B.A. ANIMATION AND VISUAL EFFECTS

Detailed Semesterised Syllabus for Programme in B.A. Animation and Visual
Effects under the Choice Based Credit System (CBCSS - Model III)

MAHATMA GANDHI UNIVERSITY
KOTTAYAM
2017

Prepared by

**THE BOARD OF STUDIES/EXPERT COMMITTEE (UG) IN
ANIMATION AND GRAPHIC DESIGN**

MAHATMA GANDHI UNIVERSITY
KOTTAYAM
MAY 2017

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1. DETAILS OF THE EXPERT COMMITTEE IN ANIMATION AND GRAPHIC DESIGN

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2. ACKNOWLEDGEMENT

The B.A. programme in Animation and Visual Effects is branded for its creative approach and distinctive topics discussed. Our curriculum is inspired by the world of art and new creative techniques. The syllabus tries to transmit most essential and updated information to students. The programme gives an opportunity for the students to develop the skills in different types of animations, visual effects compositing, video editing and cinematography along with interactive applications.

The Board of Studies puts on record our sincere thanks to the honorable Vice Chancellor and Pro Vice Chancellor of Mahatma Gandhi University, for their guidance and help, extended to us during the restructuring of the B.A Animation and Visual Effects syllabus.

The Board of Studies would like to extend our sincere gratitude to the University Syndicate members for their understanding and support.

We thank the Registrar of the University, both Academic and Finance sections of the University and the members of BOS Core-Committee for offering their service for the flawless completion of the syllabus.

The successful completion of this syllabus is the end product of hard works done by academicians from various colleges and eminent personalities from the media industry. We would like to thank them for their valuable service during the restructuring process.

For the Expert Committee in Animation and Graphic Design,

Jean Sebastian
(Convenor)
Expert Committee in
Animation and Graphic Design,
M.G. University, Kottayam

Priyadarsini Hills,
Kottayam,
May 2017

3. INTRODUCTION

Mahatma Gandhi University introduced choice based credit and semester and Grading System in colleges affiliated to the University from the Academic year 2009-2010, under Direct Grading System. Subsequently, the Kerala State Higher Education Council constituted a committee of experts headed by Prof. B. Hridayakumari, to study and make recommendations for the improvement of the working of the Choice Based Credit and Semester System (CBCSS) in Colleges affiliated to the Universities in the State. The State Government accepted the recommendations of the Committee and the Syndicate and the Academic Council of the Mahatma Gandhi University have resolved to reform the existing CBCSS regulations. Accordingly, Regulations for Undergraduate Programmes Under Choice Based Course-Credit Semester System and Grading, 2013 was introduced in the University from the Academic year 2013-14 onwards, under Indirect Grading System. The University Grants Commission, in order to facilitate student mobility across institutions within and across countries and also to enable potential employers to assess the performance of students, insisted to introduce uniform grading system in the Universities. The Academic Council of the Mahatma Gandhi University at its meeting held on 23rd May 2015 resolved to introduce the UGC Guidelines for Choice Based Credit Semester System from the Academic year 2016-17 onwards and the syndicate of the University at its meeting held on 1st August 2015 approved the resolution of the Academic Council. Meanwhile, the Hon'ble Supreme Court of India has issued orders to include core courses on Environmental Studies and Human Rights in the syllabi and curricula of all UG Programmes of universities all over India. In continuation to this the University Grants Commission has issued circulars regarding the implementation of the above said changes by accepting the directions of the Hon'ble Supreme Court as a National Policy. Hence, the Syndicate of Mahatma Gandhi University has decided to modify the syllabi and curricula of all UG programmes in accordance with the directions of the Hon'ble Supreme Court and the UGC. Further, the Syndicate has decided to implement the new regulations and syllabi with effect from the academic year 2017-2018. In view of this, the BOS/Expert Committee in Animation and Graphic Design of M.G. University have prepared the following syllabus for UG programmes in Animation and Visual Effects.

TITLE

B.A. ANIMATION AND VISUAL EFFECTS - Graduate Programmes under Choice Based Credit System, **2017**" (UGCBCSS 2017).

SCOPE

Applicable to all regular Under Graduate Programmes conducted by the University with effect from 2017 admissions, except for Professional and B.Voc programmes. Also, applicable to Distance/Private Undergraduate Programmes with suitable modifications. Under Graduate Programmes in Management Studies are included as non-professional programmes. Provided that the existing CBCSS Regulations 2013 shall be applicable to students who were admitted prior to the commencement of these Regulations and who are continuing their studies.

Examinations of the courses being run under the Distance/Private registration scheme shall be conducted annually.

The provisions herein supersede all the existing regulations for the Regular/Distance/Private Undergraduate programmes to the extent herein prescribed.

4. AIMS AND OBJECTIVES OF THE PROGRAMME

The Programme begins with the theory in art and design, animation and visual effects, then progresses to animation and visual effects practices and technologies. Students learn to create animations both in 2D and 3D from scratch, learn about photographic composition, videography, scriptwriting, storyboarding and more. The program encourages innovation and research while stressing strong technical and presentation skills. The candidates become eligible for a Degree after six-semesters of study, spanning over a period of three years and successful completion of the examinations.

The Animation and Visual Effects Programme prepares graduates for a wide range of careers in the industry such as 3D or 2D animator, Layout artist, Scriptwriter, Storyboard artist, Rigger, Character modeler, Texturing artist, Roto artist, Video editor, Lighting and rendering artist, Motion graphics artist, Compositor, Matchmove technician, Flash animator, Digital painting, Cartoonist, Illustrator, Concept artist, Photography, Videography, Visual effects supervisor, 3D architectural visualizer Etc. The skills taught in the programme encompass craft at a technical level; yet also include design, drawing, critical thinking, creativity, daring, collaboration, and a fundamental awareness of theory and history. Throughout the programme, students are engaged in all aspects of animation and visual effects production, from concept development and production design to the completion of finished segments.

5. B.A. PROGRAMME IN ANIMATION AND VISUAL EFFECTS

PROGRAMME STRUCTURE FOR MODEL III - B.A./ B.Sc. /B.COM

Programme Duration	6 Semesters
Total Credits required for successful completion of the Programme	120
Credits required from Common Course I	8
Credits required from Core + Complementary + Vocational Courses including Project	109
Open Course (Credits)	3
Minimum attendance required	75%

DURATION OF COURSE

a. The durations of U.G. Programmes are 6 semesters.
b. A student may be permitted to complete the programme, on valid reasons, within a period of 12 continuous semesters from the date of commencement of the first semester of the programme.
c. Attendance: Students having a minimum of 75% average attendance for all the courses only, can register for the examination.

6. MARK DISTRIBUTION FOR EXTERNAL AND INTERNAL EVALUATION

The external theory examination of all semesters shall be conducted by the University at the end of each semester. Internal evaluation is to be done by continuous assessment. For all papers (theory and practical) total percentage of marks of external examination is 80 and total percentage of marks of internal evaluation is 20 (ie. In the ratio of 80:20).

Marks distribution for external and internal assessments and the components for internal evaluation with their marks are shown below:

FOR ALL PRACTICAL PAPERS

A.Marks of external examination: 40
B. Marks of internal evaluation: 10

COMPONENTS OF PRACTICAL - INTERNAL EVALUATION	TOTAL MARKS
Attendance	3
Record*	5
Test Papers	2
Total:	**10**

*Marks awarded for record should be related to number of experiments recorded. All the three components of the internal assessment are mandatory.

FOR PROJECTS, INDUSTRIAL VISIT AND COMPREHENSIVE VIVA VOCE*
A. Marks of external Examination: 80
B. Marks of internal evaluation: 20

COMPONENTS OF PROJECT I.V. AND VIVA - EXTERNAL EVALUATION	TOTAL MARKS
Dissertation and I.V. report (External)	50
Comprehensive Viva Voce (External)	30
Total:	**80**

* Bonafide reports of the project work and Industrial Visit (I.V.) conducted shall be submitted at the time of examination.

COMPONENTS OF PROJECT AND I.V. - INTERNAL EVALUATION	TOTAL MARKS
Punctuality	5
Experimentation/Data Collection	5
Knowledge	5
Report	5
Total:	**20**

All the four components of the internal assessment are mandatory.

OJT EVALUATION

For on the Job Training (OJT) there is only internal evaluation.

ASSIGNMENTS

Assignments are to be done from 1st to 4th Semesters. At least one assignment should be done in each semester for all papers.

SEMINAR / VIVA

A student shall present a seminar in the 5th semester and appear for viva-voce in the 6th semester for all papers.

7. CONSOLIDATED SCHEME FOR B.A. ANIMATION AND VISUAL EFFECTS

Sem	Course Code	Course Title	Course Type	Course Category	Hour/ Week	Credit
I		1-1 Model III English I	Theory	Common	5	4
	AG1CRT01	1-2 History of Art and Design *	Theory	Core	5	4
	AV1CRP01	1-3 Raster Graphics	Practical	Core	5	4
	AG1CRP03	1-4 Rudiments of Animation Drawing *	Practical	Core	5	4
	AG1PRP01	1-5 Techniques of Photographic Composition *	Project	Comp.	5	4
					25	**20**
II		2-1 Model III English II	Theory	Common	5	4
	AG2CRT04	2-2 History of Animation and Visual Effects *	Theory	Core	5	4
	AG2PRP02	2-3 Planning for Animation *	Project	Comp.	5	4
	AV2CRP02	2-4 Introduction to 3D	Practical	Core	5	4
	AV2CRP06	2-5 Character Design for Animation	Practical	Core	5	4
					25	**20**
III	AV3CRP03	3-1 3D Character Creation	Practical	Core	5	4
	AV3CRP01	3-2 Introduction to Motion Graphics	Project	Core	5	4
	AG3PRP03	3-3 Classical Animation *	Project	Core	5	4
	AV3CMP04	3-4 Painting with Pixels	Practical	Comp.	5	4
	AV3CRP02	3-5 Rigging for Animation	Project	Core	5	4
					25	**20**
IV	AV4CRP03	4-1 Stop Motion Techniques	Project	Core	5	4
	AV4CMP05	4-2 Acting for Animators	Practical	Comp.	5	4
	AV4CRP06	4-3 3D Character Motion	Practical	Core	5	4
	AV4CMP07	4-4 2D Animation in Flash	Practical	Comp.	5	4
	AV4CRP04	4-5 Visual Effects I	Project	Core	5	4
					25	**20**

V	AG5CRT14	5-1 Environmental Studies and Human Rights	Theory	Core	5	4
	AV5CRP05	5-2 Visual Effects-II	Project	Core	6	4
	AV5CMP06	5-3 Miniatures for Low Budget Filming	Project	Comp.	5	4
	AV5CRP08	5-4 Dynamic Simulations	Practical	Core	5	4
		5-5 Open Course		Open	4	3
	AV5OPP1.1	1. Non-Linear Editing and Color Grading	Practical			
	AV5OPP1.2	2. Audio Editing	Project			
	AV5OPP1.3	3. Architectural Visualization	Practical			
					25	**19**
VI	AV6OJP01	6-1 Internship	OJT		0	2
	AG6PRP06	6-2 Animation Project *	Project	Core	6	4
	AV6PRP07	6-3 Visual Effects Projects	Project	Core	6	4
	AV6CMP09	6-4 3D Lighting & Rendering	Practical	Comp.	5	4
		6-5 Choice Based Course		Core	5	3
	AV6CBP1.1	1. Advanced Animation in Flash	Project			
	AV6CBP1.2	2. Methods of Shooting for Green Screen	Project			
	AV6CBP1.3	3. Match Moving Techniques	Project			
	AV6CMP08	6-6 Demo Reel Presentation	Project	Comp.	3	4
					25	**21**
				Grand Total:		**120**

Subjects denoted with "*" are common for B.A. Animation and Graphic Design and B.A. Animation and Visual Effects.

1-2HISTORY OF ART AND DESIGN (Theory)

OBJECTIVE

The course will examine the role and development of the visual arts in past and present cultures throughout the world. This is designed to help students to develop art application, aesthetic judgment, and to increase visual perception and critical thinking skills.

MODULE I

Prehistoric visual communications: Paleolithic to the Neolithic period, Lascaux, Altamira, Indian evidences. The earliest writing: Mesopotamian visual identification, Egyptian hieroglyphs

MODULE II

Pictographs to alphabets: North Semitic, Aramaic, Greek Etc. Asian contribution: Chinese calligraphy, Invention of paper and discovery of printing, Invention of movable type. Illuminated manuscripts: Celtic book design, Spanish pictorial expressionism, Gothic manuscripts Etc.

MODULE III

Early european block printing, Copperplate engraving Etc. German contribution: German illustrated books, Renaissance graphic design, Typographic movements, Graphic design of the rococo Era, Contribution of Caslon and Baskerville, Origins of information graphics, The modern style, Giambattista Bodoni

MODULE IV

Twentieth century graphic design, Industrial revolution, Impact of technology upon visual communication, Revolution in printing, Development of photography, Photography as a communication tool, Victorian era graphic design, Development of lithography, Boston school of chromolithography, Victorian typography

MODULE V

Art and craft movements: Victorian style, Art and crafts, Art Nouveau, Modernism, Art Deco, Bauhaus, Organic design, Minimalism, Pop art, Postmodernism, American Kitsch, Space age, Deconstructivism, Conceptual art. Digital revolution: Digital type foundry, Interactive media and world wide web, motion graphics.

REFERENCE

1. Meggs' History of Graphic Design: Philip B. Meggs, Alston W. Purvis
2. Graphic Design History: A Critical Guide: Johanna Drucker, Emily McVarish
3. The Dictionary of Visual Language: Philip Thompson, Peter Davenport

1-3RASTER GRAPHICS (Practical)

OBJECTIVE

Students develop a basic skill and understanding in raster graphic and its applications.

MODULE I

What is Raster Graphics? What is the difference between Raster and Vector graphics? Digital image, Pixels, Bit depth, DPI, LPI, Resolution, File formats (Print and screen media formats: GIF, JPEG, TIFF etc.). Compression: Lossy, Lossless, Colour: Colour Coding, Process colour (CMYK), RGB, Spot colour, Colour systems. Duotones, Tritones, Quadratones Etc.

MODULE II

Selection tools, Retouching tools, Pathmaking tools, Image adjustment options. Processing camera RAW layer, Channel, Mask, Path, Layer comp, Paragraph & character, Swatches, Adjustment layers

MODULE III

Preference settings, Colour settings, Assign profile automate, Script. proof setup, Gamut warning, Bit preview, Screen mode show, Pixel aspect ratio

MODULE IV

Saving with clipping path & alpha channel, PSD, PDF, EPS, TIFF, JPEG. Camera RAW

MODULE V

What are the use of blend modes? How to apply blend modes? Different types of blend modes: Normal modes, Darken modes, Lighten modes, Contrast modes, Comparative modes and color modes. Application of blend modes, Creating custom textures for 3D models, Compositing Etc.

REFERENCE

1. Adobe Photoshop Classroom in a Book: Adobe Creative Team
2. The Book of GIMP - A Complete Guide to Nearly Everything: Olivier Lecarme, Karine Delvare

1-4RUDIMENTS OF ANIMATION DRAWING (Practical)

OBJECTIVE

Rudiments of animation drawing is intended to provide the student an understanding of basic drawing techniques for animation.

MODULE I

Introduction to different drawing materials and tools: Dry media (Pencils, Charcoals, Chalks, Crayons, Pastels, Erasers, Smudging Tools), Wet Media (Dip pens, Disposable and Cartridge Pens, Brushes), Inks (Water based, Alcohol based, Indian/Chinese ink), Paints (Water based, Acrylic, Oil), Drawing surfaces (Papers, Newsprint, Watercolor paper, Charcoal paper, Canvas) Tools for erasing and sharpening: Palettes, Knives, Easels

MODULE II

Doodling and noodling (Drawing straight lines, Drawing curved lines, Free hand drawing) Holding the pencil: Angle and direction of lines (Drawing lines, Circles, Ovals, Scribbles, Patterns Etc.) Shapes and forms, Memory and imagination drawing, Drawing with grids

MODULE III

Drawing from observation: Life drawing, Use of basic shapes and forms, Sketching poses, Rapid sketching from live models, Attitude: Gestures, Line drawing, Quick sketches, Thumbnails, Stick figures, Line of action, Balance, Rhythm, Positive and negative spaces, Silhouettes, Caricaturing fundamentals, Exaggeration

MODULE IV

Perspective drawing, Vanishing points, Orthogonal lines, Horizon, Eye level. One point perspective, Two point perspective, Three point perspective, Multi-point perspective, Overlapping and intersection of shapes in one point, Two point and three point perspective views, Foreshortening

MODULE V

Tones, Lighting and shading, Basic 3Dimensional light set up, Several types of shadows, Cast shadow, Contact shadow, Contour shadow, Reflected light, Overhang shadow, Highlight, Core shadow, Objects and shapes in perspective with light and shade

REFERENCE

1. Exploring the Elements of Design: Mark A. Thomas, Poppy Evans
2. The Art of Composition: Michael Jacobs
3. The Art of Pictorial Composition: Wolehonok
4. Complete Books of Artist Techniques: Dr. Kurt Herbers
5. Drawing for The Absolute and Utter Beginner: Claire Watson Garcia
6. Perspective Made Easy: Ernest R Norling
7. Perspective Drawing Handbook: Joseph D'Amelio

1-5 TECHNIQUES OF PHOTOGRAPHIC COMPOSITION (Project)

OBJECTIVE

Techniques of Photographic Composition is intended to help students understand the basic knowledge of image making using digital camera. Students will be introduced to basic picture composition.

MODULE I

The Psychology of Visual Perception, Visual Aesthetics, Art of Film Making, Stages in Brief

MODULE II

Photography as communication tool, Basics of visual composition, Visuals, Image Sizes, Camera Angles, Elements and principles of picture composition, Balance and structure, Composing movement, Rule of space, Rule of odd, Rule of third, Golden triangle, Perspective and depth of field, Foreshortening

MODULE III

Basic features of DSLR camera, Human eye and camera, Principles of image formation, Properties of light and its control, Shutter, Lenses and exposure controls, Aperture, focus and depth of field, depth of focus. Color temperature, Direction and quality of light. Measurement of light - light meters. Histogram: Understanding basics of histogram

MODULE IV

Grammar for motion picture: Camera Movements, Principle of continuity, Action, Look, Movement, Tonal, Emotion etc. Imaginary line concept: crossing the line - 30^0 rule - 180^0 rule. Meaning and aesthetic aspects of angle selection

MODULE V

Exercise: Project work based on the syllabus and parameters of the course under the guidance of supervising faculty.

REFERENCE

1. Basic Principles of Photography: Gerald Millerson
2. Grammar of Shot (Second edition): Roy Thompson (Focal Press)
3. How to read a film: James Monaco
4. The T.V. Production - Hand Book: Zetti Herbert
5. Elements of film: Lee. R. Bobker
6. The Art of Pictorial Composition: Wolohomok

2-2HISTORY OF ANIMATION AND VISUAL EFFECTS (Theory)

OBJECTIVE

This paper should enlighten the students on the advancement made in the field of animation and visual effects so as the appreciate and understand where the technology used today developed from. It also inspires students to experiment with different types of animation and visual effects techniques so as to think of process improvements ideas for animation and visual effects.

MODULE I

Early Attempts for Animation: Early attempts to imitate and reproduce motion, Cave paintings. Persistence of vision and Phi phenomenon, Early animation devices, Initial attempts to make animation, Photography, Motion picture

MODULE II

Birth of Animation: Experimental animations (Drawn, Stop motion) all over the world, Pioneer animators, Major animation studios

MODULE III

Animation Techniques and Advancements: Animation techniques (Time lapse, stop motion, Cut-out, Silhouette, Cel), Technical advancements (Layer, Cel, Peg bar, Combining live action with cartoon characters, Synchronized sound, Technicolor process, Multi-plane camera etc.)

MODULE IV

Visual Effects: Use of miniatures in early films, Use of makeup, Rear projections, Pyrotechnics and matte paintings before the CGI era, Stereoscopic 3D, Realistic puppets and stop motion photography, Split screen technology, Space vision 3D, Stereovision 3D, Motion controlled camera, CGI Effects, Digital compositing, Animatronics, Motion capture, High speed cameras, The fusion camera system, Visual effects studios

MODULE V

Animation & VFX Around the World: American, Canadian, European, Indian, Japanese Studios.

REFERENCE

1. Enchanted Drawings: The History of Animation: Charles Solomon
2. The World History of Animation: Stephen Cavalier
3. Cartoons: One Hundred Years of Cinema Animation: Giannalberto Bendazzi
4. Of Mice and Magic: Leonard Maltin
5. Before Mickey: The Animated Film, 1898-1928: Donald Crafton
6. The Anime Encyclopedia: A Guide to Japanese Animation Since 1917: Lowry
7. Special Effects: The History and Technique: Richard Rickitt
8. Special Effects: How They Are Done in Hollywood: Robert G Willard

2-3PLANNING FOR ANIMATION (Project)

OBJECTIVE

Planning for animation is meant to guide the student through the various stages of pre-production before the production starts of an animation project. It starts from developing an idea through to selling of a story using storyboards and animatics.

MODULE I

Techniques of animation, Different types of animation, Workflows of different types of animation, Pre-production, Production and Post-production stages, Types of animation, Experimental animations

MODULE II

Developing idea/concept: Story, Basic elements of a story, Types of stories, Creating story ideas, Sources of storyline, Adaption, Character roles, Characterization, Dialogues, Basic structure of a story, Old and modern structures, Concept of acts, Theme, Subplots, Tone, Genre, Writing for different types and groups of audience, Animation script, Animation script Vs. Live action movie script, Shot, Scene, Sequence, Screenplay format, Elements of screenplay format, Montage

MODULE III

Character designing, Features of a character, Types/Kinds of characters, Designing props and assets of character, Creating turnarounds/Character model sheets, Blueprints, Character size comparison charts, Character attitude poses

MODULE IV

Storyboard, Definition, Importance of storyboarding, Different types of storyboards, Storyboard formats, Elements of storyboarding (Design, Color, Light and Shadow, Perspective, Staging, Composition rules), Concept of panels and its usages, Floor plans, Storyboarding movements, Illustrating camera techniques in a storyboard, Visual continuity, Transitions, Digital storyboarding

MODULE V

Creation of Animatic: Scanning storyboard panels and synchronizing it with the sound tracks

REFERENCE

1. The Encyclopedia of Animation Techniques: Richard Taylor
2. How to Write for Animation: Jeffrey Scott
3. Writing for Animation, Comics and Games: Christy Marx
4. How to Draw Animation - Learn the Art of Animation from Character Design to Storyboards and Layouts: Christopher Hart
5. The Art of the Storyboard - Storyboarding for Film, TV, and Animation: John Hart
6. Exploring Storyboarding: Wendy Tumminello
7. Don Bluth's Art of Storyboard: Don Bluth

2-4INTRODUCTION TO 3D (Practical)

OBJECTIVE

This course is meant to introduce the student to the world of 3D. In this course, the student will learn about how to work in 3D space, model, texture, apply lights and finally take a render output of his/her creation.

MODULE I

Introduction to 3D graphics, 3D Object's Coordinate System: X, Y and Z axis. How to identify the X, Y and Z axis by its color (Red, Green, Blue), 3D softwares available, What is 3D Animation? 3D production pipeline, 3D animation and their applications in animation movies, visual effects, advertisements, 3D visualisation, simulation, training videos Etc.

MODULE II

3D interface, Organising work: Project folders, Basic skills for handling the selected software like transforming objects, Object properties, Hierarchies, Pivots Etc. Modeling techniques like Spline, NURBS, Polygon and SubD, Various tools and their applications, Detailed modeling of furniture, instruments, character props etc.

MODULE III

Shaders and materials, 2D and 3D textures, Texturing with HDR images, Different types of material creation, Normal and artificial lighting: 1 Point, 2 Point, 3 Point lighting in 3D space, Common light attributes, Shadows and its attributes.

MODULE IV

Introduction to animation, Keyframe creation, Animation curves, Path animation, 3D Cameras, Creating Camera movements

MODULE V

Exterior Modeling: Buildings, Street, House, children's park Etc. Interior Modeling: Room and furnitures. Exterior lighting, Interior Lighting: Global illumination, Final Gather. Rendering: Render settings, Batch rendering, Rendering image sequences

REFERENCE

1. The Art of 3D Computer Animation and Effects: Isaac Kerlow
2. Autodesk 3ds Max 2014 Essentials: Randi L. Derakhshani, Dariush Derakhshani
3. Autodesk Maya 2014 Essentials: Paul Naas
4. Blender Studio Projects: Digital Movie Making: Tony Mullen, Claudio Andaur
5. Digital Animation Bible - Creating professional animation with 3ds Max, Lightwave & Maya: George Avgerakis
6. 3D Automotive Modeling: An Insider's Guide to 3D Car Modeling and Design: Andrew Gahan

2-5 CHARACTER DESIGN FOR ANIMATION (Practical)

OBJECTIVE

Character design for animation is intended to provide the student with an understanding of the anatomy of a human body, a creature or a cartoon character.

MODULE I

Human Anatomy: Anatomy of different age groups (Babies, Kids, Teens, Young Adults, Aged). Basic Proportions, Basic understanding of the skeletal and muscle system, Human forms in perspective

MODULE II

Male and female anatomy. Body Structure - Proportion and construction of body parts (Torso, Face, Eyes, Nose, Ears, Mouth, Hand, Feet etc.) Motion analysis, Study of poses

MODULE III

Anatomy of animals, birds, reptiles. Body structure: Basic forms, proportion and construction of body parts: head, legs, tails. Use of perspectives while drawing animals, birds, reptiles and Insects. Understanding motion and grace

MODULE IV

Cartoon characters, Understanding cartoon characters, Cartoon constructions, Character development. Drawing from basic shapes, Distortion of proportions. Cartoon faces, Eyes, Mouths, Hair, Nose, Hands, Feet, Facial expressions

MODULE V

Classic cartoon characters (Humans, Animals, Birds, Reptiles - Cute, Screwball, Goofy, Heavy, Pugnacious - Fairy tale characters, Gnomes, Elves, Dwarves, Witches). Anime Style

REFERENCE

1. How to Draw What You See: Rudy De Reyna
2. Figure Study Made Easy: Aditya Chari
3. Figure Drawing Without a Model: Ron Tiner
4. Anatomy for the Artist: Sarah Simblet
5. The Art of Animal Drawing: Construction, Action, Analysis, Caricature: Ken Hultgen
6. Animal Drawing: Anatomy & Action for Artists: Charles R. Knight
7. Animal Anatomy for Artists: Eliot Goldfinger
8. Cartoon Animation: Preston Blair
9. Disney Animation - The Illusion of Life: Frank Thomas and Ollie Johnston
10. How to Draw Animation - Learn the Art of Animation from Character Design to Storyboards and Layouts: Christopher Hart

3-13D CHARACTER CREATION (Practical)

OBJECTIVE

3D Character Creation is intended to provide skills of character modeling to the student with an understanding of the anatomy of a human, a creature or a cartoon character.

MODULE I

Modeling humans, Basic proportions, Modeling of body parts (Head, Ear, Mouth, Limbs, Torso etc.)

MODULE II

Modeling animals and birds, Basic proportions, Modeling of body parts (Head, Ear, Horns, Mouth, Limbs, Torso, Tail, Wings etc.)

MODULE III

Modeling different types of human characters (Real, Stylized, Comic, Characters of different age group etc.), Creation of blend shapes

MODULE IV

Texturing a character: UV Texture Layout, Unfolding UVs, Mirroring UV, Arranging UV Shells, Transferring UVs, Multiple UV sets, Optimizing Textures, Unwrap UVW, Optimizing Textures.

MODULE V

Creating skin material using subsurface scattering, Mental ray shaders and MIA materials for character texturing, 3d paint tool and its application.

REFERENCE
1. Mastering Autodesk Maya 2012: Todd Palamar SYBEX
2. Maya Character Creation: Chris Maraffi

3-2 INTRODUCTION TO MOTION GRAPHICS (Project)

OBJECTIVE

This course trains students in the essential vocabularies and concepts of motion graphics using type, shapes, objects and images. It covers the fundamental concepts for motion graphics including graphics and promos for television networks, film titles and advertising.

MODULE I

What is motion graphics? Softwares used for Vfx, Node based and layer based compositing, Exploring advantages of VFx, File formats, Introduction to After Effects, After Effects panels, Starting a new project, Project settings, Importing assets, Methods of creating new composition, Composition settings

MODULE II

Layer Management: Selecting, Moving layers, Replace footage, Trim in and out points, Ripple insert. Layer properties in the timeline panel, Show and hide properties in timeline, Copy/paste properties to different layers. Basic animation using layer properties, Animation using keyframe and Graph Editor, Keyframe assistant, Keyframe interpolation, Spatial keyframes and motion paths, Animate text with text animators. Blending modes: Using blending modes with different layers. Adjustment layers, Solid layer, Null objects, Text layer, Guide layer, Concepts in parenting: Parent and child layer

MODULE III

Mask: Creating masks, Mask points, Mask feather tool, Animating masks, Mask by painting. Track mattes: Luma matte, Alpha matte, Traveling matte, RGBA. Motion blur. RAM Preview: Setting resolution for preview. Uses of pre-composition and nesting. Puppet tools. Effects and Presets: Applying effects from effects and preset panel, Compound effects. What is expressions? Applying simple expressions.

MODULE IV

3D Layer: 3D space, Z dimension, 3D Rotation, Z scale, 3D motion paths, Creating camera, Camera settings. Lighting in 3D space, Lighting parameters, Manage shadow. Multiplane compositing: 3D camera movement through 2D image layers. Controlling speed of different layers to show depth. Depth composting, Z channel, RGBA Z image

MODULE V

Rendering: Render queue panel. Render settings, Output module settings. Introduction to Adobe Media Encoder

REFERENCE

1. Creating Motion Graphics with After effects: Trish and Chris Meyer, Focal Press
2. Motion Graphics with Adobe Creative Suite5 Studio Techniques: Richard Harrington and Ian Robinson

3-3CLASSICAL ANIMATION (Project)

OBJECTIVE

To provide a solid foundation of the principles animation, together with observational studies essential for the student of animation. Observational drawing from life includes drawing from the model or animal, to better understand gesture, poses and particularly movement. By the end of this course participants will be able to: 1. Appropriately plan out their animated scenes visually; 2. Demonstrate an understanding of composition and visual storytelling; 3. Demonstrate a basic understanding of character and scene design.

MODULE I

Animation equipment: Cels, Light box, Peg holes and Peg bars, Line/Pencil tests, Field charts, Rostrum camera. The exposure sheet (X Sheet), Concepts of Soundtrack, Track breakdown, Key frames, In-betweens, Clean-up etc.

MODULE II

Line of action, Path of action, Maintaining volume, Key drawings, Extremes and breakdowns, Inbetweens, Spacing and charting, Timing ladder and numbering of animation drawings, Flipping key drawings, Animation methods: Straight ahead, Pose to pose and a combination of both

MODULE III

Experiments with basic principles of animation (Squash and stretch, Anticipation, Staging, Straight ahead and Pose to pose animation, Follow through and overlapping action, Slow out and Slow in, Arcs, Secondary action, Timing, Exaggeration, Solid drawing, Appeal)

MODULE IV

Acting for animators, Character acting, Difference between acting for drama and acting for animation, Studies from movies, Basics of animation acting, Posing, Timing, Staging, Voice acting, Expressions, Body language

MODULE V

Animating walks, Normal and stylized walks, Walks of different types of human characters, Runs, Different types of runs, Runs of different types of human characters, Jumps, Skips, Leaps. Takes and double takes, Anticipation, Overlapping actions, Mass and weight.

REFERENCE

1. The Illusion of Life: Disney Animation: Ollie Johnston, Frank Thomas
2. The Animator's Survival Kit: Richard Williams
3. Cartoon Animation: Preston Blair
4. Timing for Animation: Harold Whitaker and John Halas
5. How to Make Animated Films: Tony White
6. The Animator's Workbook: Tony White
7. The Male and Female Figure in Motion: Edward Muybridge

3-4PAINTING WITH PIXELS (Practical)

OBJECTIVE

This course will introduce the students to the art and craft of painting techniques like matte painting and digital paint effects with the help of graphic pen tablets. Students apply this technique to recreate realistic or dreamscapes and textures for 3D models. Emphasis is on learning how to use a graphic pen tablet which has become popular in the industry. Importance is also given to the visual effect techniques like removal of unwanted elements from a footage, wire removal, roto brush Etc.

MODULE I

Concept of digital painting, Learning digital painting, Techniques used for drawing with tablet and graphic pen, Draw and painting in Photoshop, Digital creation of charcoal drawings, pastel, watercolor and oil painting, Colorizing black and white photograph with Photoshop

MODULE II

Character design: issues and limitations, Creating character history, Designing the physical look, Drawing, Sketching and painting of the character, Value and color in character creation. Lighting for a character, Using and blending edges in painting, Creating textures and patterns, Painting an eye, face and hair, Painting real and fantasy characters.

MODULE III

Digital matte painting: Preparing the background plate, Articulated mattes, Plate restoration, Plate extension, Adding 3D elements, Creating sky mattes, Static matte and motion matte painting, Color grading, Final output.

MODULE IV

Methods and techniques of creating a dreamscape or BG using elements from various sources

MODULE V

Wire removal technique using various compositing softwares. Rotoscopy: basics and examples, Tracing for animation, matting with green screen, Garbage matting, mid ground Roto, Compositing mid ground, colorizing and animated wipe.

REFERENCE
1. Bold Vision: A Digital Painting Bible: Gary Tonge
2. Digital Fantasy Painting Workshop: Martin McKenna
3. Digital Character Design and Painting: Don Seegmiller
4. Complete Digital Painting Techniques: David Cole
5. Digital Fantasy Painting: Michael Burns
6. The Complete Guide to Digital Illustration: Steve Caplin, Adam Banks and Nigel Holmes
7. 100 Ways to Create Fantasy Figures: Francis Tsan
8. The Invisible Art: The Legends of Movie Matte Painting: Mark Cotta Vaz & Craig Barron
9. D'artiste Matte Painting: Alp Altiner, Dylan Cole and Chris Stoski.

3-5 RIGGING FOR ANIMATION (Project)

OBJECTIVE

This course will introduce various methods of rigging which is most essential part of 3D animation. Students can develop their technical skills during this course.

MODULE I

Study of skeleton setups, Skeleton creation, Joints and their manipulations, IK and FK, Attribute controls, Rig controls. Constraints, Locking and hiding animation channels, Custom attributes, Driven keys, Connecting various attributes

MODULE II

Study of expressions and Basic scripting for rigging. Creating and organizing joint hierarchies, Orienting joints, Naming joints, Mirroring joints, IK leg, FK blending, Rotate plane solvers, Creating custom attributes, Spline IK, Human inverse kinematics

MODULE III

Creating rigs for props and characters. Deformers, Skinning, Interactive/smooth binding, Controlling skin weights, Painting skin weights, Editing skin weights in component editor, Use of blend shapes.

MODULE IV

Understanding the muscle systems, Using capsules, Creating a muscle using muscle builder, Editing muscle parameters, Converting the smooth skin to a muscle system, Sliding weights, Rig a cartoon character applying muscle system. Study and analysis of various rigging setups

MODULE V

Project work based on the syllabus and parameters of the course under the guidance of supervising faculty.

REFERENCE
1. Animation Methods - Rigging Made Easy: Rig Your First 3D Character in Maya: David Rodriguez
2. Blender Studio Projects: Digital Movie Making: Tony Mullen, Claudio Andaur
3. Maya Character Rigging: Cheryl Cabrera
4. Game Character Developmentwith Maya: Antony Ward
5. The MEL Companion: David Stripinis

4-1STOP MOTION TECHNIQUES (Project)

OBJECTIVE

In this course students are introduced to a wide range of stop motion styles, materials and techniques including clay, object and puppet animation utilizing both tabletop and multi plane setups. Students are encouraged to develop a personal approach while exploring possibilities in character design, armature and set building, lighting, etc.

MODULE I

History of stop motion techniques, Study of famous stop motion works and studios, General workflow of stop motion animation, Script, Storyboard, Character design, Set design, Props creation for stop motion animation. Shooting technique: Camera, Tripods, Lighting, Data storage and editing software

MODULE II

Study of time lapse and pixilation, Project works in Time lapse and Pixilation techniques

MODULE III

Study of cutout animation, Sand animation, Project works

MODULE IV

Puppet/clay animation: Types of puppets: Simple clay models, Toys, Maquette, Armature, Simple wire and plasticine puppets and clothed puppets, Preparation of models, Colouring, Puppet costumes

MODULE V

Post production: Editing and effects, Adding sound tracks and sound effects

REFERENCE
1. The Art of Stop motion animation: Ken A Priebe
2. Stop motion: Craft skills for model Animation: Susannah Shaw
3. Stop motion: Passion, Process and Performance: Barry JC Purves
4. Creating 3D Animation - The Aardaman Book of Film making: Peter Lord & Brian Sibley
5. Stop motion Armature Machining - A Construction Manual: Tom Brierton
6. A Century of Stop Motion Animation from Melies to Aardaman: Ray Harry Hausen
7. Stop motion Filming and Performance: Tom Brierton
8. Stop motion Puppet Sculpting: Tom Brierton

4-2ACTING FOR ANIMATORS (Practical)

OBJECTIVE

This course focuses on acting and directing skills that will strengthen the animator's ability to communicate visually. Students act out their characters and complete drawings of motion studies, expressions and poses.

MODULE I

Historical aspects: Pre-scientific and Scientific theories of acting. Aristotelian concept of emotion and acting, James Lange theory, Stanislavsky system (Method Acting). Meyerhold system (Bio-mechanics), Berthold Brecht (Alienation), Samuel Beckett (Absurd Theatre), Grotowski (Theatre of Poverty)

MODULE II

Why characters differ? Character types and their motion, Acting as responding to a situation, Heroes and Villains, Domination and Subordination, Primary and Secondary Characters, Anticipation - Action - Result, Exaggeration, Walks: Acting and Attitudes, Tell the story visually, Clear staging for the audience: Keeping it simple and readable

MODULE III

Emotion and empathy, Emotional involvement, Attaining believability, Development of Drama, Conflict: Good Vs Evil, Character Goals, Mannerisms, Acting with senses, Animating force versus form, Blinks have meaning, Camera itself an actor (Subjective viewpoint)

MODULE IV

Body acting and gestures, Facial expressions, Feeling of the character: Actions that show joy or inner torments, Space and effort, Speech analysis

MODULE V

Acting for camera, Techniques of acting, Pantomime, Voice-over acting

REFERENCE
1. The Illusion of Life, Disney Animation: Frank Thomas and Ollie Johnston
2. Timing for Animation: Harold Whittaker, John Halas
3. The Animator's Survival Kit: Richard Williams
4. Acting in Animation: A Look at 12 Films: Ed Hooks
5. Action: Acting Lessons for CG Animators: Gibbs and Gibbs

4-33D CHARACTER MOTION (Practical)

OBJECTIVE

In this course the student will be applying the principles of traditional animation onto 3D computer animation and focuses on acting skills that will strengthen the animator's ability to communicate visually using a 3D software.

MODULE I

Terminology for 3D Animation: Timeline, Keyframe, Frame rate, Poses, Line of action, Working with 3d Rigs: Importance of poses, Creation of poses from reference images, Importance of familiarizing with the rig's controllers, Understanding the body mechanics: COG (Center of gravity), Importance of line of action and balance in a pose, What is twinning? Silhouette and its application in creating a perfect pose, Positive and negative spaces

MODULE II

Setting up for animation using Animation Settings: Tangents, Auto Key, Animation Start/End, Playback Start/End, Playback Speed etc. Concept of pose-to-pose in 3D animation? Animation passes: Pass 1-Blocking, Pass 2-Breakdowns, Pass 3-Inbetweens. Apply the concept of passes with a walk cycle, Clean-up using graph editor. What is a Graph Editor? How to read a Graph Editor? Animation curves, Changing the shape of the animation curves by moving the keys, Tangent menu, Editing tangent handles, Breaking tangents, Healing tangents. What is Gimbal lock and how to fix it? What is a Dope sheet? How to edit keys using dope sheet? What is Polishing pass?

MODULE III

Principles of traditional animation applied to 3D computer animation: Squash and Stretch, Timing, Anticipation, Staging, Follow Through and Overlapping Action, Straight Ahead Action and Pose-to-Pose Action (Keyframes), Slow In and Out, Arcs, Exaggeration, Secondary action, Appeal

MODULE IV

Cycling Animation: Walk, Run, Sneak cycles, Sad walk, Happy walk, Jump. Using exposure sheets, Adjusting timing and spacing with dope sheet. Exercises in weight and mass, Secondary Action, Fast Action.

MODULE V

Animation constraints. Animating the body: Body language, Action, Reaction, Push and Pull, Lift, Throw. Discuss the use of video references in animation

REFERENCE
1. Principles of Traditional Animation Applied to 3D Computer Animation: John Lasseter
2. The Illusion of Life: Disney Animation: Frank Thomas & Ollie Johnston
3. The Animator's Survival Kit: Richard Williams
4. Digital Character Animation Part 1, 2 & 3: George Maestri
5. Animation: Mechanics of Motion: Chris Webster

4-42D ANIMATION IN FLASH (Practical)

OBJECTIVE

This course provides an overview of 2D character animation using Flash

MODULE I

Flash drawing basics, Sub-selection tool, Bezier tools, Draw a cartoon character in Flash, Convert drawings to symbols, Different types of symbols, Organizing library, Organize character to different symbols, Make a cartoon character using symbols for animation

MODULE II

Movie symbol filters, Introduction to timeline, Classic tween, Shape tween, Keyframes, Ease in and Ease out using edit ease graph, Document setup, Layers, Layer properties, Mask layer, Guide layer, Bouncing ball animation using guide layer

MODULE III

Basic walk cycle, Run cycle, Jump cycle using cartoon character symbols

MODULE IV

Import sound to flash, Lip sync cartoon character to dialogue, Do acting and dialogue animation of 10 seconds

MODULE V

Import PNG files created in Photoshop for background and character design, Use bone tool to do character animation, Limited walk cycle using bone tool

REFERENCE

1. Flash Cartoon Animation. Learn from the Pros: Glenn Kirkpatrick, et al
2. Hollywood 2D Digital Animation. The New Flash Production Revolution: Sandro Corsaro, Clifford J Parrott
3. The Art of Cartooning with Flash: Dan Gray, John Kuramoto, Gary Leib

4-5VISUAL EFFECTS I (Project)

OBJECTIVE

Visual Effects-I is a continuation of "3-2 Introduction to Motion Graphics". This course introduces the student to advanced tools and compositing techniques.

MODULE I

Introduction to Visual effects, Difference between visual effects and special effects,Chroma key compositing - Principles of chroma key compositing, Pulling the matte using keyer. Despill operation to avoid spill contamination (hue operation), Garbage mattes to support keying, Colour correction and composite the foreground and background, Chroma shoot, Materials used for chroma screen, Lighting techniques for chroma shoot, Shooting the chroma. Advantages of video cameras with little compression (4:2:2,4:4:4) for chroma shoots, motion tracking in chroma screen for camera movements

MODULE II

Color correction and color grading: Primary and secondary color correction, Correcting and matching shots, Basic color grading, Colour balancing of elements, Vignettes

MODULE III

Rotoscoping - Uses and advantages of rotoscoping, Creating rotos with splines, Hierarchical parent and child roto shapes, Interpolation technique, Keyframe rotos, Final inspection, Rotoscope motion blur and semi transparency

MODULE IV

Tracking: Motion tracking, Motion stabilization, Mocha tracking, Camera tracking in After Effects, Set extensions, Problems faced during tracking, Time-stretching, time-remapping and time warp effects

MODULE V

How to approach and plan a VFX shot? Other VFX applications - Morphing, Adding atmospheres, Crowd replication, Basics of stereo compositing. What is a Vfx breakdown?

REFERENCE

1. Compositing Visual Effects: Steve Wright
2. Digital Compositing for Film and Video: Focal Press

5-1 ENVIRONMENTAL STUDIES AND HUMAN RIGHTS (Theory)

OBJECTIVE

Environmental education helps students to understand how their decisions and actions affect the environment, builds knowledge and skills necessary to address complex environmental issues, as well as ways we can take action to keep our environment healthy and sustainable for the future. It encourages character building and develop positive attitudes and values**.**

MODULEI

Multidisciplinary Nature of Environmental Studies: Definition, scope and importance, Need for public awareness

Natural Resources: Renewable and nonrenewable resources: Natural resources and associated problems. **a)Forest Resources**: Use and over-exploitation, deforestation, case studies: Timber extraction, mining, dams and their effects on forest and tribal people. **b)Water Resources**: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. **c)Mineral Resources**: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. **d)Food Resources**: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. **e)Energy Resources**: Growing energy needs, renewable and nonrenewable energy sources, use of alternate energy sources, Case studies. **f)Land Resources**: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles.

Ecosystems: Concept of an Ecosystem: Structure and function of an ecosystem - Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids. **Introduction, types, characteristic features, structure and function of the given ecosystem:** Forest ecosystem

MODULEII

Biodiversity and its Conservation: Introduction, Biogeographical classification of India, Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values, India as a mega-diversity nation, Hotspots of biodiversity, Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, Endangered and endemic species of India

Environmental Pollution: Definition, Causes, effects and control measures of: Air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Thermal pollution, Nuclear hazards, Solid Waste Management: Causes, effects and control measures of urban and industrial wastes, Role of an individual in prevention of pollution, Pollution case studies. Disaster management: floods, earthquake, cyclone and landslides.

Social Issues and the Environment: Urban problems related to energy, Water conservation, rain water harvesting, watershed management, Resettlement and rehabilitation of people: Its problems and concerns, Case studies. Environmental ethics: Issues and possible solutions, Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, Case studies. Consumerism and waste products, Environment Protection Act, Air (Prevention and Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act, Issues involved in enforcement of environmental legislation, Public awareness

MODULEIII

Sound Pollution: Dynamic Range of Hearing- Amplitude, frequency, Threshold of hearing, threshold of pain. **Causes of Sound pollution**: Industrialization, poor urban planning, social events, transportation, construction activities, household chores. **Effect of Sound Pollution**: Hearing problem, Health issue, Sleeping disorder, Cardiovascular issues, Trouble communicating, Effect on wildlife. Prevention of sound pollution

MODULEIV

Media and Environment: Media coverage of environmental issues; Agenda setting of environmental risks and its presentation, Role of various media in establishing and maintaining perspectives on environment, Tendencies and limitations of green journalism, Media as bridge between science and public

MODULEV

Human Rights: An introduction to human rights, meaning, concept and development. Three generations of human rights (Civil and Political Rights; Economic, Social and Cultural Rights)

Human Rights and United Nations: Contributions, main human rights related organs UNESCO, UNICEF, WHO, ILO, Declarations for women and children, Universal declaration of Human Rights.

Human Rights in India: Fundamental rights and Indian constitution, Rights for children and women, Scheduled castes, Scheduled tribes, Other backward castes and minorities

Environment andHuman Rights: Right to clean environment and public safety, Issues of industrial pollution, Prevention, Rehabilitation and Safety aspect of new technologies such as chemical and nuclear technologies, Issues of waste disposal, Protection of environment

Conservation of Natural Resources and Human Rights: Reports, Case studies and policy formulation. Conservation issues of western ghats: mention Gadgil committee report, Kasturirangan report. Over-exploitation of groundwater resources, marine fisheries, sand mining etc.

Internal: Field study
- Visit to a local area to document environmental grassland/hill/mountain
- Visit a local polluted site: Urban/Rural/Industrial/Agricultural Study of common plants, insects, birds Etc.
- Study of simple ecosystem-pond, river, hill slopes Etc.

Reference
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2. Clark.R.S., Marine Pollution, Clanderson Press Oxford (Ref)
3. Cunningham, W. P. Cooper, T. H. Gorhani, E & Hepworth, M.T.2001 Environmental Encyclopedia, Jaico Publ. House. Mumbai. 1196p .(Ref)
4. Dc A.K.Enviornmental Chemistry, Wiley Eastern Ltd.(Ref)
5. Down to Earth, Centre for Science and Environment (Ref)
6. Heywood, V. H. & Watson, R. T. 1995. Global Biodiversity Assessment, Cambridge University Press 1140pb (Ref)
7. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p (Ref)
8. Mekinney, M. L. & Schock, R. M. 1996 Environmental Science Systems & Solutions. Web enhanced edition 639p (Ref)
9. Miller, T. G. Jr., Environmental Science, Wadsworth Publishing Co. (TB)

10. Odum, E. P. 1971. Fundamentals of Ecology. W. B. Saunders Co. USA 574p (Ref)
11. Rao M. N. & Datta, A. K. 1987 Waste Water treatment Oxford & IBII Publication Co.Pvt.Ltd.345p (Ref)
12. Rajagopalan, R. Environmental Studies from crisis and cure, Oxford University Press, Published: 2016 (TB)
13. Sharma B. K., 2001. Environmental Chemistry. Geol Publ. House, Meerut (Ref)
14. Townsend C., Harper J, and Michael Begon, Essentials of Ecology, Blackwell Science (Ref)
15. Trivedi R.K., Handbook of Environmental Laws, Rules Guidelines, Compliances and Standards, Vol I and II, Enviro Media (Ref)
16. Trivedi R. K. and P.K. Goel, Introduction to air pollution, Techno-Science Publication (Ref)
17. Wanger K.D., 1998 Environmental Management. W.B. Saunders Co. Philadelphia, USA 499p (Ref)

(M) Magazine (R) Reference (TB) Textbook

Human Rights
1. Amartya Sen, The Idea Justice, New Delhi: Penguin Books, 2009.
2. Chatrath, K. J.S., (ed.), Education for Human Rights and Democracy (Shimla: Indian Institute of Advanced Studies, 1998)
3. Law Relating to Human Rights, Asia Law House,2001.
4. Shireesh Pal Singh, Human Rights Education in 21st Century, Discovery Publishing House Pvt. Ltd, New Delhi
5. S. K. Khanna, Children and The Human Rights, Common Wealth Publishers,1998. 2011.
6. Sudhir Kapoor, Human Rights in 21st Century,Mangal Deep Publications, Jaipur,2001.
7. United Nations Development Programme, Human Development Report 2004: Cultural Liberty in Today's Diverse World, New Delhi: Oxford University Press, 2004.

5-2VISUAL EFFECTS II (Project)

OBJECTIVE

Advanced techniques for 3D animation and visual effects development; including 3D pre-visualization, camera match moving, multi-pass rendering and digital compositing.

MODULE I

Camera and lighting techniques necessary to complete each shot effectively: Structure of digital images: The Pixel, greyscale and colour images, Four channel images, LDR and HDRI images, Image resolution, Pixel & image aspect ratio, Digitizing image, Bit depth, Compression, File formats, DPI, What is a plate in Vfx? Who is a plate supervisor? Basics of Match moving – 2D tracking process – Automatic tracking

MODULE II

Compositing CGI: Foreground image, Background image, Matte, Alpha channel (Premultiplied and non-premultiplied alpha compositing), Gray pixels in matte, Compositing the layers, Blending and colour correcting the layers

MODULE III

Multi-pass rendering workflow to support advanced post and compositing: Multipass: Specular pass, Diffuse pass, Occlusion pass, Shadow pass, Reflection pass, Composite different passes, Creative control of passes using image blend modes and colour correction techniques.

MODULE IV

Node-based or layer-based compositing tools as necessary to assemble the shots and rendered assets: 3D in live action - Principles of camera tracking, Set Extensions, Film live action set, Create photorealistic 3D set in 3D software, High Dynamic Range Imagery (HDRI) for photorealistic lighting and reflection mapping, Composite live action set and 3D set adjusting lighting, Shadows, Alignment and other interactive elements

MODULE V

Export camera parameters and motion path to 3D softwares: Color correction and post tools as necessary to uniformly polish the final project, 3D composting systems, Uses of 3D compositing, 3D compositing scene, Simple geometric shapes, Texture maps, 3D camera, Lights shaders. Import 3D objects from 3D softwares, Composite 2D elements and 3D elements in 3D composite

REFERENCE

1. Digital Lighting and Rendering (2nd Edition): Jeremy Birn
2. Compositing Visual Effects: Steve Wright
3. Maya Professional Tips and Techniques: Lee Lanier
4. Match moving: The Invisible Art of Camera Tracking: Tim Dobbert

5-3MINIATURES FOR LOW BUDGET FILMING (Project)

OBJECTIVE

This subject is intended to introduce the student to the use of models and miniatures in filmmaking. In a world where CGI seems to always be the first choice, models and miniatures offer realism and immediate feedback in-camera to let you know if you got the shot at a lower budget. This subject will also introduce the student to the rich history of miniatures and its practical application in special effects for film at every level.

MODULE I

Discuss the use of miniatures in special effects. Application of miniature in film and stop motion animation. History of miniatures in filmmaking. Discuss the utilization of miniatures in film starting from "Le Voyage dans la Lune", "Close Encounters of the Third Kind", "Titanic", "Inception", "Interstellar" and "The Wolf of Wall Street". Discuss the advantages of using miniatures over CGI

MODULE II

Building a miniature set - Castle, House, Furniture, Trees etc. Making model miniatures using foam, wood, plastic, metal, glue etc. Painting the details on the models. Special effects using scaled models/replica of military tanks, helicopter, UFO, the Taj Mahal etc. and the use of remote controlled vehicles for film. What are Bigatures and what are its advantage? Discuss the possibilities of using 3D printers in creating miniature models using 3D applications

MODULE III

What is forced perspective/foreground hanging miniatures? How to create low cost visual effects using forced perspective at the foreground?

MODULE IV

Tips for filming miniature models - Depth of field, Tilt-shift photography technique, Chroma shot. Camera speed - Problems with scaled models (Gravity doesn't scale proportionately with size), Solution: Shoot it at high speed (overcranking) and play the footage back in slow motion eg. a miniature explosion. Setting up the miniature lights, Atmospheric effects for miniature sets like fog, smoke, wind, lightning etc.

MODULE V

Final composite using a compositing softwares for Keying, Garbage matte, Color correction, Color grading, Masks, Tracking, Effects. Adding dynamic simulations like fire, smoke Etc. Sound effects for more realism

REFERENCE

1. Industrial Light & Magic: Into the Digital Realm: Mark Cotta Vaz
2. Industrial Light & Magic: The Art of Innovation: Pamela Glintenkam
3. Special Effects: The History and Technique: Richard Rickitt
4. Plastic Reality: Special Effects, Technology & the Emergence of 1970s Blockbuster Aesthetics: Julie A. Turnock
5. Techniques of Special Effects of Cinematography: Raymond Fielding

5-4DYNAMIC SIMULATIONS (Practical)

OBJECTIVE

This course is meant to introduce the students to the possibilities of using dynamic simulation in movies and animation projects. It is meant to introduce the student to an animation using mathematical calculations to get a desired effect through simulation.

MODULE I

What is dynamic simulation? Discuss the application of dynamic simulation in animation movies and visual effects, Movement with forces, Different types of forces involved in motion: Applied force, Frictional force, Tension force, Normal force, Air resistance force, Spring force, Gravitational force etc.

MODULE II

What is Particle system? Study of Particles: Emitters, Animating particles, Render the particles, Goals, Multiple goals, Particle instancer, nParticle, nParticle collisions, Simulating water using particles, Applying fluid behavior to particles to create ink or dust-like effect

MODULE III

Soft and Rigid Bodies: Soft bodies, Rigid bodies, Rigid body constraints, Edit rigid body constraints, Springs, Soft and rigid body limitations, Edit rigid body attributes

MODULE IV

Maya nucleus, Introduction to nCloth, nCloth constraint, Introduction to nHair, Introduction to fluid effects: Clouds, Fire, Smoke, creating an ocean etc.

MODULE V

Using dynamics simulation in animation movies to simulate cloth, water, fire, ropes etc. Combining digital plates with live action footage: Final composite using a compositing softwares

REFERENCE

1. Digital compositing for Film and Video: Steve Wright.
2. Special Effects: An Oral History: Pascal Pinteau.
3. Special Effects: The History and Technique: Rickit, Richard.
4. Maya Visual Effects: The Innovator's Guide: Eric Kellur.

5-5 OPEN COURSE

I. NON-LINEAR EDITING AND COLOR GRADING (Practical)

OBJECTIVE

The objective of this paper is to provide the basic principles involved in editing visuals and develop a basic skill with the tools and techniques available in standard Non-linear video editing and colour grading.

MODULE I

Colour TV and video recording, Origin of television systems NTSC, PAL, SECAM, History of formats of video - B&C, VHS, SVHS, U-matic, Beta etc. Modern developments - DV.HD Tapeless media HD & LR

MODULE II

Shooting script and editing script, Cut and shot transition, Match cut, Jump cut, Scene transitions, Editing rushes, Online, Linear AB roll, Logging, Advantages and disadvantages, Editing software, Non-linear softwares. Audible sound, Clapboard synchronization

MODULE III

Continuous shots, Concept of time and space, Introduction to video editing, Jump cut and editing principles, Time and space concepts

MODULE IV

Overview of what is meant by "Color Timing", History of color manipulation from early hand color techniques, three strip, Hazeltine, early telecine color timing, Where we are today: Digital intermediate (DI), Color, Da Vinci etc. - 4:4:4/4:2:2 etc. 10bit vs. 8bit, resolution etc. DI, Film vs Video latitude, First hands-on session with color. Controlling specified areas of the image through use of secondaries, Shapes vs keys, Tonal ranges, Tracking

MODULE V

Color grading, Creating mood for the scene: Tinting footages, Exposure adjustments, Brightness and contrast

REFERENCE

1. Video Production Handbook: Focal Press
2. HD Cinematography: Focal Press
3. NonlinearEditing: Bryce Button (Focal Press)
4. Grammar of edit (Second edition): Roy Thompson (Focal Press)
5. Make the Cut: Lori Jane Coleman A.C.E & Diana Friedberg.
6. Grammar of Shot: Roy Thompson (Focal Press)

5-5 OPEN COURSE

II. AUDIO EDITING (Project)

OBJECTIVE

The students should have a basic knowledge in audio aspects and basic audio editing techniques.

MODULE I

Physiology of sound, Audible sound spectrum, Creative use of sound, Aesthetic applications, Recognizing realistic sound for artistic fulfillment, Discussion on soundtracks in different films.

MODULE II

Different methods of recording sound: Recording sound in controlled situation, Playback, Pre-recording, Dubbing, Post synchronization, Voice recording, Microphones for location recording, Microphone for studio recordings

MODULE III

Sound design for animation, Historical voice talent in animation, Casting voice talent, Working with voice actors, Recording dialog, Synchronization, The role of music in animation, Functions of SFX in animation, Discussion on soundtracks in different animation films.

MODULE IV

Basic audio editing techniques and concepts, Conversion of files from one format to another, mono to stereo conversions, Audio special effects, Audio plug-ins.

MODULE V

Introduction to digital audio workstation: Midi and digital sound, Basic mixing techniques, Introduction to mastering, Delivery formats.

REFERENCE
1. Practical recording Techniques: Bartlett, Bruce and Jenny Bartlett
2. Audio and Video Systems: R. G. Gupta
3. Sound: Efron
4. Acoustics: Mackenzie
5. From Microphone to Ear: G. Slot
6. Designing for Animation: Robin Beauchamp

5-5 OPEN COURSE

III. ARCHITECTURAL VISUALIZATION (Practical)

OBJECTIVE

This course covers the popular 3ds Max program for architecture modelling. This gives the student an opportunity to explore the possibilities in 3D architectural visualization.

MODULE I

3ds max Interface, Modelling concepts - Spline based modelling, Mesh modelling, Parametric modelling. Spline sub objects, Splines to 3D, Cross section modifier, Surface modifier, Extrude, Bevel, Lathe, Loft, Weld vertices. Introduction to modifiers. Polygons: Editable poly sub objects, Edit poly modifier, Slice plane, Cut tool, Parametric deformers, AEC extended: Stairs, Windows, Doors, Foliage Etc.

MODULE II

Furniture modeling using polygons: Sofa, Chair, Tables, Bed, Shelf, Curtain, Towels, Computer chair etc.

MODULE III

Introduction to texturing, Standard materials and shades, creating uniform textures, UV map, Unwrap UV, Different maps, Editing UV coordinates. Arch & Design materials, mental ray ProMaterials. Applying texture on furniture, floor, glass and metal materials. Multi Sub Object Materials for furniture, doors, windows Etc.

MODULE IV

Introduction to digital lighting, Light theory, Creating three point lighting system, Exposure Controls, Basic lights and photometric lights, Daylight system. Advanced lighting - Selecting advanced lighting, Enabling light tracing, Lighting for radiosity, Local and global lighting settings, Advanced lighting materials, Rendering with mental ray, Mental ray lights and shadows understanding caustics and photons, Controlling indirect illumination. Camera - Controlling camera, Aiming camera, Lens settings, Field of view, Environment range, Clipping planes, Depth of field, Motion blur

MODULE V

Animation: Keyframe animation, Animation along trajectories, Modify animation using function curves, Parameter Curve Out-of-Range. How to import architectural plan (.DWG format) and model the structure, Create a camera walk through of the finished architecture model. Rendering tools, Completing a project from modeling through rendering.

REFERENCE

1. Realistic Architectural Visualization with 3ds Max & Mental Ray: Jamie Cardoso & Roger Cusson
2. Essential CG Lighting Techniques with 3ds Max: Darren Brooker

6-1 INTERNSHIP

OBJECTIVE

To acquire practical industry based experience. Internship is on the job training to assimilate the professionalism in a career. Internships offer students a period of practical experience in the industry relating to their field of study. The students will have to undergo an Internship at an animation studio or a post-production visual effect studio as per the field of specialization of the candidate for a month either at the end of the fifth semester or the beginning of the sixth semester.

The students would prepare individual reports after the Internship and the same should be attested by the organization under which the student did the internship. The students' comprehensive report will be submitted to the HOD for evaluation. A faculty member will monitor the students during the internship. The internships would have a credit of 1 with 100 marks and the marks would be submitted to the university at the end of the six semesters.

6-2ANIMATION PROJECT (Project)

OBJECTIVE

Students should create an animation of minimum one minute to a maximum three and half minute excluding titles using any of the following methods for their animation project,

- Full 2D Animation

- Full 3D Animation

- Full Stop-motion Animation

- 2D Animation + 3D Animation

- 3D Animation + Stop-motion Animation

- 2D Animation + Stop-motion Animation

- 2D Animation + Visual Effects

- 3D Animation + Visual Effects

- Stop-motion Animation + Visual Effects

- 2D Animation + 3D Animation + Visual Effects

- 3D Animation + Stop-motion Animation + Visual Effects

- 2D Animation + Stop-motion Animation + Visual Effects

- Live Action + Animation

Project should be worked out through various production stages after the final approval by the supervising faculty. Students have to complete the final project within the given time period. Student should keep all the important paper works (script, storyboard and character designs) along with them. Viva Voce is part of the examination.

6-3 VISUAL EFFECTS PROJECT (Project)

OBJECTIVE

Students develop an innovative body of work making use of the skills and knowledge acquired during the previous courses. This guided project culminates into a final presentation accompanied by a process book.

Working closely with the faculty, students define specific production goals to explore or complete an animation project of their choosing. Emphasis is on the conceptual, aesthetic and technical processes. Students are encouraged to share their specific areas of expertise while producing individually directed projects.

6-4 3D LIGHTING AND RENDERING (Practical)

OBJECTIVE

This course trains students in advanced 3D lighting and rendering

MODULE I

Mental ray/Arnold/V-ray material and its application. DGS material, Diffuse, Glossy and Specular attributes, Dielectric shaders/materials

MODULE II

Scientific light theories, Artistic theories, Digital lighting theory, Working with Maya lights, Light types and attributes

MODULE III

3-point lighting concepts, Computer generated imagery, Effective use of key light, fill light, back light. HDRI Lighting, Lighting an interior scene, Daylight, Artificial lighting, Working with shadows, Depth map shadows, Raytraced shadows. Three-point lighting: Lighting a character. Mood lighting, Lighting surfaces: Faking Radiosity, Expression based lighting

MODULE IV

Software rendering, Setting render globals, Creating physical fogs, Paint effects. Render passes, Batch rendering, Interactive photorealistic rendering. Hardware rendering, Using the timeline, Rendering a sequence

MODULE V

Render wrangler, Preparing render sequences, Render diagnostics, Optimizing scene size, Baking simulations, Batch rendering, Command line rendering, Render management solutions, LOD, Optimizing lights, Shadows, Ray tracing

REFERENCE

1. Advanced Maya Texturing and Lighting with CDROM: Lee Lanier, Wiley Publishing
2. Texturing and Modeling: A Procedural Approach: David S. Ebert

6-5 CHOICE BASED COURSES

1. ADVANCED ANIMATION IN FLASH (Project)

OBJECTIVE

This course is a continuation of 4-4 2D Animation in Flash and is intended for students who would like to specialize in Flash animation. Students will explore various production skills needed for work in digital 2D animation production.

MODULE I

Anatomy of story, Casting the characters, Exaggerating personality, Adopting stereotypes. Flash animation: Setting up a good FLA, Frame by frame animation and animating with tweens

MODULE II

Composing the space in Flash: The rule of thirds, Line, Circular, Triangle compositions. Contrasting scales, Color dominance, Color as mood, Color contrast, Perspective, Relative size, Light and shadow for depth perception, Depth of field and focusing attention using blur filter, 3D transform

MODULE III

Panning the camera, Distorting perspective for camera tilt (Distort the corners, wrap the middle), Zip pan, Zoom in and Zoom out, 3D translation tool and tween to create a truck in camera, Create multiplane effect in Flash, 3D rotation tool with attached movie clips to simulate 3d space

MODULE IV

Create lighting in flash: Light source, Light fall off, Shadow, Intensity, Soft light, Hard light, Key light, Fill light, Rim light, Front lighting, Side lighting, Rim lighting, Three-point lighting, High key light, Low key light, Mood lighting, Skew tool for casting shadows for character animation, Animated mask for light effect

MODULE V

Creating special effects in Flash such as rain, snowfall, wind, flag animation, lens flare, smoke effect etc. Sound, Editing sound, Lip sync, Flash ink and paint, Rendering a movie

REFERENCE
1. Flash Cartoon Animation: Learn from the Pros: Glenn Kirpatrick and Kevin Peety
2. The Art of Flash Animation: Creative Cartooning: Mark Stephen Smith
3. Flash + After effects: Add Broadcast feature to Good Flash Designs: Chris Jackson
4. The Animator's Guide to 2D Computer Animation: Hedley Griffin
5. How to Make Animated Films: Tony White

6-5 CHOICE BASED COURSES

2. METHODS OF SHOOTING FOR GREEN SCREEN (Project)

OBJECTIVE

The students should gain detailed knowledge with regard to shooting within a studio for green screen.

MODULE I

Basics of visual storytelling, Camera angles and movements, Use of light meter, Filters and flashes - Basic lighting techniques, Color temperature

MODULE II

Components of a studio, Studio floor, Shooting with a single camera, Prepare a floor chart with flow of action, Movement, Camera set ups etc. Multi camera setup and studio lighting, Discuss motion control rigs and its application

MODULE III

Modern day travelling mattes and how they works: Luma-Key matte, Chroma-key matte, Difference mattes, Blue Screen matte, Green Screen mattes, etc. Green Vs. Blue screen, shadow matting, Poorly lit green screens and its problems, Pulling the Mattes, Different types of keyers

MODULE IV

Basic setups for shooting green screen: Lights: Key, Fill, Back, Side spill suppressor light, Matte keying fabrics and materials, Floodlights an umbrella lights, Lighting the backing, Lighting the talent, creating tracking markers for motion tracking, White balancing the camera before shooting, Shooting with HD camera. Matching with background objects, Interacting with the background and objects

MODULE V

Project: Students should do two projects by shooting green screen and composite it with a background.

REFERENCE
1. Advanced Photography: M.T. Lang Ford
2. Basic Motion Picture Technology: Happe
3. Professional Lighting Hand Book: Carlson
4. The Green Screen Handbook: Jeff Foster
5. The Visual Effects Arsenal: Bill Byrne
6. Green Screen Made Easy: Jeremy Hanke, Michele Yamazaki

6-5 CHOICE BASED COURSES

3. MATCH MOVING TECHNIQUES (Project)

OBJECTIVE

By exploring concepts in 3D camera match move of live action scenes, as well as rigid object tracking, students experience tracking 3D shots by hand and by applying the use of camera tracking softwares. Students analyze data and create seamless camera connections between live action shots and 3D computer generated objects.

MODULE I

History of tracking: Where did Matchmoving come from, who invented it, where was it first used? What is matchmoving based upon? - Rotoscoping and Photogrammetry. What is Matchmoving, How does it work? Camera tracking softwares, Two methods of defining the camera motion: Manual and Automatic

MODULE II

2D tracking process, Track placements, Plate issues

MODULE III

Working method of film cameras, Importance of gathering data to recreate elements of the live footage in 3D, Good calibration process, Calibrating cameras, Evaluating the solution for a camera tracking, Calibrations and camera moves, Setting up a coordinate system supervised tracking, Importance of lighting in shooting

MODULE IV

Automatic tracking, Fitting the camera and set, Adding test objects, Getting right information from sets, Creating 3D coordinate frame, Export camera parameters and motion path to 3D softwares. Import point cloud (track points) and camera data to 3D softwares, Use point cloud as a reference point for placing 3D objects, Combining digital plates with live action plates

MODULE V

Project work based on the syllabus and parameters of the course under the guidance of supervising faculty.

REFERENCE
1. Match moving: The Invisible Art of Camera Tracking: Tim Dobbert
2. The Art and Science of Digital Compositing: Ron Brinkmaan
3. The Filmmaker's Hand Book: Steven Ascher and Edward Pincus

6-6DEMO REEL PRESENTATION (Project)

OBJECTIVES

Demo reel presentation is intended to assist the student to prepare for a job interview. Student will have to present his/her demo reel which is a culmination of their original works or of their area of expertise. The faculty will share tips and strategies to create an engaging demo reel and to face a job interview successfully. The demo reel should be in video format or a website or in print format. The student is free to use his/her individual creative style to present the final demo reel.

MODULE I

Preparing for an Interview: Research the organization, Compare your skills and qualifications to the job requirements, Prepare responses, Plan what to wear, Plan what to bring, Pay attention to nonverbal communication, Follow up. How to write a successful media CV?

MODULE II

What is a demo reel? Tips to create a successful demo reel: Keep it short, Make it specific, Choose a style (Collage or samples), Put your best work first, Your work only, Slate it - Include contact details at the start or the end of the demo reel, Showcase your involvement, Highlight impressive clients, Emphasize technical ability, Before and after shots of their work, Be mindful of aspect ratios, Say "No" to copyrighted music, Cut to the beat, Don't repeat footage, Quality control, Online all the time, DVDs for delivery, Label with contact info, Active and accessible, Show your personality, Ask a critic

MODULE III

Discuss the importance of self-promotion. Getting visibility: Youtube, Vimeo, Social Media, Blogs, Web page, Business cards, Job portals Etc.

REFERENCE

1. Interview: How to Master Interviews and Stand Out Among Your Peers: Stefan Anderson
2. Success in Interview: Anand Ganguly

WEBSITE REFERENCE
http://www.premiumbeat.com/blog/top-20-tips-for-creating-a-successful-demo-reel/
https://careerservices.princeton.edu/undergraduate-students/interviews-offers/preparing-interviews
http://www.kent.ac.uk/careers/cv/mediacv.htm
http://www.bbc.co.uk/academy/production/article/art20130702112136472