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 132 – ADVANCED COMPUTER-AIDED DRAFTING AND DESIGN IN 3D MODELING

2 hours lecture, 4 hours laboratory, 3 units

Catalog Description

Advanced Computer-Aided Drafting and Design (CADD) topics such as aspects of designing with solid modeling and parametric modeling, concepts, application of three-dimensional constructions, and editing 3D modeling. Exploring and experiencing Additive Manufacturing (aka Rapid Prototyping or 3D Printing Technology). 3D Solid Modeling software "*Autodesk Inventor*" will be used as an instructional tool.

Prerequisite
"C" grade or higher or "Pass" in CADD 115 or equivalent

Recommended Preparation
Working knowledge of basic computer operations and file administration

Entrance Skills
Without the following skills, competencies and/or knowledge, students entering this course will be highly unlikely to succeed:
1) Complete orthographic drawings (using mechanical tools/computer).
2) Solve geometric construction with accuracy and detail.
3) Create sectional and auxiliary views.
4) Create pictorial drawings.

Course Content
1) Computer geometric modeling
2) 3D modeling fundamentals
3) Concepts of Constructive Solid Geometry (CSG)
4) Sketch the 2D outline of the part
5) Creating 3D features (extrusion, revolve, sweep, loft)
6) Editing 3D features
7) Creating fillets and chamfers
8) Creating holes
9) Shelling a part
10) Creating rectangular and circular pattern
11) Producing and editing engineering drawings for parts and assemblies
12) Designing a part in the context of an assembly
13) Preparing a Bill of Material (BoM) for assembly drawing
14) Produce data for most the Additive Manufacturing (AM) machines
15) Operate and troubleshoot 3D printers

Course Objectives
Students will be able to:
1) Develop computer geometric modeling.
2) Apply geometric/dimensional constraints, deleting the existing constraints and adding additional constraints.
3) Start and complete a base solid feature and create the next solid feature.

4) Create advanced 3D models using various modeling strategy and features, such as extrusion, revolve, sweep, loft, rectangular and circular patterns, shell.
5) Create drawings from parts or assemblies and associative functionality.
6) Create auxiliary, sectional, and detailed views.
7) Add annotation to drawings, such as dimensions, reference dimensions, center marks and center lines, Bill of Material from parts list or assembly model, to complete the drawing sheet.
8) Produce data for most of the Additive Manufacturing (AM) machines.
9) Operate and troubleshoot 3D printers.

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) Student portfolio of drawing exercises and final project that measure the student's skill and competency in using and applying mechanical and computer-aided drafting tools for engineering applications.
2) Midterm exam that measures the student's ability to create advanced 3D models and produce detail drawings of parts and components used in manufacturing. Final exam that measures the student's capability as a draftsman at an advanced level, such as producing data for the Additive Manufacturing machines, operating and troubleshooting 3D printers, as well as creating a complete engineering drawing of assembly and its components.
3) In-class activities (written/oral) that measure the student's ability to articulate fundamental drafting design and production skills required in the field of engineering graphics.

Special Materials Required of Student
USB flash drive (2GB or larger)

Minimum Instructional Facilities
CADD computer lab

Method of Instruction
1) Lecture and demonstration
2) Lab assignments and projects

Out-of-Class Assignments
1) Weekly mini drawing project (at least five projects)
2) Monthly group drawing project (two projects)
3) Final project

Texts and References
1) Required (representative example): Shih, Randy. *Parametric Modeling with Autodesk Inventor 2018*. SDC Publications, 2018.
2) Supplemental: Handouts

Student Learning Outcomes
Upon successful completion of this course, students will be able to:
1) Start and complete a base solid feature and create the next solid feature.
2) Create advanced 3D models using various modeling strategy and features, such as extrusion, revolve, sweep, loft, rectangular and circular patterns, shell.
3) Create drawings from parts or assemblies and associative functionality.
4) Create auxiliary, sectional, and detailed views.
5) Add annotation to drawings - such as dimensions and tolerances, reference dimensions, center marks and center lines, Bill of Material from parts list or assembly model, to complete the drawing sheet.
6) Operate and troubleshoot 3D printers.