This program focuses on preparing students for a variety of careers that are (or will) be available to high school and college graduates in the coming years.

Who should be interested in the Virtual Enterprise & Finance Academy?

ALL STUDENTS – male or female, motivated to be successful in post-secondary education and future careers. Students participating in the Finance Academy may be interested in careers in a variety of areas including:

- Finance
- Web Design
- Management
- Secondary and post-secondary education
- Accounting
- Marketing
- Business
- Military

Benefits of participating in the Virtual Enterprise & Finance Academy:

- Emphasis on academic excellence with specialized courses and classroom activities.
- An introduction to all facets of the financial services industry and exposure to current technology
- Field trips to local area businesses to learn about careers, operations and workplace environment.
- Class projects that mirror real world events and tie into the curriculum.
- Opportunity to earn college credits while in high school.
- Use of computers and cutting edge technology in the classroom to complete projects.
- Business partner mentoring, internships, and job shadowing.
- Enhanced opportunities for employment after graduation.

What courses are available to Virtual Enterprise & Finance Academy students?

The following courses are available to Virtual Enterprise & Finance Academy participants and any other student interested in exploring the rapidly-evolving world of Finance and technology:

Required Courses

- *Personal Financial Literacy*
- *Virtual Enterprise*
- *Business Law*
- *Computers & The Internet*
- *Accounting I*
- *Web Design 1 & 2*
- *Internship*

Electives:

- *Advanced Accounting*
- *Personal Law*
- *Work Study*
- *Business Math*
- *Computer Fundamentals*
- *Sports & Entertainment Marketing*

Engineering & Technology Education

There is little doubt that rapid changes in technology impact almost every aspect of our lives. Students who learn to design, produce, and market ideas, solutions, and products will become successful in all endeavors. Engineering & Technology Education at Kenmore West includes action-based programs for all students, including future paths to college, apprenticeships, and on-the-job training. Through the wide-variety of courses available, all students have the opportunity to explore technology as an elective or choose a sequence of study to prepare for future success.
For more information, go to: **www.ktufsd.org/academies**.

Art/Music Requirement
Design and Drawing for Production (DDP) may be used to satisfy the Art/Music graduation requirement. Students not satisfying this requirement may still participate in PLTW IED/DDP as an elective.

Third Year Mathematics
Either *PLTW Digital Electronics (PLTW DE)* or *Networking 1* may substitute for a third unit of mathematics credit.

Third Year Science
PLTW Principles of Engineering (PLTW POE) may substitute for a third unit of science credit.

Regents Diploma with "Advanced Designation"
Students completing a sequence of not less than five units of credit in Engineering & Technology Education are **not** required to complete the additional two units of World Languages or to pass the Regents Comprehensive Examination in that language to earn a **Regents Diploma with Advanced Designation**.

Project Lead the Way (PLTW)
Project Lead the Way courses are part of a nationally recognized pre-engineering curriculum that benefits all students, especially those interested in careers in STEMs (Science-Technology-Engineering-Mathematics). All PLTW courses offer college credit through several postsecondary institutions.

Additionally, students interested in PLTW courses may participate in the Pre-Engineering Academy CTE program, earning an additional diploma endorsement indicating career readiness for STEM careers. Students *DO NOT* have to participate in an Academy to enroll in PLTW courses.

Go to **www.pltw.org** for additional information.

Academies (CTE Programs)
Three different Academies are available through the Engineering & Technology Education department. Participating in an Academy is one of many ways students may study the technological world and prepare for future success. Engineering & Technology Education Academies include:

- ✓ Computer Networking & Technology Academy
- ✓ Information Technology Academy
- ✓ Pre-Engineering Academy

See the Academies section at the beginning of this Curriculum Handbook, your counselor, or any Engineering & Technology Education teacher for further information.

Please Note:
ALL students may enroll in **ANY** Technology Education course as an **ELECTIVE**.

Design and Drawing for Production (IED/DDP)
IED/DDP is open to all students, but is typically taken by 9th and 10th grade students. This design course may be used to satisfy the New York State **Art/Music/Design requirement** for any student. This course follows the NYS-prescribed curriculum for Design & Drawing for Production while preparing students for further study in Engineering & Technology Education. Students have access to modern prototyping laboratories with equipment that ranges from traditional fabrication tools to 3D printers. Throughout the class, a wide variety of open-ended activities are experienced using modern 3D modeling software, modern prototyping equipment (such as 3D printers), and classroom machinery. This is in addition to traditional sketching, drawing, and presentation techniques. This course is open to all students, but is typically taken by 9th and 10th grade students. It is the first step to your pathway to a CTE diploma endorsement.
Note: may be taken to satisfy Art/Music requirement or as an elective.
Prerequisites: None
Grade Levels: 9, 10, 11, 12
40 Weeks – 1 Unit
Assessment: Project Lead the Way

PLTW Computer Integrated Manufacturing (CIM)
Computers-n-Robots
The major focus of this course is to answer the questions: How are things made? What processes go into creating products? Is the process for making a water bottle the same as it is for a musical instrument? How does an assembly line work? As students find the answers to these and other questions, they learn about the past, present, and future of manufacturing. This course is built around several key topics: computer modeling, Computer Numeric Control (CNC) equipment, computer aided manufacturing (CAM), and robotics. PLTW CIM students build on the skills and knowledge acquired in PLTW IED/DDP and move to a higher level of design visualization while creating and troubleshooting robotic systems created using Vex robotics (www.vexrobotics.com).
Prerequisite: DDP
Grade Levels: 10, 11, 12
40 weeks - 1 unit
Assessment: Project Lead the Way
Reading Level: Mixed

PLTW Principles of Engineering (POE)
This survey course of engineering exposes students to some of the major concepts they'll encounter in a postsecondary science, technology, engineering, and mathematics (STEMs) courses of study. Students have an opportunity to investigate engineering and high-tech careers and to develop skills and understanding of course concepts. Students employ engineering and scientific concepts in the solution of engineering design problems throughout this course. Additionally, students develop problem-solving skills as each applies his or her knowledge of research and design while creating solutions to various challenges. Hands-on activities will be undertaken including experimentation and design of electronic power packs, solar powered vehicles, powered model vehicles, aerodynamics and aircraft flight, auto safety, and robotics and machine automation. Students interested in technology, engineering, or various STEM careers will benefit from this course.
Please note: PLTW Principles of Engineering (POE) may substitute as a third unit of science credit.
Prerequisites: DDP
Grade Levels: open to 10, recommended 11, 12
40 Weeks – 1 Unit
Assessment: Project Lead the Way

PLTW Computer Science Principles (AP CSP)
This course offers students an introduction to computer science, covering the College Board's Computer Science principles framework. Participants will be introduced to computation tools that foster creativity and build students' awareness of the demand for computer specialists in all professional fields. Topics include app design, graphical user interfaces, internet security protocols for commerce and social media, intelligent machines, and visualizing data. This course may be taken as an elective or as part of a PLTW and/or five-unit sequence.
Prerequisites: DDP recommended
Grade Levels: 10, 11, 12
40 Weeks – 1 Unit
Assessment: Project Lead the Way

PLTW Digital Electronics (DE)
Are you interested in knowing how all modern electronics work? Students in this course study electronic circuits that are used to process and control digital signals. Digital electronics is the foundation of all modern electronic devices such as cell phones, computers, communication systems, digital cameras, high-definition televisions, and MP3 players. The major focus of the DE course is to expose students to logic design, teamwork, communication methods, and engineering standards.
Please note: PLTW Digital Electronics (PLTW DE) may substitute as a third unit of mathematics credit.
Prerequisites: DDP
Grade Levels: 11, 12
40 Weeks – 1 Unit
Assessment: Project Lead the Way

PLTW Engineering Design & Development (EDD)
This course is the final, capstone experience in the Project Lead the Way sequence of learning and a requirement for two of the district's CTE programs. In this unique design course, students work in teams to engineer and develop original solutions to valid open-ended technical problems by applying the engineering design process. Students perform research to choose, validate, and justify a technical problem. After carefully defining the problem teams design, build, and test their solutions while working closely with industry professionals who provide mentoring opportunities. Finally, student teams present and defend their original solution to an outside panel. This course is appropriate for 12th grade students and select 11th grade students.
Prerequisites: At least two PLTW courses
Grade Levels: 11, 12
40 Weeks – 1 Unit
Assessment: Project Lead the Way

Computer Aided Design (CAD)
This course is an introduction to problem solving and modeling. Students develop an understanding and application of the types, uses, and advantages of the computer aided design (CAD) systems. This class will help in the transition from high school to college, especially for those students who will follow engineering, architectural, or other technical fields. The numerous applications of computer aided design systems to design, mechanical drawing and drafting are also studied. The course will be taught using state of the art technology including industry-standard AutoCAD software.
Prerequisite: DDP
Grade Levels: 10, 11, 12
20 Weeks – ½ Unit
Examination: Local

Advanced Computer Assisted Design (CAD)
This course covers the fundamentals and techniques of three-dimensional solid modeling using industry-standard AutoCAD software. This is a project-oriented course where participants create design layouts and documentation to support selected mechanical design projects. This is a good class to begin applying design and engineering skills for future careers and college.
Prerequisite: DDP
Grade Levels: 10, 11, 12
20 Weeks – ½ Unit
Examination: Local

Architecture
It is important that houses and other structure are structurally sound. It is also important that houses, buildings, and other structures are designed to be visually appealing. The objective of this course is to provide student with the opportunity to develop and refine architectural abilities related to residential and commercial design. Specialty designs will include floor plans, elevations, electrical plans, foundation plans, plot plans, cost estimates, and more. Various software programs will be taught in conjunction with modeling, and freehand sketching techniques to round out the student's knowledge and abilities. Projects will include the modeling and photographing of various commercial and residential buildings. Anyone who will design, build, or buy a home or commercial building will benefit from this course.
Prerequisite: DDP
Grade Levels: 10, 11, 12
40 Weeks – 1 Unit
Examination: Local

Basic Electricity / Electronics
This first course in electrical science is designed to provide an overview of electricity and electronics. Topics of study include electrical circuits, house wiring, printed circuit theory, energy sources, and magnetism. Manufacturing and related research development will also be studied. Content and objectives are arranged to stress basic information and introductory skills.
Prerequisites: None
Grade Levels: 9, 10, 11, 12
20 Weeks – ½ Unit
Examination: Local

Construction Systems
One of the largest and most important industries in our economy is commercial and residential construction. The construction industry is responsible for the building, maintenance, and repair of roads, bridges, dams, airports, homes, schools, offices and hospitals. This one semester course will examine the construction industry, and its materials, technology, and occupations. Students will have an opportunity to gain hands-on experiences in the design and construction of several types of commercial and residential structures. This course provides important background for anyone who will be employed in some part of the construction industry or living and working in the products of that industry. This course is offered in every-other school year (i.e. 2017-2018, 2019-2020…)
Prerequisites: None
Grade Levels: 9, 10, 11, 12
20 Weeks – ½ Unit
Examination: Local

Graphic Communications
Success in today's rapidly changing world is often determined by a person's ability to communicate. In this course students will develop the necessary skills to interact with graphic communication systems and identify career opportunities in the graphic communication field. Through the completion of practical hands-on activities, the student will cover the design, development, and generation of an image for a specific product. The emphasis of this course is on 21st century technology and will include activities in animation, web design, screen-printing, morphing and interactive multimedia. Career education is covered by exposure to the wide variety of graphic communication job opportunities.
Prerequisite: None
Grade Levels: 9, 10, 11, 12
20 Weeks – ½ Unit
Examination: Local

Media Design & Video Production
Our modern world is increasingly reliant on the creation and distribution of various forms of communications. Millions of people are engaged in the creation and maintenance of systems used to communicate audio and video information through the use of a variety of outlets including television and the internet. This course introduces those systems most utilized for mass communication, their impact on society, and related careers. Students will have the opportunity to sample and become familiar with communication technology and related careers through meaningful and practical activities. Students will have opportunities to create projects while engaging in a variety of activities including desktop publishing, audio and video editing, public speaking, and the use of audio and video equipment. This course will provide students with a very broad-based look at the communications industry and with many of the careers available in this field. *(Previously known as Communication Systems.)*
Prerequisites: None
Grade Levels: 9, 10, 11, 12
20 Weeks – ½ Unit
Examination: Local

Independent Study in Technology Education
A limited number of students are eligible to choose this program in any of the technical courses offered in the district's high schools.

Registration is limited to the number of available spaces. Specific details are available through Technology Education faculty and counselors.
Prerequisites: (2) units of Technology Education credit and special recommendation
20 or 40 Weeks/5 Meetings per Week – ½ Unit or 1 Unit
Examination: Local

Tool Time *(Manufacturing Systems)*
This course provides each student with the opportunity to explore the materials and processes used by industry to produce saleable products. During this one-semester course, students will gain hands-on experience with a variety of materials including wood, metals, plastics, ceramics, and with a wide variety of processes to make useful products. Each class will be formed into a manufacturing enterprise that will be designing and manufacturing a product for sale. This activity will provide real-world experience with many of the facets of industry, including finance, management, personnel, production, sales and distribution, safety, materials procurement, and quality assurance. As everyone is touched and affected by the manufacturing sector of our society through our communities, occupations, and as consumers, everyone needs to have an understanding of the workings of manufacturing systems. This course is offered every-other year (i.e. 2018-2019, 2020-2021…)
Prerequisites: None
Grade Levels: 9, 10, 11, 12
20 Weeks – 1/2 Unit
Examination: Local

Networking 1 *(Cisco Networking)*
This full-year course is intended to teach students the skills needed to design, build, and maintain small to medium sized computer networks. Students learn different network designs and how to support them. Students also learn the languages that networks use to communicate information and work with networking equipment such as routers, hubs, repeaters, and switches.
Please note: Computer Networking 1 may substitute as a third unit of mathematics credit.
Prerequisite: None
Grade Levels: 10, 11, 12
40 Weeks – 1 unit

Networking 2 *(Cisco Networking)*
Students work in a lab setting while learning about the design and building of network systems. After completing Networking 1 & 2, students are eligible to take the *Cisco* Certified Computer Networking Associate (CCNA) certification exam.
Prerequisite: Computer Networking 1
Grade Levels: 11, 12
40 Weeks – 1 Unit

Engineering & Technology Education Academies

Typical Program Sequences:

Pre-Engineering Academy

Grade 9	Grade 10	Grade 11	Grade 12
Design & Drawing	PLTW CIM	PLTW POE	PLTW DE
Tech Electives *(optional)* *Half or full year courses*	Tech Electives *(optional)* *Half or full year courses*	Architecture *or* PLTW CSP	PLTW EDD
		Electives *(optional)*	Electives *(optional)*

Computer Networking & Technology Academy

Grade 9	Grade 10	Grade 11	Grade 12
Design & Drawing	PLTW CIM	Networking 1	Networking 2
Tech Electives *(optional)* *Half or full year courses*	Tech Electives *(optional)* *Half or full year courses*	PLTW DE	PLTW EDD
		PLTW CSP *(optional)*	Electives *(optional)*

Project Lead the Way *(no CTE endorsement)*

Grade 9	Grade 10	Grade 11	Grade 12
Design & Drawing	PLTW CIM	PLTW POE	PLTW DE
Tech Electives *(optional)* *Half or full year courses*	Tech Electives *(optional)* *Half or full year courses*	PLTW CSP	PLTW EDD
		Electives *(optional)*	Electives *(optional)*

FOR MORE INFORMATION, GO TO: WWW.KTUFSD.ORG/ACADEMIES, SEE YOUR COUNSELOR, OR ASK ANY FACULTY MEMBER OF THE ENGINEERING & TECHNOLOGY EDUCATION DEPARTMENT.