

Common Course Number: GRA 2162C

COURSE TITLE: Introduction to 3D Animation

CREDIT HOURS: 3

CONTACT HOURS BREAKDOWN:

Lecture/Discussion 32

Lab 32

Other

Contact Hours/Week 4

CATALOG COURSE DESCRIPTION:

Prerequisite: GRA 2550C

Corequisite: None

This course is an introductory level course in 3D animation. Students create complex animations which are carefully planned through storyboarding techniques. Students will complete 3D animation projects and follow the 3D animation process, practicing and applying various features of the 3D animation software package.

**UNIT TITLES:**

- 1. Overview of Cinematic Methods.**
- 2. Storyboarding Techniques.**
- 3. Planning the Animation.**
- 4. Creating and Modeling the 3D Component Objects.**
- 5. Assembling the Component Objects into Models for the Scene.**
- 6. Animating the Models.**
- 7. Apply Lightning and Materials.**
- 8. Rendering the Scene.**
- 9. 3D Animation projects (e.g., Bouncing Sphere, Animated Animal Form, Animated Human Form, Animated Polygon-Based Industrial Models, etc.)**
- 10. Portfolio and Critique.**

## **I. Course Overview:**

Upon successful completion of this course, the students should be able to conceive of a 3D animated scene, plan the scene through storyboarding and complete animation following the 3D animation process and applying skills learned in Advanced Digital Image Design. Students will be introduced to and be able to apply more advanced animation techniques to their projects.

## **II. Units:**

### **Unit 1. Overview of Cinematic Techniques**

General Outcome:

- 1.0 The students should be able to demonstrate knowledge of basic cinematic techniques.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 1.1 Demonstrate a basic knowledge of the history of cinema.
- 1.2 Demonstrate knowledge of written scripts as an initial planning tool for a scene.
- 1.3 Understand the concept of storyboarding.
- 1.4 Identify how scenes with multiple actions are set up.
- 1.5 Describe the importance of mood and lighting.
- 1.6 Describe the importance of texture, black and white color.
- 1.7 Identify the impact produced by cinematic techniques in classic movies.

### **Unit 2. Storyboarding Techniques**

General Outcome:

- 2.0 The students should be able to demonstrate knowledge of storyboarding techniques.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 2.1 Describe the importance of storyboarding for animation.
- 2.2 Identify the storyboarding techniques used by successful 3D animation studios.
- 2.3 Create a traditional hand sketched storyboard.
- 2.4 Create a computer-generated storyboard.

### **Unit 3. Planning the Animation**

General Outcome:

- 3.0 The students should be able to select a topic scene and plan an animation using a storyboard.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 3.1 Select a topic scene to animate for their class project.
- 3.2 Produce a storyboard to the class for critique.
- 3.3 Present the storyboard to the class for critique.
- 3.4 Revise the storyboard to improve the effectiveness of the planned final animation.

## **Unit 4. Modeling the 3D Component Objects**

General Outcome:

4.0 The students should be able to create the 3D components objects which will be assembled into a model for their class animation project.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 4.1 Understand object geometry.
- 4.2 Create profiles:
  - 4.2.1 Drawing profiles.
  - 4.2.2 Copying and duplicating profiles.
  - 4.2.3 Modifying profiles.
  - 4.2.4 Editing profiles.
- 4.3 Create surface objects.
  - 4.3.1 Create basic shapes with 3D primitive tools.
  - 4.3.2 Extrude objects.
  - 4.3.3 Lath objects.
  - 4.3.4 Sweep objects.
  - 4.3.5 Skin objects.
  - 4.3.6 Create objects with cross sections.
  - 4.3.7 Model with metaforms.
  - 4.3.8 Model using particle systems.
- 4.4 Deform surface objects.
  - 4.4.1 Twist objects.
  - 4.4.2 Bend objects.
  - 4.4.3 Taper objects.
  - 4.4.4 Stretch objects.
  - 4.4.5 Skew objects.
- 4.5 Modify 3D shapes
  - 4.5.1 Project profiles onto 3D geometry.
  - 4.5.2 Create intersections.
  - 4.5.3 Trim 3D objects.
  - 4.5.4 Edit 3D geometry.

## **Unit 5. Assemble the Component Objects**

General Outcome:

5.0 The students should be able to assemble a model from the 3D component object that they have created.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

5.1 Link 3D objects to create a model.

5.2 Copy and paste objects.

5.3 Duplicate objects.

5.4 Mirror geometry.

5.5 Hide objects.

5.6 Using construction objects.

5.7 Align objects to one another.

## Unit 6. Animation of the Model

General Outcome:

6.0 The students should be able to animate their 3D model.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 6.1 Identify the animation components:
  - 6.1.1. Use the animation controls.
  - 6.1.2 Use the score
- 6.2 Set the animation preferences.
- 6.3 Animate the workspace:
  - 6.3.1 Animate an object's position in the workspace.
  - 6.3.2 Edit animation paths in the workspace.
  - 6.3.3 Animate an object's orientation in the work-space.
  - 6.3.4 Animate the object's scale.
  - 6.3.5 Animate with links.
  - 6.3.6 Use construction objects as animation aids.
- 6.4 Animate in the score
  - 6.4.1 Use tracks and frames.
  - 6.4.2 Edit tracks.
  - 6.4.3 Edit key frames.
  - 6.4.4 Create a cycle.
  - 6.4.5 Animate object deformation.
  - 6.4.6 Animate visibility.
  - 6.4.7 Animate particle systems.
  - 6.4.8 Animate with meta-forms.
  - 6.4.9 Fine-tune animation motion and timing.
  - 6.4.10 Scale and offset a track or animation.
- 6.5 Animate the camera:
  - 6.5.1 Customize the camera view.
  - 6.5.2 Animate the camera's view.
  - 6.5.3 Animate the camera object.
  - 6.5.4 Animate the camera score.
- 6.6 Optimize animation playback.

## Unit 7. Applying Lightning and Materials

General Outcome:

- 7.0 The students should be able to apply advance 3D lightning and materials affects on a model.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 7.1 Understand the principles of using lights and materials together.
- 7.2 Describe the types of lights and materials and the Light and Materials browsers.
- 7.3 Create lights and materials.
  - 7.3.1 Use the Lights and Materials browsers.
  - 7.3.2 Use the World browser to create new lights and materials.
  - 7.3.3 Create light objects in the workspace.
- 7.4 Customize and manage materials
  - 7.4.1 Apply materials.
  - 7.4.2 Customize materials.
  - 7.4.3 Create several standard materials from the default materials.
  - 7.4.4 Use texture maps.
  - 7.4.5 Manage and organize materials and maps.
- 7.5 Animate lights and materials:
  - 7.5.1 Animate omni lights and spotlights in the workspace.
  - 7.5.2 Animate texture maps in the workspace.
  - 7.5.3 Animate lights and materials properties.
- 7.6 Create fog
- 7.7 Understand how settings that affect light:
  - 7.7.1 How render styles affect lighting.
  - 7.7.2 How smoothness setting affects lighting.
  - 7.7.3 How front and back facing polygons affect lighting.
  - 7.7.4 How final render settings affect lighting.

## **Unit 8. Rendering**

General Outcome:

8.0 The students should be able to render their 3D animation.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 8.1 Describe rendering concepts:
  - 8.1.1 Types of interactive renderers.
  - 8.1.2 Interactive rendering.
  - 8.1.3 Final rendering.
  - 8.1.4 Optimizing rendering.
- 8.2 Prepare to render:
  - 8.2.1 Check the Window Setup.
  - 8.2.2 Adjust the smoothness settings.
  - 8.2.3 Optimize objects for rendering.
  - 8.2.4 Add a background color and image.
- 8.3 Set up for final render.
- 8.4 Render the screen.
- 8.5 Render to the disk:
  - 8.5.1 Use the interactive render to render a test scene.
  - 8.5.2 Use the final renderer.
  - 8.5.3 Create high-resolution renders.

## **Unit 9. 3D Animation Projects**

General Outcome:

9.0 The students should be able to complete animation projects according to the 3D animation cinematic based development metaphor, e.g., bouncing sphere, animated animal, animated polygon-based industrial form, animated human figure, or other.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

- 9.1 Describe the qualities unique to a given animation project; research and collect various designs, describing the purpose and intent of each design.
- 9.2 Distinguish qualities that make a model/animation successful.
- 9.3 Complete project according to specifications.

## **Unit 10. Portfolio and Critique**

General Outcome:

10.0 The students should be able to design and critique a portfolio.

Specific Learning Outcomes:

Upon successful completion of this unit, the students should be able to:

10.1 Reproduce projects in multiple output media.

10.2 Present project in a formal class.

10.3 Revise projects according to evaluation input.

10.4 Present final revised.