

ITT Technical Institute
CD340P
Physical and Computer-Aided 3D
Modeling
Onsite and Online Course

SYLLABUS

Credit hours: 4

Contact/Instructional hours: 66 (46 Theory Hours, 20 Lab Hours)

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

Prerequisites: CD230P Architectural Drafting II, CD250P 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.

COURSE SUMMARY

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.

MAJOR INSTRUCTIONAL AREAS

1. Exploring Autodesk 3ds Max Design
2. Basic Modeling: Primitives, Splines, and Shape and Parametric Modifiers
3. Lighting and Shadows
4. Materials and Maps
5. Portfolio

COURSE LEARNING OBJECTIVES

By the end of this course, you should be able to:

1. Navigate the Autodesk Max Design interface and 3D world.
2. Design and model surfaces with complex curves.
3. Use precision tools to apply additional control when creating, moving, rotating, and scaling objects to specific portions of existing geometry.
4. Create 3D models using spline and polygonal modeling techniques.
5. Design models with 3D geometry and 2D shapes, and apply parametric modifiers to those objects.
6. Create a 3D scene with materials and models.
7. Create 3D architectural and engineering models using AEC extended objects, stairs, doors, and windows.
8. Import models from other 3D modeling programs and use 3ds Max Design to modify existing models, create and apply materials, and render camera views and scenes.
9. Create and manipulate stylized materials using the compact Material Editor.

10. Apply lighting systems to a 3D scene to mimic the lighting of interior and exterior environments.
11. Select and enhance previous drafting and design work to be included in a portfolio.

COURSE OUTLINE

MODULE 1: EXPLORING 3D MODELING

COURSE LEARNING OBJECTIVES COVERED

- Navigate the Autodesk Max Design interface and 3D world.
- Design and model surfaces with complex curves.

TOPICS COVERED

- Three-Dimensional Creation
- Application of 3ds Max
- Navigation Methods
- Basic Rendering

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Ethier, S. J., & Ethier, C. A., Chapters 1, 2, and 3.	No	6.5 hr
Lesson: Study the lesson for this module.	No	1.5 hr
Discussion: Participate in the discussion titled “3ds Max Design and 3D Modeling.”	Yes	N/A
Lab: Complete the lab titled “Moving About the 3D World.”	Yes	N/A
Quiz: Prepare for Quiz 1.	No	1 hr
Project: Read and begin the project.	No	0.5 hr

Total Out-Of-Class Activities: 9.5 Hours

MODULE 2: PREPARATION FOR 3D MODELING

COURSE LEARNING OBJECTIVES COVERED

- Use precision tools to apply additional control when creating, moving, rotating, and scaling objects to specific portions of existing geometry.
- Create 3D models using spline and polygonal modeling techniques.
- Import models from other 3D modeling programs and use 3ds Max Design to modify existing models, create and apply materials, and render camera views and scenes.

TOPICS COVERED

- Object Orientated Design
- Views and Viewports in 3ds Max
- Modeling and Editing
- Applying Mapping Coordinates
- Basics of Editing

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Ethier, S. J., & Ethier, C. A., Chapters 5, 6, and 7.	No	6 hr
Lesson: Study the lesson for this module.	No	2 hr
Lab 1: Complete the lab titled "Spline and Polygonal Modeling."	Yes	N/A
Lab 2: Complete the lab titled "Using Precision Tools."	Yes	N/A
Research: Submit the research assignment titled "Applications of Spline and Polygonal Modeling."	Yes	4 hr
Quiz: Take Quiz 1.	Yes	N/A
Project: Continue work on Project Part 1.	No	3 hr

Total Out-Of-Class Activities: 15 Hours

MODULE 3: IMPLEMENTING 3D MODELING

COURSE LEARNING OBJECTIVES COVERED

- Design models with 3D geometry and 2D shapes, and apply parametric modifiers to those objects.
- Create a 3D scene with materials and models.

TOPICS COVERED

- Primitives and Patches
- Lofting and Boolean Operations
- Shapes and Parametric Modifiers
- Advance Modeling and Compound Object

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Ethier, S. J., & Ethier, C. A., Chapters 4, 8, and 9.	No	6 hr
Lesson: Study the lesson for this module.	No	2 hr
Discussion: Participate in the discussion titled “Lofting and Boolean Operations.”	Yes	N/A
Lab 1: Complete the lab titled “Parametric Modifiers.”	Yes	N/A
Lab 2: Complete the lab titled “3D Scene with Materials.”	Yes	N/A
Project: Submit Project Part 1.	Yes	5 hr

Total Out-Of-Class Activities: 13 Hours

MODULE 4: ARCHITECTURAL MODELING AND WORKING WITH CAMERAS

COURSE LEARNING OBJECTIVES COVERED

- Create 3D architectural and engineering models using AEC extended objects, stairs, doors, and windows.
- Import models from other 3D modeling programs and use 3ds Max Design to modify existing models, create and apply materials, and render camera views and scenes.
- Apply lighting systems to a 3D scene to mimic the lighting of interior and exterior environments.

TOPICS COVERED

- AEC Objects and Modeling
- Using Camera View and Camera Navigation
- Transforming and Modifying the Command Panel
- Light Basics, Including Placing and Modifying

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Ethier, S. J., & Ethier, C. A., Chapters 10 and 11.	No	5 hr
Reading: Biehler, J., & Fane, B., Review Chapters 1 and 2.	No	2 hr
Lesson: Study the lesson for this module.	No	2 hr
Discussion: Participate in the discussion titled “Emerging Technologies in 3D Modeling.”	Yes	1 hr
Lab 1: Complete the lab titled “Lighting of Interior and Exterior.”	Yes	N/A
Lab 2: Complete the lab titled “Special Modeling: AEC Objects.”	Yes	N/A
Quiz: Prepare for Quiz 2.	No	1 hr
Project: Continue work on Project Part 2.	No	5 hr

Total Out-Of-Class Activities: 16 Hours

MODULE 5: CREATING 3D MATERIAL

COURSE LEARNING OBJECTIVES COVERED

- Import models from other 3D modeling programs and use 3ds Max Design to modify existing models, create and apply materials, and render camera views and scenes.
- Create and manipulate stylized materials using the compact Material Editor.

TOPICS COVERED

- Material Editor
- Applying and Creating Material
- Mapping to Create Special Effects

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Ethier, S. J., & Ethier, C. A., Chapters 12 and 13.	No	5 hr
Reading: Biehler, J., & Fane, B., Chapter 4.	No	2 hr
Lesson: Study the lesson for this module.	No	2 hr
Discussion: Participate in the discussion titled “Creating Materials Versus Physical Modeling.”	Yes	N/A
Lab: Complete the lab titled “Materials Creation and Applications.”	Yes	N/A
Quiz: Take Quiz 2.	Yes	N/A
Project: Continue work on Project Part 2.	No	6 hr

Total Out-Of-Class Activities: 15 Hours

MODULE 6: UPDATING ePORTFOLIO AND PROJECT FINALIZATION

COURSE LEARNING OBJECTIVES COVERED

- Select and enhance previous drafting and design work to be included in a portfolio.

TOPICS COVERED

- Scene Composition
- Test Rendering
- Updating ePortfolio

MODULE LEARNING ACTIVITIES	GRADED	OUT-OF-CLASS TIME
Reading: Ethier, S. J., & Ethier, C. A., Chapter 15.	No	1 hr
Reading: ITT Tech Virtual Library> Basic Search> D'Aveni, R. (2015). The 3-D Printing Revolution. <i>Harvard Business Review</i> .	No	2 hr
Lesson: Study the lesson for this module.	No	1 hr
Lab: Complete the lab titled "ePortfolio."	Yes	N/A
Project: Submit Project Part 2.	Yes	5 hr

Total Out-Of-Class Activities: 9 Hours

EVALUATION AND GRADING

EVALUATION CRITERIA

The graded assignments will be evaluated using the following weighted categories:

CATEGORY	WEIGHT
Lab	30%
Discussion	10%
Project	30%
Quiz	15%
Research	15%
TOTAL	100%

GRADE CONVERSION

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

GRADE	PERCENTAGE
A (4.0)	90–100%
B+ (3.5)	85–89%
B (3.0)	80–84%
C+ (2.5)	75–79%
C (2.0)	70–74%
D+ (1.5)	65–69%
D (1.0)	60–64%
F (0.0)	<60%

LEARNING MATERIALS AND REFERENCES

REQUIRED RESOURCES

COMPLETE TEXTBOOK PACKAGE

- Ethier, S. J., & Ethier, C. A. (2015). *Physical and computer-aided 3D modeling (Custom 5th ed.)*. Boston, MA: Pearson Custom.
- Biehler, J., & Fane, B. (2014). *3D Printing with Autodesk 123D: Create and Print 3D Objects with 123D, AutoCAD and Inventor*. Indianapolis, IN: Que.

OTHER ITEMS

- Autodesk 3ds Max Design
- Ethier, S. J., & Ethier, C. A. (2015). Physical and Computer-Aided 3D Modeling Student CD (Custom 5th ed.):
https://media.pearsoncmg.com/pls/us/itt-tech/1323252908/3dsMaxDesign2015-CD_PEAR_ID_000200010272000079.zip

RECOMMENDED RESOURCES

- Books and Professional Journals
 - Derakhshani, R., & Derakhshani, D. (2012). *Autodesk 3ds Max 2012 Essentials*.
- Professional Associations
 - ACADIA: The Association for Computer Aided Design in Architecture is an international network of digital design researchers and professionals. We facilitate critical investigations into the role of computation in architecture, planning, and building science, encouraging innovation in design creativity, sustainability, and education. (<http://acadia.org>)
- ITT Tech Virtual Library (accessed via Student Portal | <https://studentportal.itt-tech.edu>)
 - School of Study> School of Drafting and Design> Recommended Links>
 - Graphics> 3D Total> Free Tutorials> 3ds Max.
 - Models & Drawings> 3D ContentCentral.

- Other References
 - 3ds Max Interface Overview
<http://knowledge.autodesk.com/support/3ds-max/learn-explore/caas/CloudHelp/cloudhelp/2015/ENU/3DSMax/files/GUID-212A9477-E69E-4174-BB6F-1B7FD97A4281-hm.html?v=2015>
 - Autodesk
<http://knowledge.autodesk.com/support/3ds-max>
 - Digital-Tutors
<http://www.digitaltutors.com/tutorial/1180-Introduction-to-Modeling-in-3ds-Max-2014>
 - Lynda.com
<http://www.lynda.com/ds-Max-training-tutorials/138-0.html>

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INSTRUCTIONAL METHODS AND TEACHING STRATEGIES

The curriculum employs a variety of instructional methods that support the course objectives while fostering higher cognitive skills. These methods are designed to encourage and engage you in the learning process in order to maximize learning opportunities. The instructional methods include but are not limited to lectures, collaborative learning options, use of technology, and hands-on activities.

To implement the above-mentioned instructional methods, this course uses several teaching strategies, such as hands-on labs and discussions that will help you in exploring the 3D modeling. Your progress will be regularly assessed through a variety of assessment tools including discussions, labs, quizzes, research assessments, and a project.

OUT-OF-CLASS WORK

For purposes of defining an academic credit hour for Title IV funding purposes, ITT Technical Institute considers a quarter credit hour to be the equivalent of: (a) at least 10 clock hours of classroom activities and at least 20 clock hours of outside preparation; (b) at least 20 clock hours of laboratory activities; or (c) at least 30 clock hours of externship, practicum or clinical activities. ITT Technical Institute utilizes a “time-based option” for establishing out-of-class activities which would equate to two hours of out-of-class activities for every one hour of classroom time. The procedure for determining credit hours for Title IV funding purposes is to divide the total number of classroom, laboratory, externship, practicum and clinical hours by the conversion ratios specified above. A clock hour is 50 minutes.

A credit hour is an artificial measurement of the amount of learning that can occur in a program course based on a specified amount of time spent on class activities and student preparation during the program course. In conformity with commonly accepted practice in higher education, ITT Technical Institute has institutionally established and determined that credit hours awarded for coursework in this program course (including out-of-class assignments and learning activities described in the “Course Outline” section of this syllabus) are in accordance with the time-based option for awarding academic credit described in the immediately preceding paragraph.

ACADEMIC INTEGRITY

All students must comply with the policies that regulate all forms of academic dishonesty or academic misconduct. For more information on the academic honesty policies, refer to the Student Handbook and the School Catalog.

INSTRUCTOR DETAILS

Instructor Name	
Office Hours	
Contact Details	

(End of Syllabus)