



# MVTHS--CTE DEPARTMENT

## Technology & Engineering Education Course Listings for 2012 - 2013

1/17/2011

### Orientation to Manufacturing I

IN200A 810

Course ID: 21052A002

This introductory course is designed to allow students to develop a knowledge of concepts in manufacturing in a global society and its impact on our lives and our environment. This course will emphasize the laboratory approach. Class activities will include demonstrations and applications of manufacturing systems, materials, tools, and machines. Students will apply mathematics and technical knowledge to problem solving.

Length of course: 1 Semester  
Credits per semester .5  
Grade level: 9, 10 (Juniors and seniors will be allowed in the course only if enrollment numbers make this possible. (Juniors will have priority.)  
Prerequisite: None

### Orientation to Manufacturing II

IN200B 811

Course ID: 21052A002

This introductory course is designed to allow students to become aware of the role that welding and cutting of materials play in manufacturing technology. General knowledge and understanding will be developed in arc and wire feed welding, oxyacetylene welding and cutting, manual, semi-automatic, and plasma cutting, and the use of computers and robotics as they relate to these processes. The laboratory approach will be emphasized. Students will apply mathematics and technical knowledge to problem solving.

Length of course: 1 Semester  
Credits per semester .5  
Grade level: 9, 10 (Juniors and seniors will be allowed in the course only if enrollment numbers make this possible. (Juniors will have priority.)

### Communications Technology (Drafting)

IN210 814

Course ID: 11002A001

Communications Technology is a course designed to foster an awareness and understanding of the technologies used to communicate in our modern society. Students will gain experience in the areas of design and drafting, radio and television broadcasting, computers in communication, photography, graphic arts, and telecommunications.

Length of course: 1 Semester  
Credits per semester .5  
Grade level: 9, 10 (Juniors and seniors will be allowed in the course only if enrollment numbers make this possible. (Juniors will have priority.)  
Prerequisite: None

### Energy Utilization Technology (Electricity)

IN220 805

Course ID: 20101A001

Energy Utilization Technology is a course designed to foster an awareness and understanding of how we use energy in our industrial technological society. Areas of study will include conversion of energy; electrical fundamentals; solar energy resources; alternate energy resources such as wind, water, and geothermal; fossil fuels; nuclear power; energy conservation; and computer uses in energy technology. Students will use laboratory experiences to become familiar with current energy technologies.

Length of course: 1 Semester  
Credits per semester .5  
Grade level: 9, 10 (Juniors and seniors will be allowed in the course only if enrollment numbers make this possible. (Juniors will have priority.)  
Prerequisite: None

### Production Technology (Construction)

IN230 818

Course ID: 13052A001

Production Technology is a course designed to foster an awareness and understanding of manufacturing and construction technology. Through a variety of learning activities, students are exposed to many career opportunities in the production field. Experiences in manufacturing include product design, materials and processes, tools and equipment, including computers, safety procedures, corporate structure, management, research and development, production planning, mass production, marketing and servicing. In construction, students will be exposed to site preparation, foundations, building structures, installing utilities, and finishing and servicing structures.

Length of course: 1 Semester  
Credits per semester .5  
Grade level: 9, 10 (Juniors and seniors will be allowed in the course only if enrollment numbers make this possible. (Juniors will have priority.)  
Prerequisite: None

### Transportation Technology (Small Engines)

IN240 822

Course ID: 20001A001

Transportation Technology is a course designed to foster an awareness and understanding of the various transportation customs that make up our mobile society. Through laboratory activities the student will be exposed to the technologies of and career opportunities involved in material handling, atmospheric and space transportation, marine transportation, terrestrial transportation, and computer uses in transportation technology.

Length of course: 1 Semester  
Credits per semester .5  
Grade level: 9, 10 (Juniors and seniors will be allowed in the course only if enrollment numbers make this possible. (Juniors will have priority.)  
Prerequisite: None

## Introduction to Engineering Design (IED)

AVC

*Project Lead the Way (PLTW)*

Course ID: 21006A001

Being creative and making a difference in the world is what engineers do. Learn why engineering is a great career for young men and women. The focus of this course is to expose students to design processes, research and analysis, teamwork, communication methods, engineering standards, and technical documentation. Using 3D computer modeling software, students learn the design process and solve design problems for which they develop, analyze, and create product models. This is the first course in a four-year sequence of courses that are part of the nationally recognized Pre-Engineering program called Project Lead The Way.

Length of course:	1 2 Semester(s)
Credits per semester	1 .5
Grade level:	11, 12 (Mt. Vernon Township H.S. Freshman and sophomores are permitted to take course)
Prerequisite:	A grade of B or above in Geometry or concurrent enrollment in Geometry or higher level math EXPLORE (Math/Science) Score: 17+ PLAN (Math/Science) Score: 19+
Application:	Yes
Class size:	25

## Principles of Engineering (POE)

AVC

*Project Lead the Way (PLTW)*

Course ID: 21004A001

This course of engineering exposes students to some of the major concepts they'll encounter in a postsecondary engineering course 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. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges. Students also learn how to document their work and communicate their solutions to peers and members of the professional community.

Length of course:	1 2 Semester(s)
Credits per semester	1 .5
Grade level:	11, 12 (Mt. Vernon Township H.S. Sophomores are permitted to take course) AVC Out-of-District – 11, 12
Prerequisite:	Completion of Introduction to Engineering Design (IED); A grade of B or above in Algebra II or Concurrent enrollment in Algebra II or higher level math EXPLORE (Math/Science) Score: 17+ PLAN (Math/Science) Score: 19+
Application:	Yes
Class size:	25

## Digital Electronics (DE)

AVC

*Project Lead the Way (PLTW)*

Course ID: 21008A001

This course is the study of electronic circuits that are used to process and control digital signals. Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras, and high-definition televisions. The major focus of the DE course is to expose students to the design process of combinational and sequential logic design, teamwork, communication methods, engineering standards, and technical documentation. Computer simulation software is used to design and test digital circuitry prior to the actual construction of circuits and devices. This course is part of a nationally recognized program called Project Lead the Way.

Length of course:	1 2 Semester(s)
Credits per semester	1 .5
Grade level:	11, 12
Prerequisite:	Completion of Introduction to Engineering Design (IED)/Principles of Engineering (POE); A grade of B or above in Algebra II or Concurrent enrollment in Algebra II or higher level math EXPLORE (Math/Science) Score: 17+ PLAN (Math/Science) Score: 19+ PACT (Math/Science) Score: 20+
Application:	Yes
Class size:	20

## Civil Engineering & Architecture (CEA)

AVC

*Project Lead the Way (PLTW)*

Course ID: 21012A001

The major focus of this course is completing long-term projects that involve the development of property sites. As students learn about various aspects of civil engineering and architecture, they apply what they learn to the design and development of a property. The course provides teachers and students freedom to develop the property as a simulation or to students to model the experiences that civil engineers and architects face. Students work in teams, exploring hands-on activities and projects to learn the characteristics of civil engineering and architecture. In addition, students use 3D design software to help them design solutions to solve major course projects. Students learn about documenting their project, solving problems, and communicating their solutions to their peers and members of the professional community of civil engineering and architecture.

Length of course:	1 2 Semester(s)
Credits per semester	1 .5
Grade level:	11, 12
Prerequisite:	Completion of Introduction to Engineering Design (IED)/Principles of Engineering (POE); A grade of B or above in Algebra II or Concurrent enrollment in Algebra II or higher level math *This course <u>can</u> be taken concurrently with Digital Electronics (DE) EXPLORE (Math/Science) Score: 17+ PLAN (Math/Science) Score: 19+ PACT (Math/Science) Score: 20+
Application:	Yes
Class size:	10

## Computer Integrated Manufacturing (CIM)

AVC

*Project Lead the Way (PLTW)*

Course ID: 21010A001

Computer Integrated Manufacturing is a specialized course within the Engineering Academy. This course teaches the fundamentals of computerized manufacturing technology. It builds on the solid-modeling skills developed in the **Introduction to Engineering Design** Course. Students use 3-D computer software to solve design problems. They assess their solutions through the relationship of design, function and materials, modify their designs, and use prototyping equipment to produce 3-D models.

Length of course:	1 2 Semester(s)
Credits per semester	1 .5
Grade level:	11, 12
Prerequisite:	Completion of Introduction to Engineering Design (IED)/Principles of Engineering (POE); A grade of B or above in Algebra II or Concurrent enrollment in Algebra II or higher level math *This course can be taken concurrently with Digital Electronics EXPLORE (Math/Science) Score: 17+ PLAN (Math/Science) Score: 19+ PACT (Math/Science) Score: 20+
Application:	Yes
Class size:	10

## Automotive Technician I

IN310A/B

855

AVC

*Vehicle Maintenance & Repair I*

Course ID: 20104A001

This course introduces students to the basic skills needed to inspect, maintain, and repair automobiles and light trucks that run on gasoline, electricity, or alternative fuels. Instructional units include engine performance, automotive electrical system, integrated computer systems, lubrication, exhaust and emission control, steering and suspension, fuel systems, cooling system, braking, and powertrain.

Length of course:	2 Semesters
Credits per semester	1
Grade level:	11, 12
Prerequisite:	Communication/Energy/Production/Transportation
Dual Credit:	Reid Lake College: AUTO 1231—Introduction to Automotive Technology (2 credit hours)—Junior/Senior only
Application:	Yes

## CAD/Drafting I

IN320A/B

830

AVC

Course ID: 21103A001

This course is for students who are interested in careers in drafting, design, architecture, construction management, interior design, graphic arts, engineering and other related professions. Students will learn to make drawings and read blueprints in the same manner as professionals in the careers listed above. Students will learn to use computer aided drafting (CAD) to make drawings by computer. The classroom is equipped with professional CAD systems

which include some of the latest and most powerful software. No previous experience with computers or drafting is needed. The main requirement for enrollment in the course is a sincere desire to learn the "language of industry"....drafting. Success in college (technology, architecture, and engineering) or technical school and success on industrial jobs can be improved by completion of this course. Students will receive a certificate of completion upon successful completion of the course. Students may then apply to take the Autodesk Certified User Examination for certification. The cost of the examination is to be paid by the student. College credit can be received by students who complete this course.

Length of course:	2 Semesters
Credits per semester	1
Grade level:	11 and 12
Prerequisite:	Communication/Energy/Production/Transportation
Dual Credit:	Rend Lake College: CAD 1201—Introduction to Computer Aided Drafting (2 credit hours)—Junior/Senior only
Application:	Yes

## Electrical Trades

IN330A/B

840

AVC

*Electronics I – Analog*  
Course ID: 17102A003

This course is designed to provide students with instruction and training in areas that prepare them to enter the electrical trades. Areas of instruction include electrical theory, circuit design and operation, the national electrical code, blue print reading, construction blue print interpretation, and test equipment usage. Students plan and organize wiring tasks, and gain practical experience by wiring mock-ups. Students become familiar with tools, materials, and methods used in residential wiring. Students troubleshoot circuits for faulty operation and make repairs. Specific studies include AC and DC theory, series and parallel circuits, motor and generator theory, motor controls, lighting and appliance wiring, low voltage wiring, and testing and repair.

Length of course:	2 Semesters
Credits per semester	.5
Grade level:	11 and 12
Prerequisite:	Communication/Energy/Production/Transportation

## Robotics

IN\_\_A/B

AVC

Course ID: 21009A001

Robotics is a course that introduces students to robotics through the investigation of the electromechanical systems that are used in robots. Students will use the knowledge and skills acquired in the course to design and build a robot. This course is intended for students who have an interest in electronics and robotics. Topics covered in the course may include mechanics, electrical and motor controls, pneumatics, computer basics, and programmable logic controllers.

Length of course:	2 Semesters
Credits per semester	.5
Grade level:	11 and 12
Prerequisite:	Communication/Energy/Production/Transportation
Application:	Yes

## Manufacturing I

IN340A/B

845

AVC

Course ID: 13207A001|13203A001

This course offers a planned sequence of learning experiences which provide students with the opportunities to develop competencies needed for employment in a variety of manufacturing-related occupations. Course content will emphasize competencies common to many occupations such as applying safety practices, selecting materials, metal fabrication, performing benchwork operations, performing precision measurement, performing layouts, performing housekeeping activities and setting and operating a variety of tools used for separating, machining, forming and combining materials, blueprint reading and related math.

Length of course:	2 Semesters
Credits per semester	1
Grade level:	11 and 12
Prerequisite:	Communication/Energy/Production/Transportation
Dual Credit:	Rend Lake College: MACH 1201—Machining Technology I (4 credit hours)—Junior/Senior only Rend Lake College: WELD 1270—Introduction to Welding Processes (4 credit hours)—Junior/Senior only
Application:	Yes

### 3-D Drawing and Animation

IN350A/B

852

The 3-D computer drawing and animation course is designed to provide students with the skills needed for a career in the fields of advertising, commercial art, graphic design, web site development, and graphic illustrator. Students will learn to apply artistic, design, and layout principles, along with text, graphics, drawing, rendering, sound, video, and 2D/3D animation integration to develop various print, video and digital products. Students will use hardware and software programs to create, manipulate, color, paint and layer scanned images, computer graphics, and original artwork. Students will use hardware and software to capture, edit, create, and compress audio and video clips. Students will use animation and 2D/3D hardware and software to create animated text, graphics and images. Students will apply artistic techniques to design and create advertisements, displays, publications, technical illustrations, marketing brochures, logos, trademarks, packaging, video graphics, and computer-generated media.

Length of course:	2 Semesters
Credits per semester	.5
Grade level:	11 and 12
Prerequisite:	Communication/Energy/Production/Transportation
Application:	Yes

### Automotive Technician II

IN410A/B

895

AVC

*Vehicle Maintenance & Repair II*

Course ID: 20104A002

This course is a continuation of and builds on the skills and concepts introduced in Automotive Technician I. This course includes instructional units in alternative fuel systems, computerized diagnostics, new vehicle servicing, automotive heating and air conditioning, transmissions, testing and diagnostics, drivetrain and overall automobile performance.

Length of course:	2 Semesters
Credits per semester	1
Grade level:	12
Prerequisite:	Automotive Technician I
Application:	Yes

### CAD/Drafting II

IN420A/B

875

AVC

Course ID: 211003A002

This course builds on the skills developed in Architectural CAD/Drafting I and allows the student to begin learning to perform tasks in a selected specialty. Students who like architecture will learn the skills necessary to draw a set of house plans. Students who like machines will learn skills necessary to complete drawings for manufactured parts for automobiles and other consumer products. Students will learn to plan, research materials, determine requirements, and organize activities to complete a drawing. Students will continue to develop skills and complete drawings with professional computer aided drafting (CAD) systems. Students who successfully complete this course will be prepared for beginning employment and (or) greater success in college or technical school programs.

Length of course:	2 Semesters
Credits per semester	1
Grade level:	12
Prerequisite:	CAD/Drafting I
Application:	Yes

### Manufacturing II

IN440A/B

890

AVC

Course ID: 13207A002|13203A002

This second training level course should offer experiences, which expand upon competencies achieved during Manufacturing I. This course will begin to offer students the opportunity to specialize in specific areas of manufacturing such as machine tool set-up and operation, welding, quality control, automated machine set-up and operation and sheet metal fabrication. Course content might include the following areas: metallurgy and heat treatment of metal, advanced machine set-up and operation, numerical control/computer, numerical control machining, performing supervisory functions and installation, and maintenance and repair of machinery, blueprint reading and related math.

Length of course:	2 Semesters
Credits per semester	1
Grade level:	12
Prerequisite:	Manufacturing I
Application:	Yes

## **Interrelated Cooperative Education**

**BU500A/B**

**900**

**AVC**

Course ID: 22153A001

This course is designed for senior students interested in pursuing careers in occupations related to industrial technology. Students are released from school for their paid cooperative education work experience and participate in 200 minutes per week of related classroom instruction. Classroom instruction focuses on providing students with job survival skills, career exploration skills related to the job, as well as improving students' abilities to interact positively with others. For skills related to the job, refer to the skill development course outlines and the task list of the desired occupational program.

A qualified, certified CTE instructor is responsible for supervision. Written training agreements and individual student training plans are developed and agreed upon by the employer, student and coordinator. The coordinator, student and employer assume compliance with federal, state and local laws and regulations.

The course content includes the following broad areas of emphasis: further career education opportunities, planning for the future, job-seeking skills, personal development, human relationships, legal protection and responsibilities, economics and the job, organizations, and job termination. Classroom and worksite instruction is based on the tasks in an occupation.

Length of course:	2 Semesters
Credits per semester	1.5
Grade level:	12
Prerequisite:	Completion of one credit of skill-specific training in an approved CTE program recommended.
Application:	Yes