

USD 233 – OLATHE DISTRICT SCHOOLS

Course Title: Intro to Dynamics

Credit: ½

Grade Level: 10, 11

Course Length: 1 Semester

Course Description:

In this introductory dynamics course, students will get hands-on experience making objects collide and interact with each other. They can make thundering waterfalls, swarms of bees, bubbling lava, water fountains, rock slides, speeding pod racers, a suspension bridge blowing in the wind.... the list of possible effects are endless.

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 dynamic simulations for specific purposes.
- Develop an understanding of the basic dynamic structure.
- Learn to create a field to direct the movement of rigid or soft bodies.
- Develop animations that show control of various dynamic attributes.
- 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 dynamic simulation.
- Develop skill in the use of techniques, procedures and dynamic concepts.
- Learn appropriate use of fire, smoke, fireworks, lightning, and shatter effects to add impact and realism to a scene.

Course Content:

I. Introduction to Dynamics

- Dynamics
- Dynamics Terminology
- Dynamics Technology/Development

II. Dynamics Production Process

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

III. Simulate Soft Bodies

- Create Soft Bodies
- Duplicate soft bodies
- Render soft bodies with motion blur
- Paint Soft Body Weights Tool
- Special uses of soft bodies
- Use attributes for advanced applications

IV. Goals

- Goals
- Create Goals
- Particle Goal
- Non particle Goal
- Multiple Goals
- Edit Goal Attributes
- Animate Goal Behavior

V. Simulate Springs

- Create Springs
- Springs on CV's
- Springs on Vertices
- Springs on Curves
- Springs on Polygonal Objects
- Spring on Lattice Points
- Edit Spring Operation

- Edit Spring Attributes

VI. Simulate Rigid Bodies

- Create rigid bodies
- Edit attributes of a rigid body
- Edit attributes of a rigid body solver
- Control complex motion and forces
- Convert rigid body animation to keys
- Segregate collisions with multiple solvers
- Work with rigid body constraints
- Create a Nail constraint
- Create a Pin constraint
- Create a Hinge constraint
- Create a Spring constraint
- Create a Barrier constraint
- Edit constraints
- Key and parent constraints

VII. Effects

- Create Fire
- Create Smoke
- Create fireworks
- Create lightning
- Create shatter
- Connect shards to fields
- 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. 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

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.

