Maulana Abul Kalam Azad University of Technology, West Bengal

Syllabus of B.Sc.in VFX Film Making (CBCS)

Effective from academic session 2021-222

SEMESTER-3

Paper: CLAY MODELLING & CG MODELLING

Code: BVFM 301

Course Objective: Here the students would learn the techniques and tools that can help you approach modelling nearly any shape with confidence. They would learn basics such as selecting and manipulating objects, organizing scenes, and customizing the interface. Next, review polygonal modelling, creating and refining meshes, sculpting, and NURBS modelling. It starts with an overview of modeling basics, before moving on to creating some specific models of a chair, a side table, and several other small room objects like walls, floors, books, bookshelves, and picture frames. Finally, he puts the whole room together by cleaning up all the files, importing the individual files into a single file, and adding the final camera shot, creating a toon character etc.

Course Outcome	Mapped modules
Remembering	M1, M2, M3, M4
Understanding the course	M1, M2, M3, M4
Applying the general problem	M1, M2
Analyse the problems	M4
Evaluate the problems after analysing	M3, M4
Create using the evaluation process	M3, M4

Module Number	Content	Total Hours	%age of questions	Blooms Level (if applicable)	Remarks (If any)
M 1	**Clay Modeling & Introduction about the 3D software**	6	25		
M 2	**Polygonal Modelling**	7	25		
M 3	**NURBS Modelling**	7	25		
M 4	**Sub Division Modelling**	10	25		

		30	**100**		

CLAY MODELLING & CG MODELLING

Total Credit: 4

Total hours of lectures: 30 hours

Sl.	Topic/Module	Hour
1.	**Module 1- Clay Modeling & Introduction about the 3D Enviornment** • Focuses on modelling characters with different types of clay. Clay models are used to improve visualization while modelling 3D digital characters. Use overlaying modelling to feel and understand the anatomy, proportions and depth of the model. • Maya Introduction and Interface – Difference between World, Local and Object Co-ordinate system • Knowing about file importing, exporting and execution and applying references to the files. • Creating a project file in Maya	6
2.	**Module 2- Polygonal Modelling** • Concepts, Advantages and Disadvantages of Poly modelling, • Creating polygon primitive objects • Polygon components and menu • Booleans, Combining and separating polygons • Building and Editing Poly models • Splitting and sub-dividing polygons • Extruding polygons, Merging vertices, Bevel • Sculpt Polygon • Maya Node System and Linking, Grouping.(Parenting and unparenting)	7
3.	**Module 3- NURBS Modelling** • Concepts, ,Advantages and Disadvantages of Poly modelling • Creating NURBS primitive objects, Creating NURBS curves • NURBS components, Editing NURBS surfaces • Lofting and extruding curves to create surfaces, attaching and detaching surfaces • Revolving, attaching and detaching curves, • Socking • Stitching surfaces	7

4.	**Module 4- Sub Division Modelling** • Concepts • Converting polygon to Sub-D, Sub-D commands • Topology • Hierarchy • Mirror,attach • Clean up of model files • Finalizing model	10

Suggested Software – Autodesk Maya

Suggested Reading:

1. Autodesk Maya 2018 by Ticked Sham
2. Mastering Autodesk Maya 2017 by Eric Keller.
3. Introducing Maya 2017 by Dariush Derakhshani.
4. Maya 8 Character Modeling by Gary Oliverio, Jones and Bartlett Publishers, 2006
5. Advanced Maya: Character Modeling by Kenny Cooper and Jim Lammers, Trinity Animation, Inc.2003
6. Jason Patnode, Character Modeling with Maya and ZBrush: Professional polygonal modeling techniques, Focal Press; Pap/Dvdr edition, 2008

Paper: CLAY MODELLING & CG MODELLING Lab

Code: BVFM 391

Course Objective:

- To gain good knowledge to create 3d character modeling.
- To apply experimental production techniques to animation and game creation

Course Outcome	**Mapped modules**
Remembering	M1, M2, M3, M4
Understanding the course	M1, M2, M3, M4
Applying the general problem	M1, M2
Analyse the problems	M4
Evaluate the problems after analysing	M3, M4
Create using the evaluation process	M3, M4

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Module Number	Content	Total Hours	%age of questions	Blooms Level (if applicable)	Remarks (If any)
M 1	**Clay Modeling & Introduction about the 3D software**	6	40		
M 2	**Polygonal Modelling**	12			
M 3	**NURBS Modelling**	12	40		
M 4	**Sub Division Modelling**	10			
		40	**100**		

CLAY MODELLING & CG MODELLING Lab

Total Credit: 2

Total hours of lectures: 40 hours

Sl.	Topic/Module	Hour
1.	**Module 1- Clay Modelling** • Hands on sessions modelling objects with clay • Creating small models from polymer clay, • Learning the art of sculpting • Showing video tutorial about Maya introduction and interface.	6
2.	**Module 2- Polygon modeling** • Making an exterior - landscape, garden, cityscapes, monuments, bridges, fences, • Modelling interiors (different kinds and styles of rooms)	12
3.	**Module 3- Nurbs modeling** • Creating bathroom/living room/ kitchen with props – as table , vase etc. • Creating an oil can using sub-D •	12
4.	**Module 4- Toon character** • Modelling a toon character/human/4 legged	10

Suggested Software – Autodesk Maya

Suggested Reading:

7. Autodesk Maya 2018 by Ticked Sham
8. Mastering Autodesk Maya 2017 by Eric Keller.
9. Introducing Maya 2017 by Dariush Derakhshani.
10. Maya 8 Character Modeling by Gary Oliverio, Jones and Bartlett Publishers, 2006
11. Advanced Maya: Character Modeling by Kenny Cooper and Jim Lammers, Trinity Animation, Inc.2003
12. Jason Patnode, Character Modeling with Maya and ZBrush: Professional polygonal modeling techniques, Focal Press; Pap/Dvdr edition, 2008

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Syllabus of B.Sc.in VFX Film Making (CBCS)

Effective from academic session 2021-222

Paper: TEXTURING

Code: BVFM 302

Course Objective: This course will focus on learning the UV Basics, tiling textures, Scaling Texture, creating bump, specular, and normal maps. The learning will also be based on image manipulation features in Photoshop to build 3D textures and then moving to Substance Painter, which is widely used in studios. The course would emphasise on creating procedural textures that are applied back in Maya. The course provides hands-on practice and a solid workflow that will help you texture almost any object you encounter in the future.

Course Outcome	**Mapped modules**
Remembering	M1, M2, M3, M4
Understanding the course	M1, M2, M3, M4
Applying the general problem	M1, M2
Analyse the problems	M4
Evaluate the problems after analysing	M3, M4
Create using the evaluation process	M3, M4

Module Number	**Content**	**Total Hours**	**%age of questions**	**Blooms Level (if applicable)**	**Remarks (If any)**
M 1	**Material and Shaders**	8	25		
M 2	**UV s**	4	25		
M 3	**Texturing using Photoshop**	6	25		
M 4	**Texturing using Substance Painter**	12	25		
		30	**100**		

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Syllabus of B.Sc.in VFX Film Making (CBCS)

Effective from academic session 2021-222

TEXTURING

Total Credit: 4

Total hours of lectures: 30 hours

Sl.	Topic/Module	Hour
1.	**Module 1- Material and Shaders** • Overview of Maya Rendering • Introduction to hypershade • Understanding the basic shader types • Work with Arnold materials • Opacity and Refraction in Arnold • Create and apply maps • Using bitmaps as textures • Working with hypershade window • Create materials in hypershade	8
2.	**Module 2- UV s** **Module 2- UV s** • UV Mapping Techniques- Understanding UV's, editing UV's and using mapping projections on polygon surfaces, planer mapping, cylindrical mapping, spherical mapping, automatic mapping, working with UV texture editor window • UNWRAPPING UV'S- Understanding unwrapping, unwrapping props and characters to facilitate texture painting, relaxing and unfolding UV's, split UV's, creating UV sets	4
3.	**Module 3- Texturing using Photoshop** • Creating Textures in photoshop • Review Reference Materials • Tile Textures • Creating maps – Bump, Diffuse, Specular, Normal.	6
4.	**Module 4- Texturing using Substance Painter** • Interface & Creating a project • Baking Maps/Textures • Creating & Applying Material • Modifying Channels • Using the Transform tools,Projection modes and Anchors • Using the painting tools • Working with layer effects • Rendering and Exporting Textures • Applying textures from Substance to Maya	12

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Suggested Software – Autodesk Maya
Adobe Photoshop
Substance Painter

Suggested Reading:

1. Autodesk Maya 2018 by Ticked Sham
2. Mastering Autodesk Maya 2017 by Eric Keller.
3. Introducing Maya 2017 by Dariush Derakhshani.
4. Beginning PBR Texturing: Learn Physically Based Rendering with Allegorithmic's Substance Painter – Abhishek Kumar
5. Advanced Maya Texturing and Lighting – Lee Lanier

Paper: TEXTURING Lab

Code: BVFM 392

Course Objective: This course will focus on learning the UV Basics, tiling textures, Scaling Texture, creating bump, specular, and normal maps. The learning will also be based on image manipulation features in Photoshop to build 3D textures and then moving to Substance Painter, which is widely used in studios. The course would emphasise on creating procedural textures that are applied back in Maya. The course provides hands-on practice and a solid workflow that will help you texture almost any object you encounter in the future.

Course Outcome	Mapped modules
Remembering	M1, M2, M3, M4
Understanding the course	M1, M2, M3, M4
Applying the general problem	M1, M2
Analyse the problems	M4
Evaluate the problems after analysing	M3, M4
Create using the evaluation process	M3, M4

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Module Number	Content	Total Hours	%age of questions	Blooms Level (if applicable)	Remarks (If any)
M 1	**Material and Shaders**	10	40		
M 2	**UV s**	8			
M 3	**Texturing using Photoshop**	8	40		
M 4	**Texturing using Substance Painter**	14			
		40	**80**		

TEXTURING Lab

Total Credit: 2

Total hours of lectures: 40 hours

Sl.	Topic/Module	Hour
1.	**Module 1- Material and Shaders** • Overview of Maya Rendering • Understanding the basic shader types • Work with Arnold materials • Opacity and Refraction in Arnold • Create and apply maps • Using bitmaps as textures • Working with hypershade window • Create materials in hypershade	10
2.	**Module 2- UV s** • unwrapping props and characters to facilitate texture painting, relaxing and unfolding UV's, split UV's, creating UV sets • Applying texture maps to the polygon surfaces by unwrap tool with basic uv tools and to assign 2d and 3d projections .	8
3.	**Module 3- Texturing using Photoshop** • Textures 2d and 3d projections and utilities • Creating Brick textures • Wood textures • Texturing a prop	8

	• Creating Maps	
4.	**Module 4- Texturing using Substance Painter** • Texturing an oil can /weapon/prop in substance Painter • Texturing a Lamp Shade/Light bulb • skin texture/ plastic/ wood/leather	14

Suggested Software – Autodesk Maya
Adobe Photoshop
Substance Painter

Suggested Reading:

1. Autodesk Maya 2018 by Ticked Sham
2. Mastering Autodesk Maya 2017 by Eric Keller.
3. Introducing Maya 2017 by Dariush Derakhshani.
4. Beginning PBR Texturing: Learn Physically Based Rendering with Allegorithmic's Substance Painter – Abhishek Kumar
5. Advanced Maya Texturing and Lighting – Lee Lanier

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Paper: RIGGING & 3D ANIMATION

Code: BVFM 303

Course Objective: Rigging is a crucial step in character development and animation. This course introduces the rules of rigging—good geometry, organization, and controls—and shows how to create joints, constraints, and connections. This course then dives into a real-world project, taking a model and building out the skeleton and the leg, foot, body, and hand controls required for effective animation. It also devotes a chapter to FK/IK switching for finer control over arm movement.

Course Outcome	**Mapped modules**
Remembering	M1, M2, M3, M4
Understanding the course	M1, M2, M3, M4
Applying the general problem	M1, M2
Analyse the problems	M4
Evaluate the problems after analysing	M3, M4
Create using the evaluation process	M3, M4

Module Number	**Content**	**Total Hours**	**%age of questions**	**Blooms Level (if applicable)**	**Remarks (If any)**
M 1	**Introduction to Rigging**	5	25		
M 2	**Rigging Basics**	10	25		
M 3	Introduction to 3D Animation & Principles of Animation	10	25		
M 4	Basic 3D Animation	5	25		
		32	**100**		

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RIGGING & ANIMATION

Total Credit: 4

Total hours of lectures: 30 hours

Sl.	Topic/Module	Hour
1.	**Module 1- Introduction to Rigging** • Understanding the anatomy • Model Clean up • Nomenclature • Requirements for a clean Model, • Parenting and grouping objects using point, orient, parent constrains • Creating controllers, set driven keys etc.	8
2.	**Module 2- Rigging Basics** • Setting up the character • Creating Skeletons - Drawing the spine, leg chains, hand skeletons. • Creating joints, editing joints, parenting joints, orienting joints • Creating hierarchical structures and skeletons for biped characters • Using IK solvers on skeletons, blending FK and IK • Binding skeletons to character mesh • Painting skin weights, editing skin weights Adding influence objects and muscles • Creating facial setups, blend shape deformers	8
3.	**Module 3 – Introduction to 3D Animation & Principles of Animation** • Understanding all 12 principles of animation how the principles work in 3D Animation. • Theory on types of animations difference between 2D and 3D animation, know about Restriction and thumb rules of 3D animation. • Understanding animation films and Live Action Movies, Importance and difference between object and character motion. • Understanding Animation Tools in Autodesk Maya.	8
4.	**Module 4 – Basic 3D Animation** • Understanding timing and spacing, know about timeline and keying, knowing about key frame animation. • Understanding Taking reference for animation, knowing about graph editor and how to control key frame animation via graph editor. • Understanding the weights and balances of primitive object motions. • Knowing animation with multiple primitive objects as the both get co-ordinates in motion as if combination in motion.	8

Suggested Software – Autodesk Maya

Suggested Reading:

1. Autodesk Maya 2018 by Ticked Sham
2. Mastering Autodesk Maya 2017 by Eric Keller.
3. 3D Animation for the Raw Beginner using Maya by Roger King
4. 3D Animation Essentials by Andy Bean
5. Introducing Maya 2017 by Dariush Derakhshani.
6. **Body Language: 3D Character Rigging Book by Eric Allen and Kelly L. Murdock**

Paper: RIGGING & 3D ANIMATION Lab
Code: BVFM 393

Course Objective: This paper will focus on understanding the different kinds of lights and light set-up in a Maya Scene. This course is an introduction where you should be able to perform basic 2D and 3D visual effects compositing with Nuke. In this section, you can learn about Nuke channels, node trees, and keyframe animation and get an overview of the compositing workflow. You will also get introduced to 2D compositing: image transformations, color correction, rotoscoping, keying, timing adjustments, and tracking. Similarly, you can expand your skills into 3D: working with lights and cameras, transforming and deforming 3D geometry, applying materials and textures, and rendering.

Course Outcome	**Mapped modules**
Remembering	M1, M2, M3, M4
Understanding the course	M1, M2, M3, M4
Applying the general problem	M1, M2
Analyse the problems	M4
Evaluate the problems after analysing	M3, M4
Create using the evaluation process	M3, M4

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Module Number	Content	Total Hours	%age of questions	Blooms Level (if applicable)	Remarks (If any)
M 1		10	40		
M 2		10			
M 3	**Introduction to 3D Animation & Principles of Animation**	5	40		
M 4	**Basic 3D Animation**	15			
		30	**80**		

RIGGING & 3D ANIMATION Lab

Total Credit: 2

Total hours of lectures: 40 hours

Sl.	Topic/Module	Hour
1.	**Module 1- Constrains, character setups** • Creating skeleton for tree and basic human body	6
2.	**Module 2- Creating Skeletons and Skinning** • Binding Tree and basic human body with painting skin weights • Adding controllers and linking with custom attributes	14
3.	**Module 3 – Introduction to 3D Animation & Principles of Animation** • Explanation of all principles with different video, working with different Live objects (e.g. - different types of balls plastic,rubber,iron) • Watching and taking live reference from different types of animation movies & live action movies. • Working with Basic rigged Object, learning about different Animation tools in Autodesk maya.	10
4.	**Module 4 – Basic 3D Animation** • Working with basic rigged object, working with frame keys, knowing spacing and timing while doing key animation. • Working with rigged object to know about Graph editor, using different type of graph tangent (e.g., liner tangent, spline tangent etc.) • Working with Ball bounce animation with principle like timing and spacing, stretch and squash applicable to it to create a believable ball bounce, working with different types of balls (e.g - rubber ball,iron ball etc.)	10

	• Create a Simple Pendulum swing with follow through and overlapping principles. • Multiple object interaction • Basic Character walk cycle	

Suggested Software – Autodesk Maya

Suggested Reading:

1. Autodesk Maya 2018 by Ticked Sham
2. Mastering Autodesk Maya 2017 by Eric Keller.
3. Introducing Maya 2017 by Dariush Derakhshani.
4. 3D Animation for the Raw Beginner using Maya by Roger King
5. Body Language: 3D Character Rigging Book by Eric Allen and Kelly L. Murdock
6. 3D Animation Essentials by Andy Bean
   Animators Survival Kit

Paper: Soft Skill Development

Paper Code : BVFM 304

Course Objective – .The objective of this Skill Certification Scheme is to enable the students to take up industry-relevant skill training that will help them in securing a better livelihood. It will help one **Learn** to communicate, listen, and work well with team members and peers. **Think** critically as a problem solver.

Course Outcome	**Mapped modules**
Remembering	M1, M2, M3, M4
Understanding the course	M1, M2, M3, M4
Applying the general problem	M1, M2
Analyse the problems	M4
Evaluate the problems after analysing	M3, M4
Create using the evaluation process	M3, M4

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Module Number	Content	Total Hours	%age of questions	Blooms Level (if applicable)	Remarks (If any)
M 1	**Personal Skills and Social Skills**	5	25		
M 2	**Team Building and Art of Negotiation**	5	25		
M 3	**Personality Development and Interview Techniques**	5	25		
M 4	**Presentation Skills**	5	25		
		20	**100**		

Soft Skill Development

Total Credit: 2

Total hours of lectures: 20 hours

Sl.	Topic/Module	Hour
1.	**Module 1 - Personal Skills:** • Knowing oneself – confidence building- defining strengths-thinking creative personal. • Values time and stress management. • Kinds of stress and reason/s of stress • Handling Stressful situation at a workplace **Social Skills** • Appropriate and contextual use of language – non-verbal communication, interpersonal skills, public speaking skills, Flexibility/Adaptability, Behavioural Skills • Problem Solving Skills	5
2.	**Module 2- Team Building and Art of Negotiation** • Nature of the team and management, motivation training • Professional goals of the members of the group • Building relation and interpersonal communication • Negotiation and Ways of negotiation • Power of language and non-verbal communication	5
3.	**Module 3- Personality Development and Interview Techniques**	5

	• Personal grooming and business etiquettes, corporate etiquette. • Social Etiquette, role play and body language • Professional meetings over lunch/dinner • Basics of the table manner. • Telephonic etiquettes and tone and pitch of the voice • Voice mail • Goal setting • Times schedule	
4.	**Module 4- Presentation Skills** • Group Discussion- mock Group Discussion using video recording. • Speaking skills/ Vocal Training • One's self, how to project one's self in the right frame and spirit. • Proper attire as per the situation • How to write CV or resume for jobs.	5

References/Suggested Readings:

1. Matila Trecee : Successful Communication: Allyun and Bacon Pubharkat

2. Nitin Bhatnagar, Effective Communication and Soft Skills. Pearson Education India

3. Peggy Klaus, The Hard Truth about Soft Skills

4. Eric Garner, Team Building.

5. Wendy Palmer and Janet Crawford. Leadership Embodiment