MVLA
2025-26
COURSE INFORMATION SHEET

Course Title: Design and Prototyping
CTE Pathway Sequence: Manufacturing and Product Development
School: LAHS
UC/CSU requirement: No (G - Approved Elective)
MVLA Graduation requirement: NA
Textbook and/or other learning resources: Youtube and online resources

Course Description/Student Learning Outcomes:

Design and Prototyping is a course meant to expose students to the ideas of computer aided design (CAD) and computer aided machining (CAM). Throughout the year students will learn to design using 2D modeling software such as adobe illustrator, and 3D modeling software such as Fusion 360. Projects will be completed with the help of 3D printers, laser cutters, and computer numerically controlled (CNC) router systems.

Expected School-wide Learning Results:
1. Collaborative Learners - Students will be able to complete cognitive and hands-on assignments in cooperative student groups. Students will acknowledge and fulfill their responsibilities in the group and be active contributors.

2. Self-Directed Learners - Students will develop and demonstrate initiative and responsibility by always trying to complete tasks when faced with challenges. Students should be able to problem solve independently and create new solutions using techniques that will apply to a variety of situations and many aspects of today's technology.

3. Critical Thinkers- Students will learn to evaluate designs for feasibility, and to take multiple real-life factors into account when creating products.

4. Knowledgeable Individuals- Students will learn problem-solving techniques that will apply to a variety of situations, as well as specific design and rapid prototyping knowledge which will allow them to understand many aspects of today's product development technology.

By the end of the year students will know how to:
1. Design three dimensional objects using CAD software
2. Print 3D objects using Ultimaker 3 printers
3. Use a Laser cutter to raster, engrave and cut wood or acrylic to create and decorate 3d objects
4. Design Laser projects using Adobe Illustrator

Course Outline/Units of Study/CTE Industry Standards(If applicable to your course):

Production Innovation and Design Pathway Standards Addressed
D1.0 Understand the basic product design and development process as it relates to the design of a product, line of products, system design, or services.
D2.0 Understand and apply research methodologies as a means to identify a need, problem, or opportunity for a new product, product line, system design, or service.
D3.0 Understand and apply various ideation techniques to develop ideas and concepts.
D4.0 Apply various two-dimensional (2-D) graphic and/or three-dimensional (3-D) modeling techniques to develop concepts.
D6.0 Produce a prototype of a product.
D7.0 Evaluate the prototype to determine if it meets the requirements and objectives.
D8.0 Understand and apply basic business and entrepreneurial principles and identify potential markets and/or other business opportunities for distribution of the product.
D9.0 Produce a package design concept for a product or line of products.

California Standards for Career Ready Practice

1. Apply appropriate technical skills and academic knowledge.
2. Communicate clearly, effectively, and with reason.
3. Develop an education and career plan aligned with personal goals.
4. Apply technology to enhance productivity.
6. Practice personal health and understand financial literacy..
7. Act as a responsible citizen in the workplace and the community.
8. Model integrity, ethical leadership, and effective management.
9. Work productively in teams while integrating cultural and global competence.
10. Demonstrate creativity and innovation.
11. Employ valid and reliable research strategies.
12. Understand the environmental, social, and economic impacts of decisions.

Units Covered in the Course

1. 3D CAD and Printing
2. 2D CAD, Laser Cutting
3. Design Thinking Projects
4. Documentation & Communication of work and products - *ongoing throughout year/ other units*
5. Career Exploration - *ongoing throughout year/ other units*

Assessment and Grading (BP 5121 / AR 5121**):** To ensure that every student has an equal opportunity to demonstrate their learning, the course instructors implement aligned grading practices and common assessments with the same frequency.

1. **Grading categories and their percentage weights:**
   25% - Productivity / In Class Work
   10% - Skill Building Assignments
   15% - Documentation
   50% - Projects

2. **Achievement evidence collected within each grading category:**
   Productivity and Synchronous Learning: Daily attendance and participation in synchronous classes will be monitored, daily progress toward project/assignment completion and revision will be assessed.
   Asynchronous Assignments: Participation and completion of asynchronous assignments will be monitored and progress toward project/ assignment completion will be assessed
   Reporting and Recording Progress: Students are required to keep and complete a running log of their progress on each project every class period.
   Projects: Individual and group projects, when possible, will be assessed based on each students' initial understanding of the required tools and the individual students' effort and revisions.

3. **Grading scales:** A= 90% -100%, B =80% - 89%, C =70% -79%, D= 60% - 69%, F below =60%

4. **Homework/outside of class practices (AR 6154)**: Assignments and projects are assigned and usually completed during class time but can be worked on outside of class. They are due based on the required date and time, and will be checked for completion and correctness.

5. **Excused absence make up practices (Education Code 48205(b)):** Students who need extra time in the workshop due to excused absences must make appointments with the teacher. If a student has an excused absence, daily homework or missed summative assessments will be accepted with one extra day allowed for each day of the absence.

6. **Academic integrity violation practices (LAHS Academic Integrity Policy):** Honesty, trust and integrity are vital components of the education process. The Governing Board believes that academic honesty and personal integrity are fundamental components of a student's education and character development. The Board expects

that students will not cheat, lie, plagiarize or commit other acts of academic dishonesty.
Students and families should understand and act upon the values of academic integrity and should encourage the highest standards of academic behavior from themselves and their peers.

It is assumed that all work completed for a class is original work created for that class, for a specific assignment. Please refer to the Academic Integrity policy in the student handbook. For categories A and C, the "V" will be worth zero. For violations in category B students will receive a failing grade.

7. **Late work practices:** Students who need extra time in the workshop due to excused absences must make appointments with the teacher. Late assignments are accepted for ½ credit.

8. **Revision practices:** All projects are expected to be revised repeatedly until the due date. After a project has been turned in no more revisions will be accepted

9. **Extra credit practices:** No extra credit will be assigned.

10. **Additional grading practices:** None

11. **LMS Used:** Canvas

Instructors' email addresses:

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Additional information: This class is taught by Career Technical Education certified teachers in Manufacturing and Product Development.