and Polygons etc;

1. **Working with unwrapping complex model (10 Hours)**

Finding how to unwrap a complex and multiple models and utilizing the UV texture space efficiently, understanding 0 to +1 texture coordinates, Understanding nature of different materials and achieving different types of texture surfaces such as wood, glass, etc; Understanding how to use a procedural map by using in built resources in maya and create a bitmap by using images, Learning how to assign maps such as diffuse, bump, specular to an object

1. **Object Animation (15 Hours)**

Motion and Idea based animation, Object – Character Interaction. Character – Character. Interaction – Simple to complex, Advanced mechanics of motion, Character using whip, axe, sword, hammer etc. Pushing, pulling, lifting weights etc, Climbing a cliff, rope, wall etc.

1. **Rigging (15 Hours)**

IK handle tool, IK Solvers, RP, SC, IK Spline, IK controls IK handle End effectors Using locators, Orientation of joints, Orientation script, Joint limits & damping, Stickiness, Switching between IK/FK, Adding the controls and attributes, Grouping and Parenting, Rigging a arm and hand, Simple rig, Advanced rig, Constraints, Point, Aim, Orient, Scale, Parent, Geometry, Normal, Tangent, Pole vector, Remove target, Set rest position, Modifying axis

1. **DYNAMICS AND PARTICLES (15 Hours)**

Rigid & Soft Body Dynamics

Colliding Soft bodies with rigid bodies

Exercise- Destructing the wall using rigid bodies and particles

Particles and Fields

Exercise- simulated rain and volcanic eruptions

Course with Credit: Pre production II (**4)** Code: BSCAVFX402

Programme: BSc Animation & VFX Semester: **IV**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** To impart skills of conceptualizing and designing characters from the story and provide knowledge and information for designing the layouts in colour

**Catalog Description:** The course cover’s in depth the Art of Character design and its creation, types, handouts, Layout and Back ground design.

**Pre-requisites:** Good hand on Preproduction I and character, background and screenplay bible.

**Course Outline:**

1. **Character Design (15 Hours)**

Character Design - Character Visualization, Character Bible, Stereotypes, Developing Character for Comics, Films and TV Episode. Elements of Character Design Creating Characters from Life

1. **Anthropomorphism (10 Hours)**

Anthropomorphism , Definition and meaning, Use of Anthropomorphic Characters in Modern Literature, Films and Television, Theo Morphs and Pathetic Fallacy

1. **Handouts (15 Hours)**

Preparing handouts, Importance of Handouts, Various Elements of Handouts, Model Sheet, Turnaround Sheet, Proportion Chart, Scale Sheet, Expression and Mouth Chart, Color Ref Sheet, Prop Sheet, Contemporary Designs.

1. **Layout Design (15 Hours)**

Layout Design - Introduction to Layout, importance of layout in Animation, Perspective- one point, two point, Three point, Warped, Schematics Projection, Cinematic Camera Angles. Preparing/Posing Layouts, Aspect Ratio, field guides, Schematic mapping, Camera Movements – tracking, zoom, panorama, Camera movement calculation to animation – matching speeds.

1. **BG Design (15 Hours)**

Multilane, BG Design and painting – levels, depth, perspective - transitioning to move from one kind of space to another in a single background. Planning and design. Color Notations, Landscapes, Cityscapes, Laying out the Animation, Concept sketches, Interior/exteriors, Passage of time, Different moods, Spaces, Design of elements, Treatment.

**Reference Books:**

1. Cartoon Animation (The Collector's Series) [Paperback], Preston Blair
2. Animation Art: From Pencil to Pixel, the world of Cartoon Anime and CGI- Jerry Beck
3. The Animation Bible: A Practical Guide to the Art of Animating from Flipbooks to Flash [Paperback], Maureen Furniss.
4. Character Animation Crash Course! [Paperback] Eric Goldberg.

Course with Credit: Lighting & Rendering (**4)** Code: BSCAVFX403

Programme: BSc Animation & VFX Semester: **IV**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The Objective of this course is to help students understand, the implementation process of lighting in the virtual world with reference to the real world

**Catalog Description:** The course Light, shade, color, properties of light, Light and its types, Light in CGI, Using CG light and rendering.

**Pre-requisites:** Good hands on Light and color in real world and 2D Digital.

**Course Outline:**

1. **SHADING (10 Hours)**

Understanding 2D and 3D texture types in Maya -Creating bump, displacement and normal maps

Creating double sided shading material -Understanding and Working layered shaders and textures

1. **LIGHTING Theory   (10 Hours)**

Lighting Theory, Studying Light and Surfaces, Natural and artificial light study, color, Aesthetics and mood, Roll of lighting in visual composition

1. **LIGHTING Types & Shadows (10 Hours)**

Light types, Attributes of Light Shadows and their functions, ***Shadow types,*** Depth mapped shadows, Raytraced shadows

1. **Art of Lighting (10 Hours)**

Understanding the Art of Lighting – 1, 2, 3point lighting, outdoor lighting, indoor lighting, product lighting

Optical FX – creating light glows and lens flares

1. **RENDERING**     **(05 Hours)**

Concepts of Rendering -Formats and aspect ratios -Render settings - Rendering optimization - Level of Details [LOD] – Ray tracing - Types of renderer

Introduction to Indirect lighting techniques

Introduction to render passes

**Learning lab:  (25 Hours)**

1. Create material shader  for Glass object, plastic , wood, clay, metal,  rock surfaces
2. Create a lighting effect for a product visualization
3. Create a candle Light effect
4. Create 3point lighting effect for character
5. Create under water lighting effect
6. Create a candle Light effect
7. Create a Natural  indoor Lighting effect
8. Create artificial indoor lighting
9. Create a render passes for a character  and composite

**Reference Books:**

### Digital Lighting and Rendering (2nd Edition) - Jeremy Birn (May 7, 2006)

### Light Shadow Space: Architectural Rendering with Cinema 4D® - Horst Sondermann (Dec 13, 2010)

Course with Credit: Advanced Compositing Techniques (**3)** Code: BSCAVFX404

Programme: BSc Animation & VFX Semester: **IV**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The students will receive information that will enable them to:

* Familiarize the Concepts and techniques used in compositing
* To familiarize in Advanced In-Depth Compositing

**Catalog Description:** The course deals with advanced technique and usage in creation. High end features like LUT, 3D layers, 3D camera projection and mattes.

**Pre-requisites:** Basics of compositing and Layer concepts.

**Course Outline:**

1. **Passes for Compositing (15 Hours)**

Pass Management, Bit Depth Allocation, Finding The Best Depth Channels, Color Channels for the Project

1. **LUT (15 Hours)**

The LUT use and Specifications, Finding the Black's and White's, Node reusing to Maintain Color Correction, Use of Plugin's in 3D Channels

1. **Advanced Compositing (20 Hours)**

Advanced In-Depth Compositing, Concepts and Techniques to Compositing Foliage, Learn to Composite Hair and Fur, Creating and Merging Horizon Lines, Using Vector Blur For Quicker Results

1. **Working in 3D (20 Hours)**

Creating Macro's and Dummies, 3D Layers / Nodes in Brief, 3D Camera Projection and Tracking, 3D Channels and Depth Creation, RGB Mattes and Rotoscopy Solutions.

**Learning Lab:**

1. Compositing a Cityscape with Live Footage [6Hours]

2. Compositing an Explosion Accident [8Hours]

3. Compositing an Live scene with Multiple CG Characters [8Hours]

4. Compositing a natural Disaster scene [8Hours]

a. Tornado

b. Tsunami

c. Earthquake

d. Ice Berg's Break

e. Volcano

5. Building and Ground Distruction

**Reference Books:**

* Compositing Digital Images, T. Porter and T. Duff, Proceedings of SIGGRAPH '84, 18 (1984)
* The Art and Science of Digital Compositing - Ron Brinkmann
* Wright'sCompositing Visual Effects: Essentials for the Aspiring Artist [Paperback]2007) - Paperback (2007) - S.Wright
* Compositing Visual Effects – Essentials for aspiring artists - Steve Wright

Course with Credit: Cinematography (**4)** Code: BSCAVFX405

Programme: BSc Animation & VFX Semester: **IV**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** To provide technical information and an appreciation of cinematography , lighting and editing, the art of presentation, sound, criticism and theories.

**Catalog Description:** The course cover’s about Cinema, Camera, Light, Editing tools and techniques.

**Pre-requisites:** Basics of Storytelling and basic Compositing.

**Course Outline:**

1. **The Art of Cinema - Cinematography (15 Hours)**

Colour – contrast and Light**,** Focus –Exposure – Rate

Framing**,** Scale**,** Camera & movement**,** Case study Alfred Hitchcock

Continuity in visual narration -Montage-Elliptical & Other visual devises in narration

1. **The Art of Presentation (10 Hours)**
2. **Editing:** Devices - Transitions**,** Matches - Various visual matches and match on action**,** Duration – Rhythm**,** Styles
3. **Editing Tools & Techniques :** Digital Conversion, Capturing video, EDL, Splice and Slicing Edit, Title Design, Export techniques
4. **Introduction To Camera (10 Hours)**

Camera (definition), Physical camera, Film camera, Still camera, Motion picture camera, Digital camera, CG /Virtual Camera, Framing, Angle of Framing, Aspect ratio, Visual Composition

HUMAN EYE VS CAMERA

WORKING OF A FILM CAMERA

Working with Camera Exposure control Focus Image capture

1. **Principles And Concepts Of Camera (10 Hours)**

Angle of view, Aperture, Circle of confusion, Colour temperature: , Depth of field, Depth of focus, Double exposure, Exposure, Exposure value, F-number , Film format, Pinhole camera Red-eye effect, Rule of thirds, Shutter speed.

1. **Cinematography (15 Hours)**

Aspects of cinematography, Lens, Zoom, Focal length, Lighting, Special effects, Frame rate selection, Role of the cinematographer, Evolution of technology: new, Camera Shots, Extreme long shot, Long shot Medium shot Closeup, Extreme close-up. Shooting for VFX shot: Green Screen studio design, capturing green screen shots, Lighting shots, Planning and techniques, Short and location notes DIGITAL CINEMATOGRAPHY (Visual Effects) :Simulating real world camera in CG, Pinhole camera, Lens-based camera, Camera movement,CG camera/software camera, Camera effects, Angle of view and film back, Film gate, Problems face with CG Camera (Dos and don’ts, Camera walk-through.

1. **Camera Movement (10 Hours)**

Cameras and perspective, Angle of view and perspective Vanishing point and perspective Framing the shot, Camera positions, Animating a virtual camera, Zooming and dolly, Depth of field, Planning animation cinematography and shot structure to communicate mood, Tripods and Dolly, Cranes, Motion Camera.

**Learning Lab:**

1. Edit a narrative short using the editing theories and techniques.
2. Edit an action based short using cinematography and editing theories.

Shoot and edit a complete VFX shot with animated title and end credits

**Reference Books:**

1. Motion Picture and Video Lighting - Blain Brown
2. Film Editing: Great Cuts Every Filmmaker and Movie Lover Must Know - Gael Chandler

Course with Credit: 3D Dynamics (**4)** Code: BSCAVFX406

Programme: BSc Animation & VFX Semester: **IV**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The student will be trained in the following.

* Understand and formulate the dynamic simulations to be created.
* To create simple dynamic simulations of object collisions and destructions.
* To create particle simulations for simulating liquids and gas.
* Understand and formulate the dynamic simulations to be created.
* To create simple dynamic simulations of object collisions and destructions.
* To create particle simulations for simulating liquids and gas.
* To understand and implement scripting for creating dynamic simulations.

**Catalog Description:** The course cover’s detailed understanding of Maya dynamics with all the fundamentals of Applied physics, different types of bodies, Particles, fields, Emitters, Collision, Caching and rendering.

**Pre-requisites:** Good in Maya tools and Interface.

**Course Outline:**

1. **Applied Physics (10 Hours)**

Introduction to Applied Physics and Quantam mechanics, Kinetic Motion, Energy Conversion, Quantum Physics

1. **Dynamic Bodies (10 Hours)**

Introduction to special effects –– Rigid bodies – Active and passive rigid bodies -Physics based procedural animation using rigid bodies Collisions – Normals – Fields and its attributes – Simulation of fields

1. **Particle System (15 Hours)**

Particles – Emitters – Emitter types and attributes - Deflectors and its attributes Simulating particle effects, Particle effects and collisions, Collision events, connecting camera with particles.

1. **Soft Bodies and Goals (10 Hours)**

Goals – Soft Bodies – Animating soft bodies - Springs– Simulating special effects – vortex - gravity – lighting – rain

1. **Effects (20 Hours)**

Destruction of objects experiments, nature elements simulation using particles [Water, smoke, fire etc]

1. **Rendering FX Elements (5 Hours)**

Rendering simulations, Optimizing simulations, Simulation for Video and motion graphics

**Learning Lab:**

1. Create dynamic simulations of objects colliding with each other.
2. Create dynamic simulations of exploding objects in scene.
3. Create particle simulation to simulate different liquid properties.
4. Create dynamic and particle simulations to simulate nature elements like rain, vortex, fire etc
5. Create dynamic simulations of object bouncing and contracting through force.
6. Create dynamic simulations of moving nature elements [Fire, smoke etc]
7. Create dynamic foliages and elements for nature scene[ Grass, Trees, Water Streams etc]

**Reference Books:**

* + Maya Studio Projects: Dynamics - Todd Palamar

### Modeling the Environment: Techniques and Tools for the 3D Illustration of Dynamic Landscapes - Bradley Cantrell and Natalie Yates (Mar 27, 2012)

**SEMESTER V**

Course with Credit: Project Management (**4)** Code: BSCAVFX501

Programme: BSc Animation & VFX Semester: **V**

**Total No. of Lecture / Practical Hrs: 40**

**Rationale:** To provide practical knowledge in setting up production studio, pitching for a project and management of the production

**Catalog Description:** The course cover’s in detail about Production, Pipeline and Project management for various productions such as film, TV, games in the studio.

**Pre-requisites:** Basic understanding of project.

**Course Outline:**

1. **Production Overview** (**10 Hours)**

Production pipeline – Study of various mediums of production such as Film, T.V, Games, etc

1. **Pipeline** (**15 Hours)**

Requirement for a Production Pipeline -The process and the pipeline - A typical pipe line – Infrastructure

1. **Project Management** (**15 Hours)**

Pipeline Management - Project Management - The work force - The recruitment – Studio Design - India scenario

**Reference Books:**

# The Visual Effects Producer: Understanding the Art and Business of VFX - Charles Finance, Susan Zwerman, Publisher: Focal Press; 1 edition (August 28, 2009)

* The VES Handbook of Visual Effects: Industry Standard VFX Practices and Procedures - Jeffrey A. Okun, Publisher: Focal Press; 1 edition (July 8, 2010)

Course with Credit: **Match Moving** (**4)** Code: BSCAVFX504

Programme: BSc Animation & VFX Semester: **V**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The students will receive information that will enable them to:

* Familiarize the tools and techniques to create Match moving and effects
* Learn Problem solving techniques to rectify the errors during the process
* Create content for broadcast, feature film and animation.

**Catalog Description:** The course cover’s in detail regarding usage of Match moving the footage and integrate various elements in the scene in a 3D package create, light and render the object and composite for final result.

**Pre-requisites:** Basic compositing and good at using a 3D package.

**Course Outline:**

1. Camera moves, focus pull, camera tilt, handheld camera
2. Tracking fundementals, keyframe tracking, perspective and corner pining,
3. Solving different tracking shots, optimizing tracking and stabilization
4. Multiple tracking points, complex tracking objects, tips and techniques
5. Matchmoving process, matchmoving software, photogrammetry, 2D tracking
6. Calibrating the camera, automatic tracking, editing automatic tracks, noise reduction
7. Set fitting, proxy geometry, fitting the set, altering the coordinate system
8. Effective troubleshooting, diagnosing problem, Advanced tools and techniques

Course with Credit: **Rotoscopy & Paint** (**4)** Code: BSCAVFX505

Programme: BSc Animation & VFX Semester: **V**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** To impart technical skills in Rotoscopy and painting and application knowledge for different requirement.

**Catalog Description:** The course cover’s in detail starting with shapes, path, placement, tools and techniques, tracking and painting.

**Pre-requisites:** Basics of compositing.

**Course Outline:**

1. **Rotoscopy (10 Hours)**

History of Rotoscoping, Latest tools for Roto, Terminologies, Shortcuts to work faster

Understanding the frame, shot length, planning the matte usage, Multiple shapes, Repeating shapes, Keying animation, Motion paths

1. **Creating Shapes (05 Hours)**

Creating splines, Transitioning between shapes, Working with pivot points, Key frame placement and types, Working with Blur, Motion blur, Checking the mattes, jitter

1. **Tracking (05 Hours)**

Tracking and scale, tracking and rotation, multiple transforms, averaging tracks, corner pinning, stabilizing footage

1. **Rotoscoping Object I (05 Hours)**

Rotoscoping Human, Isolating extremities, Joints, Hands, Overlap, fixed shapes, faces and heads, hair, Rotoscoping movement, fast and slow movement, tracking to optimize roto

1. **Rotoscoping Object II (05 Hours)**

Clothing, Shape breakdown, consistent point placement, secondary motion

1. **Painting (10 Hours)**

Concepts and tools for painting, Cleaning plates, Wire and Rig Removal, Pixel restoration.

**Learning Lab: (30 Hours)**

1. Rotoscope a footage containing minimum character movements and no camera movement.
2. Track and Rotoscope footage with camera movement and fast movement of the characters.
3. Remove wire, foilages and destructions from the footage using rotoscope.

**Reference Books:**

# The Art and Technique of Matchmoving: Solutions for the VFX Artist - Erica Hornung I Elsever Inc Publishers I

* + The Art and Technique of Matchmoving: Solutions for the VFX Artist - Erica Hornung

Course with Credit: **Stereoscopic Techniques** (**4)** Code: BSCAVFX506

Programme: BSc Animation & VFX Semester: **V**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** To introduce the stereoscopic fundamentals, history, techniques, Methods and impart knowledge in application

**Catalog Description:** The course cover’s in depth understanding of Stereo, its creation, techniques, Storytelling in Stereo, Depth factor, working with nuke in Stereo, Challenges, Tricks and Tools.

**Pre-requisites:** Understanding ofCompositing and Camera.

**Course Outline:**

1. **Introduction to Stereo world (06 Hours)**

Overview of Stereo, Basic terms of Stereography, 2D vs. 3D Film Aesthetics, How does it work ?, Lens Choice and Blocking, Composition and Staging, Depth of Field - Principles of binocular vision and history of stereoscopy, 2D and 3D depth cues - Binocular parallax.,Interocular distance, hyper/hypostereo. Accommodation/ convergence, comfort/limits, Side-by-side vs. superimposed formats, Optics, lenses, filters, polarizers. Single & dual camera systems. Base plates & beam splitters. Camera and image registration. Parallel vs. toed-in photography. Polarized and anaglyph projection, Front and rear projection. Mathematics & calculations. Excursion iCinema Scientia Visualisation Lab Displays and eyewear. Time-multiplexed displays (StereoGraphics, RealD, olby/Infitec.

1. **Stereoscopy fundamentals and depth perception (06 Hours)**

Stereo Terminology, Introduction to single-camera stereoscopic photography. Limits, anomolies & defects (vertical parallax, ghosting). mplied motion & change blindness, stereo blindness, viewer vs scene vs object motion, size constancy. Depth Perception, Virtual vs. Real world, Computing Parallax, Parallax budget

1. **Depth as storytelling tool (06 Hours)**

Comfort Limits (rules are made to be broken), Gimmick vs. Immersion in Film History, "Scoring" depth like a Film's Music Score, 3D hints, Stereopsis, Range disparity, Window violation

1. **3D Display Technologies (06 Hours)**

Introduction, Stages of Stereo 3D Presentation, 3D Display Interfaces, [Active Shutter Glasses (SG)](http://www.tftcentral.co.uk/articles/content/3d_technologies.htm#active_shutter), [Features of SG Technology](http://www.tftcentral.co.uk/articles/content/3d_technologies.htm#sg_features), [Polarized Passive 3D Technology](http://www.tftcentral.co.uk/articles/content/3d_technologies.htm#passive),  Film-type Patterned Retarder (FPR),  [Features of FPR Technology](http://www.tftcentral.co.uk/articles/content/3d_technologies.htm#fpr_features),  [FPR Misconceptions Q&A](http://www.tftcentral.co.uk/articles/content/3d_technologies.htm#misconceptions), [FPR vs. SG Battles](http://www.tftcentral.co.uk/articles/content/3d_technologies.htm#fpr_vs_sg), [NVIDIA 3D Vision](http://www.tftcentral.co.uk/articles/content/3d_technologies.htm#nvidia)  
[AMD HD3D](http://www.tftcentral.co.uk/articles/content/3d_technologies.htm#amd_hd3d), [Blu-ray](http://www.tftcentral.co.uk/articles/content/3d_technologies.htm#blu-ray), [3D Support and Panel Technologies](http://www.tftcentral.co.uk/articles/content/3d_technologies.htm#panel_tech)

1. **Stereo Compositing workflow (06 Hours)**

Planning a project. 2D and 3D software packages. Repurposing 2D software for 3D. 3D software tools for production, Setup for Stereo Workflow, Loading the Stereo Footage, Working with Stereo Footage on the viewer, Splitting, editing and swapping the Left eye and the right eye, Color correction with the left / right eyes, Converting images to anaglyph, Tracking Stereo Live action Plates

1. **3D Stereo workflow (06 Hours)**

Creating 3D stereo Cameras, Editing Stereo Cameras, Custom Stereo Rigs, Multicamera Stereo Rigs

Linking Stereo Camera's to a set of Objects, MultiPass Stereo Rendering, Adding 3D Stereo Renders in to the Live action Plates

1. **The Process of Stereo Conversion Process - Part 1 (06 Hours)**

The Process of Stereo conversion Process, Stereoscopic 3D Pipeline, Stereo Rotoscopy, Stereo Paint

Sequence Paint

1. **The Process of Stereo Conversion Process - Part 2 (06 Hours)**

Matchmoving & Camera Tracking, Depth Grading, Stereo Case Studies

**Learning Lab: (22 Hours)**

1. Edit and convert existing 2D film to stereoscopic film.
2. Create stereoscopic rendering of CG footages.

# Reference Book:

# 3D Postproduction: Stereoscopic Workflows and Techniques - Rick Baumgartner

**Elective 1**

Course with Credit: 3D Animation & Rigging (**4)** Code: BSCAVFXE502

Programme: BSc Animation & VFX Semester: **V**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** This subject will cover the core concepts of Rigging & Animation tool set in Maya software. It will enhance understanding the concepts of observation, timing, & motion in the art of animation, Understand the importance and application of Rigging techniques in Animation.

**Catalog Description:** The course cover's in-depth understanding of all the elements in Animating an object from a very basic level and all the steps which contributing in creating a breadth taking animation.

**Pre-requisites:** Basic knowledge of Maya interface.

**Course Outline:**

1. **Script and Story (03 Hours)**

Acting for a script, Animating from script– telling the story – Sequence and shots, Aspects of Staging the shots, Creating reference for Animation

1. **Animation Pre-production (06 Hours)**

Planning out how the scene should be animated, Thumb nailing and basic staging of the Character, Staging/Camera/Layout - Setting the Stage, Exploring the he important concept for presenting an Clear Idea and Facial Emotion, Essence of Cinematography

1. **Aesthetics (05 Hours)**

Acting aesthetics, Method Acting and Practical aesthetics, Difference between method acting and Practical Aesthetics, Performance of a shot, Aspects of hitting all the right beats clearly.

1. **Animation in process (15 Hours)**

Blocking, Working out the Story Telling Poses, Working on the next level in Blocking. Adding in breakdowns, Built in Overlaps, Secondary animation, Working on the Clothing and Animating Hair and appendages of the Character, Refinement of the Final Animated Scene.

1. **Story telling (03 Hours)**

Story telling through mime (Pantomime), Gestures and Body Language (Gesturing and Body Language), Single character animation and Two character Animation, Animating to dialogues and facial animation - Lip Synchronization

1. **Dialog (03 Hours)**

Sound Breakdown, Single characters delivering a conversation, Multiple characters having a conversation, Dialogue Delivery

1. **Facial Animation (05 Hours)**

**Facial Animation**, **Essentials of Facial Animation and Expressions**, **Introduction to Facial Shapes**, Setting the facial shapes according to phonemes, Setting the facial shapes according to expressions, Introduction to Eyes and Eye Blinks, Animating the face, Yawns and emotion changes (Anticipation, squash) and stretch and arcing motions.

1. **Walk Cycles (10 Hours)**

Introduction to Animal Locomotion, **Quadrupeds** Walk cycles, Run Cycles, Edward Muybridge and his pioneering contributions to Human and Animal Locomotion, Principles of Locomotion, Fossorial Locomotion, Terrestrial Locomotion, Aerial and Arboreal Locomotion, Aquatic Locomotion, Legged locomotion

1. **Demands of Rigging (05 Hours)**

Introduction to Mechanical Rigging, Model Preparation, Animation, Rigging, High Res Rigging, Scripted Rigging, Secondary Rigging - Springs, Pistons, etc., Dynamic Rigging - Guns, Antenna & Cables.

1. **Rigging (10 Hours)**

Bridging the Gap from 2D to 3D, Introduction to Rigging, Stretchy Spline IK Spine, Stretchy FK "Ribbon" Spine, Sternum & Clavicles, Scapula with Conditional Rotations, Building Rigs Using MEL - Part 1, FK-IK Arms, Auto-Clavicle Rig, Stretchy IK Legs, Building Rigs Using MEL - Part 1, Hands & Fingers, Building Rigs Using MEL - Part 3, Feet & Toes, "Ribbon" Neck Rig & Head Joint, Animation Controls, Final Hierarchy - Putting It All Together, Animation GUI Using MEL

1. **Deformers (05 Hours)**

A Look At 2D "Deformations", Introduction to Smooth Skinning & Editors, Introduction to Deformers, Upper & Lower Arms - "Deformable Rigs", Legs - more "Deformable Rigs", Initial Smooth Skin & Weighting, Pectorals Pt. 1 - Blendshapes on Ball Joints, Pectorals Pt. 2 - Influence Object & Deformation "Relaxation", Arms – Blendshapes, Trapezius - "Compression Rigs", Lats - more "Compression Rigs", Buttocks - Volume Preservation, Hands & Fingers - "Smear" Deformations, Feet & Toes - "Smear" Deformations, Final Deformation Fixes

Course with Credit: Modeling and Texturing (**4)** Code: BSCAVFXE502

Programme: BSc Animation & VFX Semester: **V**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The objective of the course is to groom the pupil in creation of Hyper-Realistic creature, Automobiles and Backgrounds for VFX movies, Low resolution models and High resolution Textures for games starting from very simple models.

**Catalog Description:** The course deals with different techniques in modeling whether its Polygon, NURBS, Subdivision model starting with cartoon character to Photo real model and Texturing.

**Pre-requisites:** Basic knowledge of Maya Modeling and Texturing.

**Course Outline:**

1. **Studying different kinds of Environment styles (05 Hours)**

Learning and observing the different styles, Architecture, learning the aesthetic sensibilities of different styles, Proportions, Volume and Scale. Creating your own concept and modeling a natural environment in 3d, working with complex shapes which are semi organic, learning the importance of detailing to achieve a realistic output. Creating your own concept and modeling a sci-fi environment in 3d, working with complex inorganic shapes. Creating your own concept and modeling an urban environment in 3d, working with complex structures.

1. **Automobile modelling (10 Hours)**

Studying a simple automobile model of your choice, learning the different shapes incorporated in the model and creating the same in 3d. Studying a complex automobile model of your choice, learning the complex shapes incorporated in the model and creating the same in 3d. Studying a simple functional object, studying the mechanics of that object and modeling the same in 3d. Studying a complex functional object, studying the mechanics of that object and modeling the same in 3d.

1. **Game modelling (10 Hours)**

Concept of game modeling, Learning the difference between modeling for films and games. Exploring the different techniques used for game modeling, Do’s and Don’ts of game modeling. Modeling different low polygon objects suitable for games. With your own concept, create a lowpoly environment by implementing all the techniques learnt in the previous units.

1. **Understanding Human anatomy (10 Hours)**

Learning the forms and shapes of the human body, understanding the bone structure, muscles and functionality of each, Mesh flow, Optimization, Learning different styles of cartoonic characters, creating your own character design and implementing the same in 3d. Learning different styles of semi realistic characters, creating your own character design and implementing the same in 3d.

1. **Realistic human modeling (10 Hours)**

Learning different styles of realistic characters and implementing the same in 3d at a blocking level determining the basic shapes and form. Modeling the human character upto an intermediate level, learning how to create the right loops for an animatable character. Modeling a human character and achieving a realistic output.

1. **Creating a Quadruped model (10 Hours)**

Learning different styles of quadruped characters, creating your own character design and implementing the same in 3d. Modeling the quadruped character and achieving a realistic output.

1. **Unwrapping techniques for an organic model (05 Hours)**

Various techniques will be introduced as how to observe the different objects and adopt the best technique for each object. In this topic you will learn how to match UV density and effectively layout the UV’s. In this topic you will learn aboutcreating basic textures in photoshop and applying the same to the character created in 3d. In this topic you will learn how to effectively create a library for textures, how to take a photograph which can used for texturing. Learning the different techniques for Hard surface texturing, how to use photographic textures and paint realistic textures of your own. Learning the different techniques for soft surface texturing, how to use photographic textures and paint realistic textures of your own. Various maps used for texturing will be introduced here such as Diffuse map, Specular map, Bump map, etc Learning the different techniques used for normal map generation, transferring the details from a high polygon mesh to a low poly mesh through normal mapping, you will also learn how to create an occlusion map which determines depth of the object.

1. **Introduction to Zbrush/Mudbox Interface (10 Hours)**

The basic interface of Zbrush or Mudbox will be introduced in this topic. The different tools will be introduced here to explore the possibilities to create a realistic model. Basic sculpting techniques for organic and inorganic models will be introduced here to achieve a realistic output, models created in the previous units will be used here to give added detail Advanced sculpting techniques for organic and inorganic models will be introduced here to achieve a hyper realistic output, Learning how to work with references to achieve hyper realistic output

Course with Credit: Lighting, Shading and Rendering (**4)** Code: BSCAVFXE502

Programme: BSc Animation & VFX Semester: **V**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The Objective of this course is to help students understand the implementation process of lighting in the virtual world with reference to real world and deals with some of the Advanced techniques in CGI which includes rendering and render engine with its shader.

**Catalog Description:** The course cover’s about Shader, Render Engine, Lighting types, Direct and Indirect Lighting and Render passes.

**Pre-requisites:** Good hands on Light and color in real world and 2D Digital.

**Course Outline:**

1. **Shading in Maya (05 Hours)**

Shading Surfaces – Diffuse and Specular Light Transmission – Anisotropic Highlights – Fresnel Effect – Surface Normals – Bevels, Shading with lambert, Phong, blinn, PhongE, Anisotropic Material, etc. Working with Mentalray shaders

1. **Utility Nodes in Maya (05 Hours)**

Working with utility nodes Creating Custom Connections and Applying Color Utilities nodes,Sampler Node, Math Utilities

1. **Lighting Basics (10 Hours)**

Understanding Lighting, Color and Composition, Light study, Aesthetics and mood

1. **Lights in Maya (10 Hours)**

Working with spot, directional and ambient lights, Working with point, area and volume lights

1. **Maya Render Engine (10 Hours)**

Maya software rendering vs Mental ray rendering, Scanline and Raytracing Processes, Getting to know raytracing, Raytraced reflections,refractions, shadows, trasperecy, Depth map shadows, Raytracing shadows, Creating shadows for fur and hair

1. **Indirect Lighting**

Final gather & Global illumination, Radiocity, Photon mapping, caustics, Lighting with HDRI, Light effects, Motion blur

1. **Traditional Lighting (20 Hours)**

3 point Lighting for Character and product, Creating Indoor Artificial night light effect, Creating candle light effect in the indoor, Creating noir effect lighting, Creating day light effect indoor, Creating day outdoor lighting, Creating artificial outdoor lighting, Creating underwater effect lighting, Creating lighting for landscapes, Lighting interior with single light source.

1. **Rendering (10 Hours)**

Preparing for rendering, Render settings window, rendering with command line, cleanup, Render optimization, Resolution, image formats, compression settings, Vector rendering, toonshading, Working with render passes.

Course with Credit: Fluid Simulation and Plugins(**4)** Code: BSCAVFXE502

Programme: BSc Animation & VFX Semester: **V**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The objective of the course is to enable the student to master Fluid dynamics and enable the student to create realistic simulation used in CGI and VFX.

**Catalog Description:** The course cover’s three elements namely Fluid Dynamics, Fluid simulation and its integration in a scene.

**Pre-requisites:** Good hands on Digital Art, Compositing, Dynamics.

**Course Outline:**

1. **Characteristics of fluids (15 Hours)**

Characteristics of fluids, Dimensions, Analysis of Fluid behavior, Measure of Fluid mass and weight, ideal gas law, viscosity**,** Compressibility of fluids, vapor pressure, surface tension, pressure at point, standard atmosphere, measurement of pressure, Buoyancy, flotation and stability, Archimedes’ principle, stability, Bernoulli equation, fluid kinematics**,** Differential analysis of fluid flow, Tools and software to create a fluid simulation.

1. **Maya Fluids (30 Hours)**

Introduction to Maya Fluids,2D and 3D Containers, Emitters, Fields, Content Details, Shading, Density, Temperature, Fuel, Various Attributes, Simulation, Caching, Substeps, Rendering.

1. **Real Flow (15 Hours)**

Introduction to real flow, Hybrido domains and emitters, grid based particles, rolling wave simulation, splash particles, mist and form particles, generation displacement maps, exporting simulation**,** Hypermesh basics, Realwaves, initial project setup, working with daemons, particle morphing

1. **Rendering Realflow (10 Hours)**

Importing realflow meshes into 3d program, liquid material for realflow geometry, reflection and refractive materials for realflow geometry, Indirect illumination and shadow, caustics, refining materials for final output

**Reference Books:**

* The Art and Science of Digital Compositing, Ron Brinkmann
* Wright's Compositing Visual Effects: Essentials for the Aspiring Artist [Paperback]2007) - Paperback (2007) by S.Wright
* Compositing Visual Effects – Essentials for aspiring artists, Steve Wright

**Elective 2**

Course with Credit: **Sound Design** (**4)** Code: BSCAVFXE503

Programme: BSc Animation & VFX Semester: **V**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** Establishing an environment Helping to tell a story, Defining mood, Rhythm and style Aiding flow of action.

**Catalog Description:** Course cover’s about Sound, its influence on storytelling, Audio formats and collaboration with visuals.

**Pre-requisites:** Interest in Music and mood based rhythm.

**Course Outline:**

1. Understanding Audio, Aesthetics of Design, Fundamentals of Acoustics interrelationship between sound, culture and media theory. Mood ethos ambience through sound.
2. Ear Training, Critical listening, Psychoacoustics, Role of sound in film
3. Storytelling through sound.
4. Sound editing, working with Dialogue –SFX-Foley- Music
5. Mixing (The mixing process, Monitoring basics for mixing, Basic Mixing Rules and techniques), Equalizing, Audio equipment, Studio Production Techniques
6. Effects introduction, overview, compression,
7. **Audio Formats -** Digital and Analogue
8. **Mastering -** Introduction to mastering - Mastering setups – Monitoring.

Project: a sound-only project, telling a story through sound.

Recreating the sound of an existing short film or a small portion in a film.

Course with Credit: **Motion Graphics** (**4)** Code: BSCAVFXE503

Programme: BSc Animation & VFX Semester: **V**

**Total No. of Lecture / Practical Hrs: 70**

**Rationale:** The students will receive information that will enable them to:

* Familiarize the tools and techniques to create Motion graphics and effects
* Learn Problem solving techniques to rectify the errors during the process
* Create content for broadcast, feature film and animation.

**Catalog Description:** The course cover’s Introduction, Footages, Format, screening, Tools and techniques, motion and visualization in Motion Graphics.

**Pre-requisites:** Basics of compositing and Digital Art.

**Course Outline:**

1. **Introduction to Motion Graphics (10 Hours)**

History of Motion Graphics, early animation techniques, early cinematic inventions, experimental animation, Motion graphics in Film titles and television, Montages

1. **Scope**  **(10 Hours)**

Film Titles, Network Branding, Commercials, Music videos, Interactive Media, Digital signage, New Technology

1. **Tools and Techniques**  **(15 Hours)**

Tools and Techniques, Effects, Expressions, Importing external animations, blending 2D, 3D elements

1. **Effects in Motion Graphics** **(10 Hours)**

Particle effects, light effect, flares, typography animation

1. **Motion Theory (05 Hours)**

The language of motion, spatial and temporal motion, coordinating movement

1. **Animation in Motion Graphics** (**15 Hours)**

Visual properties, Image considerations, Live action considerations, Typography animation, blending all three mediums, pictorial composition, sequential composition, Animation process, Keyframe animation, expressions, animating using sound and scripting

1. **Editing**  **(05 Hours)**

Editing, Cuts and transitions, Establishing pace and rhythm, Birth Life and death, conclusion

**Learning Lab:**

1. Create an animated advertisement for any cosmetic product.
2. Create and animate title / end credits for any film/documentary.
3. Create a contemporary motion graphics involving live/CG elements
4. Create broadcast logo animations for a TV channel.

**Reference Books:**

# The Art and Science of Digital Compositing, Second Edition:

# Techniques for Visual Effects, Animation and Motion Graphics (The Morgan Kaufmann Series in Computer Graphics) - Ron Brinkmann (Author)

**Semester VI**

**Final Project**

Class Outline

Step 1: Think and Ink

Idea has to build and to be moulded for VFX movie. The idea can be vague or gag not necessarily a concept, but new and the idea should include all the key skills that you learnt in the two semesters. The Idea should be visual treat rather than a story or script treat since it’s a VFX movie. The created idea will be approved by the concerned Instructor according to the Achievable complexity with the provided resources.

Step 2: Idea to Script

Put your ideas into papers as script and create a story board for the same. The Story board should have a brief scene description which says the details about the Location, Camera and Lens, Cast and Crew, Light setup and digitization. So this is the place where you need to create the live and CG elements placement and the back and forth process of inserting and removing CG elements which will out the sufficient amount of details which will enhance the reality of visual treat.

The background score is added in the story board to give the final look of the movie. Make sure the story reveals the actual strength in the storyboarding part as a whole. Every aspect of sound should be there in the storyboard...for ex, The water flow, wind flow, object falling down, fight scene. Etc.

Step 3: StoryBoard to Previz

Used the cleaned plates for Rotoart and use the same footage for overall CG elements Previz to ensure that we follow the same time or more accurate time for the final output. Use dummies(low poly models) as models for the Previz which will replace the actual detailed(high poly models) CG elements. Though you should maintain the texture treatment just to freeze the look and feel of the shot.

Step 4 : Shooting on Location

Be on the spot to make the shot details work close to the CG plan that you planned in storyboard. Take the Camera angle measurements as well as the lens and camera color profile. If you are the director for the movie discuss with yourself that the time and schedule for the camera is more suitable to shoot and a visual mockup of such shots in the location itself will reduce your work.

Step 5: Production and Footage Processing

The Production processes are very parallel to footage matchup, so clean the plates and start comparing and placing the CG elements in the live footage and start rolling the production schedules.

Step 6: Compositing

This is the very important stage in VFX movie. By Playing a very Vitol role decides the look and feel of the your short film. Which involves many references like Color script , look and feel references and photography references to enhance the details in the film. This render output should match with the step 3 storyboard output which will bind the sound to the film.

Step 7: Final Cut

This is the editing stage. Remove unwanted shots and trim cut the shots for the better and more interesting results will make the audience more committed to the Film.

Learning objective

This Module is to make a visual FX short film by the students as Team or by an Individual. The content will be executed by their creative ability and process providing with the prior storyboard approvals in the earlier semester. Students can come up with a brand new ideas with respect to more scope for VFX that should include elements like FX-Dynamics, Live footage Tracking, Cleaning, including CG elements with the cleaned plates and compositing which eventually will be the industry practice output.

The Core practice of this Module will have unique ideas said that the content should not be re-created or it should not be the inspiration of any works which is published earlier in this medium. Provided sufficient amount of days to complete this Module as an output of VFX movie, students are asked to deliver the movie with enormous creative idea and new industry technology.

* To impart knowledge in recording and documenting the preproduction, Production and Post production of the Project
* To impart skills in the presentation of the concept of the project, Lay out for the visuals and various stages of the project in professional manner

Course Outline

To impart skills of relating with practical work and theories. To impart skills in articulating the practical production experience using technical language. To understand and communicate the team work of the project. To learn skills in relating the interdisciplinary subjects, electives learnt during this Module.