ESSENTIAL CURRICULUM
FOR
ADVANCED ANIMATION

INTRODUCTION/OVERVIEW

Essential experiences are the experiences the learner is striving to attain upon completion of the various 3D Modeling and Animation Course components. The learner will reinforce the essential experiences while in the Advanced 3D Modeling and Animation Course. New experiences will be added onto previous ones making the program a cumulative process. The essential experiences will stress the cognitive as well as the technical. Teambuilding, collaboration, time management and social issues will also be introduced. The essential experiences are designed to build skills that are applicable to any future endeavor.

OVERVIEW

Students will have the ability to:
- Demonstrate practical experience in each of the 3D Modeling and Animation competencies. (User interface, objects and shapes, basic animation and controller types, low poly modeling, materials, lighting and cameras, and rendering).
- Select and develop an effective portfolio of work done in 3D Modeling and animation and related experiences.
- Use terminology and processes common to all modeling and animation strands.
- Solve a variety of 3D Modeling and Animation problems using technical verbal, visual, and written skills.
- Work effectively collaborating with team members, instructor, and peers.
- Develop organizational, leadership, and problem solving skills.
- Identify social concerns and apply ethical behavior.
- Recognize the role of 3D Modeling and Animation in a global marketplace.
- Use effective compositional skills in making 3D Models and Animations.
- Design solutions to problems that effectively fulfill the purpose.

DEVELOPMENTALLY APPROPRIATE ENTRY LEVEL SKILLS

Students will have the ability to:
- Recognize language of animation - modeling elements, principles of design, movement, lighting, etc., and apply them to 3D Modeling and Animation problems.
- Discriminate differences among various types of animation and modeling techniques.
- Use various conceptual and interdisciplinary approaches for the development of subject matter including imagination, observation, and memory, verbal to visual and experimental approaches.
- Understand and operate sophisticated computer hardware and software.
- Collect and analyze data, interpret results of research to solve problems
- Work constructively as a part of a team to achieve a common goal.
- Manage time to achieve long range goals.
- Work individually.
- Work and stay within the set parameters.

CULMINATING/EXIT COMPETENCIES

Students will have the ability to:
- Push limits of a concept while satisfying given parameters
- Revise ideas/solutions based upon critical analysis
- Identify and use the most effective methods to solve a 3D Modeling and Animation problem.
- Prepare a portfolio to choose an area of concentration.
- Apply multiple verbal, visual and written solutions to describe and solve a variety of visual problems.
- Utilize a variety of creative strategies to solve 3D Modeling and Animation problems.
- Engage in a collaboration and ongoing critical dialogue with instructor and peers.
- Participate in the monitoring of work through various in-process assessments (conferences, checklists, self evaluation).
- Create and maintain a digital and/or traditional sketchbook/journal or client file.

UNITS

UNIT I	New User Interface
UNIT II	Advanced Files and Objects
UNIT III	Advanced Rendering
UNIT IV	Overview Lab
UNIT V	Virtual Studio
UNIT VI	Modeling Characters
UNIT VII	Environmental and Low Poly Creation
UNIT VIII	Hair
UNIT IX	Cloth
UNIT X	Character Rigging
UNIT XI	Motion Capture
UNIT XII	Transforming Objects - Physics
UNIT XIII	Animation Lab
UNIT XIV	Creating Animated Materials
UNIT XV	Materials Lab
UNIT XV	Advanced Lighting
UNIT XVI	Rendering with Advanced Lighting & Cameras
UNIT XVII	Animation Careers
UNIT XVIII	Portfolio
UNIT XIX	Independent Project

OVERARCHING GOALS

Units I-IV New Features and tools available in 3ds max.

- Use the new User Interface to customize and understand animation work flow.
- Manage and create a variety of advanced file and object types.
- Render using multiple computers.
- Create specific rendering solutions based on output requirements.

Units V-IX Modeling.

- Create a Virtual Studio for more precise modeling
- Explore and create a variety of character model types.
- Model objects using fewer polygons.
- Create hair and cloth for use on characters.

Units X-XIII Animation.

- Rig a character using inverse and forward kinematics.
- Use motion capture files to rigged characters.
- Create gravity, wind, collision, aversion, etc.
- Merge objects from one scene to another.

Units XIV-XV Materials.

- Apply UVW Map modifiers to objects.
- Create and maintain a "personal" materials library.
- Use mental ray specific maps.
- Use various Map channels such as Diffuse, Opacity, Bump, and Reflection.
- Create advanced sub materials.
- Modify materials to change over time.

Units XVI-XII Lighting.

- Create lighting using radiosity.
- Utilize advanced volumetric lighting to create atmosphere.
- Render still images and videos with emphasis on advanced lighting and multiple cameras.

Units XVIII-XX Culmination.

- Create a detailed presentation on an animation career of interest.
- Generate specific examples of work related to the chosen career.
- Develop and refine exemplars and writings into a professional level portfolio.
- Produce an independent project that typifies the career of choice and also demonstrates the level of skills and knowledge acquired.

OBJECTIVES OF GOAL

Units I-IV New Features and tools available in 3ds max 8.

The student will have learned the use the new updated User Interface to customize and understand animation work flow. He/she will have managed and created a variety of advanced file and object types. Students in teams will set up and render using multiple computers called a Render Farm. Students will have created specific rendering solutions based on output requirements, such as image size, color depth, animation length, multiple camera angles, etc.

Units V-IX Modeling.

The student will have learned to create a Virtual Studio, by utilizing personal drawings and photographs, to aide in more precise modeling They will have explored and created a variety of character model types, including organic and mechanical. The modeling of objects using fewer polygons will have been perfected. Hair and cloth will have been created for use on their characters.

Units X-XIII Animation.

Students will have rigged a character using inverse and forward kinematics to create a character properly branched, connected and moveable. They will have used motion capture files to rigged characters applying live motion to modeled characters. They will have created realistic effects such as gravity, wind, collision, aversion, etc. They will have merged objects created or stored in one scene, to another.

Units XIV-XV Materials.

The student will have applied UVW Map modifiers, aligning and scaling material maps to objects. They will have used mental ray specific maps and various Map channels such as Diffuse, Opacity, Bump, and Reflection. Create advanced sub materials. They will have created and modified materials to change over time. They will have created and maintained a "personal" materials library.

Units XVI-XII Lighting.

Students will have created lighting using radiosity and utilized advanced volumetric lighting to create atmosphere. They will have rendered still images and videos with an emphasis on advanced lighting and multiple camera views.

Units XVIII-XX Culmination.

Students will have created a detailed presentation on an animation career of interest and generated specific examples of work related to the chosen career. They will have developed and refined exemplars and writings into a professional level portfolio. They will have produced an independent project that typifies the career of choice and that also demonstrates the level of skills and knowledge acquired.

Advanced Animation Essential Curriculum

Students will demonstrate the ability to use technology to solve 3D Modeling and Animation problems effectively.

> The student will be able to:
> - Students will demonstrate competency in the use of technology for each of the 3D Modeling and Animation units.
> - Students will explain how current and ongoing technology in 3D Modeling and Animation affects hardware and software.
> - Students will apply current technology to solve 3D Modeling and Animation problems.

Students will demonstrate the ability to become creative problem-solvers and risk takers who develop imaginative solutions verbally, visually, and in writing.

> Students will be able to:
> - Experiment with a variety of creative problem solving techniques to solve a problem.
> - Collect and analyze data and interpret results of research to solve problems.
> - Select the most appropriate method or methods to solve a problem.
> - Students will utilize various conceptual and interdisciplinary approaches for the solution of problems using imagination, observation, memory, verbal to visual and experimental approaches.

Students will demonstrate the ability to develop the ability to present an informed aesthetic viewpoint.

> Students will be able to:
> - Utilize modeling and animation elements and design principles and apply them to visual communication problems.
> - Discriminate among various aesthetic, theoretical and ethical viewpoints.
> - Contrast design solutions from various cultures and times.

Students will demonstrate the ability to collaborate with a team in all aspects of the development of an animation product, and exercise leadership skills.

> Students will be able to:
> - Participate with instructor and peers to engage in ongoing critical dialogue.
> - Work constructively with a team to develop an animation product.

Students will demonstrate the ability to evaluate their progress using a variety of assessment tools, and revise solutions accordingly.

Students will be able to:
- Participate in monitoring their work through various in-process assessments (conferences, checklists, self-evaluation, etc.) in collaboration with instructor and peers.
- Maintain a collective portfolio from class and related experiences to document the development of ideas and skills.

Students will demonstrate the ability to develop sensitivity for social, ethical and global concerns.

Students will be able to:
- Recognize the relationships between technical achievement and their impact on various societies.
- Identify various ways cultures and periods of time have used symbols, icons, and images.
- Identify and respond to ethical issues related to 3D Modeling and Animation.
- Identify issues related to the global market for visual communications.

Advanced Animation
Core and Sample Lessons

The following core and sample lessons address the complex issue of 3D Modeling and Animation problem solving. Each lesson is carefully structured to create an environment conducive to exploring the language of 3D Modeling and Animation. These lessons encourage the learner to explore 3D Modeling and Animation concepts, design principles and technical skills. The specific technical skills needed to execute practicum assignments are taught or developed through involvement with the problem.

Advanced Animation Core Lesson

Purpose: Recognize the variety of methods used as references for accurate modeling. Understand how 3D modeling works. Understand the applications for 3ds max results. Understand the industry standard terminology used in the software and in the manuals.
Specifications: Identify major modeling principles and explain their functions. Create an x y z series of images to be used as a modeling reference. Explain the relevance of the images used in the modeling process. Create digital automobile photographs from a model. The photographs should include all detail except the background. The images will be used to create a Virtual Studio.
Layout
* All originals will be maintained in a storage folder
* Documents will be assembled and presented, ultimately, in Acrobat PDF format.

Goals and Objectives:

Goal 1 - Students in the 3D Modeling and Animation course will acquire current and ongoing expertise using technology to interpret and solve 3D Modeling and Animation problems effectively.
Goal 2 - Students in the 3D Modeling and Animation course will become creative problem solvers and risk takers who develop imaginative solutions to 3D Modeling and Animation problems verbally and visually.
Objectives:
Students will apply current technology to solve 3D Modeling and Animation problems.
Students will experiment with a variety of creative problem solving techniques to solve a 3D Modeling and Animation problem.
Students will demonstrate competency in the use of terminology.
Students will select the most appropriate methods to create a PDF Portfolio book following given specifications.
Core Instruction for Project: Core experiences in the use of traditional and digital animation and a working knowledge of Adobe Acrobat and CorelDraw software.
Lesson Vignette: The ability to create or photograph reference images for accurate modeling is essential in the 3D Modeling and Animation course. Students need to be aware of their strengths and weaknesses in their use of industry standard techniques. Students will need to plan their work according to specifications and keep track of all related files as they progress.
Research/Cross Curricula Connections: Show examples and discuss animation techniques. Have the students explain in detail the effective use of each animation principle. Use the Internet and Information Center as resources.

Strategies for Creative Thinking: Analyze animations that contain poor examples of modeling, lighting, camera work, movement, etc. Evaluate your expectations based on the findings of above.

Student Assessment:

    Aesthetics: The Portfolio should have an appropriate cover that reflects the contents and book's purpose.

    Critical Response: Self-evaluation of progress. Peer, instructor, and mentor critique of completed Portfolio assignment PDF.

    Technical: Will be based on the inclusion of good animation examples, glossary and their effective use.

Complementary Activities:

    1. Find additional examples of a *specific* application for 3D Modeling and Animation.

    2. Design a 3D environment in panoramic format.

Assessment:

Evaluation: The students are to create an Acrobat PDF Portfolio with appropriate cover. The Portfolio should contain a Glossary and Animation exemplars.

The completed work will be within the limits of the listed specifications.

    Level 3: The student has successfully completed all of the Rubric Stem.

    Level 2: The student has partially completed the Rubric Stem.

    Level 1: The student has not completed any of the Rubric Stem.

Teacher Resources:

3ds max # fundamentals courseware, latest edition, discreet 12809-010000-5001A

Adobe Acrobat for Dummies