

Rayat Shikshan Sanstha's
YASHAVANTRAO CHAVAN INSTITUTE OF
SCIENCE, SATARA
(AN AUTONOMOUS COLLEGE)

Reaccredited by NAAC with 'A+' Grade

Bachelor of Science

Part - II

ANIMATION SCIENCE

Syllabus

to be implemented w. e. f. June, 2022

Structure of the course:

2) Semester III

Sr. No.	Subject Title	Theory				Practical	Practical	
		Course No. and Course code	Title of Course	No. of lectures per week	Credits		No. of lectures per week	Credits
1.	Animation Science	BAST-301	Cinematography	3	2	BASP-307 Lab -IX	8	4
2.		BAST-302	Principles of Animation	3	2			
3.		BAST-303	Digital Animation	3	2	BASP-308 Lab -X	8	4
4.		BAST-304	Multimedia Animation	3	2			
5.		BAST-305	Video Editing	3	2			
6.		BAST-306	Sculpturing in Animation	3	2	BASP-309 Lab -XI	8	4
7.		AECC 3	Environment Science	3	2			

2) Semester IV

Sr. No.	Subject Title	Theory				Practical	Practical	
		Course No. and Course code	Title of Course	No. of lectures per week	Credits		No. of lectures per week	Credits
1.	Animation Science	BAST-401	3D Max Animation	3	2	BASP-407 Lab -XII	8	4
2.		BAST-402	Animation Scripting Language	3	2			
3.		BAST-403	3D Maya Animation	3	2	BASP-408 Lab -XIII	8	4
4.		BAST-404	VFX	3	2			
5.		BAST-405	IPR and Cyber Security	3	2	BASP-409 Lab -XIV	8	4
6.		BAST-406	Game Design	3	2			
7.		AECC 3	Environment Science	3	2			

**B.Sc. II: Evaluation structure
Semester III.**

Theory Course	ESE	Internal Evaluation				Practical Course	Practical		Submission	
		ISE -I	ISE- II	H.A. I	H.A. II		Exam	Journal	Case study/ Educational Tour/Semin ar	Student Perfor mance
BAST-301	30	5	5	5	5	LAB-5	30	10	5	5
BAST-302	30	5	5	5	5					
BAST-303	30	5	5	5	5	LAB-6	30	10	5	5
BAST-304	30	5	5	5	5					
BAST-305	30	5	5	5	5	LAB-7	30	10	5	5
BAST-306	30	5	5	5	5					
AECC 3	30	5	5	10 (Project)			-	-	-	-
Total	210	140					150			
Grand Total	500									

B.Sc. II: Evaluation structure
Semester IV.

Theory Course	ESE	Internal Evaluation				Practical Course	Practical		Submission	
		IS E-I	ISE-II	H.A. I	H.A. II		Exam	Journal	Case study/ Educational Tour/Semin ar	Student Perform ance
BAST-401	30	5	5	5	5	LAB-5	30	10	5	5
BAST-402	30	5	5	5	5					
BAST-403	30	5	5	5	5	LAB-6	30	10	5	5
BAST-404	30	5	5	5	5					
BAST-405	30	5	5	5	5	LAB-7	30	10	5	5
BAST-406	30	5	5	5	5					
AECC 3	30	5	5	10 (Project)			-	-	-	-
Total	210	140					150			
Grand Total	500									

Semester III

Structure and titles of the course of B.Sc. II course

Code	Name of Course	Units
BAST-301	CINEMATOGRAPHY (CREDITS:02; TOTAL HOURS:45)	Unit I: Introduction of Visual Storytelling Unit II: Introduction of Camera & Camera Placement Unit III: lens & camera Movement Unit IV: Creative Lighting & Color
BAST-302	PRINCIPLES OF ANIMATION (CREDITS:02; TOTAL HOURS:45)	Unit I: History and Basic Principles Unit II: Principles Strategies Unit III: Executing Force of action to animation Unit IV: History of Animation Production and current process
BAST-303	DIGITAL ANIMATION (CREDITS:02; TOTAL HOURS:45)	Unit I: Introduction of Digital Storyboarding Unit II: Interface Highlights Unit III: Drawing & Painting Unit IV: Exporting Digital Animation
BAST-304	MULTIMEDIA ANIMATION (CREDITS:02; TOTAL HOURS:45)	Unit I: Interface Unit II: Toolbox and parameters Unit III: Inverse Kinematics and constraint Unit IV: Rendering 2D Animation
BAST-305	VIDEO EDITING (CREDITS:02; TOTAL HOURS:45)	Unit I: Workspace and workflows Unit II: Importing footage into Premiere Pro Unit III: Effects Unit IV: Transitions
BAST-306	SCULPTURING IN ANIMATION (CREDITS:02; TOTAL HOURS:45)	Unit I: Basic of Sculpturing Unit II: Introduction to Mudbox Unit III: Working with Tools Unit IV: Texturing with Mudbox

Semester IV

Code	Name of Course	Units
BAST-401	3D MAX ANIMATION (CREDITS:02; TOTAL HOURS :45)	Unit I: Interface &Modelling Unit II: Texturing & Dynamics Unit III: Rigging & Animation Unit IV: Lighting & Rendering
BAST-402	ANIMATION SCRIPTING LANGUAGE (PYTHON) (CREDITS:02; TOTAL HOURS :45)	Unit I: Introduction Unit II: Operators Unit III: Control Structure Unit IV: String Operations
BAST-403	3D MAYA ANIMATION (CREDITS:02; TOTAL HOURS :45)	Unit I: Working with Interface Unit II: Modelling with Maya Unit III: Texturing with Maya Unit IV: Lighting and Shading with Maya
BAST-404	VFX (ADOBE AFTER EFFECT) (CREDITS:02; TOTAL HOURS :45)	Unit I: Interface Unit II: Effects Unit III: 3D Tracking Unit IV: Rendering
BAST-405	IPR AND CYBER SECURITY (CREDITS:02; TOTAL HOURS :45)	Unit I: Cybercrime & Internet Unit II: Hackers, Crackers & IPR Unit III: Cyber-frauds, Scams & Corns Unit IV: Surveillance, Piracy & Crime Control
BAST-406	GAME DESIGN (UNITY) (CREDITS:02; TOTAL HOURS :45)	Unit I: Introduction Unit II: Scripting Unit III: Materials and Textures Unit IV: 2 Dimensions

Semester – III

Course –BAST-301: CINEMATOGRAPHY

Course Objectives: Student will be able to

1. Study Cinematographer work pipeline.
2. Understand equipment functions and library resources related to the study of photography.
3. Understand learn and explore the use of pencil and various tools to create textures for different subjects.
4. Study creative use of pencil drawing and expression.

Credits (Total Credits 2)	SEMESTER-III BAST-301 CINEMATOGRAPHY	No. of hours per unit/credits
UNIT - I	Introduction of Visual Storytelling	(11)
	Visual Storytelling, Photography, Exposure Times, Photography as Art, Images as Communication, The Power of the Image, Messages Hidden in Images, Communicating Your Message, The Frame, Aspect Ratio	
UNIT - II	Introduction of Camera & Camera Placement	(11)
	How is an Image Created?, Camera Obscure, Creating a Permanent Photograph, Modern Camera Sensors, Creative Use of Exposure Time, Camera Components Camera Functions, Exposing an Image, Exposure and Shutter Speed Using Slow Shutter Speed on a Video Camera, Controlling Exposure Three Exposure Controls, Aperture Effects, Exposure and Aperture, The Sensor Adjusting Sensitivity, Noise, Camera Distance, Shot Types, Extreme Long Shot, Medium Long Shot, Medium Shot, Medium Close Up and Close Up, Extreme, Close Up, Shot Size and Lenses, Over the Shoulder Shot, Two Shot, Camera Height, Eye Level Height, High Angle, Low Angle	
UNIT - III	Lens & Camera Movement	(12)
	What is a Lens?, Lens less Photography, Convergence, Lens Speed, Field of View, Sharpness, Distortion, Guidelines for Choosing a Lens, The Main Functions of a Photographic Lens, Consumer Cameras, What Lens Do I Need?, Choosing a Lens, The Normal Lens, Field of View, Lens Types, Perspective and	

	Depth, When Was the Camera Moved First?, Camera Movement Types, Motivated Camera Movement, The Panning Shot, The Tilt Shot, The Tracking Shot, The Circular Move, The Push-In Shot, The Pull-Out Shot, The Crane Shot, The Handheld Shot, The Steadicam Shot	
UNIT - IV	Creative Lighting & Color	(11)
	Three-Point Lighting, The Key Light, The Fill Light, The Back Light, Effective Use of Three-Point Lighting, Practical Lighting Applications, Lighting Analysis, Lighting the Face, Visual Intensity, Contrast and Affinity, Contrast in Color, Evaluating Color Contrast, Storytelling with Lighting, How Does Light Help Tell a Story? What is Color?, The Relativity of Color, The Human Eye, After Images, Primary Colors, Complementary Colors, Color Interpretation, Shades of Red, Color Interpretation in Cinema, The Meaning of Color, Color in Images and Film, "Drive", Emotion and Color	

Course outcomes: Student should be able to

1. Understand command of materials, equipment functions and library resources related to the study of photography.
2. Understand visual forms and their aesthetic functions and basic design principles.
3. Create props technologies and entire knowledge of work processes.
4. Create industrial and commercial applications (lights) for advanced photography.

References-

- 1) Cinematography -second edition - blain brown
- 2) Digital Cinematography: Fundamentals, Tools, Techniques, and Workflows – David Stump, Asc
- 3) Cinematography Techniques: The Different Types of Shots in Film - By Timothy Heiderich Unit
- 4) The Filmmaker’s Guide to Digital Imaging - blain brown

Course – BAST-302: PRINCIPALS OF ANIMATION

Course Objectives: Student will be able to

1. Study Principals for animation.
2. Understand principles strategies for 2D production process for between drawing
3. Study flow of classical animation with principles..
4. Understand advance production process of animation using 12 principles.

Credits (Total Credits 2)	SEMESTER-III BAST-302 PRINCIPALS OF ANIMATION	No. of hours per unit/credits
UNIT - I	History and Basic Principles	(11)
	Understanding principles that translate sequential, images into action to make animation believable Understanding properties of matter, Making use of the wave principle, delayed secondary , action, slow and fast action impact , speed, weight, tendency of weight to move in a certain way, recoil effects, squash and stretch related to weight, overlapping action, follow through Animating force acting on objects , object , weight, construction, flexibility, object behavior when force acts on them Principles of Timing, Gaining an insight into the invisible , concept of time in nature Understanding the basic unit of time in animation, Emphasizing the difference between , caricature, drama, humor Timing governing acting and movement	
UNIT - II	Principles Strategies	(11)
	The use of anticipation, action, reaction, Methods of doping, writing exposure sheets, bar sheets, planning accents, beats, scene timing, spacing of drawings, holds, easing in and out Animating to music, Principles of Movement, Understanding the meaning of movement and, movement innature.	
UNIT - III	Force of action	(12)
	conveyed through movement and animate and inanimate object behaviour Examining the laws of motion in the context of animation; cause and effect, thrown objects, rotating, force, oscillating movement, friction, resistance Studying the tendency of weight to move in a particular manner Simplification and exaggeration of movement	
UNIT - IV	History of Animation Production and current process	(11)

	<p>Understanding of the evolution of animation, Delving into animation history- both of India and the world. Precursors to animation: Cave paintings, animation toys.</p> <p>Animation before Disney Studio animation, Feature animation, Experimental animation Personal films and expression, Adult animation, final production process Animation</p>	
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Course outcomes: Student should be able to

1. Understand and demonstrate in between drawing and execution.
2. Apply web compatible animation overlapping action with Flash interface.
3. Create human and animal walk cycle using principle of animation.
4. Create motion graphics Animation.

References-

1. The Animators Survival Kit, Expanded Edition: A Manual of Methods, Principles and Formulas for Classical, Computer, Games, Stop Motion and Internet Animators by Richard Williams
2. The Illusion of life Disney animation-Frank Thomas and Ollie Johnston.
3. Cartoon Animation by Preston Blair
4. Harold Whitakar

Course – BAST-303: DIGITAL ANIMATION

Course Objectives: Student will be able to

1. Study deep knowledge of digital storyboarding
2. Understand interface of ToonBoom Harmony with plug-in.
3. Understand key historical events of drawing painting.
4. Understand principles of animation.

Credits (Total Credits 2)	SEMESTER-III BAST-303 DIGITAL ANIMATION	No. of hours per unit/credits
UNIT - I	Introduction of Digital Storyboarding	(11)
	History of Storyboard-Composition with your picture frame- Working with Shapes-Rule of thirds- -Perspective-Foreground, Middle ground and Background- Character-Poses-Shape and movement of character-Aspect Ratio-Camera Shot-Screen direction-Advance storyboard technique-Character Model Sheet.	
UNIT - II	Interface Highlights	(11)
	Introduction of Toon boom Harmony 16.0, Project Creation- Creating Scenes, Scene Settings, User interface- Menus, Toolbars, Views, Workspaces, Interface Navigation.- Layers and Columns- Adding Layers and Columns, Deleting, Renaming, Locking, Unlocking and navigating layers, Clone and Duplicate layers, Grouping and ungrouping the layers. Timing- Scene Length, Exposure, Drawings, Scene Markers	
UNIT - III	Drawing & Painting	(12)
	Drawing Tools, Drawing Optimization, Strokes Conversion, Color Swatches, Palettes, Painting Drawings, Closing Gaps. Paperless Animation- Creating a Rough Animation, Paperless Animation Tools. Scene Staging- Layer Position, Transform Tool	
UNIT - IV	Exporting Digital Animation	(11)

	<p>Pegs, Key frames, Controls, Functions, Copying Motions, Velocity.</p> <p>Importing - Importing Bitmap Images, Importing a Multi-Layer PSD, Importing Vector Files, Importing QuickTime Movies.</p> <p>Camera Set-up and Animation- Adding a Camera, Positioning the Camera Frame, Animating the Camera ,Exporting and rendering project.</p>	
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Course outcomes: Student should be able to

1. Create Digital Storyboarding(storyline)
2. Create and rigged character for pre-production.
3. Create lip Synchronization and Motion Paths in ToonBoom.
4. Understand effects of ToonBoom for production.

References-

- 1) Professional Storyboarding: Rules of Thumb Sergio Paez, Anson Jew
- 2) Complete Book of Toon Boom
- 3) User Guide- ToonBoom Harmony 16.0.
- 4) Animate to Harmony: The Independent Animator's Guide to Toon Boom 1st Edition by Adam Phillips (Author)

Course – BAST-304: MULTIMEDIA ANIMATION

Course Objectives: Student will be able to

1. Study of multimedia and its types.
2. Study of Adobe CS6 user interface.
3. Understand tweens and articulated motions with inverse.
4. Understand post production and outputs.

Credits (Total Credits 2)	SEMESTER-III BAST-304 MULTIMEDIA ANIMATION	No. of hours per unit/credits
UNIT - I	Multimedia History	(11)
	History of Multimedia, Workspace, working with the Library Panel, Understanding the Timeline, Organizing Layers in a Timeline, Using the Properties Inspector, Using the Tools Panel Undoing Steps in Flash, Previewing Your Movie, Modifying the Content and Stage, Saving Your Movie Publishing Your Movie, Finding Resources for Using Flash, Checking for Updates	
UNIT - II	Interface and parameters	(11)
	Understanding Strokes and Fills ,Creating Shapes ,Making Selections, Editing Shapes, Using Gradient and Bitmap Fills , Making Patterns and Decorations, Creating Curves, Creating Transparencies, Creating and Editing Text, creating and editing symbol, Importing Illustrator Files ,About ,Creating Symbols, Importing Photoshop Files Editing and Managing Symbols, Changing the Size and Position of Instances, Changing the Color Effect of Instances, Understanding Display Options Applying Filters for Special Effects Positioning in 3D Space, Animation Understanding the Project File ,Animating Position ,Changing the Pacing and Timing Animating Transparency Animating Filters Changing the Path of the Motion, Swapping Tween Targets, Creating Nested Animation, Using the Motion Editor Easing ,Animating 3D Motion ,Testing Your Movie	
UNIT - III	Inverse Kinematics and constraint	(12)
	Testing Your Movie, Articulated Motion with Inverse Kinematics, Constraining Joints, Inverse Kinematics with Shapes ,Armature Options, Morphing with Shape Tweens, Using Shape Hints, Simulating Physics with Inverse Kinematics About Interactive Movies, Creating Buttons Understanding ActionScript 3.0, Preparing the Timeline	

	,Adding a Stop Action, Creating Event Handlers for Buttons, Creating Destination, Keyframes, Creating a Home Button with Code Snippets, Code Snippets Options, Playing Animation at the Destination, Animated Buttons ,Understanding TLF Text Adding Simple Text, Adding Multiple Columns	
UNIT - IV	Rendering in 2d	(11)
	Production and post production, Understanding the Project File, Using Sounds, Understanding Flash Video, Using Adobe Media Encoder, Understanding Encoding Options, Playback of External Video, Working with Video and Transparency, Using Cue Points, Loading External Content, Removing External Content, Controlling Movie Clips Creating Masks, Testing a Flash Document, Understanding Publishing, Publishing for the Web, Understanding the Bandwidth Profiler, Adding Metadata, Publishing a Desktop Application, Publishing for a Mobile Device, Keeping Organized with Projects	

Course outcomes: Student should be able to

1. Understand the recent version of flash cs (IK).
2. Create fundamentals particles and vertexes using interface.
3. Create rigging or grouping for professional animation
4. Understand concepts of multimedia technology for 2D animation production.

References-

1. Adobe Flash CS6 Digital Classroom-Fred Gerantabee and the AGI Creative Team (Anonymous)
2. Adobe ® Flash Professional CS5 – Todd Perkins – Wiley India
3. How To Cheat In Adobeflashcs6 The Art Of Design And Animation Chris Georgenes
4. Acting and Character Animation: The Art of Animated Films, Acting, and Visualizing- Rolf Giesen and Anna Khan

Course – BAST-305: VIDEO EDITING

Course Objectives: Student will be able to

1. Study of freeware editing software and recent tools with parameters.
2. Understand the fundamental concepts of video editing
3. Study of video techniques prevalent for industry.
4. Understand post production process using effect rack.

Credits (Total Credits 2)	SEMESTER-III BAST-305 VIDEO EDITING	No. of hours per unit/credits
UNIT - I	Workspace and workflows	(11)
	Introduction of Adobe Premiere, Interface of Adobe Premiere Working with Projects, Capturing and Importing Source Clips, Working with Panels, Tools panel and Options panel, Creating projects, Set preferences, Set Audio Hardware preferences, Working with Photoshop and Premiere Pro, Set up a Color workspace, Apply basic color correction, Adjust color using color correction curves	
UNIT - II	Importing footage into Premiere Pro	(11)
	Importing still images, Importing digital audio, Capturing and digitizing footage, Working with timecode, Editing sequences and clips in Premiere Pro, Rendering and previewing sequences, Multi-camera editing workflow, Working with markers, Create and play clips, Trimming clips, Freeze and hold frames, Working with captions, Graphics, titles, and Motion Graphics templates	
UNIT - III	Effects	(12)
	Fixed effects, Standard effects, Applying, removing, finding, and organizing effects, Viewing and adjusting effects and keyframes, Master Clip effects, Masking and tracking, Transition, Motion: position, scale, and rotate clips, Adjustment Layers, Color correction effects, Lighting Effects	

UNIT - IV	Transitions	(11)
	Audio effects and transitions, The rolling shutter repair effect, Video effects and transitions, Blur and Sharpen effects, Channel effects, Color Correction effects, Distort effects, Noise & Grain effects, Perspective effects, Animation and keyframes in Premiere Pro, Editing audio in Premiere Pro, Compositing in Premiere Pro.	

Course outcomes: Student should be able to

1. Create organize content and sequences for video editing.
2. Create advanced documentary.
3. Developed e-contain video for e-learning or IT industry.
4. Understand post for film making.

References-

1. Premiere pro reference
2. A Beginners Guide To Using Adobe Premiere Pro.
3. Premiere Pro for Filmmakers: 1 (The Digital Filmmaking Handbook Presents) : Sonja Schenk,3 March 2020
4. Learn Adobe Premiere Pro CC for Video Communication: Adobe Certified Associate Exam Preparation Second Edition, Joe Dockery/Rob Schwartz/Conrad Chavez, 8 May 2020

Course – BAST-306: SCULPTURING IN ANIMATION

Course Objectives: Student will be able to

1. Understand history of mudbox Sculpturing and interface.
2. Study digital painting and digital sculpting.
3. Understand high-performance environment.
4. Understand compelling concept designs with details.

Credits (Total Credits 2)	SEMESTER-III BAST-306 SCULPTURING IN ANIMATION	No. of hours per unit/credits
UNIT - I	Sculpturing Basic	(11)
	Introduction of mud box, Sculpting Concepts, Comparing Traditional and Digital Sculpting, Anatomy sculptures, Proportion and measurements, Form negative space and gesture, Expression and emotion in sculptures	
UNIT - II	Introduction to Mudbox	(11)
	Interface Overview, A 3D Primer, understanding 3D space, Polygon basics, Resolutions, UV Mapping, Digital Images, Mudbox hotkeys, setting up the scene, Selecting and scaling the model, Creating Layer and Subdividing, Sculpting detail.	
UNIT - III	Working with Tools	(12)
	Sculpting a portrait bust, sculpting a Likeness, changing proportion, Refine the shapes, Facial Expression, Setting up reference sketch, Adding Camera and Bookmark, Sculpting with negative space, Sculpting a figure, Anatomy Primer	
UNIT - IV	Texturing with Mudbox	(11)
	Painting Sculptures, UV Mapping, The Paint Tools, Paint Layers, Painting the Creature, Creating Basic Skin, Viewport Rendering, Creating Displacement Maps , Normal Maps, Displacement Maps, Extracting Displacement Maps, Exporting a Low-Resolution Model, Applying Mudbox Displacement Maps.	

Course outcomes: Student should be able to

- 1) Create highly detailed 3D models..
- 2) Create sculpting and production-level texture painting programs.
- 3) Create sculpting and texture.
- 4) Create the Architectural model, games models for e-learning companies

References-

- 1) Mudbox Bible – by Kelly L. Murdock
- 2) Mastering Autodesk 3ds Mudbox -by Jeffrey M. Harper
- 3) 3Ds Mudbox - by Boughen, Nicholas

ANIMATION SCIENCE LAB- IX (BASP-307)

(BAST – 301 + BAST – 302)

Cinematography + Principals of Animation

Course Objectives: Student will be able to

1. Understand camera and its props.
2. Study difference between normal video shoots and Cinematographic video shooting position.
3. Understand different animation techniques based on style, requirements and advantages.
4. Study of animation principles for 2D animation.

Credits (Total Credit 04)	SEMESTER-III ANIMATION SCIENCE LAB- IX (BASP-307) (BAST – 301 + BAST – 302) Cinematography + Principals of Animation	No. of hours per unit/credits
Group-I	<ol style="list-style-type: none">1. Different types of Camera mounts & heads.2. Different types of camera movement.3. Camera lens - different types & properties of lenses.4. Differences between a Digital & Analogue image. Digital & Analogue Image formation theory.5. Different types of shots used in cinematography/videography.6. Colour filters: Use of colour filters in Cinematography.7. Different types of shooting formats and aspect ratio (RAW, 2k, 4k, JPEG etc).8. Colour Correction, Principles of colour correction.9. Basic use of lighting in Cinematography. Principles of different types of lights used in10. Use of light balancing and colour conversion filters in Cinematography. Colour temperature11. Different types of lighting.12. Shooting Assignment – Digital Cinematography	4
Group-II	<ol style="list-style-type: none">1. Animating bouncing ball using squash and Stretch principle of animation2. Animating Jumping character animation by using Anticipation3. Animate follow through and overlapping principle of Animation.4. Animate Ease-In and Ease-Out Principle of Animation by using Wheel.5. Create Exaggeration principle of animation.	4

	<ol style="list-style-type: none"> 6. Animate Arc principle of Animation by using Pendulum. 7. Create a scene setup design by using Staging principle of animation. 8. Animate Straight ahead and pose to pose principle of Animation. 9. Animate Secondary action principle of Animation 10. Animate Timing principle of Animation by using lip sync. 11. Solid drawing principle of Animation. 12. Create and Render scene by using principle of animation 	
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Course outcomes-Students should be able to

- 1) Understand experimental and manipulative techniques using of documentary photography.
- 2) Understand visual forms and their aesthetic functions designs.
- 3) Create production animation using 12 principles of animation.
- 4) Create character 'walk cycle'.

References-

1. Cinematography -second edition- blain brown
2. Digital Cinematography: Fundamentals, Tools, Techniques, and Workflows – David Stump, Asc
3. Cinematography Techniques: The Different Types of Shots in Film - By Timothy Heiderich
4. The Filmmaker’s Guide to Digital Imaging – blain brown
5. The Illusion of life Disney animation-Frank Thomas and Ollie Johnston.
6. Cartoon Animation by Preston Blair

ANIMATION SCIENCE LAB- X (BASP-308)
(BAST – 303 + BAST – 304)

Digital Animation + Multimedia Animation

Course Objectives: Student will be able to

1. Study different animation techniques based on style, requirements and advantages.
2. Study animation principles for 2D animation.
3. Understand tweens and articulated motions with inverse kinematics.
4. Understand professional flash multimedia movies and web-friendly Movies.

Credits (Total Credit 04)	SEMESTER-III ANIMATION SCIENCE LAB- X (BASP-308) (BAST – 303 + BAST – 304) Digital Animation + Multimedia Animation	No. of hours per unit/credi ts
Group-I	<ol style="list-style-type: none"> 1. The Drawing View- Drawing Basic Objects/Scenes in Toon boom. 2. Creating an object using he Drawing Tools. 3. Working with Layers and Columns. 4. Tracing character in ToonBoom using Shift and Trace. 5. How to Make a Cartoon in ToonBoom. 6. Creating an object using digital animation and importing it. 7. Creating In-between Key poses- Key Frames vs. Drawings. 8. Animating Organic Objects. 9. Animating inorganic Objects ToonBoom. 10. Frame-By-Frame Rough Animation. 11. Animate Walk Cycles in ToonBoom. 12. Creating Effect in Toonboom. 13. Cut out puppet animation in ToonBoom. 14. Motion Path animation in ToonBoom. 15. Rendering Some Animation Scenes. 	4
Group-II	<ol style="list-style-type: none"> 1. Animate bouncing ball using Adobe Flash CS6. 2. Animating flag by using Adobe Flash CS6. 3. Grapping/Rigging character by using Adobe flash CS6. 4. Digital layout design by using Adobe Flash Cs6. 5. Animating Human walk cycle by using Adobe Flash CS6. 6. Animating Animal walk cycle by using Adobe Flash CS6. 7. Animating Human Run cycle by using Adobe Flash CS6. 8. Animating Animal Run cycle by using Adobe Flash CS6. 9. Creating advance action animation by using Adobe Flash CS6. 10. Render scene with bg and character animation. 	4

Course outcomes-Students should be able to

1. Understand ToonBoom studio 8.1 with new features.
2. Create drawing effects using ToonBoom effect rack.
3. Create Storyboarding and produced 2D animation
4. Create Advanced multimedia animation and animate digital content Adobe FlashCS6.

References-

1. Complete Book of ToonBoom
2. User Guide- ToonBoom Harmony 16.0.
3. Animate to Harmony: The Independent Animator's Guide to Toon Boom 1st Edition
4. Adobe Flash CS6 Digital Classroom-Fred Gerantabee and the AGI Creative Team
5. Adobe ® Flash Professional CS5 – Todd Perkins – Wiley India

ANIMATION SCIENCE LAB- X (BASP-309)
(BAST – 305 + BAST – 306)

Video Editing + Sculpturing in Animation

Course Objectives: Student will be able to

1. Study of video editing software and related tools.
2. Study of the fundamental concepts of digital video and types of formats.
3. Understand 3D digital artwork for production.
4. Understand highly realistic 3D characters, engaging environments, detailed props and architectural animation.

Credits (Total Credit 04)	SEMESTER-III ANIMATION SCIENCE LAB- XI (BASP-309) (BAST – 305 + BAST – 306) Video Editing + Sculpturing in Animation	No. of hours per unit/credi ts
Group-I	<ol style="list-style-type: none"> 1. Importing / Capturing Clips. 2. Basic Time line Editing. 3. Color Corrections. 4. Multicam Editing. 5. Audio Editing. 6. Video Editing 7. Exporting. 8. Adding Markers. 9. Adding Effects 10. Adding Transitions 11. Mixing Audio. 12. Creating Titles in Adobe Premiere Pro. 13. Animating a Clip in Adobe Premiere Pro. 14. Export / Render Video setting in Adobe Premiere Pro. 	4
Group-II	<ol style="list-style-type: none"> 1. Creating Basic object in mudbox. 2. Creating Game Weapons in Maya and Mud box. 3. Creating environmental background in Maya and Mud box. 4. Dynamic Tessellation. 5. Map Extraction. 6. Creating organic object (Human) 7. Creating organic object (Animal) 8. HEAD and FACE sculpting, detailing, and painting tutorial. 9. Creating organic object (Car) 10. Preparing a Mesh for Multiple UV Tile Painting in Mud box. 	4

Course outcomes- Students should be able to

1. Understand installation and settings of Adobe Premiere.
2. Understand content and sequences of images.
3. Create highly detailed 3d. Models.
4. Create digital sculpting and texture painting.

References-

1. Premiere_pro_reference
2. A Beginners Guide To Using Adobe PremierePro.
3. Mudbox Bible – by Kelly L. Murdock
4. Mastering Autodesk 3ds Mudbox -by Jeffrey M. Harper
5. 3Ds Mudbox - by Boughen, Nicholas

Semester – IV

Course – BAST-401:3D MAX ANIMATION

Course Objectives: Student will be able to

1. Study of animation pipeline including pre-visualization and rendering.
2. Understand interior and exterior design for architectural animation.
3. Understand 3ds Max unmatched in speed and simplicity.
4. Understand classic models for production technology.

Credits (Total Credits 2)	SEMESTER-IV BAST-401 3D MAX ANIMATION	No. of hours per unit/credits
UNIT - I	Interface & Modelling	(11)
	Navigate the workspace, Touring the Interface, The Menu Bar, The Quick Access Toolbar, The Information Centre Toolbar, The Main Toolbar, Docked and Floating Toolbars, Toolbar Flouts, 15 The Viewports, Tools for Working with the Viewports, Getting to Know the Command Panel, Understanding the 3ds Max Tools, transform objects using gizmos, Use the Graphite Modelling Tools set, Use the command panel, Use the time slider and track bar, Manage files, Character Modelling, Setting Up the Scene, Creating the Image Planes, Blocking Out the Alien Model, Create the alien head, Refine the alien body, Create the alien hands, Create the alien feet, Complete the alien	
UNIT - II	Texturing & Dynamics	(11)
	Navigate the Slate Material Editor, Identify the Standard material, Identify the mental ray material, Identify shaders, Build materials for the couch, Build materials for the lounge chair, Build materials for the windows, Define UVs on the alien's body, Unwrap UVs from the alien's body , Build the material and apply it to the alien, Create static, dynamic, and kinematic rigid bodies, Understand the Mass FX interface, Use the mCloth modifier, Understand constraints, Use standard helper objects, Use atmospheric apparatus helper objects	
UNIT - III	Rigging & Animation	(12)
	Utilize the Character Studio workflow, Associate a biped with the alien model, Skin the alien model, Work with the time slider, Use animation playback controls, Use animation and time controls, Morph compound object, Render and preview an	

	animation, Apply various rendering effects to a scene, Animate the alien, Use freeform animation, Modify animating using the Dope Sheet	
UNIT - IV	Lighting & Rendering	(11)
	Recognize 3ds Max lights, Light a still life, Select shadow types Advanced Ray Traced, mental ray shadow map, Area shadows, Shadow map, Ray Traced shadows, Create atmospheres and effects, Utilize the Light Lister tool, Standard Lights, Target spotlight, Target direct light, Free spotlight, Free direct light, Omni light Skylight, mr area omni light, mr area spotlight, Navigate the Render Setup dialog, Render a scene, Work with cameras, Raytrace reflections and refractions, Render the interior and furniture	

Course outcomes: Student should be able to

1. Create 3D Interior or exterior modelling.
2. Create bone rig and constraint.
3. Understand the production camera parameters.
4. Create render scene.

References-

- 1) Mastering Autodesk® 3ds Max® 2013: Jeffrey M. Harper
- 2) AUTODESK® 3DS MAX® 2016 ESSENTIALS: Randi L. Derakhshani, DariushDerakhshani
- 3) AUTODESK 3DS MAX 2016 A COMPREHENSIVE GUIDE: Sham Tickoo
- 4) Autodesk® 3ds Max® 2014 BIBLE: Kelly L. Murdock

Course – BAST-402: ANIMATION SCRIPTING LANGUAGE

Course Objectives: Student will be able to

1. Understand knowledge of Python language.
2. Study logics for program applications in Python.
3. Study basic programming constructs.
4. Understand problem-solving methods for programming.

Credits (Total Credits 2)	SEMESTER-IV BAST-402 ANIMATION SCRIPTING LANGUAGE (PYTHON)	No. of hours per unit/credits
UNIT - I	Introduction	(11)
	Python – Overview, History of Python, Python Features, Installing Python, Setting path at Windows, Python Environment Variables, Python Identifiers, Python Keywords, Comments in Python, PYTHON – VARIABLE TYPES, Standard Data Types.	
UNIT - II	Operators	(11)
	Python Numbers, Strings, Lists, Tuples, Dictionary, Data Type Conversion and PYTHON – BASIC OPERATORS, Types of Operators: Arithmetic Operators, Comparison Operators, Assignment Operators, Bitwise Operators, Logical Operators, Membership Operators, Identity Operators, Operators Precedence.	
UNIT - III	Control Structure	(12)
	PYTHON – DECISION MAKING, If Statement, If...else Statement, The elif Statement, PYTHON – LOOPS: While Loop, The Infinite Loop, Using else Statement with Loops, For Loop, Nested Loops, Break Statement, Continue Statement	
UNIT - IV	String Operations	(11)
	PYTHON – NUMBERS: Number Type Conversion, Random Number Functions, Trigonometric Functions, Mathematical Constants, PYTHON – STRINGS: Accessing Values in Strings, Escape Characters, String Formatting Operator, Built-in String Methods, PYTHON – LISTS: Accessing Values in Lists, Basic List Operations, Indexing, Slicing, and Matrixes, Built-in List Functions and Methods	

Course outcomes: Student should be able to

1. Understand Python scripting language for developers.
2. Create design and program for Python applications.
3. Demonstrate the principles of Python programming language.
4. Create strings in Python programming language.

References-

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation www.python.org 2010
3. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
4. Martin C. Brown, Python: The Complete Reference

Course – BAST-403:3D MAYA ANIMATION

Course Objectives: Student will be able to

1. Understand construction of scene from photographic reference techniques.
2. Understand UV maps and simple textures materials for hard-surface objects.
3. Study critique polygonal modelling projects based on skills and concepts.
4. Understand independent objects modelling projects pipeline.

Credits (Total Credits 2)	SEMESTER-IV BAST-403 3D MAYA ANIMATION	No. of hours per unit/credits
UNIT - I	Working With Interface	(11)
	Introduction of 3D Maya, Maya interface, Controlling viewports, Working with files, Managing Scene, File and Project, Import and Export file, Creating and editing objects, Selecting objects and using layers, Hard-Surface Modeling, Understanding polygon geometry.	
UNIT - II	Modelling with Maya	(11)
	Polygon Modelling, Polygon Primitives, NURBS Modelling, Understand NURBS surfaces, understand subdivision surfaces, employ image planes Model with NURBS surfaces, Model with polygons, Organic modelling, implement box modelling, employ build- out modelling, Sculpt polygons, Use retopology tools, Sculpting.	
UNIT - III	Texturing with Maya	(12)
	Texture Mapping, Create UV texture coordinates, Type of Mapping, UV sets, UV References, UV editor, Creating UV shells, working with UVs set, Work with bump, normal, and displacement maps Create a subsurface scattering layering shader	
UNIT - IV	Lighting and Shading with Maya	(11)
	Basic of Lighting, Type of Light, Absorption, reflection, and refraction of light, Set up direct lighting source, modifying light, Adjust Lighting, Shadow in Maya Lighting with mental ray, Use shadow-casting lights, Render with global illumination Render with Final Gathering, Use image-based lighting, Render using the Physical Sun and Sky network Understand mental ray area lights	

Course outcomes: Student should be able to

1. Create hard- surface based and organic polygonal objects for animation media.
2. Create low-polygon model texture for game engine.
3. Create organic looking 3D objects.
4. Develop 3D professional scene.

References-

1. Autodesk Maya 2020 BASICS GUIDE-Kelly L. Murdock-Chapter 01
2. Learning Maya - Stanford Graphics Lab
3. Autodesk Maya 2017 comprehensive guide-Sham Tickoo, Purdue University Northwest, US

Course – BAST-404: VFX

Course Objectives: Student will be able to

1. Understand Visual effects and moving images.
2. Understand production programme and comprehensive picture of the VFX production
3. Study of visual effects of adobe after effect.
4. Understand 3D visualization and digital compositing.

Credits (Total Credits 2)	SEMESTER-IV BAST-404 VFX	No. of hours per unit/credits
UNIT - I	Interface	(11)
	Workspaces, panels, viewers, Projects and compositions, importing footage, working with footage items, Views and previews, Layers and properties, Cameras, lights, points of interest.	
UNIT - II	Effects	(11)
	Animation and keyframes, Apply immersive video effects, Construct VR environments in After Effects, Setting, selecting, and deleting keyframes, Keyframe interpolation, Speed	
UNIT - III	3D Tracking	(12)
	Tracking 3D camera movement, Animating with Puppet tools, Color basics, Drawing, painting, and paths, Managing and animating shape paths and masks, Mask Reference.	
UNIT - IV	Rendering	(11)
	Creating and editing text layers, Extruding text and shape layers, Transparency and compositing, Keying, Roto Brush, Refine Edge, Refine Matte effects, Markers, Basics of rendering and exporting.	

Course outcomes: Student should be able to

1. Understand Adobe After Effects and video creations.
2. Understand text, shape layers and basic animation.
3. Understand roto brush and its attribute.
4. Create mattes with extract 3D objects.

References-

1. Adobe After Effect CLASSROOM IN ABOOK
2. ADOBE AFTER EFFECTS Help and tutorials
3. Getting Started with Adobe After Effects Creative Cloud 2015 –Windows
4. Hands-On Motion Graphics with Adobe After Effects CC, Dodds David.

Course – BAST-405: IPR AND CYBER SECURITY

Course Objectives: Student will be able to

1. Understand digital evidence investigative tools and capture images.
2. Understand the types of offences investigated and enabled by digital devices,
3. Study of computer crime and determine the rights and responsibilities of parties.
4. Study of Network Surveillance tools.

Credits (Total Credits 2)	SEMESTER-IV BAST-405 IPR AND CYBER SECURITY	No. of hours per unit/credits
UNIT - I	Cybercrime & Internet	(11)
	Introduction. Types Of Cybercrimes, Frauds – ATM Frauds, Wire Frauds, Piracy, Child Pornography, Hacking, File Sharing. Computer Viruses & Denial of Services.	
UNIT - II	Hackers, Crackers & IPR	(11)
	Introduction & Definition, Classification, Software and Prevention, Ethics and Principles, Study About – Trojan Horse, Computer Worm, Spoofing, Phishing, Packet Sniffing. Study About IPR [Intellectual Property Rights & its principles.	
UNIT - III	Cyber-frauds, Scams & Corns	(12)
	Introduction on Cyber Frauds. Internet Fraud, Purchase Fraud, Online Automotive Fraud, PayPal Fraud. Online Option and Retail Schemes, Business or “Work from Home” Scheme, Money Transfer Frauds, Dating & charity Frauds. Internet Marketing & Retail Frauds.	
UNIT - IV	Surveillance, Piracy & Crime Control	(11)
	Introduction & definition. Different types and Category of Piracy. Study of Computer and Network Surveillance, corporate Surveillance & Malicious Software’s, Internet Privacy – Levels of Piracy, Risks to the internet privacy & Cookies, Crime Control – Concerns of Internet Privacy & Real-life Implications, Laws & Regulations. Study About the threats and IT ACTs	

Course outcomes: Student should be able to

1. Understand the impact of computer crime on government, businesses and consumers.
2. Demonstrate the information and data of value to an investigation
3. Apply the impact of computer crime and electronic device crime.
4. Understand the digital evidence precaution.

References-

- 1) Varun Bharatvaj – Global Security & Crime control
- 2) McQuade S – Understanding & Managing Computer Crimes.
- 3) Walden – Computer Crimes & Digital Investigation

Course – BAST-406: GAME DESIGN

Course Objectives: Student will be able to

1. Understand complex game API software environment with Object-Oriented Programming skills
2. Study of innovative ideas and technics for game designing.
3. Understand principles guiding visual, audio.
4. Study of foundational theories and approaches.

Credits (Total Credits 2)	SEMESTER-IV BAST-406 GAME DESIGN (UNITY)	No. of hours per unit/credits
UNIT - I	Introduction	(11)
	Introduction of Unity, Unity Project, Unity Projects, Assets, and Scenes, Assets and Project Files Navigating Scenes and Viewports.	
UNIT - II	Scripting	(11)
	Game Objects, Transforms, and Components Cameras, Scripting and the Unity API, Performance, Profiling, and the Stats Panel	
UNIT - III	Materials and Textures	(12)
	Materials and Textures, Mesh Renderers, Shaders, Materials for 2D Games, Method 1: Use White Ambient Light Method 2: Use Light-Immune Shaders	
UNIT - IV	2 Dimensions	(11)
	Creating Textures Power-2 Dimensions, Retain Quality, Expand Alpha Channels for Transparency	

Course outcomes: Student should be able to

1. Understand the scripting of game designing.
2. Understand the materials for 2d games..
3. Apply the process of building the game for publication
4. Create basic game props and environment scene.

References-

1. Unity Cookbook – ISEC
2. Unity in Action: Multiplatform
3. Unity Game Development (Sams Tech)
4. Unity manualhelp center

ANIMATION SCIENCE LAB- XII (BASP-407)

(BAST – 401 + BAST – 402)

3D Max Animation + Animation Scripting Language

Course Objectives: Student will be able to

1. Understand connections between theory and applications.
2. Understand materials, Adjust basic lighting and Animate build with effective environments.
3. Understand 3D array and features tools.
4. Study fundamental programming construction and functions.

Credits (Total Credit 04)	SEMESTER-IV ANIMATION SCIENCE LAB- XI (BASP-407) (BAST – 401 + BAST – 402) 3D Max Animation + Animation Scripting Language	No. of hours per unit/credi ts
Group-I	<ol style="list-style-type: none">1. How to Model a Mug in 3DS Max.2. Modelling Flower Vase using various tools in 3d max.3. Orange fruit modelling and texturing tutorial 3ds max.4. Creating Textures with the Viewport Canvas.5. Human Character Rigging on Max /Manual Bone Setup + Controls.6. Rigging Dino-Bird (Main Body) - 3ds Max CAT Rigging.7. Slice Loop Animation.8. Create 3ds max mental ray interior lighting.9. How to Render Realistic Scene.10. Very Basic V Ray Render Settings for 3ds max.	4
Group-II	<ol style="list-style-type: none">1. Write Python program to add two numbers2. Write Maximum of two numbers in Python3. Write Python Program for factorial of a number4. Write Python Program for simple interest5. Write Python Program for compound interest6. Write Python Program to check Armstrong Number7. Write Python Program for Program to find area of a circle8. Write Python program to check if a string is palindrome or not9. Write Python program to check whether the string is Symmetrical or Palindrome.10. Write Python program Reverse words in a given String.11. Write Python program Ways to remove i'th character from string.12. Write Python Check if a Substring is Present in a Given String13. Write Python program to interchange first and last elements in a list14. Write Python program to swap two elements in a list	4

	15. Write Python Ways to find length of list	
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Course outcomes-Students should be able to

1. Understand compound objects Modelling.
2. Create Animation of crowd using Populate Tool.
3. Create Walk – through HD Architectural Renders.
4. Create and develop programs.

References-

1. Mastering Autodesk 3ds Max-by Jeffrey M. Harper
2. 3Ds Max Lighting- by Boughen, Nicholas
3. 3Ds Max Bible –by Kelly L. Murdock
4. 3Ds Max Lighting- by Boughen, Nicholas
5. T. Budd, Exploring Python, TMH, 1st Ed, 2011
6. Python Tutorial/Documentation www.python.org 2010
7. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python, Freely available online.2012

ANIMATION SCIENCE LAB- XIII (BASP-408)
(BAST – 403 + BAST – 404)

3D Maya Animation + VFX (Adobe After Effect)

Course Objectives: Student will be able to

1. Understand 3D modelling techniques and complete scene of photographic reference.
2. Study textures and materials on hard-surface objects.
3. Study polygonal modelling and concepts.
4. Understand independent objects modelling projects.

Credits (Total Credit 04)	SEMESTER-IV ANIMATION SCIENCE LAB- XI (BASP-408) (BAST – 403 + BAST – 404) 3D Maya Animation + VFX	No. of hours per unit/credi ts
Group-I	<ol style="list-style-type: none"> 1. Create basketball using Subdivision 2. Create a screw-driver and render it. 3. Create basic Boolean object using polygon modelling. 4. Modelling and texturing-a-photorealistic- charger us cable with Maya and mental ray 5. Modelling Organic character (ToyDragonfly) 6. Modelling Organic character(human) 7. Create and texture galaxy with light effect 8. Texturing human character with props 9. Create and texture architecture models with light effect 10. Create and texture Mechanical models 11. Texture UV Mapping on car with Slandered light effect 12. Photoshop texturing for Maya models and animation. 	4
Group-II	<ol style="list-style-type: none"> 1. Work with Composition in After Effect. 2. Create and Animate Text in After Effect. 3. Build Custom Transition in After Effect. 4. Create custom Glitch Effect in After Effect. 5. Create Visual Effects in After Effect. 6. Create Animated Background in After Effect. 7. Select and Animate Layers in After Effect. 8. Work with 3D in After Effect. 9. Add Text with Formatting and Effects in After Effect. 10. Create Animated Sun Rays in After Effect. 11. Create a Photo Montage with After Effects 12. Create Wispy Spirit-like Text in After Effect. 13. Create Energetic Titles in After Effect. 	4

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| | 14. Create 3D Light Casting in After Effect.
15. Create Shatter Effect in After Effect. | |
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Course outcomes-Students should be able to

1. Understand hard-surface based organic based tools and techniques for media animation
2. Create fully texture a low-polygon model for game engine.
3. Create organic looking 3Dobjects.
4. Create 3D scene.

References-

1. Learning Maya - Stanford Graphics Lab
2. Autodesk Maya 2017 comprehensive guide-Sham Tickoo, Purdue University Northwest, USA.
3. Adobe After Effect CLASSROOM IN ABOOK
- 4.ADOBE AFTER EFFECTS Help and tutorials

ANIMATION SCIENCE LAB- XIV (BASP-409)
(BAST – 405 + BAST – 406)

IPR and Cyber Security + Game Design

Course Objectives: Student will be able to

1. Study of digital evidence investigative tools.
2. Understand the types of offences investigation.
3. Understand the computer crime and determine the rights and responsibilities of parties.
4. Learn the procedure of collecting, packaging or storing digital evidence.

Credits (Total Credit 04)	SEMESTER-IV ANIMATION SCIENCE LAB- XI (BASP-409) (BAST – 405 + BAST – 406) IPR and Cyber Security + Game Design	No. of hours per unit/credi ts
Group-I	<ol style="list-style-type: none"> 1. Study on cybercrime. (Definitions, Types & Example). 2. Study on Different types of computer viruses. 3. Study on classification on Cybercrimes. 4. Study on software & Ethics & Principle. 5. Study on- 1. Computer Worms <ul style="list-style-type: none"> • Spoofing. • Phishing • Packet Sniffing. 6. Study on Cyber Frauds & Schemes. 7. Study on Malicious software. 8. Study on crime control technique. 9. Study on crime control techniques. 10. Study on IT acts. 	4
Group-II	<ol style="list-style-type: none"> 1. Import character with mesh. 2. Creating Basic object 3. Create props for game design character 4. Create a Scene in Unity. 5. Create a Scene in Unity. 6. Animations in Unity 7. Creating environmental background 8. Map Extraction 9. Particle Systems and Rigid Body Simulation in Unity. 10. Character Animation and Simulation 11. Preparing A Mesh For Multiple UV Tile Painting in Mudbox 	4

Course outcomes-Students should be able to

1. Understand the impact of computer crime.
2. Demonstrate the information and data of value transmitted by electronic device.
3. Understand the information and data of value to an investigation.
4. Apply the collecting, packaging and storing the digital evidence.

References-

- 1) Varun Bharatvaj – Global Security & Crime contro
- 2) McQuade S – Understanding & Managing Computer Crimes.
- 3) Walden – Computer Crimes & Digital Investigation