



Department of Teaching & Learning
Parent/Student Course Information

Modeling and Simulation
(AT 8462)
Grades 10 - 12
Three Credits, One Year

Counselors are available to assist parents and students with course selections and career planning. Parents may arrange to meet with the counselor by calling the school's guidance department.

COURSE DESCRIPTION

In today's extremely competitive job market, it is more important than ever to have a marketable skill. Students who complete Trade and Industrial programs have the option to enter the job market directly or to continue their studies at two- or four-year colleges, community colleges, apprenticeship programs or professional technical institutions. Students learn Virginia's 21 Workplace Readiness Skills within the content area. Those who are completing a two-year sequence have the opportunity to verify their knowledge of the workplace readiness skills through an industry assessment.

This one-year course of student provides students with the opportunity to use 3ds max software to create, modify, light, animate and add special effects to virtual 3d models and environments that can be used to simulate activities in the medicine, transportation, military and in the gaming and advertising fields, just to name a few. Students should be co-enrolled in or previously successfully completed geometry. Some Computer Aided Drafting (CAD) experience is preferred. The majority of M & S post graduates pursue college degrees in Graphic Design, Computer Science and Engineering-related programs.

CERTIFICATION

Students prepare for the Auto Desk 3D Studio max Certification.

STUDENT ORGANIZATION

Skills USA is a co-curricular organization for all students enrolled in the trade and industrial education program. Participation in this organization provides opportunities for leadership development and recognition through competitive events at the local, regional and state levels. Students are highly encouraged to participate.

PREREQUISITE

None

OPTIONS FOR NEXT COURSE

Digital Design I, Engineering Technology I

REQUIRED STUDENT TEXTBOOK

None

COMPETENCIES FOR MODELING AND SIMULATION

Demonstrating Workplace Readiness Skills: Personal Qualities and People Skills

- 1 Demonstrate positive work ethic.
- 2 Demonstrate integrity.
- 3 Demonstrate teamwork skills.
- 4 Demonstrate self-representation skills.
- 5 Demonstrate diversity awareness.
- 6 Demonstrate conflict-resolution skills.
- 7 Demonstrate creativity and resourcefulness.

Demonstrating Workplace Readiness Skills: Professional Knowledge and Skills

- 8 Demonstrate effective speaking and listening skills.
- 9 Demonstrate effective reading and writing skills.
- 10 Demonstrate critical-thinking and problem-solving skills.
- 11 Demonstrate healthy behaviors and safety skills.
- 12 Demonstrate an understanding of workplace organizations, systems and climates.
- 13 Demonstrate lifelong-learning skills.
- 14 Demonstrate job-acquisition and advancement skills.
- 15 Demonstrate time-, task- and resource-management skills.
- 16 Demonstrate job-specific mathematics skills.
- 17 Demonstrate customer-service skills.

Demonstrating Workplace Readiness Skills: Technology Knowledge and Skills

- 18 Demonstrate proficiency with technologies common to a specific occupation.
- 19 Demonstrate information technology skills.
- 20 Demonstrate an understanding of Internet use and security issues.
- 21 Demonstrate telecommunications skills.
- 22 Examining All Aspects of an Industry
- 23 Examine aspects of planning within an industry/organization.
- 24 Examine aspects of management within an industry/organization.
- 25 Examine aspects of financial responsibility within an industry/organization.
- 26 Examine technical and production skills required of workers within an industry/organization.
- 27 Examine principles of technology that underlie an industry/organization.
- 28 Examine labor issues related to an industry/organization.
- 29 Examine community issues related to an industry/organization.
- 30 Examine health, safety and environmental issues related to an industry/organization.

Addressing Elements of Student Life

- 31 Identify the purposes and goals of the student organization.
- 32 Explain the benefits and responsibilities of membership in the student organization as a student and in professional/civic organizations as an adult.
- 33 Demonstrate leadership skills through participation in student organization activities, such as meetings, programs and projects.
- 34 Identify Internet safety issues and procedures for complying with acceptable use standards.

Getting Started Modeling

- 35 Identify different elements of the 3ds max interface.
- 36 Describe the functions of the elements of the 3ds max interface.
- 37 Explain the drawing planes used by 3ds max.
- 38 Set up a modeling session.

- 39 Save, close and open a 3ds max file
- 40 Creating Basic 3D Geometry (Standard Primitives)

Explain standard primitives.

- 41 Define parametric modeling.
- 42 Draw 3ds max standard primitives.

Creating Extended Primitives and Patch Grids

- 43 Define extended primitives.
- 44 Create various extended primitives.
- 45 Define patch grids.
- 46 Create a quad patch grid.
- 47 Create a tri patch grid.
- 48 Identify and practice good workplace readiness skills (work ethic and reading)

Creating Basic 3D Geometry (Shapes)

- 49 Define a 3ds max shape.
- 50 Identify the types of 3ds max spline shapes.
- 51 Create various 3ds max shapes.
- 52 Create text.
- 53 Create a section

Model Editing

- 61 Describe the different ways to reverse actions in 3ds max.
- 62 Explain different ways to select objects.
- 63 Define transforms and modifiers.

Transform objects.

- 64 Apply modifiers.
- 65 Explain and use sub-object mode.
- 66 Edit splines.
- 67 Hide and display objects.
- 68 Group, align, array and mirror objects using 3ds max tools.

Creating Compound Objects

- 69 Define loft objects, Boolean objects and terrain objects.
- 70 Create loft objects, Boolean objects and terrain objects.

Introduction to Materials and Rendering

- 71 Define rendering.
- 72 Explain materials.
- 73 Get a material from a library.
- 74 Apply a material to an object.
- 75 Create a rendering.
- 76 Save a rendering to a file.
- 77 Use image software to edit images.
- 78 Display an Active Shade viewport.

Modeling with Modifiers

- 79 Describe the functions of the mesh select and patch select modifiers.
- 80 Explain how an object with an edit patch modifier applied differs from an editable patch object.
- 81 Identify and use free form deformer modifiers (FFD).
- 82 Identify the types of materials used with a material modifier.
- 83 Explain the uses for xform and linked xform modifiers.
- 84 Identify applications for a normalize spline modifier.
- 85 List the major differences between world space modifiers and object space modifiers.

Advanced Compound Objects

- 86 Explain how to loft multiple shapes.
- 87 Create complex loft objects.
- 88 Explain the purpose of the Snap: spinner for a loft object.
- 89 Identify components of the Deformation dialog box.
- 90 Define and apply deformations.
- 91 Remove a twist from a loft object.
- 92 Explain morph, connect, Shape Merge and mesher objects.
- 93 Create a snapshot of displacement scene.

Adding Lighting

- 94 Create and use properly colored light and different types of lights.
- 95 Explain what a light is in relation to 3D modeling and animation.
- 96 Identify the four types of basic lighting in 3ds max.
- 97 Summarize lighting theory.

Adding Cameras

- 98 Define what a camera is in 3ds max.
- 99 Create cameras.
- 100 Define safe frame.
- 101 Explain and use camera matching.
- 102 Animate a camera.
- 103 Link a camera to an object for animation.

Hierarchy and Linking

- 97 Explain a hierarchy and list several advantages of its use.
- 98 Define terms used to describe hierarchies.
- 99 List the two types of hierarchical relationships 3ds max can create.
- 100 Explain the two general rules that apply to hierarchies.
- 101 Link child objects to parent objects.
- 102 Adjust pivot points.
- 103 Specify inheritance.
- 104 Lock object transformations.
- 105 Assign a link constraint.

Creating Basic Materials

- 106 List the types of materials you can create with 3ds max.
- 107 Explain the characteristics of different shading types.
- 108 Identify the components of a material's color.

- 109 Explain opacity and diffuse color.
- 110 Create basic materials.

Animation Concepts

- 111 Use 3-D modeling to define computer animation.
- 112 Identify the purpose of and analyze an existing storyboard.
- 113 Explain keys.
- 114 Set the animation length.
- 115 Define object motion blur and image motion blur.
- 116 Apply motion blur.
- 117 Use the Snapshot tool.
- 118 Define a dummy object.
- 119 Use a dummy object.
- 120 Use key elements of design to create storyboard.

Rendering and Animation Concepts

- 121 Explain the purpose of a preview animation.
- 122 Create a preview animation.
- 123 Change the background.
- 124 Set the animation output size.
- 125 Define alpha channel and explain its purpose.
- 126 Explain and apply rendering effects.
- 127 Render a final animation.

Using Track View

- 128 Identify parts of the Track View interface.
- 129 Define Track View.
- 130 Use block controllers.
- 131 Control object visibility using Track View.
- 132 Add notes and sound using Track View.
- 133 Add and adjust keys.
- 134 Explain the dope sheet and curve editor.

Careers and Electronic Portfolio

- 135 Create an Electronic Career Portfolio.
- 136 Generate a multi-media portfolio that includes examples of original student work.
- 137 Create documents for job seeking and placement. (Resume, cover letter, application, thank you)
- 138 Research careers related to computer animation.
- 139 Identify Internet safety issues and procedures for complying with acceptable use.

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For further information please call (757) 263-1070.

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2512 George Mason Drive, Virginia Beach, Virginia, 23456 or the Section 504 Coordinator at the student's school. For students who are eligible or suspected of being eligible for special education or related services under IDEA, please contact the Office of Programs for Exceptional Children at (757) 263-2400, Laskin Road Annex, 1413 Laskin Road, Virginia Beach, Virginia, 23451.

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