

USD 233 – OLATHE DISTRICT SCHOOLS

Course Title: Dynamic Effects

Credit: ½

Grade Level: 10, 11

Course Length: 1 Semester

Course Description:

More and more, films, television and video games are using dynamic effects to create a heightened sense of realism in their projects. In this course students will get hands-on experience making fire, explosions, smoke, steam, lightning, rain, snow storms and tornados are just some of the dynamic effects required by today's demanding visual effects companies. Students learn about the main hardware render types and what kind of effects they can be used for. Real world examples of how to create specific effects and integrate them with photographic elements will show you how hardware renders are used in a production environment.

Prerequisites: Animation II

Required Textbooks: TBA

Instructional Strategies: Direct instruction, demonstration, graphic organizers, application exercises, projects, cooperative groups, case studies, guest speakers, DVD(s), videos, internet.

Assessments: Daily work performance, teacher observation, rubric, checklist, classroom discussion, projects, research relevant to topic, application performance, exams, conferencing, portfolio, written response, sketchbook, journaling, self evaluation.

Course Objectives:

- Learn appropriate particle effects for specific purposes.
- Develop an understanding of particle effects structure.
- Learn to create a field to direct the movement of particles.
- Develop animations that show control of various particle attributes.
- Learn to set attributes for dynamic fluids to either repel or attract objects in the environment.
- Apply visual communications knowledge and skills to express ideas imaginatively.
- Use critical thinking, and problem solving to communicate ideas visually.
- Produce animations that demonstrate basic knowledge of expository and narrative communication processes and particle simulation.
- Develop skill in the use of techniques, procedures and dynamic effects concepts.
- Learn appropriate use of fluid effects to add impact and realism to a scene.

Course Content:

I. Introduction to Dynamic Effects

- Particles
- Dynamic Fluids
- Particle/Fluids Technology/Development

II. Dynamics Effects Production Process

- Production strategies
- Production Teams
- Dynamic Effects Simulations
- Dynamic Effects Production Work Flow

III. Simulate Particles

- Create particles
- Place particles on a surface
- Animate particles
- Work with particle attributes
- Edit particle attributes
- Choose how particles render
- Use lights, reflections, refractions, and shadows
- Set particle color
- Set particle opacity
- Set particle lifespan
- Set attributes on a per particle basis
- Set particle attributes with the Component Editor
- Set particle attributes with a ramp texture
- Instance animated geometry to particles
- Instance strokes from Paint Effects
- Use the PDC File Format

IV. Emitters

- Create emitters
- Edit attributes of an emitter
- Edit attributes of emitted particles

- Duplicate emitters
- Connect emitters and particles
- Vary emission from different points of point emitters
- Use a texture to color emission or scale the rate
- Work with emission randomness
- Spread emission more evenly from NURBS surfaces
- Emitter attributes and Power Animator equivalents

V. Fields

- Create fields and connect objects to them
- Edit field attributes
- Keep particles inside the volume
- Set field attributes with workspace manipulators
- Use manipulator icons
- Duplicate fields
- Air field
- Drag field
- Gravity field
- Newton field
- Radial field
- Turbulence field
- Uniform field
- Vortex field
- Volume Axis field

VI. Simulate Particle Collisions

- Make particles collide with a surface
- Edit particle collision attributes
- Duplicate collision effects
- Emit, kill, or split particles upon contact

VII. Goals

- Goals
- Create Goals
- Particle Goal
- Non particle Goal
- Multiple Goals
- Edit Goal Attributes
- Animate Goal Behavior
- Create curve flow
- Create a surface flow

- Surface Flow procedures

VIII. Animate Dynamics

- Set the initial state of dynamic objects
- Work with dynamic animation run-up
- Lessen playback time with dynamics
- Disable dynamics for particles or rigid bodies

IX. Particle Disk Caching

- Use particle disk caching
- Particle startup caching
- Memory caching
- Work with the dynamic relationship editor
- Connect or disconnect items
- Connect and disconnect gravity - example
- Connect to selected fields or emitters of an object

X. Render Particles

- Prepare to preview or render hardware particles
- Preview hardware particles
- Render hardware particles at final production quality
- View rendered hardware particles
- Rendering Utilities"Rendering UtilitiesRendering UtilitiesApply shadow casting to particles
- Software rendered particles
- Create raytraced shadows with particles
- Set Particle Sampler Info node attributes
- Work with advanced dynamics
- Make an object move with a dynamic parent
- Adjust frame-to-frame velocity conservation
- Apply forces in an object's local space
- Control execution time of particle dynamics
- Duplicate particle objects
- Assign image sequences to sprites
- Export particle data

XI. Fluid Effects

- Fluids
- Basic fluid concepts
- Methods for defining the contents of a fluid container

- Fluid examples
- Dynamic fluid effects
- Non-dynamic fluid effects
- Fluid containers
- Fluid properties

XII. Modify Fluids

- Change the size of a fluid container
- Change the resolution of a fluid
- Change dynamic fluid behavior
- Change fluid behavior at the container boundaries
- Convert fluids to polygons
- Modify fluid attributes
- Use fluid attribute presets

XIII. Make objects interact with dynamic fluids

- Make fluids collide with geometry
- Move geometry with the force of a fluid
- Move cloth with the force of a fluid
- Move particles with the force of a fluid
- Modify geometry with the force of a fluid

XIV. Motion fields

- Work with motion fields
- Create motion field

XV. Simulate dynamic fluids

- Set or delete the initial state of a fluid
- Save the current state of a fluid
- Cache the state of a fluid over multiple frames
- Create fluids cache files
- Append to cache files
- Delete and truncate cache files
- Load cache files
- Speed up playback
- Disable the solver
- Disable fluids collisions, emissions, and fields
- Disable display options

XVI. Create ocean effects

- Create ocean effects using example oceans
- Create new oceans
- Preview a patch of ocean
- Convert wave displacement to polygons
- Add locators
- Add a buoy to an ocean
- Make objects float
- Make boats float
- Create an Interactive boat simulation
- Understand ponds
- Understand wakes

XVII. Use fluids as textures

- Texture a fluid
- Apply a fluid texture to an object
- Assign a fluid shape material to a volume shape
- Shade particles using the fluid shape shader

XVIII. Render fluids

- Prepare to render fluids
- Cast fluid shadows onto objects
- Cast shadows onto fluids (fluids receive shadows)
- Set the properties of rendered images
- Render scenes with fluid effects
- Optimize rendering times
- Improve the render quality of fluids

XIX. Create fluid effects

- Import Fluid examples
- Create dynamic fluid effects
- Create non-dynamic fluid effects
- Create fluid containers
- Add properties to fluid containers
- Add properties as predefined gradients
- Emit fluid properties into grids
- Paint fluid properties into grids
- Add predefined initial states to fluid containers
- Add color to fluids
- Display fluid container contents

- Display sub-volumes of 3D containers
- Emit fluids from objects
- Set Contents with Curve

METHODS OF EVALUATION OF COMPETENCIES:

Evaluation of student mastery of course competencies will be accomplished using the following grading scale.

Grading:

A = 90 -100%

B = 80 - 89%

C = 70 - 79%

D = 60 - 69%

F = 0 - 59%

Extra Credit: The instructor must approve project.

0-5 points is given for extra credit per approved project. Project must be finished and handed in on specified date at the beginning of class. Only four approved projects per semester allowed.