

Tucson Unified School District
COURSE SYLLABUS TEMPLATE

1. Course title: **Engineering and Entrepreneurship**

2. Course description: **This class requires students to study and apply the basics of entrepreneurship; Idea Generation, Opportunity Evaluation, Planning, Budgeting and Timelines, Product Manufacturing, Quality Assurance, and Growth. This will be accomplished through project-based learning that will meet the needs of customers within the RUHS community, providing students with experience in project design, manufacturing, and meeting the wants and needs of a customer.**

3. Course dates: **Full Year: Aug - May**

4. Course location: **RUHS: T8 MakerSpace**

5. Instructor: **Robert Schmidt, Robert.schmidt@tusd1.org**

6. Adopted text and other learning resources:

Readings and instructions videos will be provided online. Please see the concept website for the Engineering and Entrepreneurship course <https://t8makerspace.com/EnE> for links to the general curricula and example project curricula. Each unit consists of online safety readings and videos as well as online safety tests that must be completed before a practical exam on a given tool or machine.

Readings for marketing and entrepreneurship concepts will be provided in a similar format.



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7. Course essential questions:

What is entrepreneurship?

- How should an entrepreneur decide what to make?
- How should an entrepreneur make decisions to ensure the long-term success of their business?
- How can an entrepreneur gauge if the customers wants and need have been met?

How can the engineering design process be applied to manufacturing?

- What is the safe use of the MakerSpace tools and machines?
- How can the MakerSpace tools and machine be used to produce products that meet the needs of the customer?
- How can an engineer use their knowledge of math, science, and appropriate use of available equipment to solve peoples' problems?

8. Course objectives: Upon completion of this course, students should be able to do the following:

Utilize the tenants of entrepreneurship and the steps of the engineering design process to:

- Assess the wants and needs of a customer regarding a proposed product.
- Safely and efficiently produce a product in the most cost-effective way given a certain time constraint.
- Survey the customer to gauge their satisfaction with the project.
- Communicate the strength and weaknesses, along with possible improvements to the process for use by future students asked to complete a similar project.



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9. Desired course outcomes:

Give students experience using MakerSpace equipment to create more advanced products.

Enable students to connect the ideas of entrepreneurial product design with the engineering design process.

Allowing students to explore the entrepreneurial process to see if it is something they would like to pursue in life.

Create products for use in the RUHS community to make the school a better place.

10. Course calendar/schedule: **TENTATIVE**

Given the experience with the other two project-based engineering courses taught at UHS, it is likely that the year-to-year calendar/schedule will be highly dependent upon the projects that the students choose for the class.

Each quarter, students will participate in both a group project and will have time for an individual project.

For this course, the group projects will all involve the design, manufacturing, and delivery of a product to meet the needs of a RUHS customer. The requested projects will change from quarter-to-quarter and year-to-year. However, some of the projects that have been completed by myself of the MakerSpace club in the past have included:

- **A lab table lift for the RUHS custodians to use when waxing the floors of the science labs**
- **New parking signage for the RUHS Site Engineer**
- **3-D printed marker holders for the Math Dept's student desks**
- **Personalized embroidered names for RUHS dance hoodies**
- **Repair of RUHS Color Guard flag bags**
- **Creation of a "deployable wing backpack" as a prop for RUHS Cast of Thousands' production of Kafka's Metamorphosis**
- **Senior Night sashes for the football team**



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Group projects will entail students' work in the design, manufacturing, and delivery processes. The final project presentation will require the production of a report/presentation that can be shared with any future students who work on a similar project.

Each quarter's individual project will allow students to design and manufacture a product of their own. The overall structure of the project is very similar to the group project, but the student is their own customer. These projects incentivize the course by allowing students to pursue ideas of their own. Previous MakerSpace club examples include:

- Customization and finishing of an electric guitar kit.
- Halloween costume/prop construction (woodworking, 3D printing, and/or sewing)
- Electronic lighting controls for UHS Government Debate project.
- Button Making
- Building a Vex Robotics arena from wood.
- Wood turning pen sets or magic wands.
- Sewing/wood working/3D printing of small gifts for the holidays.

Individual projects will entail students to design and manufacture a product of their own choosing. The concluding presentation for the individual projects will require students to present to their peers including an explanation of their use of the engineering design process and how this product could be produced for a wider audience as an entrepreneurial idea.

11. Assessments:

a. Assignment titles:

Group Projects:

40% Participation points – earned by working on the project in some capacity awarded every week

20% Production points – earned from the customer satisfaction survey about the quality of the product and the customer service

40% Presentation points – earned from the quality, accuracy, and appropriateness of the culminating presentation



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Individual Projects:

50% Participation points – earned by working on the project in some capacity awarded every week

50% Presentation points – earned from the quality, accuracy, and appropriateness of the culminating presentation.

- b. Due dates for major assignments:

Due to the nature of a project-based learning course, the assessment/assignment dates are fluid and can change depending upon a number of outside factors. A tentative timeline will be one of the first things that students create at the beginning of each major project. Major deadline can be pushed back if needed/possible, but major deadlines will never be bumped forward without unanimous approval by the class.

12. Course calendar/schedule: **Please see answer in question #10**

13. Grading policy: *Policy: IKA-R*

- a. What student work is graded and how grades are assigned.

Please see detailed assignment/assessment information in question #11a

- b. Dates of exams, quizzes, or other means of assessment

Please see detailed due date information in question #11b



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14. Course Policies:

a. Policy for submitting assignments:

- **Very few (if any) individual assignments will be turned in. If an individual assignment is required, students will be given due dates and submission instruction at that time.**
- **Daily activity about work towards project completion is required for some long-term projects. In these cases, a daily engineering log sheet will be provided, and turned in at the end of the project.**
- **Final products for outside customers will need to be completed on or before the date determined by the students in the design phase of the project. Students will be held to the deadlines they set for themselves.**
- **Final presentations will be submitted upon the completion of each major project. An individualized rubric will be created and shared with students before work on the culminating presentations begin.**

b. Exam schedule and make-up policy

With the exception of online safety tests that can be repeated as often as needed until a score of 100% can be attained, there are no other exams planned for this course.

The only time make-up work may be required is if a student is identified by their group as not having completed their share of the group activity. For individual projects, any need for make-up work would be self-identified by the student.

The MakerSpace is open during every conference period (Mondays and Tuesdays from 8-9 am) for make-ups, and there is also availability before or after school by appointment.



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c. Attendance: *Policy: JE– R*

The attendance policy for this course is defined by TUSD policy JE-R and can be found by following this link: [Attendance Policy](#)

d. Tardy Policy *site handbook*

UHS Tardy policy consequences are enforced by the UHS administration. They are as follows:

- **After 3 documented, unexcused tardies: administrative conference will be held with the student**
- **After 4 or more: after-school detention**
- **Continued tardies: In-school suspension**

e. Academic dishonesty

The University High School Cheating Policy is enforced by the UHS administration. The policy language can be found in the document linked here: [UHS Policy Document](#) in Section I.B

