Engineering Design & Development
Course Syllabus
2019-2020 SY

Instructor: Ms. Withers
e-mail: ladygracewithers@misdmail.org
Conference: 10:00-10:45 am
Room: B132
Tutoring time: By appointment before/after school

Course Description:

Engineering Design and Development (EDD) is the capstone course in the PLTW high school engineering program. It is an engineering research course in which students work in teams to design and develop an original solution to a valid open-ended technical problem by applying the engineering design process. The course applies and concurrently develops secondary level knowledge and skills in mathematics, science, and technology.

Utilizing the activity-project-problem-based (APPB) teaching and learning pedagogy, students will perform research to choose, validate, and justify a technical problem. After carefully defining the problem, teams of students will design, build, and test their solution. Finally, student teams will present and defend their original solution to an outside panel. While progressing through the engineering design process, students will work closely with a community mentor and experts and will continually hone their organizational, communication and interpersonal skills, their creative and problem solving abilities, and their understanding of the design process.

Engineering Design and Development is a high school level course that is appropriate for 12th grade students. Since the projects on which students work can vary with student interest and the curriculum focuses on problem solving, EDD is appropriate for students who are interested in any technical career path. EDD should be taken as the final capstone PLTW course since it requires application of the knowledge and skills from the PLTW foundation courses.

What will my classes be like?

Have you ever said: "Don't you hate it when…?" Here is your chance to do something about it! Working as part of a team, you'll design a solution to a technical problem of your choosing. Research, design, test, and construct that solution and present it to industry partners. Use what you have already learned to guide you through the process of design and product development. Who knows? You and your team might solve a problem that has stumped others, just because you were able to let your imaginations soar.

Course Goals / Objectives:

The Project Lead the Way curriculum, including Introduction to Engineering Design, focuses on making math and science relevant for students. The approach used is called APPB-learning (activities, projects, and problem-based learning). By engaging in hands-on, real-world projects, students understand how the material covered in class can be applied in their everyday lives. Learning activities will include teacher-led instruction, cooperative learning, and project-based learning. Technology will be used to enhance students learning, and provide real-world applications.

Engineering is a profession that contributes to change and improvements in our world. It creates imaginative and visionary solutions to the challenges of the 21st century – the problems of feeding the world, how we will use energy and continue to protect our environment. Engineering and technology play a vital role in the quality of everyday life and wealth creation. Appropriate attitudes relative to the professional social obligations of the engineer, and the relationships between math, science, technology and society need to be learned. Real world, open-ended engineering problems that cover a wide range of content will be presented.

Course Outline: (1 Semester)

Unit 1: Project Management *(11 days)*
- Lesson 1.1: Overview and Expectations
- Lesson 1.2: The Design Process

Unit 2: Define a Problem *(11 days)*
- Lesson 2.1: Identify a Valid Problem
- Lesson 2.2: Justify the Problem

Unit 3: Design a Solution *(19 days)*
- Lesson 3.1: Select a Solution Path
- Lesson 3.2: Develop a Design Proposal

Unit 4: Design and Prototype a Solution *(32 days)*
- Lesson 4.1: Plan for the Prototype
- Lesson 4.2: Build the Prototype

Unit 5: Test, Evaluate, and Refine the Solution *(10 days)*
- Lesson 5.1: Plan the Test
- Lesson 5.2: Test the Prototype

Unit 6: Communicate the Process and Results *(5 days)*
- Lesson 6.1: Documentation and Presentation

Grading System

Six Weeks Grade:
Daily: 60% Projects /Activities/Engineering Notebook
Major: 40% Test/Quiz
Total: 100%

Semester Grade:
80% Average 6 week grade
20% Final exam -- end of course exam **REQUIRED!!**
100% Total

End of Course Exams (Final Exam)

All students in our EDD course will take the National PLTW End of Course test.

Test Retakes (excluding the End of Course Exam)

If the student would like the opportunity to retake a failed test/assessment the student must:

1. Arrange with the instructor to receive remediation
2. Arrange with the instructor to re-test outside of class time within 3 class periods or by the end of a six week grading period, whichever comes first.
3. Sign a contract with the instructor agreeing to the above terms.

Note: The student will receive a maximum of 70% on the retake.

Assessment Standards / Grading Practices:

- Grades will be calculated on a straight point basis. Projects will be based on a scale of 1 to 100 points depending on the assignment or project. Daily work and participation grades will be based on completion of the Engineering Notebook and Portfolio. Weekly quizzes, cumulative unit exams and a **National PLTW Assessment will be given during the semester.**

  NO EXEMPTIONS
- All students must maintain an Engineering Notebook and Portfolio to pass the class. They will be checked periodically throughout the semester.

Professional Skills:

Time Management - Students *need to apply themselves on a daily basis. There is a fixed timeline to follow in this course, make sure to follow through!*

Personal Motivation - Actively *seeking and taking part in any undertaking relating to the chosen skill area.*

Problem-Solving Ability - This *course encourages and teaches students to problem solve and use critical thinking to solve problems.*

Reliability/Dependability - *Demonstration by the student that he/she can be relied upon to do what is expected in class and in group work. This includes completing assignments on time and in a professional manner and working with their group partner.*

Ability to Work with Others - A *variety of skills including teamwork are addressed. In this course students must work in groups on various tasks and projects for solving problems, generating ideas, stimulating critical thinking, etc. by unrestrained spontaneous participation in discussion. Students will acquire strong teamwork and communication skills throughout this course.*

PARENTS, after carefully reading the information in this letter, please complete the confirmation page. Confirmation page is due no later than ***January 13, 2020.*** To access the confirmation page please click the following link: https://forms.gle/F2eagWAwuJp5aXdy9

Upon receiving the confirmation page your student will receive 100 points. Let us make this an outstanding year!

Sincerely,

G. Withers

Grace Withers
PLTW-Engineering and Comp Science-1 Instructor
BBIA

Classroom Norms

1. Students are in the room when the bell rings with ID's on.

2. Students sign in at table by the door. This is how attendance is taken. It is your responsibility.

3. Students will be assigned a laptop and are not allowed to use other laptops unless specifically directed to by the instructor.

4. Backpacks, purses and other large items must be left on the floor under the table.

5. Cell phones and iPads are **not** allowed during class unless for designated instructional use per District Policy. Cellphones will be put up in the designated area. NO EXCEPTIONS!

6. Laptops are to be left in the same configuration as found. **NO CHANGES!** Remember these are not your laptops and the district is watching.

7. No outside storage devices(USB) are to be used.

8. No food/drink is allowed in the lab.

9. Follow restroom break procedure.

10. Three minutes before the end of class students are to:
    - Return all materials to the appropriate location.
    - Leave workstation, including chair, area clean and ordered for the next session.

I have received and read the ***Engineering Design and Development*** Course Syllabus, the Classroom Norm and District Student Technology Usage policy. I agree to abide by all these standards.

Student Name (printed)

Student Signature

Parent or Guardian Name (printed)

Parent or Guardian Signature

Parent or Guardian Phone Number

Parent or Guardian’s Email Address