



Computer Aided Design II: Beginning CAD for 3D Animation, Architecture and Engineering

Fairfield Ludlowe High School - Fairfield Warde High School

Full Year

COURSE DESCRIPTION

This course is a continuation of Introduction to CAD and the three areas of concentration. Students will engage with increasingly more advanced CAD concepts and techniques as they apply their CAD skills to real-world projects such as: residential building design, creating construction drawings, or rendering images and video of 3D models. Students will learn about 3D CAD and BIM software, and about creating computer simulations. They will also learn about CAD workflows, such as hand drawing, design and development, construction documentation, and rendering.

COURSE OBJECTIVES

Students will be able to:

- define and explain the purpose of elevation views and site plans in architecture.
- define and explain perspective using two vanishing points versus three vanishing points.
- draw elevation views of buildings, characters or objects, using perspective and proportion to create accurate and realistic drawings.
- use a variety of hand drawing techniques, such as line weight, hatching, and shading, to create visually appealing drawings.
- define and explain the different design elements over time.
- explain how the factors such as climate, budget, and the needs of the end users influence design decisions.
- describe the process of designing from start to finish.
- create their own projects, using the knowledge and skills they have learned in the unit.
- apply the principles of design, such as balance, proportion, and unity, and how to apply them to residential design, engineering design, and animation
- utilize the CAD tools in increasingly
- creative ways to create more complex shapes and interesting designs.
- accurately express their creative visions by creating their own custom shapes and components.
- modify the properties and settings to create visually stunning rendered images of their designs.
- produce a basic set of construction drawings.
- use the extrude, loft, sweep, and void form tools.
- modify component properties.
- set up 2D drawing views of their 3D models.
- adjust the sun position and time of day.
- apply simulated physics to objects to mimic real world phenomena
- create custom PBR materials
- apply texture mapping tools to understand how they display on a surface.
- adjust sun position, date, and geographic location.
- describe the advantages and disadvantages of different materials and systems.
- create various drawings showing what materials were used and how the pieces fit together
- apply the principles of sustainability by choosing environmentally sustainable materials to be used in their designs.

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- consider the pros and cons of various design options.
 - apply knowledge and skills from across the curriculum to solve a real-world problem.
 - conduct independent research and analyze complex information.
 - demonstrate problem-solving and critical thinking skills.
 - use a variety of communication tools and strategies to effectively convey their design concepts to an audience.
 - export scale drawings to create a prototype.
 - export their drawings in the correct file formats to create 3-D outputs.
 - construct physical prototypes using common materials and fastener techniques.
 - demonstrate safe use of hand and power tools.
 - apply knowledge and skills from across the curriculum to solve a real-world problem.
 - conduct independent research and analyze complex information.
 - manage time effectively and meet deadlines.
 - demonstrate problem-solving and critical thinking skills.
 - use a variety of communication tools and strategies to effectively convey their design concepts to an audience.
 - how to identify and define a real-world problem
 - how to conduct research and gather evidence to inform their work.
 - how to analyze and interpret complex information.
 - how to develop and implement a plan to solve a problem.

UNITS OF STUDY

Unit 1 – Drawing Basic Elevations and Site Plans, Perspective Drawing (4-5 weeks)

Unit 2 – Basic Design Processes and Workflows (3-5 weeks)

Unit 3 – Novice Level CAD Tools and 3-D Modeling Techniques (5-6 weeks)

Unit 4 – Simulating Physics Systems, PBR Materials, Lighting and Rendering Images (3-5 weeks)

Unit 5 – Introduction to sustainable materials and design. (2-3 weeks)

Unit 6 – Prototyping, Model-making and Animation Production. (5-8 weeks)

Unit 7 – Final Summative Project and Creating a Design Portfolio (8 weeks)

COURSE POLICIES AND REQUIREMENTS

GRADING: Generally . . . See district policy ([Policy 6146.1AR](#))

Grading Communication

- Specific grading expectations and practices will be communicated to all students and families at the start of the school year via a consistent format.
- If students or parents have questions about grading practices, they should follow the district's established chain of command structure (see district website) with the first contact being to the teacher and then to the school administration.
- Buildings will send out reminders of the importance of checking students' grades in the Grading Portal with directions.
- Teachers will notify guardians when students fall into the F range after October 1st.

Grade Reporting

- For a processed piece or "chunked" assignment that is part of a larger task, feedback and the grade shall be shared before the next step in the process, so long as students have submitted their work at those checkpoints, on time.

- Grades for summative assessments shall be entered within 10 school days from the date of submission or the date it was due, whichever is later.
- Grades for formative assessments shall be entered within 5 school days from the date of submission or the date it was due, whichever is later, and prior to any subsequent assessment.

Guidelines for Late Work :

- Teachers will accept late work for both summative and formative tasks beyond the due date.
- Teachers will not accept late work beyond the deadline for late work. The deadline is defined as the next class period from the due date of the assignment or the alternative date that the teacher and student may agree upon depending on individual circumstances.
- Teachers may reduce the total points students can achieve as a penalty for late work up to the deadline. Students will earn a zero (0) if the assignment is not submitted or is submitted after the deadline.
- Late work only consists of assignments with an expected due date. Assessments, such as tests, quizzes and in class assignments, must be taken on the scheduled date except in cases of make-up assessments due to an excused absence.

REASSESSMENT GUIDELINES:

Eligibility of assessments	Teachers of the same course will determine which summative assessments are eligible. Students can select any part of a project to reassess. Reassessments may not be allowed one week before the end of a term.
Process	Students have two class periods in which to indicate they would like to take a reassessment. Teachers will make clear to students their preferred method for students to request reassessment (e.g. email or filling out a simple form/spreadsheet).
Frequency	Students will have the opportunity to reassess on two summatives per year but not more than one per term (quarter).
Assessment Format	Based on discussion between the student and teacher, students will revise portions of the original assessment in which they did not show proficiency.
Gradebook impact	Original and reassessment scores will be averaged in the gradebook.

MATERIALS:

- As provided by the course.

EXPECTATIONS OF STUDENTS:

- Be Tech and Learning Ready: Come prepared with all necessary materials, including your charged device and any required software.
- Prioritize Safety: Follow all safety guidelines and procedures, especially when working with tools, equipment, or hazardous materials.
- Participate Actively: Engage in class discussions, ask questions, and contribute to group projects. Actively participate in lab activities by following instructions, working collaboratively, and cleaning up your workspace.
- Respect the Digital Realm: Treat all digital resources and equipment with care. Avoid actions that could harm or disrupt the learning environment.
- Embrace Digital Citizenship: Use technology ethically and responsibly. Be mindful of copyright laws and online etiquette.

EXTRA HELP:

- Students should seek out extra help when needed. The teacher is available for extra help by appointment before and after school as well as during prep periods