Manufacturing

Advanced Technology for Design & Production

Prerequisites: None
Grades: 9-12
Credit: 1 unit
Offered: Andrew Jackson

You'll use modern technologies in the design and improvement of products, and you'll use three-dimensional CAD software in the creation and analysis process.

You'll document designs using standards set by industry for design documentation and implement methods of green production and just-in-time component supply to allow for the lowest cost and highest quality products.

You'll design and troubleshoot data acquisitions, programmable logic control, process monitoring and automation and robotic systems, and use cameras and sensors to control automated systems.

Machine Technology 1 - Intro

Prerequisite: None
Grades: 9-11
Credit: 1 unit
Offered: Career Center

You'll learn machining and metal cutting principles using modern machine tools, hand tools and precision measuring tools through theory and hands-on applications.

You'll become familiar with all safety aspects of working in machine shop/manufacturing environments.

You'll learn to use two of the four basic machine tools, lathe and drill press to machine projects to print dimensions (hammer and baseball bat.)

You'll also perform calculations necessary to measure machined parts and effectively use layout instruments.

Machine Technology 2 - Turning/Milling Operations

Prerequisite: Machine Technology 1
Grades: 10-12
Credit: 1 unit
Offered: Career Center

You'll learn how to use a manual lathe to perform turning operations such as tapers, threads and knurling to produce projects such as a Civil War era cannon replica.

You'll also begin to use the manual milling machine to accurately drill holes and mill flat and angular surfaces to produce projects such as a machinist vise.

You'll receive more in-depth instruction on precision measuring, blueprint reading and mathematical formulas relevant to the machine tool industry through theory and hands-on applications.

Machine Technology 3 - Grinding/CNC Operations

Prerequisite: Machine Technology 2
Grades: 10-12
Credit: 1 unit
Offered: Career Center

You'll receive advanced skill development along with technical theory of machine tool operations.

You'll use the lathe, milling machine, drill press and surface grinders to produce highly accurate projects like parallels, 1-2-3 blocks and sine vise.

You'll also receive introduction instruction on CNC (Computer Numerical Control) machine processes.

Machine Technology 4 - CNC Set-up/Programming

Prerequisite: Machine Technology 3
Grades: 10-12
Credit: 1 unit
Offered: Career Center

You'll learn the fundamentals of set-up and programming of CNC milling and turning machines, using advanced blueprint reading and shop mathematic skills.

Manufacturing Work-based Credit

(see Co-op for details)

Prerequisite: Senior enrolled in final level of occupational program
Grade: 12
Credit: 1 unit
Offered: Andrew Jackson, Career Center

You'll put your manufacturing courses in action with on-the-job training. (See your school counselor and the sidebar on page 15 for details.)

Systems of Advanced Technology

Prerequisites: Advanced Technology for Design and Production
Grade: 9-12
Credit: 1 unit
Offered: Andrew Jackson

You'll apply the technologies found in modern clean, production environments as you study effective and energy efficient control of pumping, conveyors, piping, pneumatic and hydraulic control systems.

You'll apply total quality management to production design to assure quality and also focus on properties of materials and material testing.

You'll also create documentation to support designs, examining properties and justifying material selections based on properties, and you'll learn that old products become the new materials for the new products.

Welding 1 - Arc

Prerequisite: None
Grades: 10-12
Credit: 1 unit
Offered: Career Center

You'll learn safety, equipment and skills for arc welding with different types of welding rods. Both theory and hands-on instruction are emphasized.

Welding 2 - Gas Metal Arc

Prerequisite: Welding 1
Grades: 10-12
Credit: 1 unit
Offered: Career Center

You'll have hands-on training in gas metal arc welding known as MIG welding.

You'll get training with flux core wire, copper-coated wire and different types of welding gases in different positions. MIG is a widely used welding process with metal fabricators.

Welding 3 - Oxyacetylene Cutting

Prerequisite: Welding 2
Grades: 10-12
Credit: 1 unit
Offered: Career Center

You'll learn to make proper cuts of metal using the oxyacetylene cutting process. Safety will be emphasized.

You'll also learn to weld metals using this process.

Welding 4 - Gas Tungsten-arc

Prerequisite: Welding 3
Grades: 10-12
Credit: 1 unit
Offered: Career Center

You'll learn gas tungsten welding, known as TIG welding, which uses a non-consumable electrode and a special electrode holder.

You'll learn how shielding gas protects the welding puddle and can be used to weld aluminum, stainless steel and other types of metal using the correct type of filler metals.