

Engineering Design & Development (EDD)

Fall 2024 Course Syllabus

Hope MacKenzie, Instructor



SUMMIT TECHNOLOGY
ACADEMY

Academics Amplified. Professions Launched.

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Class Hours: 7:55 – 10:00 am, 11:55 am – 1:55 pm

COURSE DESCRIPTION: This course is the senior capstone class in the PLTW Engineering pathway. It is an open-ended engineering research course in which students work in teams to design, develop and document an original solution to a well-defined and justified open-ended problem by applying an engineering design process.

Students will perform research to select, define, and justify a problem. After carefully defining the design requirements and creating multiple solution approaches, teams of students select an approach, create, and test their solution prototype. Student design teams will present their design process, original solution and results to a panel of engineering professionals at semester end.

While progressing through the engineering design process, students will work closely with experts and will continually hone their organizational, communication and interpersonal skills, their creative and problem solving abilities, and their understanding of the design process.

INSTRUCTIONAL PHILOSOPHY: EDD is a very open-ended course. In short, it is YOUR project and your instructor is more facilitator than teacher. Each design team will report to the instructor on a weekly basis as to the progress on their team project. Written and oral communication are key to success in the course. EDD is about the engineering design *process*, not the product created. Student grades are NOT dependent on a successful and/or marketable prototype, but rather on how thoroughly the engineering design process is documented and communicated.

ESSENTIAL STANDARDS:

1. Engineering Mindset - Students will exhibit specific personal and professional characteristics that lend themselves to the creative, collaborative, and solution-driven nature of the profession.
2. Design Process: Problem Validation/Justification - Students will effectively articulate a problem statement supported by credible sources and validated through research and expert input.
3. Design Process: Solution Design - Students will generate multiple solution possibilities aligned with identified design requirements and evaluate solutions using feedback from experts/stakeholders and a decision matrix. The selected solution will undergo refinement based on evidence of its viability.
4. Design Process: Prototype, Testing and Analysis - Students will create a testable prototype and an unbiased testing plan based on the defined design requirements to determine the effectiveness of the solution created.
5. Documentation - Students will document the engineering process in an organized, clear, complete and consistent manner.
6. Professionalism - Students will conduct themselves in a manner consistent with engineering professionals, guided by professional ethics and standards.

MAJOR ASSIGNMENTS/PROJECTS:

1. Twelve Element Papers - Students, in their design teams, will formulate a problem statement, and follow through on the engineering design process culminating in a constructed and tested prototype. The entire process will be documented in Elements A-L.
2. Three Major Presentations
 - a. Project Proposal (TBD)
 - b. Preliminary Design Review (TBD)
 - c. Critical Design Review - to a panel of local engineering professionals (December 18)
3. Competency Reflections

GRADING POLICY: Grades will be figured using the Summit Technology Academy approved grading scale. Grades are cumulative throughout the semester. Semester grades (A1) are computed per the following weighted categories:

1. Element Papers (Team) - 25%
2. Presentations (Individual/Team) - 25%
3. Competency Reflections (Individual) - 50%

The Critical Design Review presentation in December will serve as the Final Exam and is weighted 10% of the semester (S1) grade.

The following standardized grading scale is used for STA:

A	95 - 100%	C	73 - 76%
A-	90 - 94%	C-	70 - 72%
B+	87 - 89%	D+	67 - 69%
B	83 - 86%	D	63 - 66%
B-	80 - 82%	D-	60 - 62%
C+	77 - 79%	F	59% & below (No Credit)

TUTORING/EXTRA HELP PLAN: STA utilizes a pyramid of interventions in order to increase the likelihood that students successfully meet the course requirements. Tutoring or extra help can be obtained by contacting the STA teacher through email or in person. The teacher will provide either immediate help, set up a time to meet, or utilize an online video conference method.

ATTENDANCE POLICY: Regular attendance reflects dependability. Be aware that in this class you work as part of a team. Your team members rely on you to complete your share of the research, work, etc. If you are going to miss a day due to a school activity or illness, try to notify your group members so they can make arrangements accordingly. Summit Technology Academy's policy may differ from that of the sending school and will be in effect for the period of attendance at STA. Please reference the on-line [STA Student Handbook](#) for the most current policy.

A student shall be allowed no more than nine (9) absences, excused or unexcused, per semester in any one class. When a student reaches 9 days, the school will send an informational letter to the parents, regardless of prior contact by phone or conference. The letter serves as notification of the number and type of absences by the student in each class. On the tenth (10) absence, in any one class, the student will not earn credit for that

class. Students will have the opportunity to work with their administrator or teacher to make up missed time prior to the end of the semester. If a student still has 10 or more absences at the conclusion of the semester the student will be required to complete an attendance waiver appeal. A waiver to maintain full credit must be submitted by the end of the semester. This waiver should include documentation of illness, funeral, or family emergency from a medical doctor, dentist, minister, or other official source. The waiver should be turned into the attendance office.

ELECTRONIC GRADEBOOK/POWER SCHOOL WEBSITE: Grades are updated on a weekly basis. The Power School website address is <https://powerschool.lsr7.org/public/>.

ACADEMIC LETTERING: Students who have earned a 94.5% or higher in a STA program for the first semester and a 94.5% or higher grade at the time of the fifth grading period will receive the academic letter.

TARDY POLICY: A tardy will be issued in accordance with the student handbook. Students are on time if they are seated in the classroom at 7:55AM/11:50AM, not simply walking through the classroom door.

DRIVING PRIVILEGES: Driving to STA is a privilege and can be revoked at any time. Students are allowed to drive to STA as long as their sending school allows them to drive and a permit is on file. Driving permits may be revoked if a student is frequently tardy, late to school, or exhibits irresponsible driving practices upon entering, or leaving STA, etc. Please reference the on-line [STA Student Handbook](#) for the most current policy.

ELECTRONICS POLICY: No electronics or headphones are allowed in the classroom unless being used in the educational process or as directed by the instructor. Electronics (including cell phones) should be silenced and placed in backpacks or purses and out of sight during class.

DAILY MATERIALS NEEDED:

1. Engineering Notebook: provided by STA
2. 3-ring Binder or Folder
3. Scientific calculator (no phones)
4. Pencil(s) and pen(s)
5. Flash drive (optional)

TECHNOLOGY: Students are required to utilize technology for various assignments. Access outside of class is required.

LATE WORK: Late work will be accepted on a case by case basis, and will require consultation with the teacher. In addition, late work may be subject to reduced credit.