

## Computer Aided Drafting for Architecture

PEIMS Code: N1300429

Abbreviation: CAD4ARCH

Grade Level(s): 10–12

Award of Credit: 1.0

### State Approved Innovative Course

- Districts must have local board approval to implement innovative courses.
- In accordance with Texas Administrative Code (TAC) §74.27, school districts must provide instruction in all essential knowledge and skills identified in this innovative course.
- Innovative courses may only satisfy elective credit toward graduation requirements.
- Please refer to [TAC §74.13](#) for guidance on endorsements.

### Course Description:

*Computer Aided Drafting for Architecture* introduces students to the specific architectural computer aided design and drafting (CADD) software and equipment required to produce architectural working drawings and construction documents.

### Essential Knowledge and Skills:

- (a) General Requirements. This course is recommended for students in Grades 10-12. Recommended prerequisite: Architectural Design. Students shall be awarded one credit for successful completion of this course.
- (b) Introduction.
  - (1) Career and technical education instruction provide content aligned with challenging academic standards and relevant technical knowledge and skills for students to further their education and succeed in current emerging professions.
  - (2) The Architecture and Construction Career Cluster focuses on designing, planning, managing, building, and maintaining the built environment.
  - (3) Computer-Aided Drafting for Architecture allows students to acquire knowledge and skills needed to use specific architectural design software and equipment required to produce architectural working drawings and construction documents.
  - (4) Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.
  - (5) Statements that contain the word "including" reference content that must be mastered, while those containing the phrase "such as" are intended as possible illustrative examples.

(c) Knowledge and Skills.

- (1) The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:
  - (A) describe the roles, responsibilities, and dynamics of a team as applied in the architecture and construction industry;
  - (B) explain employers' work expectations;
  - (C) use effective and accurate architectural and/or construction vocabulary throughout the design and drafting process;
  - (D) demonstrate knowledge of the concepts and skills related to health and safety; and
  - (E) demonstrate safety in the workplace as specified by appropriate governmental regulations.
- (2) The student demonstrates knowledge of the function and application of tools, libraries, and materials used in architectural CADD software. The student is expected to:
  - (A) describe architectural computer-aided design, drafting, and architectural CADD applications;
  - (B) describe the purpose of Building Information Management (BIM) and how it is applied in the software;
  - (C) demonstrate how to start and exit architectural CADD software without corrupting files;
  - (D) select and use architectural project template files;
  - (E) save, close, and open project files;
  - (F) navigate and use the architectural CADD interface and manipulate the workspace, tools and libraries;
  - (G) demonstrate how to use the property palette, project browser, and view control bar;
  - (H) determine, specify, and set-up project drawing units, unit precision, and limits;
  - (I) use drawing snap and grid functions;
  - (J) use and determine what level of detail is required, and scale per plan;
  - (K) use the context menu, navigation bar, and viewing command to perform zooming and panning;
  - (L) use the various window options to open, close, and display multiple views in the drawing window;
  - (M) demonstrate the use of dynamic input and the command line; and
  - (N) demonstrate the use of the Quick Access Tool Bar to access frequently used CADD tools.
- (3) The student demonstrates the use of architectural CADD tools for drawing and editing an architectural model. The student is expected to:
  - (A) draw a structure; select exterior and interior wall types;

- (B) use the options bar and properties pallet to specify wall details;
  - (C) add room separation lines;
  - (D) use the various modify tools to edit walls: trim, extend, mirror, split, align, move, array, scale, offset, array, rotate, copy, scale, and pin;
  - (E) edit wall profiles, create openings, attach and detach walls, and join walls;
  - (F) demonstrate how to shade, crop, hide, unhide, isolate, and un-isolate elements and categories on current views;
  - (G) insert doors and windows, select type and size from family options, or load from libraries;
  - (H) add component's features such as furniture and equipment, and load from libraries;
  - (I) create curtain walls, including the addition of mullions and panels;
  - (J) insert curtain walls doors;
  - (K) select and draw floor types, including slope, sink, and elevated floors;
  - (L) select a ceiling type and create a ceiling;
  - (M) design and draw a roof, including the addition of slopes and overhangs;
  - (N) select, load, and modify columns;
  - (O) design, draw, and edit stairs, railing, and ramps; and
  - (P) draw architectural details, including: 2D objects, detail lines, regions, groups, symbols, and drafting views.
- (4) The student demonstrates the use of annotation and dimension standards and practices. The student is expected to:
- (A) use proper text and dimension standards and rules for architectural drawings;
  - (B) select and apply text and dimension styles and size to enhance readability of drawings;
  - (C) demonstrate how to use aligned, linear, angular, radial, and diameter dimensioning, and set constraints;
  - (D) demonstrate how to place spot elevation, spot coordinate and spot slope annotations;
  - (E) add and edit tags;
  - (F) create and modify schedules and legends; and
  - (G) annotate details, add detail tags, and create filled regions.
- (5) The student demonstrates the use of architectural CADD view tools to create plans, elevations, sections and 3-dimensional views. The student is expected to:
- (A) create floor plans, reflected ceiling plans, and various views, including structural, plan region, and area plan views;
  - (B) create exterior and interior elevations;
  - (C) create building-cross section views, wall section, and detail section views;

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- (D) edit and specify elevation, section, and call-out tags and line-of-sight locations; and
  - (E) modify, add, and delete elevation levels.
- (6) The student demonstrates the use of architectural CADD tools for printing and plotting drawings. The student is expected to:
- (A) set up sheet size, and title blocks following architectural standard practices;
  - (B) name and edit sheet labels;
  - (C) select proper drawing scales for viewports, arrange viewports on sheets;
  - (D) add schedules, legends, and notes on sheets;
  - (E) select printer and setup print settings, including range, paper size, orientation, scale, placement, appearance, and other printer specific options; and
  - (F) print or plot architectural working drawings and construction documents at various scales.

### Recommended Resources and Materials:

Autodesk Building Design Suite 2020 [computer software]. Retrieved from [www.autodesk.com](http://www.autodesk.com)

SDC Publications Retrieved from [www.sdcpublications.com](http://www.sdcpublications.com)

Alan Jeffis David A. Madsen David P. Madsen Architectural Drafting & Design 7<sup>th</sup> Edition MA: Delmar Cengage Learning.

### Recommended Course Activities:

- Transfer a single-story residential sketch to the architectural CADD system producing the related working drawings and construction documents.
- Convert/design a double-car carport into a master bedroom suite using the architectural CADD software producing the related working drawings and construction documents.
- Convert/design a double-car garage into a family room using the architectural CADD software producing the related working drawings and construction documents.
- Design a small studio apartment on the architectural CADD software producing the related working drawings and construction documents.
- Design a single-story residence on the architectural CADD software producing the related working drawings and construction documents.

### Suggested methods for evaluating student outcomes:

Performance on assigned projects and teacher developed assessments will be used to determine the student's success. Students will be evaluated on skill competency, written tests, daily grades and group/individual projects using checklists and rubrics.

**Teacher qualifications:**

An assignment for *Computer Aided Drafting for Architecture* is allowed with one of the following certificates.

- Mathematics/Physical Science/Engineering: Grades 6-12
- Mathematics/Physical Science/Engineering: Grades 8-12
- Secondary Industrial Arts: Grades 6-12
- Secondary Industrial Technology: Grades 6-12
- Trade and Industrial Education: Grades 6-12 – This assignment requires appropriate work approval.
- Trade and Industrial Education: Grades 8-12 – This assignment requires appropriate work approval.
- Vocational Trades and Industry – This assignment requires appropriate work approval.
- Any home economics or homemaking certificate
- Family and Consumer Sciences, Composite: Grades 6-12

**Additional information:**