

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

CADD TECHNOLOGY 133 – ADVANCED ARCHITECTURAL COMPUTER-AIDED DRAFTING AND DESIGN

2 hours lecture, 4 hours laboratory, 3 units

Catalog Description

This course is an advanced, practical study of Revit and Building Information Modeling (BIM). Emphasis is placed on the complex aspects of the Revit program used in the development of two-dimensional, three-dimensional, and presentation documents. This course is intended for advanced CADD/architecture students and practicing professionals.

Prerequisite

“C” grade or higher or “Pass” in CADD 131 or equivalent

Entrance Skills

Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:

- 1) Create Computer Aided Drafting and Design (CADD) solid model, parametric objects organized into a three-dimensional architectural project as applied to architectural contract documents.
- 2) Develop preliminary architectural design sketches created with traditional techniques into three-dimensional, parametric solid modeled design solutions for use in architectural contract documents.
- 3) Complete contract documents suitable for submission to governmental agencies charged with review and approval of these documents.
- 4) Provide an estimate of the materials required to construct the architectural design developed from the CADD contract documents.
- 5) Design, plan and build a CADD three-dimensional model developed from a pre-described program, typical of those presented to professionals for similar projects.
- 6) Evaluate the effectiveness of parametric, three-dimensional CADD programs for the creation of contract documents for small architectural projects.

Course Content

- 1) Review of Revit three-dimensional, parametric, solid modeling architectural objects:
 - a. Revit modeling elements
 - b. Component elements
 - c. Revit viewing elements
 - d. Revit annotation elements
 - e. Revit noting elements
 - f. Revit symbols
 - g. Architectural drawings prepared with Revit
- 2) Provide a design based upon a pre-defined program for a mid to high rise structure:
 - a. Sketch and design from pre-defined program
 - b. Review and critique design through presentation with peers and faculty/professionals
 - c. Generate three-dimensional (3D) CAD design of schematic design
 - d. Generate presentation documents of design development
 - e. Present design solution to peers and faculty/professionals through electronic means
- 3) Produce contract documents typical of submittal package to governmental agencies for review:
 - a. Site development plan

- b. Architectural floor plans
 1. Core development (stairs and elevators)
 2. Basement floor plans
 3. Lobby floor plans
 4. Upper floor plans
 5. Penthouse floor plans
 6. Mechanical level floor plans
 - c. Exterior elevations (all sides)
 - d. Conceptual structural design
 - e. Building sections
 - f. Architectural and structural details
 - g. Schedules, legends and reports
- 4) Estimate materials and cost of structure based upon program analysis

Course Objectives

Students will be able to:

- 1) Use the Revit parametric computer program to create a complete three-dimensional (3D) model from an original architectural design.
- 2) Extract finite two-dimensional and visually accurate three-dimensional component views for advanced contract documents from an electronic three-dimensional computer-generated model.
- 3) Create complex two-dimensional line drawings, proposed to be utilized in the construction industry, from a three-dimensional model.
- 4) Build a sophisticated electronic three-dimensional model utilizing multiple compound wall types, standard and custom user created doors and windows, complex massing structural elements, user generated interior and exterior specialty components, advanced environmental systems components, research and development of library components, and advanced use of two-dimensional and three-dimensional drafting and design components, three-dimensional drafting and design components.
- 5) Create printed black and white and color presentation documents and drawings from an electronic three-dimensional model.
- 6) Create a complete design process set of documents for a complex structure, including conceptual design documents, preliminary design documents, design development documents, contract documents, schedules, and legends from an electronic three-dimensional model.

Method of Evaluation

A grading system will be established by the instructor and implemented uniformly. Grades will be based on demonstrated proficiency in subject matter determined by multiple measurements for evaluation, one of which must be essay exams, skills demonstration or, where appropriate, the symbol system.

- 1) Quizzes:
 - a. Written analysis that requires students to recognize the variety of available CADD components for the creation of small scale architectural projects, while utilizing the solid modeling, parametric building elements in the program and the evaluation of the effectiveness of varying CADD programs as applied to the profession of architecture
 - b. CADD drawings that evaluate students' knowledge of the many varying uses of the program as applied to the planning, preparation, creation and construction of design projects based upon pre-described planning and design programs, typical of those presented to professionals for similar type projects. Evaluation of these drawings will be based upon industry standards that include completeness, accuracy, and time required to complete the project under strict guidelines and criteria.
- 2) Projects:
 - a. Written analysis of the pre-described architectural program presented for the preparation of the design project.

- b. Design sketches utilizing traditional presentation techniques such as pencil and bond paper and ink on sketch paper.
 - c. Preliminary solid modeling “mass model” designs created with the CADD program.
 - d. Detailed presentations utilizing a variety of techniques to describe the project to a potential client, similar to those techniques used in the architectural profession.
 - e. Knowledge of the required documents and nomenclature to complete a small scale architectural project suitable for submission to the local government agency charged with its review and approval.
 - f. Estimate the materials utilized to create the CADD produced three-dimensional model.
- 3) Midterm: CADD drawing that evaluates students’ knowledge of the varying uses of the program as applied to the planning, preparation, creation and construction of design projects based upon pre-described planning and design programs typical of those used in the profession. Evaluation of these drawings will be based upon industry standards that include completeness, accuracy and time required to complete the project under strict guidelines and criteria.
- 4) Final Exam:
- a. Multiple choice exam that measures students’ knowledge of the detailed operation of the CADD program.
 - b. CADD drawing that evaluates students’ knowledge of the many varying uses of the program as applied to the planning, preparation, creation and construction of design projects based upon pre-described planning and design programs typical of those used in the profession. Evaluation of these drawings will be based upon industry standards that include completeness, accuracy and time required to complete the project under strict guidelines and criteria.
- 5) In-class activities (written/oral) that measure students’ ability to articulate fundamental drafting design and production skills required in the field of engineering graphics

Special Materials Required of Student

USB flash drive (1GB or larger)

Minimum Instructional Facilities

CADD computer lab

Method of Instruction

- 1) Lecture and lab demonstrations
- 2) Lab assignments
- 3) Projects

Out-of-Class Assignments

- 1) Bi-weekly mini-drawing projects (at least five)
- 2) Three group drawing projects (three students together)
- 3) Final drawing project

Texts and References

- 1) Required (representative example): Stine, Daniel, Commercial Design, Autodesk Revit 2018. SDC Publications, 2018.
- 2) Supplemental: None

Student Learning Outcomes

Upon successful completion of this course, students will be able to:

- 1) Create a complete three-dimensional (3D) model from an original architectural design.
- 2) Create complex two-dimensional line drawings, proposed to be utilized in the construction industry, from a three-dimensional model.

- 3) Build a sophisticated electronic three-dimensional model utilizing multiple compound wall types, standard and custom user created doors and windows, complex massing structural elements, user generated interior and exterior specialty components, advanced environmental systems components.
- 4) Use the library for two-dimensional and three-dimensional building design components at an advanced level.
- 5) Create a complete design process set of documents for a complex structure, including conceptual design documents, preliminary design documents.
- 6) Use a three-dimensional model to create documents for:
 - a. Development purpose
 - b. Contracts
 - c. Schedules
 - d. Legends