

Grossmont-Cuyamaca Community College District Articulation Agreement

High school(s): Helix Charter High School	College: Cuyamaca College		
High School Course	Credits	College Course	Units
CAD 1/2 (Computer Aided Design)		CADD 115	3

1. Course Prerequisites

None

2. Recommended Preparation

3. College Course Description

Introduction to engineering drafting. Covers the fundamentals of drafting using both mechanical instruments and the computer as drafting tools. Students will learn the fundamentals of engineering graphics as a universal language of communication in all engineering fields. Includes organization and drawing layouts, text, dimensions, tolerances, scales, multi-view projections, and pictorial drawings to visualize, represent and document basic engineering problems.

4. Required Content for Articulation

Students will be able to:

- A. Identify the differences in graphic language of various engineering fields.
- B. Use mechanical and Computer-Aided drafting tools to produce sketches.
- C. Identify and use all tools and equipment required for two-dimensional drafting.
- D. Use geometric construction tools to produce 2D drawings.
- E. Describe and use the basic AutoCAD terms, concepts and techniques.
- F. Produce orthographic projections both manually and with Computer using AutoCAD.
- G. Sketch and draw pictorial drawings.
- H. Use engineering documentation to support CAD drawings.
- I. Use sectional and auxiliary views to produce complex drawings.
- J. Apply dimensions and tolerances in accordance with industry standards.

5. Required Competencies (SLOs) for Articulation

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

- A. Draw orthographic and isometric drawings.
- B. Produce working drawings with engineering documentation such as title block and drawing scale.
- C. Create sectional, auxiliary and detail drawings.
- D. Produce dimensioning and tolerances in accordance with industry standards (ASME 14.5 and ISO standards)

6. Assessment Methods

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.

- A. Tests (objective)
Midterm exam that measures the student's ability to describe and apply fundamental drafting concepts, terminology and techniques used in engineering graphics.
- B. Projects
 - 1) Portfolio of drawing exercises and projects that demonstrate the student's skill and competency in using and applying mechanical and computer-aided drafting tools for engineering applications.

2) 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.

C. Final exam (objective, essay)

Final exam that measures the student's capability as a draftsman. For example, the student will be required to use engineering concepts to produce 2D drawings.

7. RUBRIC: Attached (if applicable)

8. **Texts and other supporting materials (software, etc.)**

Required (representative example): Plantenberg, Kristie. *Engineering Graphics Essentials with AutoCAD 2018 Instruction*. SDC Publications, 2017.

9. **Criteria for Course Articulation**

- a. High school and college teachers attend articulation meetings to determine curriculum alignment and articulation competency rubric.
- b. Student must pass high school course with a grade of "B" or better and have mastered course competencies as identified in the articulation competency rubric.

Agreement was based on Statewide Career Pathways Project Template: Yes ____ No ____

Name of Template used:

Articulation meeting held: 17 October 2019

Effective Date: Fall 2019

Expiration Date: 1 December 2022

High School/CTE/Signatures

J. Bullark 11/18/19
Teacher Date

Jennifer Bullark
Teacher (print name)

[Signature] 11/18/19
Principal Date

Helix Charter High School
High School

Additional High School Teachers

[Signature] 11/18/19
Teacher Date

Flynn Moore
Teacher (print name)

Teacher Date

Cuyamaca College Signatures

[Signature] 11/19/2019
Instructor/Division Chair Cuyamaca College Date

CYRUS SAGHARI
Instructor/Division Chair (print name)

[Signature]
Dean of Career Education, Cuyamaca College Date

Grossmont College Signatures

Instructor/Division Chair, Grossmont College Date

Instructor/Division Chair (print name)

Dean of Career Education, Grossmont College Date

Teacher (print name)

Helix Charter HS

CAD 1/2

INSTRUCTOR: Bullock and Moore

bullock@helixcharter.net

moore@helixcharter.net

Class meets both A/B day for a total of 7 hrs a week.

Course Description

CAD (Computer Aided Design) 1-2: Engineering and Architecture through hands on activities and computer based design with AutoCAD. Students apply geometric knowledge of the x, y, and z-axis through coordinate entry methods. The class will focus on the 2D and 3D environment. Students will apply these techniques and principles to various projects including Mars Rovers, Cardboard Chair, Dream House, Paper Roller Coasters, Bridge Building, etc. Students will become familiar with system hardware and software related to CAD, including AutoCAD, Fusion 360, and Google SketchUp. This course is a combination of project based learning, lecture, and self-paced learning. Being creative and willingness to problem solve is encouraged. This course meets the technology graduation requirement, and is an excellent complementary course to Robotics, AP Physics, Environmental Design, and even ACE Club (Architecture, Construction and Engineering). This course is an option for the Computer Science/Engineering Career Path. This course meets the UC/CSU "G" requirement. This course satisfies the Helix Technology Requirement.

Students also have an opportunity to get industry certifications through Solid Professor and Precision Exams.

Prereq: None

Text: *We do not use a textbook. We use Solid Professor (<https://www.solidprofessor.com/> students can get industry certified) and <https://www.mycadsite.com/>*

Course Objectives:

This course introduces students to the world of drafting through engineering and architecture. They will learn to use a T-square and scale ruler as well as translate that to the CAD software. Students are encouraged to understand underlying geometric concepts as well be able to plan sketch by hand and on the computer. Students are expected to learn/review the x,y axis, coordinate systems, orthographic projection, section views, pictorial drawings, industry based plans, auxiliary views as well as title blocks, viewports, 3D renderings and dimensioning, etc.

Course Software Content

UNIT 1 (4 weeks) *These concepts are learned through drawing and through the computer in AutoCAD)*

- Coordinate System Angular Measurement
- Selecting, Right to Left and Left to Right
- Entering Points, Absolute, Relative, and Polar
- Autocad Interface, Tabs, Panels, Command Line, etc.
- Workspaces/Model Space/Layout Space
- UCS vs WCS
- Lines, circles, rectangles, arcs, trim, extend, offset, OSNAP, move, copy, stretch, mirror, rotate, fillet, chamfer, array, zooming, panning.
- Layers, Text, Dimensions, Units (DDUNITS), scale
- DDE and Object Tracking
- Properties of Objects
- Title Blocks for Mechanical Drawings and renderings.
- Orthographic Projection
- Sections Views (Mechanical drawing sections and in AutoCAD)
- Sectioning in AutoCAD

Unit 2 (6 weeks) *(Students will learn to draw floor plans by hand and then through AutoCAD)*

- Floor Plans
- Door swings, wall thickness, reading plans, columns, using an array in a floor plan
- Blocks
- Title Blocks for floor plans
- Align and Rotate
- Non-graphical Information
- Hatching
- Working with Text
- Polylines
- Parametric Constraints: Geometric, Dimensional, Display and Delete
- Elevation Drawings
- Floor plan design and elevation design

Unit 3 (6 weeks) *(Students learn to represent 3D objects by hand and then through AutoCAD)*

- Introduction to 3D Space (Advanced drawings)
- Z-Axis
- Elevation
- Extrude
- Face
- Hidden Lines

- Isometric Drawings
- Pictorial Drawings
- 3D Printing and Pictorial Drawings
- Primitive Solids
- Regions
- Rendering
- Shading
- Solid Model
- Surface Model
- Plan View
- Viewport
- Wireframe
- Line Thickness
- Revolved Objects
- Lofting
- Mapping Materials
- Rendering and Lighting

Final Project/Final 3D Exam (2 Weeks)

*(This is considered a 1-year Concentrator course and meets for an entire semester every day from Aug-Dec and then spring classes occur Jan-June)
The follow up Capstone course to this class is CAD ¾: Advanced Architecture and Engineering*

Student Learning Outcomes for Helix Charter and our courses are as follows:

- Constructive Thinkers
- Effective Communicators
- Functional Producers
- Informed Decision Makers
- Self-Directed Learners

In CAD class this will be assessed through drawing w/ dot paper and graph paper and the computer for orthographic and isometric drawings. They will create drawings that mirror industry standards in documentation with scale and title block. They will understand dimensioning and sectional drawings, as well as understand and be tested on tolerances such as ASME 14.5 and ISO standards)

Projects include:

- Cardboard Chair
- Floor plans and Elevation Project
- Reading Plans project
- 3D Parts in 3D printing
- Solar Car Challenge
- Prototyping
- Final Exam: 3D Multiview Object of their choice.

Assessments:

Students are assessed with rubrics for project completion, short answer and reflection, online portfolio via Google site, and accurate 3D printed objects.

Grading Scale:

Written, Software Assignments and Quizzes: 30%

Projects	40%
Portfolio	10%
Final Project	20%

All assignments are due on the due date. If not turned in on time, students will attend tutorials Tuesday and Wednesday morning to complete the assignments on their own time. If they fail a test or project they can make it up to 80%.

Grading Policy

Final grades will be posted in Canvas and are based on a 100 scale. A = 90-100%

B = 80-89%

C = 79-70%

F = 69- Below

Expectations: Students are expected to arrive on time and have good attendance. It is up to the student to ask about work missed when they are absent. Students will work together and are expected to be a strong participant.