

Maulana Abul Kalam Azad University of Technology, West Bengal
Syllabus of B. Sc. in Animation and Film Making (CBCS)
(Effective from academic session 2021-22)

SEMESTER-3

Paper: CLAY MODELLING & CG MODELLING

Code: BAFM 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.

SL	Course Outcome	Mapped modules
1	Remembering	M1, M2, M3, M4
2	Understanding the course	M1, M2, M3, M4
3	Applying the general problem	M1, M2
4	Analyse the problems	M4
5	Evaluate the problems after analysing	M3, M4
6	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		

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CLAY MODELLING & CG MODELLING

Total Credit: 4

Total hours of lectures: 30 hours

Sl.	Topic/Module	Hour
1.	<p>Module 1- Clay Modeling & Introduction about the 3D Environment</p> <ul style="list-style-type: none"> • 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.	<p>Module 2- Polygonal Modelling</p> <ul style="list-style-type: none"> • 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.	<p>Module 3- NURBS & Sub Division Modelling</p> <ul style="list-style-type: none"> • 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 • Converting polygon to Sub-D, Sub-D commands 	7
4.	<p>Module 4- Modelling Clean up</p> <ul style="list-style-type: none"> • Concepts • Topology • Hierarchy 	10

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	<ul style="list-style-type: none"> • Mirror,attach • Clean up of model files • Finalizing model 	
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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: BAFM 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Making an exterior - landscape, garden, cityscapes, monuments, bridges, fences, • Modelling interiors (different kinds and styles of rooms) 	12
3.	Module 3- Nurbs modeling <ul style="list-style-type: none"> • Creating bathroom/living room/ kitchen with props – as table , vase etc. • Creating an oil can using sub-D 	12
4.	Module 4- Toon character <ul style="list-style-type: none"> • Modelling a toon character/human/4 legged 	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 modelling techniques, Focal Press; Pap/Dvdr edition, 2008

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Paper: TEXTURING

Code: BAFM 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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TEXTURING

Total Credit: 4

Total hours of lectures: 30 hours

Sl.	Topic/Module	Hour
1.	Module 1- Material and Shaders <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Creating Textures in photoshop • Review Reference Materials • Tile Textures • Creating maps – Bump, Diffuse, Specular, Normal. 	6
4.	Module 4- Texturing using Substance Painter <ul style="list-style-type: none"> • 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

Suggested Software – Autodesk Maya
Adobe Photoshop
Substance Painter

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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: BAFM 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

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		

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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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Textures 2d and 3d projections and utilities • Creating Brick textures • Wood textures • Texturing a prop • Creating Maps 	8
4.	Module 4- Texturing using Substance Painter <ul style="list-style-type: none"> • 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:

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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: LIGHTING & COMPOSITING (INTRO TO NUKE)

Code: BAFM 303

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.

To possess virtual lighting technologies and the tools necessary to create photorealistic imagery.

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 Lighting & Maya Lighting	8	25		
M 2	Arnold Lighting	8	25		

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M 3	Introduction to Nuke & 2D Compositing	8	25		
M 4	3D Compositing	8	25		
		32	100		

LIGHTING & COMPOSITING (INTRO TO NUKE)

Total Credit: 4

Total hours of lectures: 32 hours

Sl.	Topic/Module	Hour
1.	Module 1- Introduction to Lighting & Maya Lighting <ul style="list-style-type: none"> • Introduction to CG Lighting • Working with Maya Lights 1-Point, Direct, Spot, Ambient, Area and Volume, • Three Point Lighting and Exterior Lighting, Cast shadows, decay rate, Previewing lighting and shadows • Creating depth map Shadow, creating ray traced shadows, • Concept of lighting system and shadows, Creating area light shadows, setting area light visibility 	8
2.	Module 2- Arnold Lighting <ul style="list-style-type: none"> • Introducing Arnold and its rendering concepts • Basic Maya Lights for Arnold • Using Arnold lights • Add depth of field in Arnold • Create motion blur in Arnold • Volumetric Lighting in Arnold • Exterior & Interior Lightng in Arnold • Maya Rendering in Arnold • Enviornmental Lighting • Creating Basic Lighting Passes 	8
3.	Module 3- Introduction to Nuke & 2D Compositing <ul style="list-style-type: none"> • Tour of the interface • TheTimeline • Project Settings • Build Node trees • Working with properties panels • Adjust node parameters • Keyframe Animation • TheDope Sheet • The curve Editor • Introduction to the channels, 2D Viewer Wipe controls 	8

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	<ul style="list-style-type: none"> • Transfer Images, Corner Pinning, Reformat images, Color Correcting • Rotoscoping • Mask Operations • Compositing multipass CGI • Chromakey basics • Tracking Basics 	
4.	Module 4- 3D Compositing <ul style="list-style-type: none"> • Overview of 3D Compositing • 3D Viewer • Built in geometric Perspectives • Lights • Cameras • Transform Geometry • ThePhong Shader & Material Properties • Camera Projection • Deform Geometry 	8

Suggested Software – Autodesk Maya
 Foundry Nuke

Suggested Reading:

1. Autodesk Maya 2018 by Ticked Sham
2. Mastering Autodesk Maya 2017 by Eric Keller.
3. Advanced Maya Texturing and Lighting – Lee Lanier
4. Introducing Maya 2017 by Dariush Derakhshani.

Paper: LIGHTING & COMPOSITING (INTRO TO NUKE) Lab

Code: BAFM 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

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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	Maya Lighting	10	40		
M 2	Arnold Lighting	10			
M 3	Introduction to Nuke & 2D Compositing	10	40		
M 4	3D Compositing	10			
		30	80		

LIGHTING & COMPOSITING (INTRO TO NUKE) Lab

Total Credit: 2

Total hours of lectures: 30 hours

Sl.	Topic/Module	Hour
1.	Module 1- Maya Lighting <ul style="list-style-type: none"> • Set light for Day, Night and Morning • Create FOG nodes in your scene. • Render a frame and video of indoor and outdoor scenes. • Direct Illumination-Creating and Illuminating a Stage Show, 	10
2.	Module 2- Arnold Lighting <ul style="list-style-type: none"> • Arnold viewport rendering, Render a frame and video of indoor and outdoor scenes. 	10

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	<ul style="list-style-type: none"> • Render a photorealistic output of an interior scene. • Render a natural scene show different time by varying lighting. • Advance lighting using arnold render. 	
3.	<p>Module 3- Introduction to Nuke & 2D Compositing (After Effects)</p> <ul style="list-style-type: none"> • Loading images • Using Generators • Frame range & Timing • The write & read node • Merging nodes and compositing • Assignments will be done on following above points • Render a 2D composite scene 	10
4.	<p>Module 4- Compositing & Introduction of Nuke</p> <ul style="list-style-type: none"> • Integrating a CGI (Computer Generated Image) render into a real scene • Learn how to make a 3D Scene • Render layers (AOVs) inside of Nuke, and how to break them apart • Create dynamic lens flares based off of source imagery • Studying shadow & light, and how to match the real world • Matching color tones, darks, highlights of an image • Using utility passes to do spot corrections (Position Pass) • Learn the variety of uses for Z-Depth passes • Use ID passes to correct different geometries • Learn how to match camera attribute (Defocus, Grain, Bokeh, Lens Distortion) • Create realistic post-production camera imperfections and artifacts • Compositing elements / FX into a shot • How to quality control (QC) your final shot • How to use the normals AOV to fine tune CG. • Assignments will be done on following above points indivial on different live footages and render images 	10

Suggested Software – Autodesk Maya
 Nuke

Adobe After Effects

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. Advanced Maya Texturing and Lighting – Lee Lanier

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Paper: Soft Skill Development

Paper Code : BAFM 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

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		

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Soft Skill Development
 Total Credit: 2
 Total hours of lectures: 20 hours

Sl.	Topic/Module	Hour
1.	<p>Module 1 - Personal Skills:</p> <ul style="list-style-type: none"> • 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 <p>Social Skills</p> <ul style="list-style-type: none"> • Appropriate and contextual use of language – non-verbal communication, interpersonal skills, public speaking skills, Flexibility/Adaptability, Behavioural Skills • Problem Solving Skills 	5
2.	<p>Module 2- Team Building and Art of Negotiation</p> <ul style="list-style-type: none"> • 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.	<p>Module 3- Personality Development and Interview Techniques</p> <ul style="list-style-type: none"> • 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 	5
4.	<p>Module 4- Presentation Skills</p> <ul style="list-style-type: none"> • 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