Engineering Design & Development (EDD)

Hope MacKenzie

2022-2023 Course Syllabus

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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. Students will be able to identify and write the PLTW twelve engineering design processes.
2. Students, in their design teams, will develop a problem statement based upon firsthand life experiences that is intended to address/solve the team's chosen problem.
3. Students will conduct the necessary research in order to ascertain the need for and the existence of solutions to their problem that may already be in the public domain.
4. Once a particular solution has been decided upon, and data has been collected and analyzed, student design teams will develop a series of product specifications pertaining to their problem solution.
5. Students, in their engineering notebooks, will provide detailed sketches and diagrams of their design solution. These will be updated as necessary.
6. Students will submit a technical paper documenting their design process and solution.
7. Students, during construction phase, will abide by all requisite safety procedures, both on and off –site.
8. Students will present their project design to a panel of local engineering professionals.
9. Students will research, present, and submit a formal paper on engineering ethics.
10. Students will demonstrate an ability to function on diverse teams and to communicate effectively.

MAJOR ASSIGNMENTS/PROJECTS:

1. Engineering Design Project Development
    a. Twelve Element Papers (Team) - 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.
    b. Three Major Presentations (Team)
        i. Project Proposal
        ii. Preliminary Design Review
        iii. Critical Design Review - to a panel of local engineering professionals
    c. Engineering Notebook - This project item is to be maintained throughout the design project process. It will be assessed on a regular basis.
2. Engineering Ethics Paper
3. Engineering Careers Presentation

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

1. Engineering Design Project Development: 75%
2. Classwork: 15%
    a. Various activities to support comprehension of engineering design process
    b. Technical writing activities
    c. Ethics paper/presentation
3. Math: 10%
    a. weekly math topics

LATE WORK: No late work is accepted. Any assignment, be it a paper, report, etc., that is not turned in (hard copy and/or email) by the due date and time or as prescribed in this syllabus will receive a ZERO! In short, anything late will simply not be tolerated.

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. 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.

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 should be placed in backpacks or purses and out of sight.

DAILY MATERIALS NEEDED:

1. Engineering notebook: provided by STA
2. Mathematics notebook/folder
3. 3-ring binder or Folder
4. Scientific calculator
5. Pencil(s) and pen(s)
6. Flash drive (optional)

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