Murrieta Valley High School

Intro to Design

Mr. Hunter

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Course Description:
Introduction to Design is the first course in the Project Lead the Way Engineering sequence. The major focus for this course is to expose students to the elements and principles of visual design using the engineering design process. Projects will focus on design factors such as aesthetics, format, geometric shape & form, perspective drawing, scale, proportion, and presentation techniques. Students will use computers as a medium/tool for design of project components such as sketching techniques, orthographic drawing, 3D modeling and rendering. Assignment requirements are based on color, form and aesthetics with emphasis on the stages of the design process and critical thinking skills. In addition to the design process and principles of visual design, students will focus on research and analysis, teamwork, various communication methods, engineering standards, and technical documentation. Through hands-on projects, students will apply engineering standards while documenting their work and designs in an engineer's notebook. Students will design solutions to solve proposed problems and communicate solutions to peers and members of the professional community. The course assumes no previous knowledge, but students should be concurrently enrolled in appropriate mathematics and science courses.

***Note –** Introduction to Design is the same course as PLTW's Introduction to Engineering and Design with the addition of supplemental units of instruction and projects that address California's Visual and Performing Arts content standards. As a result this course is UC Approved "F" which meets the districts requirement for Visual and Performing Arts credit.

Course of study includes:

- Design Process
- Technical Sketching and Drawing
- Measurement and Statistics
- Puzzle Cube Project
- Geometric Shapes and Solids
- Dimensions and Tolerances
- Advanced Modeling
- Advanced Designs
- Visual, Functional, and Structural Analysis
- Product Improvement by Design
- Engineering Design Ethics
- Design Teams

Students will use Autodesk Inventor, which is a state of the art 3-D design software package from Autodesk to help design solutions for different design projects. Working in teams, students will learn to document solutions, solve problems, and communicate solutions to other students and members of the professional community of engineering and engineering design.

Introduction to Design is intended to serve as a foundation course within the Project Lead The Way® course sequence. All of the topics learned in this course will be used in future courses.

Project Lead the Way

Project Lead the Way (PLTW) is a national program forming partnerships among Public Schools, Higher Education Institutions and the Private Sector to increase the quantity and quality of engineers and engineering technologists graduating from our educational system. The program is partially funded by Charitable Venture Foundation, a private foundation located in Clifton Park, New York. PLTW has a support staff of experienced technology educators and college and university partners to support schools as they implement PLTW curricula.

PLTW has developed a four-year sequence of courses which, when combined with college preparatory mathematics and science courses in high school, introduces students to the scope, rigor and discipline of engineering and engineering technology prior to entering college. The courses are:

- Introduction To Design / Introduction To Engineering and Design (now offered)
- Principles of Engineering
- Digital Electronics
- Computer Integrated Manufacturing
- Civil Engineering and Architecture
- Engineering Design and Development

Introduction at this level will attract more students to engineering, and will allow students, while still in high school, to determine if engineering is the career they desire. Students participating in PLTW courses are better prepared for college engineering programs and more likely to be successful, thus reducing the attrition rate in these college programs, which currently exceeds 50% nationally.

PLTW has a comprehensive organizational structure in place to ensure continued participation and success. Key elements provide support at every level of the program. PLTW provides local, state and national organization for leadership and support, a model curriculum, teacher training and development, and consulting services.

Required Text

There will be NO text for this class. All information will be provided through PowerPoint, teacher discussion, or online (Learning Management System aka LMS).

Course Outline (subject to change)

Unit 1 – Design Process

- Identify the design process steps
- Apply engineering notebook standards
- Research a product's history

Unit 2 – Technical Sketching and Drawing

- Identify, sketch, and explain the function of points, construction lines, object lines, and hidden lines
- Sketch multiview drawings
- Sketch an isometric view of simple geometric solids

Unit 6 – Reverse Engineering

- Visual Analysis
  - Identify visual design elements within a given object
- Functional Analysis
  - Identify the reasons why engineers perform reverse engineering on products
- Structural Analysis
  - Identify the types of structural connections that exist in a given object

Unit 3 – Measurement and Statistics

- Measure and record linear distances using a scale
- Measure and record linear distances using a dial caliper
- Apply linear dimensions to a multiview drawing
- Calculate the mean, mode, median, and range of a data set

Unit 4 – Modeling Skills

- Create Computer Aided Design (CAD) models from dimensioned sketches
- Assemble the product using the CAD modeling software
- Apply geometric and numeric constraints to CAD sketches

Unit 5 – Geometry of Design

- Identify common geometric shapes and forms by name
- Calculate the area of simple geometric shapes.
- Calculate the surface area and volume of simple geometric forms.

Unit 7 – Documentation

- Identify dimensioning standards commonly used in technical drawings

Unit 8 – Advanced Computer Modeling

- Create an exploded model of a given assembly
- Perform part manipulation during the creation of an assembly model

Unit 9 – Design Teams

- Identify group norms that allow a virtual design team to function efficiently
- Brainstorm and sketch possible solutions to an existing design problem
- Create a decision making matrix

Unit 10 – Design Challenges

- Identify the five steps of a product's lifecycle and investigate and propose recyclable uses for the material once the lifecycle of the product is complete
- Develop and document an effective solution to a problem that meets specific design requirements

Required Materials

- Engineering Notebook Quad Ruled
- Binder with index dividers and paper
- Blue or Black pens
- Mechanical pencils
- Calculator

Classwork

- Daily assignments 10-20 points
- Modeling assignments - 10-25 points
- Projects - 25-100 points
- Notebook Checks – 25-75 points
- Final Exams - 100 points

Grading Scale									
A+	97.00 – 100	B+	87.00 – 89.49	C+	77.00 – 79.49	D+	67.00 – 69.49	F	0 – 59.49
A	92.50 – 96.99	B	82.50 – 86.99	C	72.50 – 76.99	D	62.50 – 66.99		
A-	89.50 – 92.49	B-	79.50 – 82.49	C-	69.50 – 72.49	D-	59.50 – 62.49		

MAKE-UP WORK POLICY:

Students will be given no more than one week to complete an assignment before it would be considered late. It is the student's responsibility to follow through, complete assignments and submit by the due date.

Students can make up assignments at home, during class, and after school. Assignments not completed within the 6 week grading period will not be accepted at a later date!

LATE WORK / ASSIGNMENT POLICY:

Late work must be submitted within each six-week grading period that it is assigned. Students will be reminded of missing assignments during the class period and are encouraged to check ABI and/or PLTW's LMS to verify scores and their current grade.

If assignments are not turned in on time, the following grading system will apply:

- One day late - minus one letter grade (from total score)
- Two days - minus two letter grades (from total score)
- Three days late or more – half of the total score

Students are responsible for and should not discard any assignments until the final grade has been posted in ABI.

*Students can make arrangements to come in before and/or after school to make up work. I am usually here before school by 7:00 a.m. and stay after school M, W, F until 3:30 p.m.

ACADEMIC HONESTY STATEMENT

Academic dishonesty includes but is not limited to: cheating, copying from other sources (on-line courses, any internet site), homework turning in work done by parents, projects, tests, notes, using notes without permission, forging, altering or duplicating school or teacher documents or signatures, plagiarism and text messaging regarding test data or information. The 'I' (Integrity) from our school's motto, will be enforced.

College Credit

Intro to Design is currently articulated with Riverside Community College meaning students can earn 3 units of college credit for FREE. Students need to earn a B or better during both semesters and on the Final Exams. In order to earn the credit students will need to sign up as an RCC student during the spring semester on a day that will be planned in advance. I will notify parents when this day is near with further details.

Classroom Management

- A copy of the Student Code of Conduct can be found in the MV Guide.
- I expect you to read and understand that code.
- I will try my best to observe all of the points in that code.
- I expect you to be in your seat each day ready to learn, and able to act respectfully to yourself and to others.
- You cannot learn if you do not respect the rules, others, yourself, and your teacher.
- Every day when you walk through that door, I will do my best to inspire, motivate, and teach you about engineering design.
- I will expect the same from you.

Miscellaneous

- If there is a problem, big or small, let me know.
- It's best to talk to me in private if the situation requires it.
- Once we have spoken, I will do my best to fix the situation.
- The best way to contact me is by email.
- My email address is at the top of this document.
- I will try to answer phone calls and emails within 24 hours.

PLEASE GET A QUAD RULED ENGINERING NOTEBOOK BY MONDAY - WORTH 10 POINTS

10 Point Homework Assignment Due by 11:59pm Tuesday for 10 points

In an effort to go paperless your parent will send me an email stating that they have looked over the course syllabus with you.

Directions –

1. Please have one of your parents send me an email to cdhunter@murrieta.k12.ca.us with your period, first, and last name in the subject line.
2. Example – 2 Sarah Snyder
3. Please have your parent include their contact info including email (if different from one they are sending from) and preferred phone number.
4. If you or your parent has any questions please include them in the email.