Raja Mansingh Tomar Music & Arts University, Gwalior, M.P.

Animation III Year Syllabus

SUBMISSION DETAILS (PRACTICAL)

B. DESIGN ANIMATION YEAR III

Semester – V

SUBJECT	SIZE	MINIMUM ASSIGNMENT	TOPIC & MEDIUM
Clay Modeling	-	10	Clay
3D Props Modeling	-	50	On Computer
3D Environment Modeling	-	8	On Computer
3D Character Modeling	-	4	On Computer

SCHEME OF EXAMINATION

B. DESIGN ANIMATION YEAR III

Semester – V

Paper	Time	Size	External Marks	C.C.E.	Total
Autodesk MAYA	3 Hrs.	-	70	30	100
Digital Modeling	3 Hrs.	-	70	30	100
Screenwriting	3 Hrs.	-	70	30	100
				Total	300
Practical			**External Marks**	**Internal Assignment**	
Clay Modeling	6 Hrs.	-	60	40	100
3D Props Modeling	6 Hrs.	-	60	40	100
3D Environment Modeling	6 Hrs.	-	60	40	100
3D Character Modeling	6 Hrs.	-	60	40	100
				Total	400
				Grand Total	**700**

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Animation III Year Syllabus

B. DESIGN ANIMATION YEAR III

Semester – V

PAPER – I (THEORY) – AUTODESK MAYA

- The Maya user interface: Creating, manipulating, and viewing objects, Viewing the Maya 3D scene, channel box, attribute editor, navigation tools, Layers. Creating and opening Maya files and project. Digital pipeline in Maya. How the pipeline works?
- 3D Modeling & Texturing : NURBS Modeling: Revolving/Lofting/Extrude/Birail/Bevel a curve to create a surface, Create menu commands, sculpting a NURBS surface, NURBS Boolean, Editing NURBS objects. Converting NURBS to Polygon/Subdivision.
- Texturing: UV texturing mapping, UV unfolding, applying textures to polygon, Introduction to Hypershade, Types of Materials, 2d & 3d textures in maya, creating PSD network, creating textures in Photoshop. Creating and applying Normal map, Bump Map, Displacement, Specular Map and Alpha Map.
- Lighting & Rendering: About Lighting & Rendering, Describe All Types Of Light, Ambient Light, Point Light, Area Light, Directional Light, Volume Light, 3 Point Lighting Technique, Direct & Indirect Lighting, Maya Software & Mental Ray Rendering & Lighting, Physical Sun And Sky, Image Based Lighting, Final Gathering, Global Illumination
- Rigging & Animation: Rigging Fundamentals, Bones creation, IK & FK handle tool, Joint, Skeleton, skinning, Deformers, Principle of Animation, Time line window and time line, Animation Preferences, Animation Editors (Graph editor, trax editor, dope sheet), Ball animation, Path animation, Camera Animation, Weight shifting & Force animation, Set Driven Key (SDK), Play Blast
- Dynamics & Batch Rendering: Dynamics: Particles, Fields, Soft & Rigid bodies, effects, Hair, Fluid Effects, Fur, paint effect, Introduction to Visor window, creating smoke/cloud/fire effects. Batch rendering process.

Suggested Reading

1. Mastering Autodesk Maya by Todd Palamar
2. Beginner's Guide to Character Creation in Maya by Jahirul Amin

PAPER – II (THEORY) – DIGITAL MODELING

- What is Digital Modeling?
- Who can become a professional Digital Modeler?
- Fundamentals of a Digital Model – A Models Anatomy, Model Classification: Hard Surface & Organic, Model Styles
- Digital Modeling Methods – Build Out, Primitive Modeling, Box Modeling, Patch Modeling, Digital Sculpting, 3D Scanning, Modeling with Texture & Animation Tools, Importance of mixing methods
- Modeling a Realistic Head – Choosing a method: Edge Extend vs Box Modeling
- 3D Printing – What is 3D Printing, 3D Printing Applications, preparing a 3D model for 3D printing, 3D printing to manufactured toy process

Suggested Reading

1. Digital Modeling by William Vaughan

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PAPER – III (THEORY) – SCREENWRITING

- What is screenplay?
- The Subject
- The creation of character
- Building a character
- Story & Character
- Endings & Beginnings
- Setting up the story
- Two incidents
- Plot Points
- The Scene
- The Sequence
- Building the story line
- Screenplay form
- Writing the screenplay
- Adaptation& Collaboration
- Selling the Script

Suggested Reading

1. Screenplay: The Foundations of Screenwriting by Syd Field

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Animation III Year Syllabus

B. DESIGN ANIMATION YEAR III

Semester – V

PRACTICAL

PRACTICAL 1 – CLAY MODELING

COURSE OUTLINE

1. Basic Geometrical shapes
2. Man-made objects
3. Human form
4. Human parts – hand, feet, eyes, nose, etc.
5. Simple compositions with the use of human figures
6. Clay Modeling of human figures using armature

PRACTICAL SUBMISSION

Using clay make models -

1. Basic Geometrical shapes - 5
2. Man-made objects - 5
3. Human form - 2
4. Human parts – hand, feet, eyes, nose, etc. - 5
5. Simple compositions with the use of human figures - 3
6. Clay Modeling of human figures using armature – 3

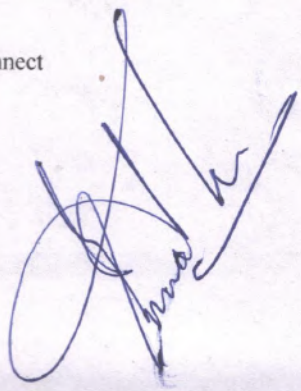
Suggested Reading

1. Digital Modeling by William Vaughan

PRACTICAL 2 – 3D PROPS MODELING

COURSE OUTLINE

1. Introduction of Maya basic interface
2. Learn how to set up your own project
3. Guide to mastering viewport navigation
4. Geometry modeling basic exercise
5. Modeling exercise using: Extrude, Bevel, Insert Edge Loop and Connect
6. Making 3D model -
   - Weapons
   - Vehicles
   - Props



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2019 – 2020

PRACTICAL SUBMISSION

1. Gather image reference of at least 5 objects, should include details like:
   - Various angles of each objects
   - Overarching theme
   - Art style inspiration
2. Low Poly And High Poly Weapons Model
   - 3 Sci-Fi Machine guns
   - 5 Warrior swords
3. High Poly Vehicle Model

Suggested Reading

1. Digital Modeling by William Vaughan

PRACTICAL 3 – 3D ENVIORNMENT MODELING

COURSE OUTLINE

1. The basic process of environment Modeling
2. Blocking layout with Basic geometry
3. The structure of a good environment modeling
   - Utilize modeling techniques
   - Clean topology
   - World scale, Naming convention and Version control
4. Creating 3d Model for Movie
   - House Model
   - Interior and Exterior Model
   - Trees and Plants Model for vegetation
5. Developing layout model using Referencing

PRACTICAL SUBMISSION

1. Tree and Plant Model
2. 2 Building Model
3. 2 Interior Model
4. 2 Exterior Model

Suggested Reading

1. Digital Modeling by William Vaughan

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Animation III Year Syllabus

2019 - 2020

PRACTICAL 4 – 3D CHARACTER MODELING

COURSE OUTLINE

1. The process of 3d character creation
2. The structure of a good character model
   - Polygon count
   - The default position
   - Clean topology
   - The structure of the joints
   - World scale, Naming convention and Version control
4. 3D Character creation step by step
   - Creating 3D model sheet
   - Match character front and side view in Photoshop
   - Import character sheet into Maya
   - Creating 3D model in Maya (Male and Female)
   - Torso, Hand, Feet, Head, Face, Cloth, Hair

PRACTICAL SUBMISSION

1. 1 High Poly Male Character
2. 1 High Poly Female Character
3. 1 High Poly Animal Model
4. 1 High Poly Warrior With Full Armor

Suggested Reading

1. Digital Modeling by William Vaughan
2. Maya Character Creation: Modeling and Animation Controls by Chris Maraffi

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Bachelor of Design Animation Syllabus

SUBMISSION DETAILS (PRACTICAL)

B. DESIGN ANIMATION YEAR III 2019 – 2020

Semester – VI

SUBJECT	SIZE	MINIMUM ASSIGNMENT	TOPIC & MEDIUM
3D Model Texturing	-	10	On computer
Basic 3D Animation & Rigging	-	10	On computer
Digital Sculpting (Z – Brush)	-	3	On computer
Stop Motion Animation	-	1	On computer

SCHEME OF EXAMINATION

B. DESIGN ANIMATION YEAR III

Semester –VI

Paper	Time	Size	External Marks	C.C.E.	Total
ZBrush	3 Hrs.	-	70	30	100
Stop Motion Animation	3 Hrs.	-	70	30	100
Lighting & Rendering	3 Hrs.	-	70	30	100
				Total	300
Practical			**External Marks**	**Internal Assignment**	
3D Model Texturing	6 Hrs.	-	60	40	100
Basic 3D Animation & Rigging	6 Hrs.	-	60	40	100
Digital Sculpting (Z – Brush)	6 Hrs.	-	60	40	100
Stop Motion Animation	6 Hrs.	-	60	40	100
				Total	400
				Grand Total	**700**

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B. DESIGN ANIMATION YEAR III

SEMESTER – VI

Paper – I (Theory) – ZBrush

- Introduction to ZBrush – Understanding digital images, Anatomy of a Pixel, Vector image, Understanding Resolutions, Understanding 3D space
- ZBrush Interface – ZBrush Canvas, Light Box, ZBrush Shells, Trays and Palettes, Title Bar
- What is ZSphere?
- What is Polymesh Editing – Polygroups and Dynamesh, SubTools and Working with SubTools, ZSketching with ZSphere
- What is Polypainting and SpotLight, Different Polypainting Techniques, Uses of SpotLight
- What are FiberMesh, Materials and Rendering
- What is GoZ ?

Suggested Reading

1. Introducing ZBrush 3rd Edition 3rd Edition by Eric Keller

PAPER – II (THEORY) – STOP MOTION ANIMATION

- Different between classical animation and stop motion animation
- Animation Principles for Stop Motion
- Stop motion Animation formulas
- Armature, Puppet Armatures
- Timing for Stop Motions
- Lighting for Stop Motions

Suggested Reading

1. Stop-Motion Animation: Frame by Frame Film-Making with Puppets and Models (Basics Animation) by Barry J.C. Purves
2. The Advanced Art of Stop Motion Animaton by Ken Priebe

Paper – III (Theory) – LIGHTING & RENDERING

- Fundamentals of Lighting Design – Visual Goals of lighting design, Lighting Challenges, Your Workspace & Creative control
- Types of Lights
- Shadows & Occlusion – The Visual Function of Shadows, Shadow Algorithms, Occlusion
- Lighting in Animation – Three Point Lighting, Functions of Light & Issues in Lighting Character Animation
- Cameras & Exposure – F- Stops & Depth of Field, Shutter Speed & Motion Blur
- Composition & Staging – Camera Angles, Types of shots, improving your shots, Framing for Film & Video
- Shaders & Rendering – Shading Surfaces, Anti- Aliasing, Raytracing, Reyes Algorithm, Global Illumination, Caustics
- Production Pipelines & Lighting on larger productions

Suggested Reading

1. Digital Lighting & Rendering by Jeremy Birn

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2019 -2020

4. Do Storyboard
5. Give final output in clay animation (short film)

NOTES

- Compulsory to use aluminum armature (aluminum puppets) for the clay animation.
- Use colored modeling clay.
- Use Aluminum Craft / Armature Wire

Suggested Reading

1. The Advanced Art of Stop-Motion Animation by Ken Priebe

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B. DESIGN ANIMATION YEAR III

SEMESTER –VI

2019 - 2020

PRACTICAL

PRACTICAL I – 3D MODEL TEXTURING

COURSE OUTLINE

1. Concept of Unwrapping and Texturing for Model
2. UV Mapping Techniques
   - Planer Mapping
   - Cylindrical Mapping
   - Spherical Mapping
   - Automatic Mapping
3. Block out color Map
4. Proper UV Layout
5. Creating seamless texture in Photoshop
6. Creating Bump, Normal, Specular and Transparency Maps
7. Baking Color, Normal and Occlusion Map in Maya
8. PBR Texture Generation in Substance Painter
9. Baking inside substance painter

PRACTICAL SUBMISSION

1. Unwrap High Poly Props and Characters -
   - Separate UV set for Body, Cloth and Armor
2. Bake High Poly Details on Model
3. Texture all your environment

Suggested Reading

1. Maya for Games: Modeling and Texturing Techniques by Michael Ingrassia
2. Digital Modeling by William Vaughan

PRACTICAL II - Basic 3D Animation & Rigging

- Introduction to rigging
- Working with connections: Connection Editor, Outliner & Constraints.
- Set driven key/ Parent & Child Connections
- Deformers- Lattice, Wrap, Cluster.
- Deformers- Sculpt, Jiggle, Wire, Blend Shapes
- Introduction to Joints & IK Handles
- Creating an Arm Setup : FK/IK Blend
- Creating a Leg Set-up
- Creating a Biped Rig: Setting up the Skeleton & Finishing the rig with controls

- Skin Binding
- Paint weights
- Four-Wheeler Rigging
- Animation Essentials and Perception of Motion (Timing, curves, handles, holds, slow in and out)
- Acquainted with keys of Basic concept of bouncing ball
- Explain Graph Editor with Timing & Spacing in bouncing ball
- Adding squash and stretch
- Understanding of Body balance, weight & arc
- Detail explanation of Graph Editor & Dope Sheet
- Biped Walk cycle in place(Stationary)
- Biped Walk cycle progressive
- Run cycle
- Jump with distance
- Ball Throw
- Lip-Sync- AEIOU
- Lip-Sync with dialogue
- Expressions with Joy, anger, shock, etc.
- Camera animation

PRACTICAL SUBMISSION

1. Car Rigging or Prop Rigging or Basic Biped Rig
2. Any action contains biped walk cycle or run cycle (Ex; Character run & climb a wall)

Suggested Reading

1. Animation from Pencils to Pixels: Classical Techniques for the Digital Animator by Tony White
2. Mastering Autodesk Maya 2016: Autodesk Official Press by Todd Palamar
3. How to Cheat in Maya 2014: Tools and Techniques for Character Animation by Kenny Roy
4. Rig it Right! Maya Animation Rigging Concepts by Tina O'Hailey

PRACTICAL III - DIGITAL SCULPTING (Z - BRUSH)

COURSE OUTLINE

- Sculpting Concepts – Comparing Traditional & Digital Sculpting, Anatomy for Sculptures, Proportions & Measurements, Form, Negative Space & Gesture.
- Digital Sculpting - Introduction to UI, Introduction to tools, Methods of Sculpting by the help of meshes in z brush, Making of Shield (Brush Strokes, Masking, Displacement)
- Model a human skull
- Model human head with details
- Model human basic body
- A model imported from maya and fine tune
- Introduction to Z Sphere, Transpose, Modeling Animal using Zsphere
- Gesture poses
- Understanding of UV space and Texturing, Poly paint, Z App link
- Export of Normal, Displacement, Cavity maps
- Assignment - Create a fearsome warrior, a sportsman, a realistic old age face
- Realistic Character Modeling n Texturing - Building up Shapes - (Relative Scale, Form, Detailing), UV Layout & tiles in 3D space - (Planning, Techniques), Create new textures for painting their existing

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B. DESIGN ANIMATION YEAR III

SEMESTER –VI

2019 - 2020

PRACTICAL

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COURSE OUTLINE

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- Export of Normal, Displacement, Cavity maps
- Assignment - Create a fearsome warrior, a sportsman, a realistic old age face
- Realistic Character Modeling n Texturing - Building up Shapes - (Relative Scale, Form, Detailing), UV Layout & tiles in 3D space - (Planning, Techniques), Create new textures for painting their existing

models, Utilize Projection Master to work with detail brushes and alpha, Brushes for highly detailed texture painting.

- Create realistic character texture painting
- Create texture for cartoons
- Create face expressions & morphing

PRACTICAL SUBMISSION

To be done in Z Brush..

1. Create a fearsome warrior
2. Create a sportsman,
3. Create a realistic old age face
4. Paint one figures developed in Assignment 1 or 2 or 3
5. Create 1 displacement maps and apply them in Maya

Suggested Reading

1. Sculpting from the Imagination: ZBrush (Sketching from the Imagination) by 3DTotal Publishing
2. ZBrush Characters and Creatures by Kurt Papstein, Mariano Steiner, Mathieu Aerni, 3DTotal Team
3. Introducing ZBrush 3rd Edition (Serious Skills) by Eric Keller

PRACTICAL IV – STOP MOTION ANIMATION

COURSE OUTLINE

ANIMATION - STOP MOTION

- Introduction
- Software Intro
- Framing, Staging and Blocking
- Screening, Framing the Shot Blocking The Shot
- Effective Use of Dope Sheets
- Timing and Spacing
- Introduction to Puppets
  - ❖ Screening
  - ❖ Historical Context
- Introduction to Aluminum Puppets
- Timing
- Introduction to Lighting
- Advanced Puppet Making and Intro to rigging
- Design and Fabrication for Puppets
- Principles of camera lenses
- Production planning for stop motion

PRACTICAL SUBMISSION

Make a short film using stop motion animation (clay animation) – This is a group project & students must work in groups of 3-5.

1. Make a small script
2. Design Character
3. Design Background

4. Do Storyboard
5. Give final output in clay animation (short film)

NOTES

- Compulsory to use aluminum armature (aluminum puppets) for the clay animation.
- Use colored modeling clay.
- Use Aluminum Craft / Armature Wire

Suggested Reading

1. The Advanced Art of Stop-Motion Animation by Ken Priebe