Lecture Contact Hours: 32-36; Homework Hours: 64-72; Total Student Learning Hours: 96-108
Laboratory Contact Hours: 64-72; Homework Hours: 0; Total Student Learning Hours: 64-72

CUYAMACA COLLEGE
COURSE OUTLINE OF RECORD

CADD TECHNOLOGY 131 – ARCHITECTURAL COMPUTER-AIDED DRAFTING AND DESIGN

2 hours lecture, 4 hours laboratory, 3 units

Catalog Description
This course is a hands-on study of computer-aided drafting and design (CADD) using three-dimensional (3D) parametric solid modeling programs, such as Revit and AutoCAD, and associated commands, techniques, and processes required for the creation of contract documents for residential projects using professional standards. Application of architectural graphics, symbols, patterns, layouts, text, dimensions and scales to develop design drawings for small architecture, interior design, and space planning projects. Uses the parametric CADD program Revit.

Prerequisite
"C" grade or higher or "Pass" in CADD 120 or ENGR 119 or equivalent

Entrance Skills
Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:
1) Use of AutoCAD terms, concepts and techniques in engineering drafting and design.
2) Application of AutoCAD in 2D geometric shapes and 3D solid modeling.
3) Add dimensions and tolerances to drawings.
4) Perform AutoCAD editing commands to make necessary changes.
5) Plot drawings in different plot-scale and paper format configurations.

Course Content
1) Revit three-dimensional, parametric, solid modeling architectural objects
2) Revit modeling elements
    a. Host elements (wall, floor, ceiling, roof, stair, ramp)
    b. Component elements (windows, doors, etc.)
3) Revit viewing elements
    a. Plans
    b. Elevations
    c. 3D views
    d. Sections
    e. Schedules
4) Revit annotation elements
    a. Datum elements
    b. Levels (grids, reference planes)
5) Revit noting elements
    a. Dimensions
    b. Notes
    c. Tags
6) Revit symbols
7) Architectural drawings prepared with Revit
    a. Site plan
    b. Floor plans
    c. Elevations

d. Sections
e. Details
f. Schedules

Course Objectives

Students will be able to:

1) Create a three-dimensional (3D) model from a given original architectural design using a parametric computer program.
2) Build an electronic three-dimensional model utilizing compound walls, standard and custom doors and windows, massing structural elements, interior and exterior specialty components, environmental and windows, massing structural elements, interior and exterior specialty components, environmental systems components, library components, and two-dimensional and three-dimensional drafting components.
3) Extract two-dimensional and three-dimensional contract documents from an electronic three-dimensional computer generated model.
4) Create two-dimensional line drawings, typically utilized in the construction industry, from a three-dimensional model.
5) Create printed black and white and color drawings from an electronic three-dimensional model.
6) Create 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 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 on 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 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 field.
   e. Application of knowledge of the required contract 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 student 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 by professionals. 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 examples):
   a. Stine, Daniel. *Residential Design Using Autodesk Revit 2018*. SDC Publication, 2018.
   b. Krygiel, Eddy and James Vandezande. Mastering Autodesk Revit Architecture 2018, Pub. by Wiley 2018.

2. Supplemental: None

Exit Skills
Students having successfully completed this course exit with the following skills, competencies and/or knowledge:
1) Create 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 their review and approval.
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.

Students Learning Outcomes

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

1) Translate preliminary architectural design hand-sketches into 3D dimensional parametric.
2) Prepare complete contract documents for small scale architectural projects for submission to agencies for review and approval.
3) Estimate the materials needed to construct the architectural design.
4) Design, plan and build a three-dimensional CADD model developed from a pre-described program of a small scale architectural project.