Pine-Richland Info:

*Introduction to Technology and Engineering*

Credit Value:   1.0

Term(s) Offered:   Full Year

Prerequisites:   None

Open to Grades:   9, 10, 11, 12

**Description**: This course is recommended for first year students to introduce them to different areas of Technology Education at Pine-Richland High School. The areas covered in the course are Informational Systems, Construction Systems, and Transportation Systems. This class is divided into three equal sessions in each of the above areas. In the Construction Systems area, the students use various materials and tools and are exposed to the safe operation of the major hand and power tools used in the manufacturing processes. The Informational Systems area includes Computer Aided Design (CAD) and architectural and engineering design. The Transportation Systems area includes topics covering air transportation, land transportation and an introduction to robotics and power technology.

*Systems Engineering*

Credit Value:   1.0

Term(s) Offered:    Full Year

Prerequisites:   None

Open to Grades:   10,11,12

**Description:**This course is designed to provide the student with the problem solving activities related to scientific and engineering principles. The students will construct individual and group projects dealing with construction,transportation, and manufacturing. Some of the hands on activities include: mousetrap powered vehicle design,marine transportation, tower construction, and ergonomic design. Emphasis is placed on applying current technology applications to everyday problems and situations.

Advanced Systems Engineering

Credit Value:   1.0

Term(s) Offered:   Full Year

Prerequisites:   Completion of Systems Engineering

Open to Grades:   11, 12

**Description**: This course is designed to provide an opportunity for the advanced research, design and development of activities dealing with the various areas of technology education. The concentration of areas are: Construction Systems, Transportation Systems, and an introduction to Bio-Technology. Students will research, collect data, problem solve, design and develop prototypes that an engineer would face in the real world. These hands-on activities include bridge construction, catapult design, aerodynamic design, and boat construction.

*Materials Processing*

    Credit Value:   1.0

    Term(s) Offered:   Full Year

     Prerequisite(s):   None

Open to Grades:    10, 11, 12

**Description:**This course is designed to introduce students to various common materials and the machine processes used to transform these materials into a product. Students participate in hands-on activities that require them to cut,form, join, and finish materials while safely using the tools and machines located in the production lab. Students will individually construct various given projects and will learn how to operate the laser engraver and CNC router. This  
course mainly deals with woodworking, although other materials such as metal and plastics will be introduced.

*Computer Aided Design*

Credit Value:    1.0

Term(s) Offered:    Full Year

Prerequisite(s):    None

Open to Grades:    10, 11, 12

**Description**: This course is designed to give a better understanding to those students who plan to go on in the field of engineering and architecture or want to develop computer generated movies. This course introduces each student to the many uses of CAD (Computer-Aided Design). Each student will have extensive experience with AutoCAD, Inventor, AutoCAD Architecture, Revit and 3DS Max software. Two-dimensional and three-dimensional designs will be created and produced. Three-dimensional renderings will be produced and the world of solid modeling and computer  
generated animations will also be introduced.

*Engineering Design*

Credit Value:    1.0

Term(s) Offered:    Full Year

Prerequisite(s):    Completion of CAD or IED (PLTW) with a 70% or higher

    Open to Grades:    11, 12

**Description:**This course is designed to give a better understanding to those students who plan to go on into the field of engineering or to the student who plans to enter the industrial force as a future draftsman or designer. Through the use of computer-aided design, mechanical drawing, orthographic projection, sectioning, auxiliary views, and isometric drawings will be created. As students work on these units they learn how to convey ideas and detail to other people and understand and interpret the ideas of others. Students develop a set of detailed working drawings. and are introduced to solid modeling and creating 3-D objects to solve various problems.  
 

*Architectural Design*

Credit Value:    1.0

Term(s) Offered:    Full Year

Prerequisite(s):    Completion of CAD with a 70% or higher

Open to Grades:    11, 12

**Description**: This course is an introduction into architectural drafting using AutoCAD Architecture or Revit. Building materials and construction principles are expressed using developed plans and construction procedures. Students study construction techniques and develop floor plans, foundation plans, roof plans, wall sections, and elevations of a home. A 3D exterior model is produced which includes a walk-thru video.  
 

*Advanced Architecture*

Credit Value:    1.0

Term(s) Offered:    Full Year

Prerequisite(s):    Completion of Architectural Design or CEA (PLTW) with a 70% or higher

Open to Grades:    12

**Description**: Advanced Architectural Design is designed to provide the student with further advanced problem solving activities related to architectural design. Students develop the ability to think creatively and critically towards the design and problem solving processes. Various scenarios and issues are given to the students to solve which require ideas and solutions, testing solutions and the development of plans using AutoCAD Architecture. Plumbing, electrical, HVAC layouts and small models of their solutions may be created. Students enter an architectural design competition to potentially win a $1500 scholarship.

*Video Production*

Credit Value:    1.0

Term(s) Offered:    Full Year

Prerequisite(s):    None

Open to Grades:    9, 10, 11, 12

**Description**: This course will introduce students to the communications field of video media. Students will experience hands-on video camcorder operations, camera movements, and field production techniques associated with the real world media. Students will complete various assignments within the classroom in order to practice the skills learned.Students will be introduced to non-linear editing (digital) processes and HD-video. A completion of hands-on projects, covering an array of topics and skills, will enable the students to learn and practice professional video techniques. Students will also have the opportunity to gain knowledge of the latest technology available in the field of video media. Students interested in careers associated with media communications are encouraged to take this foundation course.  
 

*Advanced Video Production*

Credit Value:    1.0

Term(s) Offered:    Full Year

Prerequisite(s):    Completion of Video Production with a 70% or higher

Open to Grades:    10, 11, 12

**Description**: This course covers advanced techniques in video and television production. Students learn advanced digital video editing(Adobe Creative Suite), music creation, text/graphics generation, video animation and special effects. Copyright and authoring laws are studied and practiced. Students learn the skills necessary to write, produce, operate and film television/movie programs within a studio environment. Training on studio jobs enables students to run and operate a functioning portable television studio. Students are evaluated on several projects, including but not limited to writing, producing, and directing a movie and television program. Students contribute material for PRTV programming.

*TV Production (PRTV)*

Credit Value:    1.0

Term(s) Offered:    Full Year

Prerequisite(s):    Completion of Video Production or Advanced Video Production with an 80% or higher and teacher recommendation.

Open to Grades:    11, 12

**Description:** This course continues to build upon the student‟s skills and techniques of video/television production. Utilizing the knowledge learned in Video Production and Advanced Video Production, students expand their production skills by completing several projects. Students continue to learn the skills necessary to produce television programs within a studio environment. Students write and produce school announcements (PRTV), variety shows, talk shows and Pine-Richland events. All students study/practice on-air skills and are required to appear in front of the camera. This class provides students the opportunity to create a variety of programs for Pine-Richland School District. 

*Robotics Engineering*

Credit Value:    1.0

Term(s) Offered:     Full Year

Prerequisite(s):    None

Open to Grades:    10,11, 12

**Description**: Robotics integrates mechanical, electrical, and software engineering. In this highly technical course, students design robots and robotic systems with an emphasis on engineering as well as project management. Throughout this course, students use a team approach to problem-solve large projects just as professional engineers do. Students learn the importance of mechanical design for manipulators and mobile robots, as well as pneumatic systems, including physics of fluid power and types of actuators. Students learn about electronics including proper wiring solutions for motors and sensors, as well as control systems using both remote control and computer programming. Students use Robot C software to program their robots and Autodesk Inventor 3D modeling software to devise prototypes to be created on the 3D printer. Robotic sensors and their programming are also among the skills learned in this challenging course.

*Advanced Robotics Engineering*

Credit Value:    1.0

Term(s) Offered:     Full Year

Prerequisite(s):   Completion of Robotics Engineering or CIM (PLTW) with a

70% or higher

Open to Grades:    11, 12

**Description**: In this course, students expand the knowledge they have learned in Robotics Engineering. Students are introduced to programming jointed arm robots and understand how they are used in manufacturing. As an entire class, students will use a team approach to create a manufacturing work cell that is completely automated and tested for accuracy and cost efficiency. In today’s manufacturing, many products are produced quickly and accurately through the use of automation. Students learn how to use MasterCam software to create tool paths for CNC machines such as mills and plasma cutters. For the final project, students use 3D engineering software to design a 4lb battle robot which competes in a 6’x6’ enclosed lexan arena. Once the design is finalized, students fabricate the robot out of various metals and polymers using CNC machines. These robots will then battle robots made by their classmates and students from other schools in a double elimination bracket. Additionally, students taking this course have the opportunity to interview with local manufacturing companies for a summer internship.  
 

*Project Lead the Way:*

*Introduction to Engineering Design*

Credit Value:    1.0

Term(s) Offered:     Full Year

Prerequisite(s):    None

Open to Grades:    9, 10, 11, 12

**Description**: Introduction to Engineering Design is an introductory course, which develops student problem solving skills, with emphasis placed upon the concept of developing a 3-D model or solid rendering of an object. Students focus on the application of visualization processes and tools provided by modern, state of the art computer hardware and software called Inventor. This modern computer-based process replaces the traditional hand drawing methods. The course will emphasize the design development process of a product and how a model of that product is produced, analyzed and evaluated using a Computer Aided Design System. Various design applications will be explored with discussion of possible career opportunities. Students may elect to receive transcript college credits from Rochester Institute of Technology.  
 

*Principles of Engineering (POE)*

 Credit Value:    1.0

Term(s) Offered:     Full Year

Prerequisite(s):    IED

Open to Grades:    10, 11, 12

**Description:**Designed for 10th or 11th grade students, this survey course exposes students to major concepts they’ll encounter in a post secondary engineering course of study. Topics include mechanisms, energy, statics, materials, and kinematics. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges, document their work and communicate solutions.

Specialization Courses (2)

*Civil Engineering & Architecture* (CEA)

Credit Value:    1.0

Term(s) Offered:     Full Year

Prerequisite(s):    POE

Open to Grades:    11, 12

**Description:** Students learn about various aspects of civil engineering and architecture and apply their knowledge to the design and development of residential and commercial properties and structures. In addition, students use 3D design software to design and document solutions for major course projects. Students communicate and present solutions to their peers and members of a professional community of engineers and architects. This course is designed for 11th or 12th grade  
students.

Computer Integrated Manufacturing (CIM) – New Course for 2015-2016 School Year

Credit Value:    1.0

Term(s) Offered:     Full Year

Prerequisite(s):    POE

Open to Grades:    11, 12

**Description:** 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 do assembly lines work? How has automation changed the face of manufacturing? While students discover the answers to these questions, they’re learning about the history of manufacturing, robotics and automation, manufacturing processes, computer modeling, manufacturing equipment, and flexible manufacturing systems. This course is designed for 11th or 12th grade students. 