

CURRICULUM GUIDE

Name of Course: Computer Animation

Course #: 750

Date Written: July 2008

Prerequisites: Art 1/Graphic Design/Media 1

Level: Introductory Level

Number of Credits: 5

Grade Levels Offered To: 10-12 Grade Students

Course Description:

The course will start with a general introduction to computer animation. The class will examine where, how, and why computer animation and computer generated graphics are used in our increasingly technological society.

Hand sketching and basic hand drawing techniques will be introduced as it is an essential skill to computer animators. Students will be required to practice hand sketching and drawing throughout the duration of the course, and be called upon to use their skills to complete storyboards as well as computer animated segments.

Four important areas of focus for this course will be Basic Concepts, Modeling, Animation, and Rendering. After an overview of the 3D Studio Max interface, students will learn how to build simple models using a variety of techniques. Students will learn how to animate models at a basic level and extract character and emotions from animated objects. Finally, students will learn how to embellish the scene using materials and lights and render a movie file.

Equal Opportunity Statement –

High Point Regional High School's curriculum and instruction are aligned to the State's Core Curriculum Content Standards and address the elimination of discrimination by narrowing the achievement gap, by providing equity in educational programs and by providing opportunities for students to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomical status.

Course Goals & Objectives:

- ✓ Explore past, present, and future of the computer animation.
 1. Students will be able to discuss the transition from hand drawing to computer drawing.
 2. Students will be able to discuss current methods and techniques of computer drawing and animation.
 3. Students will be able to list 3-5 ways that computer can be used by society in the future.
- ✓ Understand applications for computer animation.
 1. Students will develop an understanding of how computer animation is used in society.
 2. Students will be able to discuss visual effects in movies, animated 2d/3d feature movies, independent shorts, video and computer games, television.
- ✓ Develop hand sketching skills
 1. Students will practice hand sketching shapes, characters, and objects.
 2. Students will hand sketch storyboards.
- ✓ Understand computer modeling
 1. Students will be able to summarize basic modeling concepts as space, objects and structures, points, lines, and surfaces.
 2. Students will become familiar with geometric primitives, sweeping, and freeform objects.
- ✓ Understand Rendering
 1. Students will develop an understanding of rendering concepts, such as: materials and mapping, cameras, lighting, shading, and surfacing.
- ✓ Understand animation and effects
 1. Students will gain an understanding of and be able to discuss types of animation, principles of animation, character development, and file formats.
 2. Students will develop storyboards, create 3d scenes, apply realistic lighting, model characters, and animate objects.
 3. Students will create and develop an animated short.

Core Curriculum Content Standards Addressed:

NJCCCS-

8.1. A.5. Produce a multimedia project using text, graphics, moving images, and sound.

8.1. A.8. Discuss and/or demonstrate the capability of emerging technologies and software in the creation of documents or files.

8.2. B.1 Describe the potential and implications of contemporary and emerging computer applications for personal, social, lifelong learning, and workplace needs.

8.2. B.9 Create and manipulate information, independently and/or collaboratively, to solve problems and design and develop products.

8.2. B.11 Identify a problem in a content area and formulate a strategy to solve the problem using brainstorming, flowcharting, and appropriate resources.

Standards for Technological Literacy-

The Nature of technology –

Standard 3. Students will develop an understanding of the relationships among technologies and the connections between technology and other fields of study.

The Designed World –

Standard 17. Students will develop an understanding of and be able to select and use information and communication technologies.

Units/Assignments

Unit 1 - Introduction (15 Days)

Goal #1 - Explore past, present, and future of the computer animation.

Objectives

1. Students will be able to discuss the transition from hand drawing to computer drawing.
2. Students will be able to discuss current methods and techniques of computer drawing and animation.
3. Students will be able to list 3-5 ways that computer can be used by society in the future.

Goal # 2 - Understand applications for computer animation.

Objectives

1. Students will develop an understanding of how computer animation is used in society.
2. Students will be able to discuss visual effects in movies, animated 2d/3d feature movies, independent shorts, video and computer games, television.

Resources

Introduction to Computer Animation [Compressed PostScript] [PDF]

Video: Pixar Shorts

Assignments/Practice Activities/Projects/Assessment

Homework:

Reading:

Reading Assignment #1

Reading Assignment #2

Writing assignment – Write a one paragraph response to each of the prompts listed below.

Discuss the evolution of computer animation citing examples from the Pixar shorts video and your assigned reading.

Discuss any new trends or major events on the horizon in the future of computer animation as it relates to film and movies.

Unit 2 - Hand Sketching in Animation (20 Days)

Goal #1 - Develop hand sketching skills

Objectives

1. Students will practice hand sketching shapes, characters, and objects.
2. Students will hand sketch storyboards.

Assignments/Practice Activities/Projects/Assessment

Homework:

Read handouts then answer questions on corresponding worksheet.

Sketching practice:

Sketch the shapes, characters, and objects listed below. Keep all work in your sketchbook.

Basic Shapes

1. Sphere
2. 3 Spheres on a plane
3. Cube
4. Cube on a plane
5. Tube
6. Cone
7. Cylinder
8. Tea pot
9. Chess Set

Characters & Objects

1. Telephone Poll
2. Phone
3. Tree
4. Dog
5. Cat
6. Man
7. Woman

In-Class work:

Project- Develop a story board for a 30 sec. advertisement for a product of your choosing.

Assessment:

Test- Sketching Test

Unit 3 - Basic Concepts (45 Days)

Goal # 1 - Understand computer modeling

Objectives

1. Students will gain an understanding of the 3D Studio Max user interface.
2. Students will be able to summarize basic modeling concepts as space, objects and structures, points, lines, and surfaces.
3. Students will become familiar with geometric primitives, sweeping, and freeform objects.

Fundamentals of 3ds Max

1. Making a scene
2. Selection tools
3. Zoom, pan, display
4. Organizing objects
5. Transforms and coordinates

Homework Assignments:

Read handouts:

http://download.autodesk.com/us/3dsmaxdesign/interface_overview/2009/3dsMaxUIOverview.htm

Test:

Fundamentals Test

Modeling

1. Modeling tools
2. Reference images
3. Virtual studio
4. 15-minute building
5. Modeling around maps
6. Modeling from a plan
7. Modeling a gorge
8. Modeling a character
9. Secrets of the Spline

Homework Assignments:

Read handouts and answer questions on work sheets.

Projects:

Modeling a Parking Meter

Modeling a Building

Modeling a Building from a Plan

Modeling a gorge

Modeling a character

Test:

Modeling Test 1

Readings:

[Principles of Animation](#) [PDF]

[Keyframing](#) [PDF]

Configuration Space:

Real-Time Robot Motion Planning Using Rasterizing Computer Graphics Hardware, (J. Lengyel, M. Reichert, B. Donald, and D. Greenberg), *Proc. SIGGRAPH '90*, Dallas, TX (Aug 1990), pp. 327-336.

[\[Compressed PostScript\]](#) [PDF]

[The Motion Factory](#)

Unit 4 - Rendering (55 Days)

Goal #1 – Students will gain a basic understanding of computer rendering.

Objectives

1. Students will develop an understanding of rendering concepts, such as: materials and mapping, cameras, lighting, shading, and surfacing.
2. Students will render a scene.

Rendering

1. Rendering Basics
2. Mental Ray Rendering
3. Depth of Field
4. A shift in perspective
5. Active shade

Homework Assignments:

Read handouts and answer questions on work sheets.

Materials and mapping

1. Material Editor basics
2. Mapping coordinates
3. Preparing textures
4. Applying a decal
5. People, trees, and cars
6. Multiple maps
7. Background maps
8. Procedurally speaking
9. Gradual mix
10. Unwrapping the mapping
11. Mapping a character
12. Basic Mental Ray materials
13. Custom Mental Ray materials
14. *Lumps, bumps, and dainty curly stuff*

Homework Assignments:

Read handouts and answer questions on work sheets.

Lighting

1. 1-2-3 lighting
2. Exterior lighting
3. Interior lighting
4. Bright sunny day
5. Space scenes
6. Mental Ray lighting
7. Good lighting made better
8. *Interlude: How to waste time with lighting*

Homework Assignments:

Read handouts and answer questions on work sheets.

Shadows

1. Pick your shadows
2. Shadow timesavers
3. Where's the shadow?
4. Trouble shooting shadows

Homework Assignments:

Read handouts and answer questions on work sheets.

Reflections

1. Basic Reflections
2. Bling
3. Mirrors
4. Dude, where's my reflection

Homework Assignments:

Read handouts and answer questions on work sheets.

Glass

1. Exterior daytime windows
2. Interior daytime windows
3. Night time and dusk
4. Glass bottle
5. Fun with physics

Homework Assignments:

Read handouts and answer questions on work sheets.

Unit 5 - Animation (45 Days)

Goal #1 – Students will gain a basic understanding of animation and effects.

Objectives

1. Students will gain an understanding of and be able to discuss types of animation, principles of animation, character development, and file formats.
2. Students will develop storyboards, create 3d scenes, apply realistic lighting, and animate characters and objects.
3. Students will create and develop an animated short.

Animation

1. Animation 101
2. Spinning your gears
3. Following a path
4. Look-a-here

Sketching practice:

<http://www.cs.dartmouth.edu/~brd/Teaching/Animation/Papers/principles.pdf>

Homework Assignments:
Reading Assignment #: Rules of Animation
Questions

Character Animation

1. Biped Workflow
2. Biped 101
3. Biped Fitting
4. Skinning
5. Walking in your footsteps
6. Catch a wave
7. The alternative Biped
8. Bouncing and flexing

Homework Assignments:
Watch video and answer questions on work sheet.

Implementation of Technology:

In this course students will be completely immersed in computer technology. Students will use computers on a daily basis to complete class activities and projects. Students will use sophisticated computer animation software such as 3D Studio Max, Macromedia Flash, and Adobe Photoshop.

Materials, Resources, Year Published & Name of Text:

How to Cheat in 3DS Max 2009: Get spectacular Result Fast by Michele Bousquet

Animation from Pencils to Pixels: Classical Techniques for the Digital Animator
by Tony White - Performing Arts - 499 pages

This book is intended to serve as your one-stop how-to animation guide.

3ds Max 9 Bible

by Kelly L. Murdock - Computers - 1248 pages

Loaded with advice, professional tips, and more than 150 step-by-step lessons, this is the most comprehensive reference-tutorial on 3ds Max on the market, and the one you'll turn to again and again.

Rendering With Mental Ray & 3ds Max

by Joep van der Steen - 2007 - 256 pages

Student Evaluation Methods:

Students will be graded in the areas listed below, based on a standard points system.

Homework – 5 pts

In-Class Assignments – 10 pts

Quizzes – 10 pts

Tests – 25 pts

Projects – 50 pts

Final Project – 100 pts

- Midterm and final exams written 2009

District Policy: