PLTW Info:

CEA:



**Civil Engineering & Architecture (CEA)**

*Specialized Course, PLTW Pathway to Engineering-*

***TCD is a PLTW Certified School***

**20th Century architecture was "form follows function" -- but today's buildings are multi-functional. What is your vision for the 21st Century?**  
New building plans look impressive onscreen, but how would that cool structural design you developed stand up to a flood, earthquake, city inspector, or historical commission? Some of today's designs integrate housing, workspace, recreation, and the great outdoors into the same building or complex.  
  
**What will my classes be like?**  
Use 3D modeling software to create and test your own residential and commercial designs, factoring in:  
   
Materials and systems  
Structural design  
Cost/efficiency analysis  
Storm water management  
Site design / considerations  
Utilities and services  
Building codes  
Architectural style and guidelines  
  
Research the professional and technical careers in the design and construction industry, including those addressing new developments in energy efficiency, green technologies, and changing populations. Be inspired to shape the spaces of the 21st Century!

**CURRICULUM TOPICS**

This is not a comprehensive list of all available skills and goals, but given to show the scope of the curriculum. It is recommended that students are concurrently enrolled in college preparatory mathematics and science courses.

CEA is one of the specialized courses in TCD's Project Lead The Way Pathway to Engineering course sequence. Students who have successfully completed the IED and POE foundation courses at TCD or their high school can easily transition to this course. To receive maximum recognition or credit from PLTW-affiliated colleges and universities, students should successfully complete the two foundation courses, one specialized course, and the capstone course. Some affiliates offer recognition or credit on a course by course basis. [For more information click here.](http://www.tcdupage.org/cms/lib2/IL01001587/Centricity/Domain/8/PLTW%20College%20Credit%20FY13%20LINKS.pdf)

The course of study includes:

* History of CEA
* Careers in CEA
* Residential Design and Construction
* Cost and Efficiency Analysis
* Commercial Building Systems and Structures
* Services and Utilities
* Site Considerations

**For additional PLTW course information:**[Introduction to Engineering Design](http://www.tcdupage.org/site/Default.aspx?PageID=786) (IED)  
[Principles of Engineering](http://www.tcdupage.org/site/Default.aspx?PageID=787) (POE)  
[Digital Electronics](http://www.tcdupage.org/site/Default.aspx?PageID=215) (DE)

[Engineering Design & Development](http://www.tcdupage.org/site/Default.aspx?PageID=1253) (EDD) -- capstone course

EDD:



**Engineering Design & Development (EDD)**

*Capstone Course, PLTW Pathway to Engineering*

***TCD is a PLTW Certified School***

**Collaboration makes things happen!** In this capstone course, you will work as part of a team to develop a solution to a technical problem of your choosing. Challenge yourself with one of those “don’t you hate it when...” issues of the world and try to solve it. Or see a need here at TCD, your home high school, or your community and find a way to meet that need. Research, design, test, and construct your solution or recommendations, then present it to industry or community partners. You and your team will use what you’ve already learned to guide you through the process of design and product development. Who knows? You may solve a problem that has stumped others!

**But what KIND of project?**

[Click here for examples](http://www.tcdupage.org/cms/lib2/IL01001587/Centricity/Domain/32/EDD_Projects.pdf) of actual EDD projects from around the nation, tackled by PLTW Pathway to Engineering students just like you.

**Instructor**:

[Jonathan Kinczyk](mailto:jonk@tcdupage.org)

**Photos from the**[**2015 TCD Engineering Showcase.**](http://www.tcdupage.org/site/Default.aspx?PageID=1546)

**View the projects presented at the 2015 TCD Engineering Showcase:**

|  |  |  |
| --- | --- | --- |
| [**Kinetic Energy Sports Ball**](https://youtu.be/-AAAhxFg94I) | [**Pneumatic Motor**](https://youtu.be/pYigbJ9uo2E) | [**Crack a Snack Package Design**](https://youtu.be/zi87To4pJz8) |
|  | [**Snap Cord**](https://youtu.be/iW3NDTS6-Ww) |  |

**View the projects presented at the 2014 TCD Engineering Showcase:**

|  |  |  |
| --- | --- | --- |
| [**Multi-Density  Mechanical Pencil**](http://youtu.be/QGyifzfoH_Y) | [**Transitioning Window Visor**](http://youtu.be/rTm5jKP8vKY) | [**C Run Master App**](http://youtu.be/xroT8zOzqgE) |
| [**Heated Landscape Blower**](http://youtu.be/8J-ITvut0b4) | [**KE Power Shoe**](http://youtu.be/HYC2ZIUarCs) |  |

**View the projects presented at the 2013 TCD Engineering Showcase:**

|  |  |  |
| --- | --- | --- |
| [**EM Powered Cell Phone Charger**](http://youtu.be/FpXoP2D9UNc) | [**Automotive Entry System**](http://youtu.be/a9L-1JOqvjo) | [**Redesigned  Light Bulb Changer**](http://youtu.be/CEEDGX0EveM) |
| [**Chain Link Removal Tool**](http://youtu.be/Pv_PVU6MhjM) | [**Retractable Cord Management Device**](http://youtu.be/TkM7kXzZ5FU) | [**Windshield Wiper Temperature Sensor**](http://youtu.be/iYx4lhY3bew) |
|  | [**Portable Ergonomic Chair for the Elderly**](http://youtu.be/Uu_uggBv_EQ) |  |

EDD is the capstone course in TCD's PLTW Pathway to Engineering course sequence. Students wishing to enroll in EDD should have successfully completed one of the Pathway to Engineering specialized courses first semester. For maximum recognition or credit from PLTW-affiliated colleges and universities, it is recommended that a student successfully complete the two foundation courses, one specialized course, and the capstone course. Some affiliates give recognition/credit on a course by course basis. [For more information click here.](http://www.tcdupage.org/cms/lib2/IL01001587/Centricity/Domain/8/PLTW%20College%20Credit%20FY13%20LINKS.pdf)

**For additional PLTW course information:**[Introduction to Engineering Design](http://www.tcdupage.org/site/Default.aspx?PageID=786) (IED) - foundation course  
[Principles of Engineering](http://www.tcdupage.org/site/Default.aspx?PageID=787) (POE) - foundation course  
[Digital Electronics](http://www.tcdupage.org/site/Default.aspx?PageID=215) (DE) - specialized course

[Civil Engineering & Architecture](http://www.tcdupage.org/Page/788) (CEA) -- specialized course

IED:



**Introduction to Engineering Design (IED)**                           
*PLTW Pathway to Engineering Foundation Course*

***TCD is a PLTW Certified School***

Instructors:

[Judy Johnson](http://www.tcdupage.org/site/Default.aspx?PageID=594)

Ever wondered how to design something new or draw out an idea to show your friends? Stop wondering and do it, using AutoDesk Inventor, state-of-the-art 3D design software! Discover the role of an engineer in taking an idea from the design process to product testing to manufacturing or production. Produce an incredible, working prototype of your project with a 3D printer. You will work on projects, activities, and problems not only of interest to you, but that have global and human impacts. Work in teams to design and improve products, document your solutions, and communicate them to others.

**Curriculum Topics**

The topics below are among the essential skills for this program. This is not a comprehensive list of all available skills and goals, but given to show the scope of the curriculum. If you find you are not familiar with the meaning of the course topics, don't worry -- that's the language of engineering! You will master it one step at a time. Changes may occur year to year based on industry input, change in focus, or other factors. Please contact the program instructor or coordinator for additional information.   
  
**Introduction to Engineering Design** is intended to serve as a foundation course within TCD's Project Lead The Way Pathway to Engineering course sequence. Topics covered in this course will be used in future courses.

The course of study includes:

* The Role of the Engineer
* The Design Process
* Technical Sketching and Drawing
* Measurement and Statistics
* Geometric Shapes and Solids
* Dimensions and Tolerances
* 3D Modeling Skills
* Reverse Engineering
* Structural Analysis
* Product Improvement
* Design Teams

IED is one of the foundation courses in TCD's PLTW Pathway to Engineering course sequence. Students who have successfully completed the foundation courses Introduction to Engineering Design (IED) and Principles of Engineering (POE) at TCD or their high school can easily transition to the specialized courses. For maximum recognition or credit from PLTW-affiliated colleges and universities, it is recommended that a student successfully complete the two foundation courses, one specialized course, and the capstone course. Some affiliates give credit or recognition on a course by course basis. [For more information click here.](http://www.tcdupage.org/cms/lib2/IL01001587/Centricity/Domain/8/PLTW%20College%20Credit%20FY13%20LINKS.pdf)

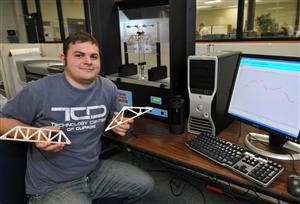
**For additional TCD-PLTW course information:**  
[Pathway to Engineering](http://www.tcdupage.org/site/Default.aspx?PageID=255) -- Overview  
[Principles of Engineering](http://www.tcdupage.org/site/Default.aspx?PageID=787) (POE)  
[Digital Electronics](http://www.tcdupage.org/site/Default.aspx?PageID=215) (DE)

[Civil Engineering & Architecture](http://www.tcdupage.org/Page/788) (CEA) -- specialized course  
[Engineering Design & Development](http://www.tcdupage.org/site/Default.aspx?PageID=1253) (EDD) -- capstone course

POE:

|  |  |
| --- | --- |
| PLTW logo    **Principles of Engineering (POE)**  *PLTW Pathway to Engineering Foundation Course*  ***TCD is a PLTW Certified School***      Instructors:  [Judy Johnson](http://www.tcdupage.org/site/Default.aspx?PageID=594) | IED/POE |
| **Principles of Engineering** exposes students to some of the major concepts in a college level engineering course of study. Go beyond "myth-busting" to solution building! As you master the basic concepts needed to continue your education in engineering or engineering technology, you will apply them, tackling real world challenges:   Energy sources and applications Machine systems Fluid power Testing the strength and durability of materials Understanding how things move and applying that knowledge to projects  You are not in this alone: team up with other students to test and share your developing skills through hands-on projects and presentations. You will learn to document your work and communicate your solutions to others.    POE gives students the opportunity to apply math, science, and technology concepts, so it is expected you are concurrently enrolled in college preparatory math and science classes. | |
| **CURRICULUM TOPICS**  The topics below are among the essential skills for this program. This is not a comprehensive list of all available skills and goals, but given to show the scope of the curriculum. If you find you are not familiar with the meaning of the course topics, don't worry -- that's the language of engineering! You will master it one step at a time. Changes may occur year to year based on industry input, change in focus, or other factors. Please contact the program instructor or coordinator for additional information.  Topics covered in this course will be used in future courses.    The course of study includes:            Mechanisms          Energy Sources          Energy Applications          Machine Control          Fluid Power          Statics          Material Properties          Material Testing          Statistics          Kinematics    POE is one of the foundation courses in TCD's PLTW Pathway to Engineering course sequence. Students who have successfully completed the foundation courses Introduction to Engineering Design (IED) and Principles of Engineering (POE) at TCD or their high school can easily transition to this course. For maximum recognition or credit from PLTW-affiliated colleges and universities, it is recommended that a student successfully complete the two foundation courses, one specialized course, and the capstone course. Some affiliates give credit or recognition on a course by course basis. [For more information click here.](http://www.tcdupage.org/cms/lib2/IL01001587/Centricity/Domain/8/PLTW%20College%20Credit%20FY13%20LINKS.pdf)      **For additional TCD-PLTW course information:** [Pathway to Engineering](http://www.tcdupage.org/site/Default.aspx?PageID=255) -- Overview [Introduction to Engineering Design](http://www.tcdupage.org/site/Default.aspx?PageID=786) (IED) [Digital Electronics](http://www.tcdupage.org/site/Default.aspx?PageID=215) (DE)  [Civil Engineering & Architecture](http://www.tcdupage.org/Page/788) (CEA) -- specialized course [Engineering Design & Development](http://www.tcdupage.org/site/Default.aspx?PageID=1253) (EDD) -- capstone course | |

Pathway To Engineering:

**** **Pathway to Engineering***Developed by Project Lead The Way (PLTW), a leader in STEM education****TCD is a PLTW Certified School.***  
[**PLTW "Innovation H.S. Brochure**](http://static.issuu.com/webembed/viewers/style1/v1/IssuuViewer.swf?mode=embed&layout=http%3A%2F%2Fskin.issuu.com%2Fv%2Fcolor%2Flayout.xml&backgroundColor=000000&showFlipBtn=true&logo=http%3A%2F%2Fwww.pltw.org%2Fimages%2Fpltw_icon_gs_sm.jpg&documentId=100518155426-f6d34c00615047db9ea9be114ff736c8&doc)

**You have a vision to make the world a better place; master the tools to bring that vision to life!**

The products we use and spaces we inhabit every day were developed through engineering. Combine your natural curiosity, design talents, and problem-solving ability with in-demand technical skills as you explore the creative world of engineers, architects, manufacturers, and design technicians.

TCD's hands-on learning labs and industry standard technology are the perfect fit for this challenging curriculum developed by Project Lead The Way (PLTW), an innovative leader in STEM education (see[www.pltw.org](http://www.pltw.org/)).

[One team of young engineers create 3D printed mechanical hands](http://www.youtube.com/watch?v=WxCDZquT2Yk)

**Project Lead The Way (PLTW)**

There are not enough U.S. students majoring in engineering, manufacturing, or technology to fill millions of highly-skilled, high-paying jobs that will open in the next decade due to retirements and new innovations. PLTW, a non-profit innovator in STEM education (Science, Technology, Engineering & Mathematics), developed **Pathway to Engineering** to encourage students to explore these careers, reinforce critical STEM skills, and help keep the U.S. globally competitive.

Studies of this curriculum have proven that PLTW students become the kind of prepared, competent, high-tech employees and entrepreneurs U.S. industry needs. The goal of PLTW is to increase the number, quality, and diversity of engineers graduating from our educational system. The program also offers students the chance to find out if engineering is the career for them before investing in their college education.  
  
Research shows that PLTW students are five times as likely as other students to choose engineering and related disciplines in college and they have a higher retention rate in post-secondary engineering, science, and related programs.

At TCD, "Pathway to Engineering" is a series of semester-long courses offered over two years (junior year and senior year). There are three enrollment options:

**A. Full PLTW at TCD:** A student enrolls in the two foundation courses (IED, POE) for his or her junior year, followed senior year by a one-semester specialized course (AE, CEA, CIM, or DE) and a one-semester capstone course (EDD).

**B. Completing PLTW at TCD:** Students who have already taken one or both foundation courses (IED, POE) at their high school may continue the PLTW sequence at TCD in the junior or senior year.

**C. Partial PLTW Enrollment:** Students interested in engineering who cannot follow the complete sequence may still enroll in foundation or specialized courses. Talk to your counselor or TCD's Career Counselor for information.

Note: In order to receive maximum recognition from PLTW-affiliated colleges and universities, a student must successfully complete the two foundation courses, one specialized course, and one capstone course. Some institutions give credit/recognition on a course by course basis. For more information about PLTW college credit/recognition, [click here](http://www.tcdupage.org/cms/lib2/IL01001587/Centricity/Domain/8/PLTW%20College%20Credit%20FY13%20LINKS.pdf).

**For TCD-PLTW course information:**[Introduction to Engineering Design](http://www.tcdupage.org/site/Default.aspx?PageID=786) (IED) - foundation course  
[Principles of Engineering](http://www.tcdupage.org/site/Default.aspx?PageID=787) (POE) - foundation course  
[Digital Electronics](http://www.tcdupage.org/site/Default.aspx?PageID=215) (DE) - specialized course

[Civil Engineering & Architecture](http://www.tcdupage.org/Page/788) (CEA) -- specialized course  
[Engineering Design & Development](http://www.tcdupage.org/site/Default.aspx?PageID=1253) (EDD) -- capstone course