

**APTECH 57 Course Outline as of Fall 2021****CATALOG INFORMATION**

Dept and Nbr: APTECH 57 Title: ADVANCED AUTOCAD

Full Title: Advanced AutoCAD

Last Reviewed: 1/25/2021

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	2.00	17.5	Lecture Scheduled	35.00
Minimum	3.00	Lab Scheduled	3.00	6	Lab Scheduled	52.50
		Contact DHR	0		Contact DHR	0
		Contact Total	5.00		Contact Total	87.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 70.00

Total Student Learning Hours: 157.50

Title 5 Category: AA Degree Applicable

Grading: Grade Only

Repeatability: 00 - Two Repeats if Grade was D, F, NC, or NP

Also Listed As:

Formerly:

**Catalog Description:**

Computer-aided drafting using the AutoCAD software program. Areas covered include: advanced layout, construction and editing techniques, advanced dimensioning practices, three-dimensional (3D) modeling and rendering, software customization, project-oriented architectural, civil and mechanical engineering applications, and an introduction to computer animation with 3ds Max.

**Prerequisites/Corequisites:**

Course Completion of APTECH 46

**Recommended Preparation:****Limits on Enrollment:****Schedule of Classes Information:**

Description: Computer-aided drafting using the AutoCAD software program. Areas covered include: advanced layout, construction and editing techniques, advanced dimensioning practices, three-dimensional (3D) modeling and rendering, software customization, project-oriented architectural, civil and mechanical engineering applications, and an introduction to computer

animation with 3ds Max. (Grade Only)

Prerequisites/Corequisites: Course Completion of APTECH 46

Recommended:

Limits on Enrollment:

Transfer Credit: CSU;

Repeatability: Two Repeats if Grade was D, F, NC, or NP

## **ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:**

<b>AS Degree:</b>	<b>Area</b>	Effective:	Inactive:
<b>CSU GE:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>IGETC:</b>	<b>Transfer Area</b>	Effective:	Inactive:
<b>CSU Transfer:</b>	Transferable	Effective: Spring 1991	Inactive:
<b>UC Transfer:</b>		Effective:	Inactive:

**CID:**

**Certificate/Major Applicable:**

Both Certificate and Major Applicable

## **COURSE CONTENT**

### **Student Learning Outcomes:**

At the conclusion of this course, the student should be able to:

1. Produce architectural and engineering CAD-generated drawings.
2. Utilize AutoCAD to create three-dimensional architectural and engineering models.
3. Produce finished drawings on titled sheets including advanced dimensioning, annotations, bill-of-materials, and drawing legends.

### **Objectives:**

At the conclusion of this course, the student should be able to:

1. Set up and utilize the AutoCAD software program within various architecture, engineering, and construction industry situations.
2. Identify and use proper construction and editing techniques necessary for effective industry related layout work.
3. Demonstrate proficiency setting up dimensioning parameters for various architecture, engineering, and construction industry situations.
4. Construct wire-frame, surface, mesh, and solid 3D models within the AutoCAD software program.
5. Produce computer renderings from 3D CAD files.
6. Create and utilize a personal AutoCAD profile that will result in more efficient use of the software.
7. Produce an architectural drafting/design project that includes:
  - a. Site plan
  - b. Floor plan
  - c. 3D model
  - d. Exterior elevations
8. Produce a mechanical engineering drafting design project that

includes:

- a. 3D parts files
  - b. Assembly drawing
  - c. Detailed parts drawings
  - d. Stereo lithography files (STL) for 3D-printing use
9. Create a computer animation of a mechanical assembly

## **Topics and Scope:**

- I. AutoCAD Software Setup for Various Industry Disciplines
  - A. Template files
  - B. System variables
  - C. Units
  - D. Layer conventions
  - E. Text styles
  - F. Dimension styles
  - G. Layouts
  - H. Single and multiple file strategies
- II. Construction and Editing in Layout Techniques
  - A. Orthographic projections
  - B. Geometric constructions
- III. Industry Standard Dimensioning
  - A. Dimension and extension lines
  - B. Symbols and arrows
  - C. Text
  - D. Fit
  - E. Primary units
  - F. Alternate units
  - G. Tolerances
- IV. Planar to Three-Dimensional Objects and Creation Techniques
  - A. Lines, splines, polylines
  - B. 3Dface
  - C. Region
  - D. Mesh Modeling
  - E. Solid primitives
  - F. Boolean operations: union, subtract, interfere, and intersect
  - G. Extrude
  - H. Revolve
  - I. Loft
  - J. Sweep
- V. Computer Renderings
  - A. Material assignment
  - B. Lighting
  - C. Environment
  - D. Still image generation and printing
- VI. Interface Configuration
  - A. Ribbon organization
  - B. Toolbars
  - C. Tool palettes
  - D. Keystrokes
  - E. Workspaces
- VII. Architectural Drafting/Design Drawings

- A. Site plan
- B. Floor plan
- C. 3D model
- D. Exterior elevations

#### VIII. Mechanical Engineering Drafting/Design Drawings

- A. 3D parts files
- B. Assembly drawing
- C. Detailed parts drawings
- D. Stereo lithography files

#### IX. Computer Animation of a Mechanical Assembly

- A. Material assignment
- B. Lighting
- C. Camera animation
- D. Rendering

The above Topics and Scope apply to both lecture and lab course components in an integrated format.

#### Assignment:

1. Reading (5 - 10 pages per week)
2. Weekly CAD exercises
3. Homework: Computer generated CAD drawings (12)
4. Quizzes (2 - 4)
5. Final exam

#### Methods of Evaluation/Basis of Grade:

**Writing:** Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

None, This is a degree applicable course but assessment tools based on writing are not included because problem solving assessments are more appropriate for this course.

Writing  
0 - 0%

**Problem Solving:** Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

CAD exercises and drawings

Problem solving  
65 - 80%

**Skill Demonstrations:** All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

None

Skill Demonstrations  
0 - 0%

**Exams:** All forms of formal testing, other than skill performance exams.

Quizzes and Final Exam
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Exams 20 - 35%
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**Other:** Includes any assessment tools that do not logically fit into the above categories.

None
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Other Category 0 - 0%
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**Representative Textbooks and Materials:**

AutoCAD 2021: A Problem Solving Approach. 27th ed. Tickoo, Sham. CADCIM Technologies. 2020

AutoCAD and Its Applications: Comprehensive 2020. 27th ed. Shumaker, Terence, et al.

Goodheart-Willcox. 2020

Instructor prepared materials