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.

Required Materials:

- Facemask, worn correctly at all times
- Standard earbuds, not Bluetooth
- Personal hand sanitizer
- Composition book for notes
- Pocket folder for handouts
- Black or blue ink pen (fine tip preferred)
- Pink eraser or art gum eraser
- Flash Drive or cloud storage account
- All other materials provided using class fees.
- Course & TSA Fee
  - **Course Fee:** $65 total by the end of the third week of school
    - $50 for computer lab supplies fee. This also helps pay for certification testing and PPE.
    - $15 for TSA membership.
    - Cash or checks made to ACTC.

TSA: Technology Student Association is a co-curricular component of BTA. Students are encouraged to become participating members of the organization as it enhances classroom instruction, helps develop leadership skills and provides opportunities for growth and service. TSA dues are $15.

Course Objectives: The Project Lead the Way curriculum, including Engineering Design and Development (EDD), 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.

Available Industry Credentials: Autodesk Inventor Certified User and/or Autodesk Fusion 360 Certified User

Instructional Methods: PowerPoint presentations, cooperative group activities, original research, class discussions, demonstrations, note-taking, role-playing, online coursework, pictures and videos, others as needed.

Course Outline:
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.

Assessment Procedures: Daily assignments, tests and quizzes, performance assessments, laboratory work, project reports, assignment completion, class discussion/participation, and project presentation are used in assessing student learning and progress throughout the course. Work not turned in or attempted will receive a zero for the assignment. Students who have an excused absence will have 3 days to make up work.

Schoology: The course is all computer based so most assigned work cannot be completed at home. Utilize Schoology to see what work you are missing while absent. It is the student's

responsibility to find out what they missed when absent from class. ***Please see the note regarding COVID 19 quarantine/virtual procedures at the end of this document.***

Grading:

Major Grades	**65%**	Tests, projects, portfolio
Minor Grades	**35%**	Daily work, class assignments, employability grade

Grading Scale: 100-90   A   89-80   B   79-70   C   69-60   D   59-0   F

Class Rules & Expectations:
1. The student will adhere to the guidelines of student conduct set forth in the school handbook.
2. Students will be seated when tardy bell rings.
3. Tardies are dealt with according to ACTC policy.
4. A zero is earned under the following conditions:
   - cheating (ex. talking during a test, cheat sheets, etc.)
   - <u>failure</u> to make-up missed work due to an excused absence within 3 days
   - an <u>unexcused</u> absence

Expectations
1. Be Respectful
2. Be Responsible
3. Be Resourceful

Consequences
1. Student/Teacher conference
2. Parent contact
3. Office referral

*A severely disruptive student will be immediately sent to the office.

Make-up Work Procedure: Attendance is required. You have three school days to turn in makeup work. **You are responsible for acquiring and completing your make-up work. Schoology has all assigned work.** However, you are welcome to ask questions about and get help with any make-up work that you don't understand.

Cleanliness: Please make sure the area around your desk is clean and neat before you leave each day. We will wipe down all surfaces daily, after each user.

Personal Devices: Cell phone, headphones, camera, and/or iPod usage is not allowed in the classroom unless specified by the teacher. We have computers in the lab for classwork and research, so there is no need for you to have your phone out. If you choose to use or make any of these items visible during class, you are giving me permission to hold your item(s) until the end of class.

Email: Please make sure you have a Gmail email account. This will be used to sign up for many accounts in our classroom.

Social Media: We have a class Instagram page where we document our journey through the year. You will be featured on it! Follow @actctsa on Instagram.

COVID19 Quarantine/Virtual Procedures: <u>Most</u>, but not all of the curriculum used in this class can be delivered virtually. To accomplish this, students will have to create multiple online accounts for different platforms. We will do this during the first week of school. It is imperative that you keep your usernames and passwords written down somewhere safe so you have easy access to them. I recommend multiple copies.

If you have to be isolated due to COVID exposure during this time, you are expected to keep up with your assignments. All assignments will be available in Schoology. Losing your login information will not be an acceptable excuse for not completing work. If you are diagnosed with the coronavirus, we will make arrangements for make-up assignments.

Keep these 4 pages. Please return the fourth page.

Cooper's EDD Syllabus Return Page

*Your first assignment: Please read the attached information and sign below, have a parent/guardian read the information and sign below, and bring the contract back to class to receive credit. Thank you for your cooperation! I am looking forward to a great year. Parents, please feel free to contact me if you have any questions.

I (we) have read the information about the Engineering curriculum, grading policy, student responsibility, and classroom procedures for Mr. Cooper. I understand my image may be featured on the ACTC website and social media, lobby TV or ACTC social media pages.

I have read the classroom management plan and agree to follow all rules and procedures.

_____   _____

Student Signature   Date

Students, stop right now and join the EDD Class Remind account. Log into your Remind app and add class actcedd. If texting, text 81010 the message @actcedd.

Awesome! Now get your parents to sign this paper, give you the class fee and bring this form and money to class.

_____   _____

Parent/Guardian Signature   Date

Parent/Guardian preferred phone number: _____

Parent/Guardian preferred email address: _____

It is the policy of ACBOE that no student shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination in any program on the basis of sex, race, color, religion, national origin, age, handicapping condition, belief, creed or ethnic group.