PROJECT LEAD THE WAY (PLTW)

(POE) PRINCIPLES OF ENGINEERING - PROJECT LEAD THE WAY

9th - 12th Grade
Credit – **1 Practical Art**
Full Year

Prerequisite: Geometry or above OR Concurrent enrollment

Through practical, hands on problems that engage and challenge, students explore a broad range of engineering topics including mechanisms, strength of materials and structures, and robotics. Students will develop skills in problem solving, research, and design while learning strategies for design process documentation, collaboration, and presentation. POE is a foundational course in the Project Lead the Way Engineering program – a multi-year, multi-course program design to build interest in STEM careers. Upon successful completion of the course and EOC, students are eligible for college credit through one of many universities affiliated with Project Lead the Way. **(This course does not qualify for NCAA eligibility.)**

(IED) INTRODUCTION TO ENGINEERING DESIGN - PROJECT LEAD THE WAY

9th - 12th Grade
Credit – **1 Practical Art**
Full Year

Prerequisite: Geometry or above OR Concurrent enrollment

Students dig deep into the engineering design process, applying math, science, and engineering standards to hands-on projects. They work both individually and in teams to design solutions and produce prototypes for a variety of problems using 3D modeling software, 3D printing, and hands-on fabrication. Students document their design process using their engineering notebook. IED is a foundational course in the Project Lead the Way Engineering program – a multi-year, multi-course program designed to build interest in STEM careers. Upon successful completion of the course and EOC, students are eligible for college credit through one of many universities affiliated with Project Lead the Way. **(This course does not qualify for NCAA eligibility.)**

(DE) DIGITAL ELECTRONICS - PROJECT LEAD THE WAY
Offered every other year – (Even years) Next offering: 2020-2021

9th - 12th grade
Credit – **1 Practical Art**
Full Year

Prerequisite: Geometry or above OR Concurrent enrollment

From smartphones to appliances, digital circuits are all around us. This course provides a foundation and hands-on experience for students who are interested in Electrical Engineering, Computer Science, electronics, or circuit design. Students study topics such as combinational and sequential logic and circuit design tools used in industry including logic gates, integrated circuits, and programmable logic devices to design custom digital circuits. Students pursuing Electrical Engineering or Computer Science will benefit greatly from this coursework in college. DE is a specialty course in the Project Lead the Way Engineering program – a multi-year, multi-course program design to build interest in STEM careers. Upon successful completion of the course and EOC, students are eligible for college credit through one of many universities affiliated with Project Lead the Way. **(This course does not qualify for NCAA eligibility.)**

(CEA) CIVIL ENGINEERING AND ARCHITECTURE - PROJECT LEAD THE WAY
Offered every other year (odd years) Next offering: 2019-2020

9th - 12th Grade
Credit – **1 Practical Art**
Full Year

Students learn important aspects of building and site design and development. They apply math, science, and Standard engineering practices to design both residential and commercial projects and document their work in Industry-grade 3-D architectural modeling and presentation software, Autodesk Revit. CEA is a specialty course in the Project Lead the Way Engineering program – a multi-year, multi-course program design to build interest in STEM careers. Upon successful completion of the course and EOC, students are eligible for college credit through one of many universities affiliated with Project Lead the Way. **(This course does not qualify for NCAA eligibility.)**

(EDD) ENGINEERING DESIGN AND DEVELOPMENT - PROJECT LEAD THE WAY

11th -12th Grade
Credit – **1 Practical Art**
Full Year

Prerequisites: One foundation PLTW course and one PLTW specialty course

Students will apply their knowledge gained from their previous PLTW courses to focus on a real-world problem. Students will identify a need or a problem, conduct research, and design or improve a product to meet the need. Students will conduct research, go through the design process, prototype, and explore the patent process. EDD is the capstone course in the Project Lead the Way Engineering program – a multi-year, multi-course program design to build interest in STEM careers. Upon successful completion of the course and EOC, students are eligible for college credit through one of many universities affiliated with Project Lead the Way. **(This course does not qualify for NCAA eligibility.)**

(CSP) COMPUTER SCIENCE PRINCIPLES – PROJECT LEAD THE WAY

9th – 12th Grade
Credit – **1 Practical Art**
Full Year

Prerequisite: Geometry or above OR Concurrent enrollment

Using the Python programming language as a primary tool and incorporating multiple platforms and languages for computation, this course aims to develop computational thinking, generate excitement about the field of computing, and introduce computational tools that foster creativity. This course helps students develop programming expertise and explore the workings of the internet. Projects and problems include app development, visualization of data, cybersecurity, and simulation. CSP is a foundation course - aligned to the AP Computer Science Principles exam- in the Project Lead the Way Computer Science program – a multi-year, multi-course program design to build interest in STEM careers. Upon successful completion of the course and EOC, students are eligible for college credit through one of many universities affiliated with Project Lead the Way. **(This course does not qualify for NCAA eligibility.)**

(CSA) AP COMPUTER SCIENCE APPLICATIONS – PROJECT LEAD THE WAY

11th or 12th Grade
Credit – **1 Practical Art**
Full Year

Prerequisite: Geometry or above; OR Concurrent enrollment; Computer Science Principles or consent of instructor

AP Computer Science Applications focuses on further developing computational-thinking skills through the medium of Android App development for mobile platforms. The course utilizes industry-standard tools such as Android Studio, Java programming language, XML, and device emulators. Students collaborate to create original solutions to problems of their own choosing by designing and implementing user interfaces and Web-based databases. CSA is a specialty course in the Project Lead the Way Computer Science program – a multi-year, multi-course program designed to build interest in STEM careers. Upon successful completion of the course and EOC, students are eligible for college credit through one of many universities affiliated with Project Lead the Way. **(This course does not qualify for NCAA eligibility.)**

PRINCIPLES OF BIOMEDICAL SCIENCES – PROJECT LEAD THE WAY (PLTW)

9th – 12th Grade
Credit – **1 Science**
Full Year

The death of a fictional character, Anna Garcia is the thread that ties all of the units of this course together. In reading Mrs. Garcia's autopsy report, students discover what contributed to her death. Students study metabolism as they discover that Mrs. Garcia suffered from diabetes. Through this study, carbohydrates, proteins and calorimetry will be explored. As they learn about her sickle-cell disease, students study genetics and DNA. Models and computers will be used to simulate changes in the DNA and proteins. Mrs. Garcia also had hypercholeteremia. A study of this will involve dissection of sheep hearts and the use of computers to analyze and experiment with student blood pressure, heart rate and EKG. Students will also learn to analyze abnormal EKGs. When it is discovered that the patient also had an infectious disease, students learn about the differences between bacterial infections and viruses. Gram staining will be done and students will learn how to choose an antibiotic based on the results. The final project for the class will be to write a grant proposal on a topic of the student's choice, using what was learned about research and writing science summaries. The proposals will be shared through a PowerPoint presentation.
This is the introductory course in a potential four-course program that ends with an on-site research assignment with a health care professional.

STUDENTS WILL RECEIVE <u>SCIENCE CREDIT ONLY</u> FOR THIS CLASS.

<u>HUMAN BODY SYSTEMS – PROJECT LEAD THE WAY (PLTW)</u>

10th – 12th Grade
Credit – **1 Science**
Full Year

Prerequisite: PLTW Principles of Biomedical Science, Honors Biology or instructor approval.

Students will engage in the study of the processes, structures, and interactions of the human body systems. Important concepts in the course include: communication, transport of substances, locomotion, metabolic processes, defense, and protection. The central theme is how the body systems work together to maintain homeostasis and good health. The systems are studied as "parts of a whole," working together to keep the amazing human machine functioning at an optimal level. Students design experiments, investigate the structures and functions of body systems, and use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary actions, and

respiratory operation. Students work through interesting real world cases and often play the role of biomedical professionals to solve medical mysteries. This course will be taught concurrently with Human Anatomy and Physiology. This course does not have an extended lab period.

This is the second course in a potential four-course program that ends with an on-site research assignment with a health care professional.

STUDENTS WILL RECEIVE SCIENCE CREDIT ONLY FOR THIS CLASS.

MEDICAL INTERVENTIONS – PROJECT LEAD THE WAY (PLTW)

11th – 12th Grade
Credit – **1 Science**
Full Year

Prerequisite: PLTW Principles of Biomedical Science, PLTW Human Body Systems, Honors Biology or instructor approval.

Students investigate a variety of interventions involved in the prevention, diagnosis and treatment of disease as they follow the lives of a fictitious family. The course is a "How-To" manual for maintaining overall health and homeostasis in the body as students explore how to prevent and fight infection; how to screen and evaluate the code in human DNA; how to prevent, diagnose and treat cancer; and how to prevail when the organs of the body begin to fail. These scenarios expose students to the wide range of interventions related to immunology, surgery, genetics, pharmacology, medical devices, and diagnostics. Each family case scenario introduces multiple types of interventions and reinforces concepts learned in the previous two courses, as well as presenting new content. Interventions may range from simple diagnostic tests to treatment of complex diseases and disorders. These interventions are showcased across generations of a family and provide a look at the past, present and future of biomedical sciences. Lifestyle choices and preventive measures are emphasized throughout the course as are the important roles scientific thinking and engineering design play in the development of interventions of the future. This course does not have an extended lab period.

This is the third course in a potential four-course program that ends with an on-site research assignment with a health care professional. **(This course does not qualify for NCAA eligibility.)**

STUDENTS WILL RECEIVE SCIENCE CREDIT ONLY FOR THIS CLASS.

BIOMEDICAL INNOVATION – PROJECT LEAD THE WAY (PLTW)

12th Grade
Credit – **1 Science**
Full Year

Prerequisite: PLTW Principles of Biomedical Science

Working through progressively challenging, open-ended problems that address topics such as clinical medicine, physiology, biomedical engineering, and public health, students will explore innovative solutions for the health challenges of the 21st century. They will have the opportunity to work on independent projects with a mentor or advisor from a university, hospital, research institution, or the biomedical industry. Throughout the course, students will be expected to present their work to an audience of STEM professionals. The course is designed for 12th grade students.

This is the fourth course in a potential four-course program that ends with an on-site research assignment with a health care professional. **(This course does not qualify for NCAA eligibility.)**

STUDENTS WILL RECEIVE SCIENCE CREDIT ONLY FOR THIS CLASS.