

TECHNOLOGY EDUCATION

Graduation Requirement: All students must earn one credit in Arts or Career & Technical Education classes.

| <u>COURSE TITLE</u> | <u>UNITS</u> | <u>GRADES OFFERED</u> | | | |
|--|--------------|-----------------------|----|----|----|
| <i>Communications Pathway-Media*</i> | | | | | |
| Introduction to Video Game Design | .5 | 9 | 10 | 11 | 12 |
| Video Game Design 1 | 1 | | 10 | 11 | 12 |
| Video Game Design 2 (Honors) | 1 | | | 11 | 12 |
| AP Mobile Computer Science Principles | 1 | | 10 | 11 | 12 |
| <u>COURSE TITLE</u> | <u>UNITS</u> | <u>GRADES OFFERED</u> | | | |
| <i>Communications Pathway- Video/Film*</i> | | | | | |
| Video Production 1 | .5 | 9 | 10 | 11 | 12 |
| Video Production 2 | .5 | 9 | 10 | 11 | 12 |
| Advanced Video Production | 1 | | 10 | 11 | 12 |
| <i>STEM Manufacturing Pathway (Wood Technology)*</i> | | | | | |
| Introduction to Manufacturing Technology | .5 | 9 | 10 | 11 | 12 |
| Manufacturing Technology | 1 | | 10 | 11 | 12 |
| Advanced Manufacturing Technology | 1 | | | 11 | 12 |
| <i>STEM Transportation Pathway (Automotive Technology)*</i> | | | | | |
| Introduction to Transportation Technology | .5 | 9 | 10 | 11 | 12 |
| Transportation Technology | 1 | | 10 | 11 | 12 |
| Advanced Transportation Technology | 1 | | | 11 | 12 |
| <i>STEM Engineering Pathway SHS*</i> | | | | | |
| Introduction to Engineering Design (UNH)** | 1 | 9 | 10 | 11 | 12 |
| Principles of Engineering Honors (UNH) (UB)** | 1 | | 10 | 11 | 12 |
| Civil Engineering and Architecture | 1 | | 10 | 11 | 12 |
| Digital Electronics (Weighted the same as AP) (UNH)** | 1 | | | 11 | 12 |
| Engineering Design & Development Honors (UNH) | 1 | | | | 12 |
| <i>STEM Architecture/Engineering Pathway BHS*</i> | | | | | |
| Computer Aided Drafting & Design | .5 | 9 | 10 | 11 | 12 |
| Architecture & Engineering 1 | 1 | | 10 | 11 | 12 |
| Architecture & Engineering 2 | 1 | | | 11 | 12 |
| Technology Education-Independent Study | .5, 1 | | | | 12 |

**See Career Pathway Program section for sequence of courses.*

***Opportunity to earn transferable college credit through the University of New Haven (UNH) or University of Bridgeport (UB)*

Communications Pathway (Game Design)

Introduction To Video Game Design (9-12)

.5 Units, 5 Periods (1/2 year)

In this class students will analyze game theory and game mechanics from a game maker's perspective. After students understand the fundamental concepts of creating various board games, they will be introduced to 2D gaming software. Students will use multiple sources in a self-directed environment to create a variety of interactive video games. This course will serve as a foundation for the process of video game design. **Prerequisite: none**

Video Game Design 1 (10-12)

1 Unit, 5 Periods (full year)

This class is a continuation of Introduction to Video Game Design. Video Game design students will perform critical analyses of video games in order to gain a better understanding of play mechanics. Students will continue to work with 2D gaming software while learning game design techniques. These skills will enable the student to assemble interactive and engaging experiences for the users of their systems

and applications. As part of the learning experience, students will gain valuable skills that will lead to the use of 3D gaming software that introduces the learner to basic animation tools and techniques.

Prerequisite: C or better - Introduction to Video Game Design

Video Game Design 2, Honors (11-12)

1 Unit, 5 Periods (full year)

This course will share introductory game design techniques enabling the student to assemble interactive and engaging experiences for the users of their systems and applications. As part of the learning experience, students will gain valuable skills while using the Unity 3D application development environment. Concepts that will be covered include: lighting effects, rendering video, special effects such as explosions and glow, and editing video and sound. The final project is to create an animation that teaches a lesson. **Prerequisite: C or better - Video Game Design 1**

Mobile Computer Science Principles (AP) (10-12)

1 Unit, 5 Periods (full year)

In this course students will learn computer science by building socially useful mobile apps. In addition to programming and computer science principles, the course is project-based and emphasizes writing, communication, collaboration, and creativity. This course is supported by the Mobile Computer Science Principles Project (Mobile CSP), an NSF-funded effort to provide a broad and rigorous introduction to computer science based on App Inventor, a mobile programming language for Android devices. The course is based on the College Board's emerging Advanced Placement (AP) Computer Science Principles curriculum framework for introductory computer science. **Prerequisite: successful completion of Algebra 1 with a grade of C or better**

Communications Pathway (Video/Film)

Video Production 1 (9-12)

.5 Unit, 5 Periods (1/2 year)

This course introduces the basics of video production utilizing a personal camcorder and video editing equipment. Students study video technologies, basic equipment operation, video composition, basic lighting, audio production planning, and visual storytelling. Students work in groups to create video projects utilizing post-production editing.

Prerequisite: none

Video Production 2 (9-12)

.5 Unit, 5 Periods (1/2 year)

This course is a continuation of Video Production I in a video studio production setting. Students learn studio production planning, lighting, and audio along with basic video engineering. Students practice all crew positions including floor director, camera operator, lighting technician, audio technician, technical director and program director. **Prerequisite: C or better in Video Production 1**

Advanced Video Production (10-12)

1 Unit, 5 Periods (full year)

Various production techniques for a variety of video applications are included in this advanced video course. These techniques include theatrical, news gathering, informational, and documentary-style productions. Students focus on pre-production planning and combining studio and field production into a final presentation. As part of this course, students will help produce programming for broadcast.

Prerequisite: C or better in Video Production 2

Manufacturing Pathway STEM

Introduction to Manufacturing (9-12)

.5 Unit, 5 Periods (1/2 year)

In this course students are introduced to the materials, processes and equipment that can be found in the manufacturing industry. Students are exposed to different career opportunities in the construction and manufacturing industries. Students will also be introduced to the safe use of tools needed to process materials in the industry. Additionally, students will be introduced to Computer Aided Manufacturing (CAM) as well as CNC operations. This will include two-dimensional geometry, tool paths, and set up. **Prerequisite: none**

Manufacturing Technology (10-12)

1 Unit, 5 Periods (full year)

Students are instructed on the safe use of stationary and portable power equipment used in the construction and manufacturing industries to complete a project and learn about job-site safety. Students will continue

to grow their knowledge of Computer Aided Manufacturing (CAM) as well as CNC operations. This will include three-dimensional geometry, tool paths, and set up. A small structure will be designed and constructed with a variety of materials and construction techniques. Students will be introduced to joinery and more advanced manufacturing techniques. **Prerequisite: C or better in Introduction to Manufacturing Technology**

Advanced Manufacturing Technology (11-12)

1 Unit, 5 Periods (full year)

Students will investigate careers in the manufacturing industry and utilize tools and equipment to design and manufacture projects. In this advanced class, students will expand their skills acquired from the foundations class and demonstrate knowledge of a variety of industrial materials and processes. Some of the tools and equipment that will be used include CAD/CAM, MasterCAM, Solidworks, CNC Router. Projects and equipment may vary between schools. **Prerequisite: C or better in Manufacturing Technology**

Transportation Pathway STEM (Automotive Technology)

Introduction to Transportation (Automotive) (9-12)

.5 Unit, 5 Periods (1/2 year)

This course includes a study of the various ways in which society has used natural forces and different fuels to power machines. These fuels include water, wind, solar, electrical, and nuclear as well as fossil. Students will study the theory, maintenance, and repair of the small internal combustion engines and electric motors. **Prerequisite: none**

Transportation Technology (Automotive) (10-12)

1 Unit, 5 Periods (full year)

This course is designed to allow students to develop skills necessary for work in the Automotive and Transportation technology industry. An emphasis is placed on Powertrain, exhaust, lubrication and cooling systems. Problem-solving activities related to transportation systems (air, land, space and water) are also covered. **Prerequisite: C or better in Introduction to Transportation Technology I**

Advanced Transportation Technology (Automotive) (11-12)

1 Unit, 5 Periods (full year)

This course introduces the student to troubleshooting automotive and other transportation systems. Other areas of study will include dismantling and assembling mechanical and electrical components of brake, suspension systems. The use of computerized diagnostic equipment will also be discussed. Activities will include development of alternate fuel vehicles such as solar electric and hybrid vehicles. **Prerequisite: C or better in Transportation Technology**

Engineering & Architecture Pathway STEM

SHS

(Project Lead the Way)

Introduction to Engineering Design (9-12) SHS

1 Unit, 5 Periods (full year)

This is the first course in the Project Lead the Way Engineering Pathway. Knowledge and skills attained in this course will be used in subsequent PLTW courses. In this course students will use the design process to complete a variety of problem-based activities. Students will become proficient in the use of Autodesk Inventor, which is a state of the art Computer Aided Design software package. Students will solve design problems as they develop, create, and analyze product models. Students will study the design concepts of form and function then use technology to translate conceptual design into reproducible products.

Pre-requisite or Co-requisite: Algebra 1

Principles of Engineering Honors (10-12) SHS

1 Unit, 5 Periods (full year)

This course will continue to help students understand the field of engineering and engineering technology. Students develop problem-solving skills by tackling real-world engineering problems. Through theory and practical hands-on experiences, students address the emerging social and political consequences of technological change. Students will learn about engineering, design process, communication and documentation, engineering systems, statics, **robotics**, materials and materials testing, thermodynamics, engineering for quality and reliability and dynamics. **Prerequisite: Introduction to Engineering Design**

Civil Engineering and Architecture (10-12) SHS

1 Unit, 5 Periods (full year)

Civil Engineering and Architecture is the study of the design and construction of residential and commercial building projects. The course includes an introduction to many of the varied factors involved in building design and construction including building components and systems, structural design, storm water management, site design, utilities and services, cost estimation, energy efficiency, and careers in the design and construction industry. The major focus of the CEA course is to expose students to the design and construction of residential and commercial building projects, design teams and teamwork, communication methods, engineering standards, and technical documentation. **Prerequisite: Introduction to Engineering Design or permission of instructor**

Digital Electronics (Weighted the same as Advanced Placement) (10-12) SHS

1 Unit, 5 Periods (full year)

How do robots make decisions? How does my calculator work? What does an electrical engineer do? These and many more questions are waiting for you to find the answers in the Digital Electronics™ course. Digital electronics is so embedded in your daily life, from listening to music to withdrawing money from a bank, that it has invaded many other areas of engineering. This course is designed to teach you about applied logic, which introduces you to the basics of electronics and digital systems – the building blocks to many products you use. This course is important for anyone exploring a career in engineering or engineering technology. The course includes topics on Basic Electron Theory, Electron Laws, Number Systems, Logic Systems, Boolean Algebra, Microprocessors, and a Student Self-Directed Project. Digital Electronics is weighted as an AP (advanced placement) level course. **Prerequisite: Introduction to Engineering Design**

Engineering Design & Development Honors (11-12) SHS

1 Unit, 5 Periods (full year)

This course allows the student to design a solution to a technical problem of their choosing. They have the chance to eliminate one of the “*Don’t you hate it when...*” *statements of the world*. This is an engineering research course in which students will work in teams to research, design, test and construct a solution to an open-ended engineering problem. The team presents and defends their solution to a panel of outside reviewers at the conclusion of the course. The EDD course allows students to apply all the skills and knowledge learned in previous PLTW courses. The course also engages students in time management and teamwork skills, a valuable set of skills for students. **Prerequisite: Introduction to Engineering Design plus two of the other three PLTW courses offered**

Engineering & Architecture Pathway STEM

BHS

Computer-Aided Drafting and Design (9-12) - BHS

.5 Unit, 5 Periods (1/2 year)

Students will develop skills, understanding and knowledge of the correct use and application of technical drawings as they pertain to architectural and engineering concepts. Emphasis is placed on the skills required for basic print reading, graphic note-taking, and, project development and planning. Students will engage in the design process through concept development, freehand sketching, and finished working drawings. The students will be introduced to 2D and 3D computer-based design software that will allow them to convert work into a digital format. The course will expand the uses of the computer as a drafting tool in the manufacturing process through laser and 3D printing applications. Activities will include developing a wide range of skills utilized in various design applications including engineered and architectural drawings. **Prerequisite: none**

Architecture & Engineering 1 - BHS

1 Unit, 5 Periods (full year)

In this course, students will apply mathematical and scientific knowledge with technical skills and problem-solving techniques to develop solutions for a variety of real-world problems. Several engineering disciplines will be covered, including civil, mechanical and environmental. There will be a heavy emphasis on mechanical engineering and the use of the Vex **robotics** system. This course will also focus on the study of residential architectural concepts such as the home design process, building codes, conventions in producing architectural drawings, room layout and relationships, and aesthetic considerations and functionality. Students will develop proficiency in the use of architectural design software and parametric solid modeling software. **Prerequisite: C or better Computer-Aided Drafting and Design**

Architecture & Engineering 2 - BHS

1 Unit, 5 Periods (full year)

This is the third course of a three course pathway which will continue to build the students understanding of architecture and various engineering disciplines. Students will collaborate on the design and documentation of a commercial facility within a project design team. Students will conduct a site analysis/survey, and learn about site considerations important to the function of the building including land use and development, parking lot and road design and construction, storm water management, utilities and power supply, water supply, and landscaping. Students will also perform a structural analysis of the building and will document their work using 3D architectural software. This course will also provide opportunity for the students to engage in the design and development of advanced manipulative tools and programming using the Vex robotic system. **Prerequisite: C or better Architecture and Engineering 1**

Technology Education- Independent Study (12)

.5 Unit, 5 Periods or 1 Unit, 5 Periods (full year)

Students who have completed three years in a Technology Education cluster may work by contract with a staff member on an individual program focusing on in-depth experiences in terms of craftsmanship and experimentation with technique. **Prerequisite: Permission of Instructor**