

**ADVANCED ANIMATION
COURSE CODE: 5351**

COURSE DESCRIPTION: Advanced Animation teaches students how to use Autodesk Maya to model, animate, and render with a focus on establishing a working knowledge of animation tools and techniques. Emphasis is placed on career awareness, fundamentals of modeling, storyboard creation, cameras and lighting. Students will learn how 3D technology is used for film, broadcast, and games and how it is rapidly becoming the medium of choice.

OBJECTIVE: Given the opportunity to participate in essential learning experiences in the classroom including the use of the necessary equipment, supplies, and facilities, the student, given the necessary number of instructional hours, will be able to perform the following core standards written for a one-unit course.

RECOMMENDED GRADE LEVELS: 10-12

COURSE CREDIT: 1 unit

PREREQUISITE: Foundations of Animation

COMPUTER REQUIREMENT: one computer per student

RECOMMENDED SOFTWARE: Autodesk Maya

RESOURCES:

www.mysctextbooks.com

A. SAFETY AND ETHICS

1. Identify major causes of work-related accidents in offices.
2. Describe the threats to a computer network, methods of avoiding attacks, and options in dealing with virus attacks.
3. Identify potential abuse and unethical uses of computers and networks.
4. Explain the consequences of illegal, social, and unethical uses of information technologies (e.g., piracy; illegal downloading; licensing infringement; inappropriate uses of software, hardware, and mobile devices).
5. Differentiate between freeware, shareware, and public domain software copyrights.
6. Discuss computer crimes, terms of use, and legal issues such as copyright laws, fair use laws, and ethics pertaining to scanned and downloaded clip art images, photographs, documents, video, recorded sounds and music, trademarks, and other elements for use in Web publications.

7. Identify netiquette including the use of e-mail, social networking, blogs, texting, and chatting.
8. Describe ethical and legal practices in business professions such as safeguarding the confidentiality of business-related information.

B. EMPLOYABILITY SKILLS

1. Identify positive work practices (e.g., appropriate dress code for the workplace, personal grooming, punctuality, time management, organization).
2. Demonstrate positive interpersonal skills (e.g., communication, respect, teamwork).

C. STUDENT ORGANIZATIONS

1. Explain how related student organizations are integral parts of career and technology education courses.
2. Explain the goals and objectives of related student organizations.
3. List opportunities available to students through participation in related student organization conferences/competitions, community service, philanthropy, and other activities.
4. Explain how participation in career and technology education student organizations can promote lifelong responsibility for community service and professional development.

D. USER INTERFACE

1. Use menu bars, command panels, and software navigation tools.
2. Demonstrate the ability to map between the various coordinate systems.
3. Compare and contrast use of Orthographic/Perspective Views.
4. Demonstrate the ability to select objects and sub objects.
5. Use positional transformations.

E. STORYBOARD FUNDAMENTALS

1. Create a story for a storyboard.
2. Describe the purpose of the 3d graphics and/or animation including the target audience.
3. List the objects.
4. Apply brainstorming techniques to focus development efforts.
5. Create scene-by-scene illustrations.
6. Outline and link action sequences.

F. MODELING

1. Create standard, extended and architectural primitives.

2. Modify object properties.
3. Transform and clone objects.
4. Create and use object arrays.
5. Build compound objects.
6. Construct spline objects.
7. Employ techniques to extrude a 2D object into a 3D object.
8. Apply modifiers that will rotate a spline to create a circular cross section.
9. Employ various techniques to modify edges, faces and vertices.
10. Convert objects to Editable Mesh, Poly, Patch and Nurbs.

G. APPLYING MATERIALS AND MAPS

1. Specify the ambient and diffused color of an object.
2. Specify the specular, reflective, and luminosity material properties of objects.
3. Add filters to an object.
4. Create various surface patterns such as smoke, tiles, and swirls.
5. Compare and contrast techniques for simulating land and water.
6. Create reflections and refractions on objects.
7. Create maps that will wrap an image onto an object.
8. Create maps that will modify the surface of an object.
9. Apply environmental maps for modifying background images.
10. Compare, contrast and use opacity versus transparency.

H. PAINT EFFECTS

1. Describe user interface for paint effects.
2. Create pressure curves.
3. Create cycling animation.
4. Create a custom brush.
5. Use paint effects mesh.
6. Modify object shading.
7. Change mesh settings and mesh environments.
8. Change texture settings.
9. Create illuminating and shadowing paint effects.

I. KEYFRAME ANIMATION

1. Define keyframe.
2. Create a simple keyframe animation using position.
3. Create a simple keyframe animation using rotation.
4. Edit keyframe animations using graph editor.
5. Describe how different tangent settings affect an animation.
6. Edit keyframe animations using dope sheet.
7. Create a keyframe animation using driven keys.

8. Create a keyframe animation using a motion path.

J. CHARACTER RIGGING

1. Define rigging tools.
2. Define skinning tools.
3. Create skeleton using joints.
4. Define inverse kinematics (IK) and forward kinematics (FK).
5. Describe parent/child hierarchy.
6. Use Influence Objects.
7. Impose limits and constraints on skeleton joints.

K. CHARACTER ANIMATION

1. Create IK handles and mirroring joints.
2. Create foot and knee controls.
3. Create a foot roll from scratch.
4. Create the back spine.
5. Connect back spine to legs.
6. Create back and hip controls.
7. Add constraints to controls.
8. Insert joints into a joint chain and head controls.
9. Build arms and arm IK controls.
10. Create fingers.
11. Adjust local rotation of the finger joints.
12. Use the paint weight tool to influence skin.

L. LIGHTING TECHNIQUES

1. Compare and contrast natural light versus artificial light.
2. Describe and use three-point lighting.
3. Apply principles of basic color theory to lighting.
4. Employ various lighting types.
5. Identify key principles in effective lighting.

M. CAMERA TECHNIQUES

1. Compare and contrast the difference between a free and a target camera.
2. Calculate and change camera's focal length.
3. Describe the impact of depth of field on an object.
4. Describe and apply the use of motion blur on an object.
5. Apply techniques to create shadows.

N. PARTICLE SYSTEMS, EFFECTS, AND FIELDS

1. Define effects, fields, and particles.
2. Create a particle emitter.
3. Apply a field to a particle system.
4. Create particle collisions.
5. Apply effects to an object.

O. RENDERING

1. Use animation position controllers.
2. Set key frames manually.
3. Create various object paths.
4. Ghost an object's trajectory.

Reviewed February 2010

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