

Cedar Trails Exploration Center (CTEC) – Juniors & Seniors – AM/PM Blocks – 2 block minimum



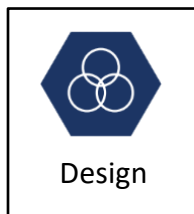
CTEC CAPS provides more Career & Technical Education opportunities for USD 232 students along with collaboration among strands while experiencing a CAPS Network program. CAPS has five Core Values which drive CTEC:

- 1. Profession-Based Learning** – Instructors develop real-world, project-based learning strategies through collaborations with business and community partners. These interactions enhance the learning experience, preparing students for college and career.
- 2. Professional Skills Development** – Unique experiences allow students to cultivate transformative professional skills such as understanding expectations, time management and other essential business values. These skills are critical to providing students a competitive advantage in their post-secondary education and professional careers.
- 3. Self-Discovery and Exploration** – Students realize their strengths and passions by exploring and experiencing potential professions. This allows them to make informed decisions about their future, while learning to exhibit leadership.
- 4. Entrepreneurial Mindset** – Instructors create an environment where creative thinking and problem solving is encouraged. An innovative culture is key to fostering entrepreneurial learning and design thinking.
- 5. Responsiveness** – CAPS supports high-skill, high-demand careers through ongoing innovation in curriculum development, programs and services based on local business and community needs.

CTEC CAPS has three strands: Bioscience, Design, and Emerging Technologies



The Bioscience Strand is science in action. It involves the use of cellular and molecular processes to solve modern health problems or make useful products. It is also an avenue for learning more about topics such as clinical medicine, biochemistry, physiology, forensic science, biomedical engineering, and/or public health. Many career opportunities await in the area of Bioscience!



The Design Strand involves the visual aesthetics of multimedia including still and motion graphics, animation and game design. It is artistic visual communication. All design experiences assist with future careers in design, marketing, production, branding, web development, game development, and user-centric design.



The Emerging Technologies Strand is a convergence of electronics, robotics, computer science, engineering and manufacturing. Future careers are still “emerging” but could include: programming, robotics, cybersecurity, automated systems, fabrication, production, and all facets of engineering.



Enrolling in the **Bioscience** Strand? FOLLOW THESE CTEC STEPS...



STEP 1 = Junior Year **STEP 2 & 3** = Senior Year

CTEC Bioscience Strand NOTE: To attend CTEC, you must enroll in a total of 2 full credits per year. The following courses are for upperclassmen who have previously taken Biology and Chemistry and whose IPS indicates a career within the bio/life sciences: animal, human, plant. If interested in the medical aspect, please take Anatomy & Physiology at your home high school.

The following are recommendations only. Talk with your counselor to design your path!

STEP 1 >

Take:

AP Chemistry (1) **OR** Medical Interventions (1)

+

Biotechnical Engineering (1)

STEP 2 >

Take:

Biomedical Innovation (1)

+

Biochemistry Workplace Experience Capstone (1)

OR

Biomedical Research/Workplace Experience Capstone (1)

(Choose the appropriate capstone course based on your area of interest)

STEP 3 >

Senior year, create and develop a professional LinkedIn account.

Continue to prepare your professional digital portfolio inside of Xello.

Talk with your counselor about postsecondary opportunities in Life Sciences.



Enrolling in the Design Strand? FOLLOW THESE CTEC STEPS...



STEP 1 = Junior Year **STEP 2 & 3** = Senior Year

CTEC Design Strand NOTE: To attend CTEC, you must enroll in a total of 2 full credits per year. The following courses are for upperclassmen who have previously taken CTE courses or electives related to Design, and whose IPS indicates a career within Design (digital).

The following are recommendations only. Talk with your counselor to design your path!

STEP 1 >

Choose **one** path below:

NOTE: Computer Graphics (1) is the pre-req for Animation.

Graphic Design Fundamentals (.5) +
Principles of Illustration (.5) – fall
(double block)
+
Graphic Design (1) – spring (double
block)

OR

Animation (1) – fall (double block)
+
Game Design (1) – spring (double block)

STEP 2 >

Continue with your path and choose **one** path below:

Take:

Graphic Design Workplace Experience
Capstone Course (2) – double block

OR

Take:

Web & Digital Project Management
Capstone Course (2) – double block

STEP 3 >

Senior year, create and develop a professional LinkedIn account. Prepare a portfolio of professional projects that can be shared with business/industry.

Continue to prepare your professional digital portfolio inside of Xello.

Talk with your counselor about postsecondary opportunities in Design.



Enrolling in the Emerging Technologies Strand? FOLLOW THESE CTEC STEPS...



STEP 1 = Junior Year **STEP 2 & 3** = Senior Year

CTEC Emerging Technologies Strand NOTE: To attend CTEC, you must enroll in a total of 2 full credits per year. The following courses are for upperclassmen who have previously taken STEM-related courses and whose IPS indicates a career within engineering, robotics, manufacturing, or programming.

The following are recommendations only. Talk with your counselor to design your path!

STEP 1 >

Take: Robotics (1) **OR** Emerging Technologies (1) + Choose **one** path below:

AP Computer Science
Principles (1)

Digital Electronics (DE) (1)
OR
Computer Integrated
Manufacturing (CIM) (1)

Intro to Welding (.5)
+
Production Blueprint
Reading (.5)

STEP 2 >

Continue with your path and choose **one** block below:

AP Computer Science A (1)
+
Cybersecurity (1)
OR
Robotics Capstone (1)
OR
Programming Project
Management Capstone (1)

DE (1) **OR** CIM (1)
+
Engineering Design &
Development (1)
OR
Robotics Capstone (1)
OR
Engineering Workplace
Experience Capstone (1)

Production Methods I (1)
+
Robotics Capstone (1)
OR
Research & Design for Manufacturing
Capstone (1)
OR
Production Methods II (1) +
Research & Design for Manufacturing
Capstone (1)

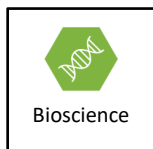
STEP 3 >

Senior year, create and develop a professional LinkedIn account.

Continue to prepare your professional digital portfolio inside of Xello.

Talk with your counselor about postsecondary opportunities in:
Robotics, Programming, Engineering and Manufacturing.

Course Explanations & Enrollment Tips – Bioscience



All courses in this Strand are connected by being Life Sciences. All support foundational skills needed for future careers in all of the biosciences: human, plant or animal. Future careers could be: Clinical research, medical science, environmental science, animal science, forensic science, pharmaceutical, biostatistics, microbiology, bioinformatics, quality control, biomanufacturing, and more!

| Bioscience Strand at CTEC CAPS | | | | | | | | |
|---|-------------|--------|--------|----------------|----|----|------------|---|
| Course Title | Course Code | Credit | Weight | College Credit | 11 | 12 | Course Fee | Prerequisite |
| Medical Interventions | CTC77A/B | 1 | | | X | X | \$10 | Chemistry |
| AP Chemistry | SCP20A/B | 1 | FW | X | X | X | \$10 | Chemistry or Honors Chemistry |
| *Biotechnical Engineering | CTC71A/B | 1 | | | X | X | \$10 | Biology/AP Biology/Chemistry or concurrent enrollment |
| *Biomedical Innovation | CTC74A/B | 1 | | | X | X | \$10 | Medical Interventions |
| *Biochemistry Workplace Experience (Capstone Course) | CTC75A/B | 1 | | | X | X | None | Application |
| *Biomedical Research / Workplace Experience (Capstone Course) | CTC76A/B | 1 | | | X | X | None | Application |

*Application Level CTE Courses

STEP to finding your path... CTEC requires 2 full blocks/credits per year
Notice the left-hand side is chemical, lab and engineering focused, while the right-hand side is medical focused.

AP Chemistry (1 credit)

This rigorous course is intended to prepare students for the AP Chemistry Exam. AP Chemistry topics covered include atomic theory and structure and chemical bonding, kinetics, equilibrium, and thermodynamics. AP Chemistry labs are equivalent to those typically found in college level chemistry courses. The class is designed to provide students with a solid foundation in chemical knowledge and principles.

Medical Interventions (1 credit)

Medical Interventions allows students to investigate the variety of interventions involved in the prevention, diagnosis, and treatment of disease. This course will explore how to prevent and fight infection, how to screen and evaluate the code in our DNA, how to prevent, diagnose, and treat cancer, and how to prevail when the organs of the body begin to fail. Through these scenarios, students will be exposed to the wide range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics. Students practice problem solving with structured activities and progress to open-ended projects and problems that require them to develop planning, documentation, communication, and other professional skills. Students should take this course prior to taking Biomedical Innovation.

Biotechnical Engineering (1 credit)

Excellent course for those interested in pursuing a future career in BioTech/BioChem/BioMed. Biotechnical Engineering enables students to develop and expand their knowledge and skills in biology, physics, technology and mathematics. Course content draws upon diverse fields such as biomedical engineering, bimolecular genetics, bioprocess engineering, or environmental engineering. Students may engage in project-based learning and problems related to biomechanics, cardiovascular engineering, genetic engineering, tissue engineering, biomedical devices, human interfaces, bioprocesses, forensics, and bioethics.

Biochemistry Workplace Experience Capstone Course (1 credit) – Application Only

Excellent course for those interested in pursuing a future career in **BioTech/BioChem**. This workplace experience course is a Career & Technical Education (CTE) elective course, which might combine onsite experiences with in-class experiences and provide students with the opportunity to work on client-based projects or a senior capstone project.

Biomedical Innovation (1 credit)

Excellent course for those interested in pursuing a future career in the area of BioMed/BioChem/BioTech. This is a [Project Lead the Way](#) course. Please take Medical Interventions prior to taking this course. In this research course, students will apply their knowledge and skills to answer questions or solve problems related to the biosciences. Students design innovative solutions for the health challenges of the 21st century (such as the cure for Cancer, etc.) by addressing topics such as clinical medicine, biochemistry, physiology, biomedical engineering, and/or public health. They may have the opportunity to work on an independent project and may work with a mentor or advisor from industry.

Biomedical Research Workplace Experience Capstone Course (1 credit) – Application Only

Excellent course for those interested in pursuing a future career in the area of **BioMed**. Advanced level application course that incorporates experienced based learning including client-based projects, a senior capstone project, or Internships supported by classroom research within their area of interest/study.

Course Explanations & Enrollment Tips - Design



All courses in this Strand are connected through digital design and artistic communication. All support foundational skills needed for future careers in all areas of still or motion graphics. Future careers could be: graphic designer, web/email/social media marketer, animation designer, visual designer, digital designer, production/manufacturing artist, UX designer, UI designer, IxD designer, brand specialist, web designer, and more!

| Design Strand at CTEC CAPS | | | | | | | | |
|--|-------------|--------|--------|----------------|----|----|------------|--|
| Course Title | Course Code | Credit | Weight | College Credit | 11 | 12 | Course Fee | Prerequisite |
| Graphic Design Fundamentals | CTC04 | .5 | | | X | X | \$20 | |
| Principles of Illustration | CTC02 | .5 | | | X | X | \$20 | |
| Graphic Design | CTC52A/B | 1 | | | X | X | \$40 | Graphic Design Fundamentals + Principles of Illustration |
| Animation | CTC51A/B | 1 | | | X | X | None | Computer Graphics or concurrent enrollment |
| *Game Design | CTC56A/B | 1 | | | X | X | None | Computer Graphics and Application |
| *Graphic Design Workplace Experience (Capstone Course) | CTC01A/B | 1 | | | X | X | \$40 | Application |
| *Web & Digital Communications Project Management (Capstone Course) | CTC58A/B | 1 | | | X | X | None | Application |
| *Application Level CTE Courses | | | | | | | | |

STEP to finding your path... CTEC requires 2 full blocks/credits per year
Choose your path from the following design courses...

Graphic Design Fundamentals (.5 credit)

This course serves as an introduction class to graphic design and pairs perfectly with Principles of Illustration. Graphic Design Fundamentals provides a basic understanding of the graphic design process. Topics include analyzing the design elements and principles, exploring industry tools, software and equipment and learning composition techniques to develop a quality product.

Principles of Illustration (.5 credit)

This course pairs perfectly with Graphic Design Fundamentals!

Principles of Illustration explores a variety of media, tools and supports as a means to communicate ideas. Topics include an understanding of illustration as applicable to careers in graphic design, animation, apparel/textile design, industrial design, web design, architecture, interior design and fine arts.

Techniques in traditional and digital illustration applications will be explored as directly linked to social trends.

Graphic Design (1 credit)

Graphic Design emphasizes design elements and principles in the purposeful arrangement of images to communicate a message. The focus is on creating art products such as advertisements, product design and identity symbols. Take Graphic Design Workplace Experience after this course.

Graphic Design Workplace Experience Capstone Course (1 credit) – Application Only

Graphic Design Workplace Experience will take the tools and software that you used in Graphic Design and apply them to “real world” applications. We will meet with clients and gain an understanding of problem solving for real projects considering production processes and client’s needs. We will develop a digital portfolio of projects to prepare you for submissions to college and to prepare you for job interviews.

Animation (1 credit) (Fall Double Block)

In this project-based course, students will explore Flash’s drawing, animation and audio capabilities and build interactive content that can be shared over the Internet. Students will learn how to create interesting motion graphics. They will learn about the aesthetics of design, motion and sound. By constructing user interactive projects, students will be challenged to think in a non-linear way. Students will learn to use a combination of logical reasoning, critical thinking and artistic creativity. Perfect course to take prior to taking Game Design!

Game Design (1 credit) (Spring Double Block)

A practical introduction to game design and game prototyping, design iteration, and user testing. Students will learn how to use popular game development software to create engaging, interactive games in a variety of styles. Challenging hands-on projects that teach all elements of successful game development will be provided.

Web & Digital Project Management Capstone Course (1 credit) – Application Only

Take this course if interested in continuing to develop your skills in Animation or Game Design. This course provides students with information and skills necessary for success in managing projects and operating logistical ventures in technology, business, and industry. Students may work on client-based projects, a senior capstone project, and/or seek out an internship as a part of this work-based learning course.

Course Explanations & Enrollment Tips – Emerging Technologies



All courses in this Strand are connected through common skills and real-world projects similar to one business containing each as a department.

All support foundational skills needed for future careers in all areas of robotics, computer programming, engineering, and manufacturing.

Future careers could be: robotics engineer, web/software developer, cybersecurity specialist or info security consultant, support engineer, product manager, all facets of engineering, manufacturing production/process development engineer, manufacturing quality assurance, manufacturing logistics and inventory control, manufacturing safety and environmental assurance, manufacturing maintenance/installation/repair, and more!

STEP ONE to finding your path...

CTEC requires 2 full blocks/credits per year

Everyone in this strand will choose **ONE** of the following:

Emerging Technologies (1 credit)

This course is VERY hands-on! Select this course if you want to go into Manufacturing! So many jobs available in Manufacturing right after high school with a certification or minimal college CTE training! Students will be exposed to the emerging technology of 3D rendering software and printing. The course will be project-based and students will create projects using a variety of materials and technologies. The course will expose students to topics in the fields of engineering, programming, electronics, mold-making, manufacturing, metalsmithing, and design.

Robotics I (1 credit)

This course will prepare and introduce students to the programming and electronics skills needed for robotics. Perfect course to take if you are interested in Computer Science or Engineering, and with a college degree, there are many jobs available! Students will be introduced to the main types of robotics, plus, students will build, assemble and troubleshoot robotic devices/systems while constructing and verifying circuits. This is a project-based course in which students will work on collaborative projects.

| Emerging Technologies Strand at CTEC CAPS | | | | | | | | |
|--|-------------|---------|--------|----------------|----|----|------------|---|
| Course Title | Course Code | Credit | Weight | College Credit | 11 | 12 | Course Fee | Prerequisite |
| Robotics I | CTC66A/B | 1 | | | X | X | \$20 | None |
| Robotics Capstone | CTC97A/B | 1 | | | X | X | \$20 | Robotics I or Instructor Approval; No concurrent enrollment |
| Emerging Technologies | CTC55A/B | 1 | | | X | X | \$40 | None |
| AP Computer Science Principles | CTC90A/B | 1 | FW | | X | X | None | None |
| Digital Electronics | CTC62A/B | 1 | FW | X | X | X | \$20 | Engineering Design (at home high school) |
| Computer Integrated Manufacturing | CTC63A/B | 1 | | | X | X | \$20 | Robotics or Emerging Technologies or concurrent enrollment |
| Introduction to Welding | CTC67 | .5 | | | X | X | \$40 | Robotics or Emerging Technologies or concurrent enrollment |
| Production Blueprint Reading | CTC68 | .5 | | | X | X | None | Robotics or Emerging Technologies or concurrent enrollment |
| *AP Computer Science A | CTC90-91A/B | 1 | FW | X (DHS & CTEC) | X | X | None | AP Computer Science Principles |
| *Cybersecurity | CTC92A/B | 1 | | | X | X | \$20 | AP Computer Science Principles |
| *Programming & Software Development Project Management (Capstone Course) | CTC93A/B | 1 | | | X | X | None | AP Computer Science A or concurrent enrollment + Application |
| *Engineering Design & Development | CTC64A/B | 1 | FW | X | X | X | \$20 | Digital Electronics or Computer Integrated Manufacturing or concurrent enrollment |
| *Engineering Workplace Experience (Capstone Course) | CTC65A/B | 1 | | | X | X | None | Digital Electronics or Computer Integrated Manufacturing or concurrent enrollment + Application |
| Production Methods I | CTC69A/B | 1 | | | X | X | \$40 | Intro to Welding & Advanced Production Blueprint Reading |
| *Production Methods II | CTC96A/B | 1 | | | X | X | \$40 | Production Methods I or concurrent enrollment |
| *Research & Design for Manufacturing (Capstone Course) | CTC72A/B | .5 or 1 | | | X | X | \$20 | Mass Production + Application |
| *Application Level CTE Courses | | | | | | | | |

TO FINISH STEP ONE...

CHOOSE A PATH:

Manufacturing, Programming or Engineering (see next 3 pages)

Interested in MANUFACTURING?

CTEC requires 2 full blocks/credits per year

Next step after taking/enrolling in Emerging Technologies, take these courses:

Production Blueprint Reading (.5 credit)

This course is meant to be taken at the same time as Introduction to Welding.

A technical level course designed to develop advanced technical communication skills used to interpret manufacturing production drawings as related to manufacturing occupations including blueprints, schematics, and other trade prints.

Introduction to Welding (.5 credit)

This course is meant to be taken at the same time as Production Blueprint Reading.

An introductory level course designed to instruct students in basic welding skills. Student will complete OSHA 10-Hour General Industry (Manufacturing) Certification.

MANUFACTURING – Last Step (typically senior year)

CTEC requires 2 full blocks/credits per year

Next step after taking/enrolling in Intro to Welding & Ad. Pro. Blueprint Reading:

Production Methods I (1 credit)

This course builds on the skills learned in Welding and Blueprint Reading. This is a hands-on fabrication course!

A comprehensive course designed to instruct students in the knowledge and skills common to manufacturing occupations and required for fabricating products using a variety of materials (plastic, metal, composites, etc.)

Production Methods II (1 credit)

An application level course in the Manufacturing Pathway at CTEC which builds on skills learned in Production Methods I where students will learn and apply advanced manufacturing and fabrication skills using current manufacturing technologies.

Research & Design for Manufacturing Capstone Course (1 credit) – Application Only

Take this course along with Production Methods or Robotics Capstone.

This is an advanced level application course that incorporates experienced based learning including client-based projects, a senior capstone project, or Internships supported by classroom attendance and discussion, within their area of interest/study.

Robotics Capstone (1 credit)

This course is designed to be taken after Robotics I offered at CTEC. Students will build on the knowledge gained during the first year of Robotics by working with a team of their peers to compete in several area robotics competitions.

Interested in PROGRAMMING?

CTEC requires 2 full blocks/credits per year

Next step after taking/enrolling in Robotics:

AP Computer Science Principles (1 credit)

Students will be introduced to the central ideas of computer science, inviting students to develop their computational thinking vital for success across multiple disciplines. The course is unique in its focus on fostering students to be creative and encouraging students to apply creative processes when developing computational artifacts. Students will also develop effective communication and collaboration skills, working individually and collaboratively to solve problems while discussing and writing about the importance of these problems and their impact on the local and global society.

PROGRAMMING – Last Step (typically senior year)

CTEC requires 2 full blocks/credits per year

Next step after taking/enrolling in AP Computer Science Principles.

Choose **TWO** of the following courses:

AP Computer Science A (1 credit)

The course introduces students to computer science with fundamental topics that include problem solving, design strategies, and methodologies, organization of data (i.e., data structures), approaches to processing data (algorithms), analysis of potential solutions and the ethical and social implications of computing. The course emphasizes both object-oriented and imperative problem solving and design using Java language. These techniques represent proven approaches for developing solutions that can scale up from small, simple problems to large, complex problems.

Cybersecurity (1 credit)

Cybersecurity is a problem-based course that gives students a broad exposure to the many aspects of digital and information security, while encouraging socially responsible choices and ethical behavior. It inspires algorithmic thinking, computational thinking, and especially, “outside-the-box” thinking. Students explore the many educational and career paths available to cybersecurity experts, as well as other careers that comprise the field of information security.

Programming Project Management Capstone Course (1 credit) – Application Only

Advanced level application course that incorporates experienced based learning including project management, client-based projects, a senior capstone project, or Internships supported by classroom attendance and discussion, within their area of interest/study.

Interested in ENGINEERING?

CTEC requires 2 full blocks/credits per year
Next step after taking/enrolling in Robotics.
 Choose **ONE** of the following:

Digital Electronics (DE) (1 credit)

A rigorous college-credit course that uses computer simulations to learn about the logic of electronics as they design, test, and construct circuits and devices. Students design circuits to solve open-ended problems, assemble their solutions, and troubleshoot them as necessary. Students will use mathematic theorems to perform Boolean algebraic functions to design complex logic circuits.

Computer Integrated Manufacturing (CIM) (1 credit)

Computer Integrated Manufacturing courses involve the study of robotics and automation. Building on computer solid modeling skills, students may use computer numerical control (CNC) equipment to produce actual models of their three-dimensional designs. Course topics may also include fundamental concepts of robotics, automated manufacturing, and design analysis.

ENGINEERING – Last Step

CTEC requires 2 full blocks/credits per year
Next step after taking/enrolling in either DE or CIM.
 Choose **TWO** of the following:

Digital Electronics (DE) (1 credit)

A rigorous college-credit course that uses computer simulations to learn about the logic of electronics as they design, test, and construct circuits and devices. Students design circuits to solve open-ended problems, assemble their solutions, and troubleshoot them as necessary. Students will use mathematic theorems to perform Boolean algebraic functions to design complex logic circuits.

Engineering Design & Development (1 credit)

Engineering Design & Development (EDD) is a 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.

Engineering Workplace Experience Capstone Course (.5 or 1 credit) – Application Only

This course can be one or two semesters depending on the length of the internship. This course might combine onsite experiences with in-class experiences and provide students with the opportunity to work on client-based projects or a senior capstone project.

Computer Integrated Manufacturing (CIM) (1 credit)

Computer Integrated Manufacturing courses involve the study of robotics and automation. Building on computer solid modeling skills, students may use computer numerical control (CNC) equipment to produce actual models of their three-dimensional designs. Course topics may also include fundamental concepts of robotics, automated manufacturing, and design analysis.

Robotics Capstone (1 credit)

This course is designed to be taken after Robotics I offered at CTEC. Students will build on the knowledge gained during the first year of Robotics by working with a team of their peers to compete in several area robotics competitions.