ITT Technical Institute

CD340T

Physical and Computer-Aided 3D Modeling

Onsite Course

SYLLABUS

Credit hours: 4

Contact/Instructional hours: 60 (36 Theory Hours, 24 Lab Hours)

Prerequisite(s) and/or Corequisite(s):

Prerequisites: CD230T Architectural Drafting II, CD250T Engineering Graphics II

Course Description:

Introduces the student to tools and skills used in the manipulation of two-dimensional materials to convert these into precise three-dimensional models of various forms, products or architectural space layouts. Students will also use software to model objects and spaces with light, shadows, color and textures that are placed in appropriate backgrounds.

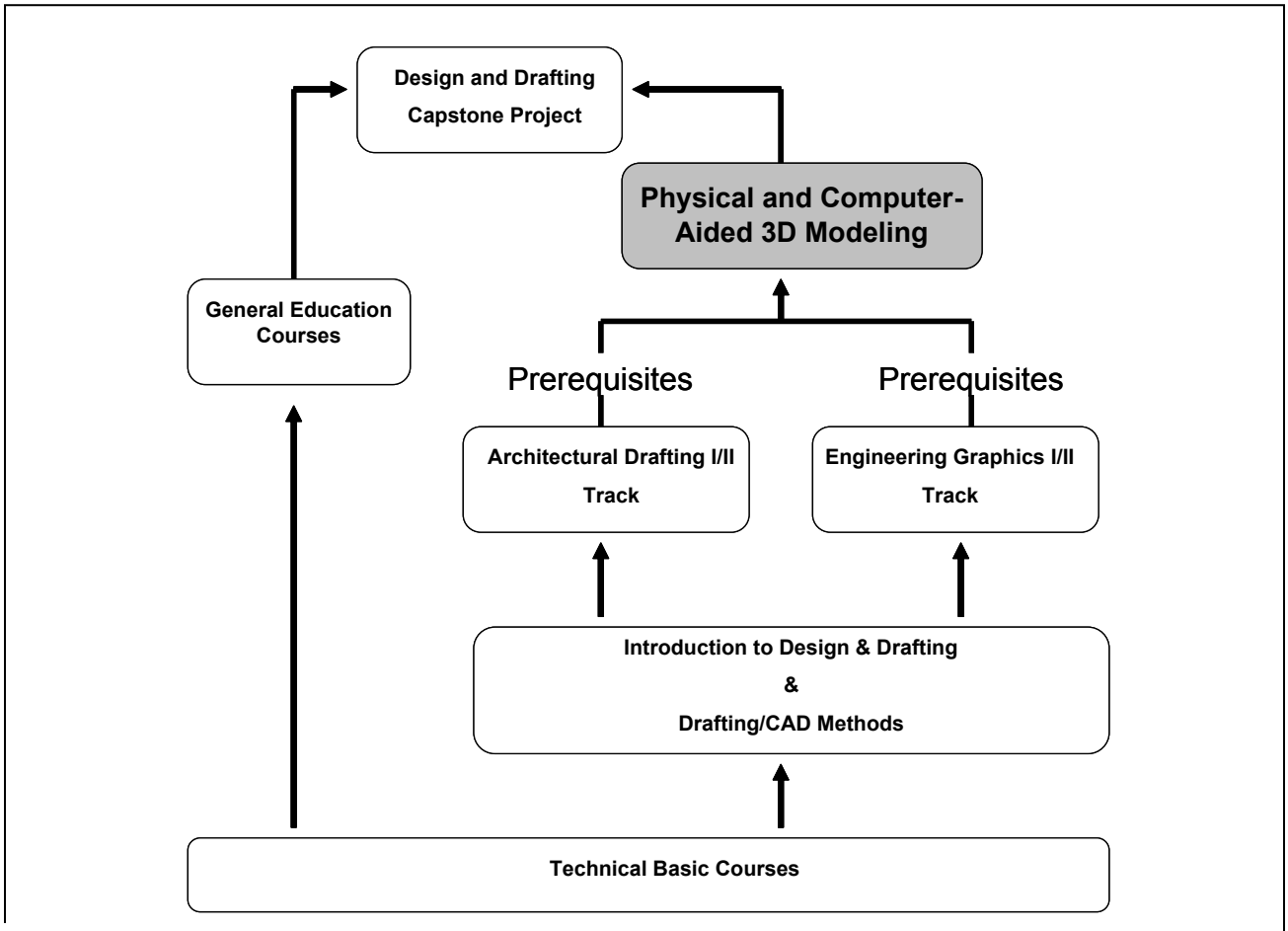
Where Does This Course Belong?

How does this course relate to the program? Take a look!

Physical and Computer-Aided 3D Modeling is a course required to achieve an Associate's Degree in the Computer Drafting and Design program.

Many industries use drafters who can translate ideas, sketches and specifications of an engineer, architect or designer into complete and accurate working plans needed to make products, engineer projects or create structures. Graduates may begin their careers in a variety of entry-level positions in various fields involving drafting and design, some of which include mechanical drafting, piping drafting, architectural and construction drafting, civil drafting, interior design, illustration and design detailing.

The following course sequence provides an overview of how Physical and Computer-Aided 3D Modeling fits in the program.



Note: Refer to the catalog for the state-specific course information.

Syllabus: Physical and Computer-Aided 3D Modeling

Instructor: _____

Office hours: _____

Class hours: _____

Course Description

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Major Instructional Areas

1. Basics of physical modeling
2. Exploring Autodesk 3ds Max Design
3. Basic modeling: primitives, splines, and shape and parametric modifiers
4. Lighting and shadows
5. Materials and maps
6. Portfolio

Course Objectives

1. Create physical models using desktop modeling techniques, tools, and materials.
2. Navigate the Autodesk Max Design interface and 3D world.
3. Use snaps and other precision tools in 3ds Max Design.
4. Create 3D models using spline and polygonal modeling techniques.
5. Design models using shape and parametric modifiers.
6. Create a 3D scene with realistic materials and maps.
7. Create realistic 3D scenes using AEC extended objects, stairs, doors, and windows.
8. Manipulate realistic materials using the Material Editor.
9. Apply realistic lighting to a 3D scene.
10. Apply basic camera animation to a scene.
11. Select visual designs to be included in a portfolio.

SCANS Objectives

SCANS is an acronym for Secretary's Commission on Achieving Necessary Skills. The committee, created by the National Secretary of Labor in the early 1990s, created a list of skills and competencies that the committee feels are necessary for employees to function in a high-tech job market.

1. Respond to written directions.
2. Participate in conversation, discussion, and group demonstrations.
3. Perform basic computations; use basic numerical concepts such as whole numbers and percentages in practical situations; make reasonable estimates of arithmetic results without a calculator; and use tables, graphs, diagrams, and charts to obtain or convey quantitative information.
4. Explain meaning of unknown or technical vocabulary and judge the accuracy and appropriateness for use for a designated audience.

Course Outline

Note: All graded activities, except the projects, are listed below in the pattern of <Unit Number>.<Assignment Number>. For example, Labs: 2.1 refers to the 1st lab activity in Unit 2.

Unit	Activities
1—Introduction to Physical and Computer-Aided Modeling	Content Covered: *Physical and Computer-Aided 3D Modeling*: o Chapter 1, "Introduction to Three-Dimensional Presentation" o Chapter 3, " Interacting with Autodesk 3ds Max Design" o Chapter 4, "The Fast Lane" o Chapter 19, "The Need for Physical Modeling" o Chapter 20, " The Design Process in Desktop Modeling" o Chapter 21, "Materials in Desktop Modeling" o Chapter 22, " Tools for Desktop Modeling" Labs: 1.1
2—Beginning Modeling	Readings: *Physical and Computer-Aided 3D Modeling*: o Chapter 5, "Moving About the 3D World" o Chapter 6, "Basics of Creation" o Chapter 7, " Basics of Editing" o Chapter 23, "Foamcore Modeling" Labs: 2.1-2.2
3—Modeling Primitives, Shapes, and Modifiers	Readings: *Physical and Computer-Aided 3D Modeling*: o Chapter 8, "Basic Modeling: Primitives, Shapes, and Shape and Parametric Modifiers" Quizzes: 3.1 Labs: 3.1
4—Advanced Modeling in 3ds Max Design	Readings: *Physical and Computer-Aided 3D Modeling*: o Chapter 9, "Advanced Modeling: Compound Objects" Labs: 4.1 Unit Project 1 due
5—Architectural Modeling	Readings: *Physical and Computer-Aided 3D Modeling*: o Chapter 10, " Special Modeling: AEC Objects" o Chapter 24, "Matboard Modeling" Labs: 5.1-5.2
6—Cameras, Lights, and Rendering	Readings: *Physical and Computer-Aided 3D Modeling*: o Chapter 11, "A Brighter Outlook: Cameras, Lights and Rendering" Quizzes: 6.1 Labs: 6.1
7—Material Creation	Readings:

Unit	Activities
and Application in 3ds Max Design	*Physical and Computer-Aided 3D Modeling*: ○ Chapter 12, "A New Coat of Paint: Materials Creation and Applications" Labs: 7.1 Unit Project 2 due
8—Basic Animation	Readings: *Physical and Computer-Aided 3D Modeling*: ○ Chapter 13, "Let's Get Moving: Animation" ○ Chapter 25, "Clay Modeling" Labs: 8.1-8.2
9—Advanced Camera and Lighting Techniques	Readings: *Physical and Computer-Aided 3D Modeling*: ○ Chapter 15, "Still Life: Working with Light and Shadow" Quizzes: 9.1 Labs: 9.1
10—Portfolio Development	Portfolio Selection and Revision Labs: 10.1
11—Course Review and Project Presentations	Course Review Course Project Submission, Presentation, and Critique

Instructional Methods

This course is broken into two sections: Physical Modeling and Computer-Aided 3D Modeling.

Physical and 3D computer modeling are used in combination to develop new products and in architectural and civil projects. Physical modeling introduces you to tools and skills used in the manipulation of two-dimensional materials and convert these into precise three-dimensional models of various forms. You will also use the Autodesk Max software to model 3D objects, apply materials and mapping, add light sources to create effects such as shadows, and arrange camera views to create realistic renderings.

The curriculum is designed to promote a variety of teaching strategies that support the outcomes describe in the course objectives and that foster high cognitive skills. Your progress will be regularly assessed using various accessible methods and tools. Classroom practices will create a climate of high values with respect to both diversity and inclusiveness. An open communication environment will help to ensure useful interactions between students and the instructor and among students themselves.

Instructional Materials and References

Student Textbook Package

- Ethier, S. J., & Ethier, C. A. (2012). Physical and Computer-Aided 3D Modeling (Custom 3rd ed.). Boston, MA: Pearson Custom

- Ethier, S. J., & Ethier, C. A. (2012). Physical and Computer-Aided 3D Modeling Student CD (Custom 2nd ed.). Boston, MA: Pearson Custom.

References

ITT Tech Virtual Library
Log on to the ITT Tech Virtual Library at http://library.itt-tech.edu/ to access online books, journals, and other reference resources selected to support ITT Tech curricula.

Recommended Links

ITT Tech Virtual Library> School of Study> School of Drafting and Design> Recommended Links>

Dictionaries>

- CAD/CAM Glossary

Professional Organizations>

- American Design Drafting Association
- Autodesk User Group International (AUGI)
- Women in Technology International WITI)

Recommended Links>

- Autodesk Support
- MatWeb Material Property Data

Other References

The following resources may be found **outside** of the ITT Tech Virtual Library, whether online or in hard copy.

Periodicals

You may click "Periodicals" from the Main Menu or use the "E-Journal Look-up" function on the home page to find the following periodicals.

- 3D World Magazine
  http://www.3dworldmag.com
- CAD User Magazine

http://www.caduser.com

- CAD Digest

http://www.caddigest.com

- CADALYST Online

http:// www.cadalyst.com

- CADinfo.NET

http://www.cadinfo.net

- Computer Graphics World
  http://www.cgw.com

Websites

- Woodcentral
  http://woodcentral.com
  Forum for woodworkers covering tools and techniques
- Glue-it
  http://www.glue-it.com
  Links, glossaries, and resources for model makers
- Association of Professional Model Makers
  http://www.modelmakers.org
  Professional organization for model makers
- CGArchitect: The Global Community for Architectural Visualization Professionals
  http://www.cgarchitect.com
  An online magazine for architectural artists and architects who specialize in computer graphics and illustration

- Autodesk
  http://www.autodesk.com
  Web site for vendor of 2D and 3D design software
- 3dRender
  http://www.3drender.com
  Information about 3D lighting
- Evermotion
  http://www.evermotion.org
  High-end 3D examples, downloads, and tutorials
- Engineers Edge
  http://www.engineersedge.com
  Information and resources for designers, engineers, and manufacturing professionals
- 3d Diva
  http://www.3d-diva.com

Good site for architectural textures

- Max Forums

http://www.maxforums.org

A good forums site for max users of various skill levels

- VRay Materials

http://www.vray-materials.de

A great site for Vray textures

- 3DM

http://www.3dm.net

Another good site for beginners that has free textures, art, tutorials and other goodies

Links to web references are always subject to change without prior notice.

Course Evaluation and Grading

Evaluation Criteria Table

The final grades will be based on the following categories:

CATEGORY	WEIGHT
Quizzes	20%
Unit Projects	20%
Labs	30%
Course Project	30%
Total	**100%**

Note: Students are responsible for abiding by the Plagiarism Policy.

Grade Conversion Table

The final grades will be calculated from the percentages earned in the course, as follows:

A	90–100%	4.0
B+	85–89%	3.5
B	80–84%	3.0

C+	75–79%	2.5
C	70–74%	2.0
D+	65–69%	1.5
D	60–64%	1.0
F	<60%	0.0

(End of Syllabus)