INDUSTRIAL TECHNOLOGY

INDUSTRIAL TECHNOLOGY COURSES CAN BE USED
AS ELECTIVE CREDITS

CONTENT MISSION STATEMENT: The content area of Industrial Technology education provides a foundation for all students to pursue a vocation in construction, manufacturing, transportation, communication, and service industries. It also provides a foundation and interest in life long avocations. Knowledge and skills in this content area also provide many advantages in time and money over the student's lifetime. The content area will include but is not limited to: career potential, work ethic, technical ability, lifelong learning, teamwork, and applied academics.

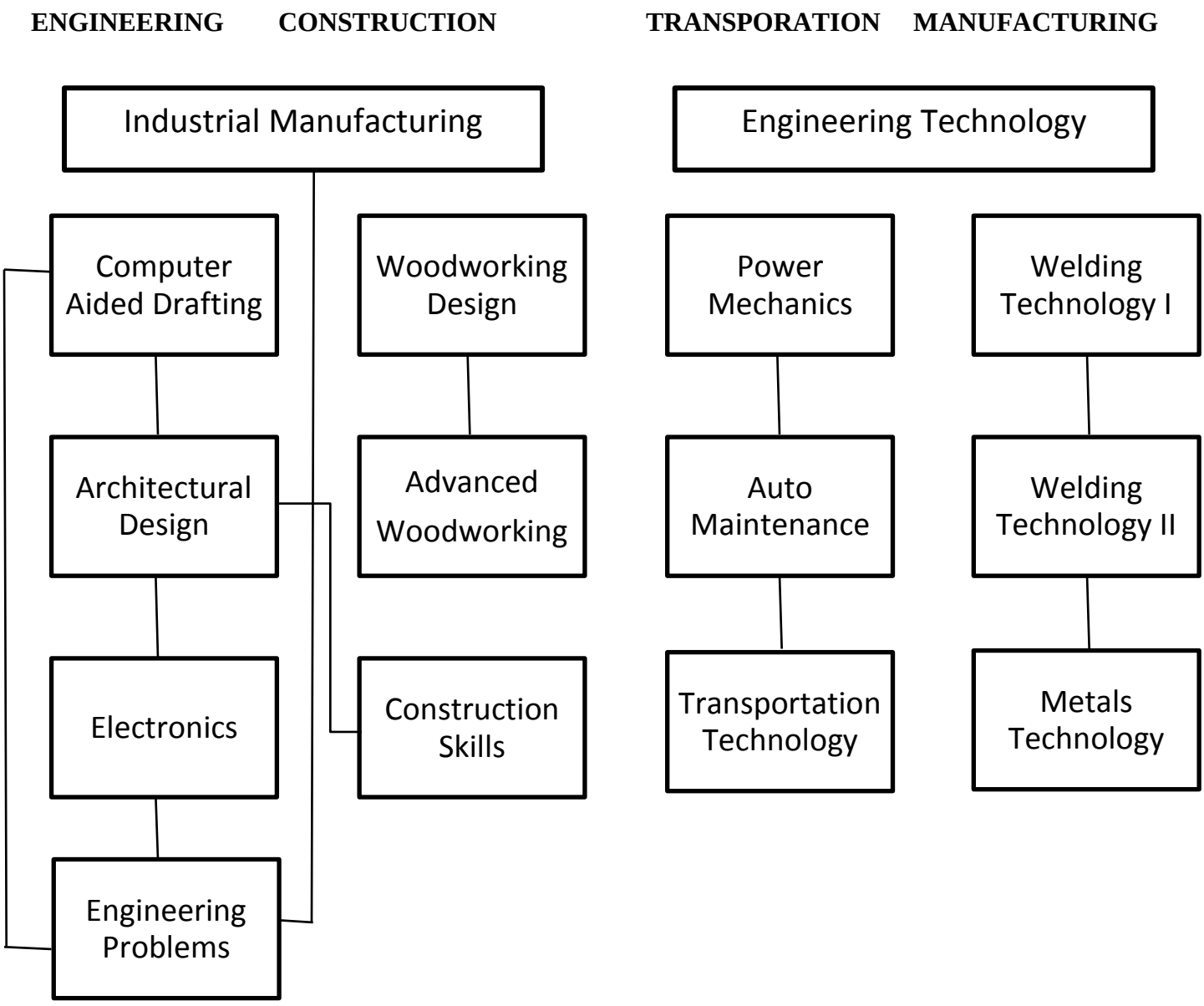
COURSE TITLES	**CREDIT**	**GRADE LEVEL**				**PREREQUISITE**
		9	10	11	12	
Architectural Design	1	x	x	x	x	None
Auto Maintenance	.5			x	x	None
Construction Skills	3			x	x	None
Electronics	.5		x	x	x	None
Engineering Problems	1			x	x	CAD, recommendation Materials and Processes or staff permission
Engineering Technology	.5	x	x	x	x	None
Industrial Manufacturing	.5	x	x	x	x	None
Computer Aided Drafting (CAD)	1	x	x	x	x	Recommend Engineering Technology
Metals Technology	.5		x	x	x	None
Power Mechanics	.5	x	x	x	x	None
Robotics	.5	x	x	x	x	None
Transportation Technology Academy*	2				x	Auto Maintenance, Power Mechanics, and Administrative Approval
Welding Technology I	.5	x	x	x	x	None
Welding Technology II*	.5		x	x	x	Welding Technology I with “C” or better
Woodworking Design	.5		x	x	x	None
Advanced Woodworking	.5		x	x	x	Woodworking Design with “C” or better

*Dual credit – see your counselor for more information.

Content Standards:
The students will:

1. develop a respect for others, their property, themselves, and pride in a job well done.
2. acquire and improve skills and knowledge in the content area to provide a foundation for further education or the transition from school to work.
3. develop career awareness and related skills to enable them to make viable career choices and become employable in a variety of vocational careers.
4. select, apply, and maintain technology including machines and computers.
5. read, write, speak, listen, and compute to the best of their ability to better function at work and in society.
6. demonstrate interpersonal, teamwork, and leadership skills necessary to function in a multicultural, global world of work.
7. develop an appreciation for lifelong learning and interests.
8. develop problem solving and creative thinking skills to choose best alternatives and reveal new possibilities.
9. manage time, materials, and resources to best complete a project or product.
10. develop a better appreciation of responsibility, self-esteem, integrity, and honesty.

INDUSTRIAL TECHNOLOGY SEQUENCE



ARCHITECTURAL DESIGN **070311** **GRADES: 9-12**
***PREREQUISITE: NONE** **1 CREDIT/2 TERMS**

Students selecting this course will utilize computer software to design and draw a complete set of plans for a residence that meets local building codes and architectural standards. This course is highly recommended for students interested in architectural design or interior decorating. This class is required for sophomore students entering the Industrial Technology curriculum in the construction area.

Benchmarks
The students will:
- •identify career opportunities in the fields of engineering, manufacturing, construction, transportation, and other technical fields.
- •demonstrate a basic understanding of design concepts used in architectural drafting.
- •demonstrate a basic knowledge of residential construction techniques.
- •practice standardized drafting procedures to complete residential architectural plans using CAD software.
- •utilize standard architectural symbols to complete residential architectural plans using CAD software.
- •practice the key components of an industrial work ethic.

AUTO MAINTENANCE **090111** **GRADES: 11-12**
***PREREQUISITE: JUNIOR OR SENIOR, VALID DRIVER'S LICENSE** **.5 CREDIT/1 TERM**
AND ACCESS TO A CAR THAT CAN BE DRIVEN TO THE SHOP WEEKLY

Auto Maintenance is a one term beginning course in automotive maintenance. We will determine what can be worked on by owners at home and what needs to be done by professionals and how to choose and work with professional technicians. We will cover selecting vehicles and vehicle sources, finances, licensing, and insuring vehicles. Basic units covered in this course are lubrication, cooling, battery, fuel system, wheel balance, charging and starting systems, with some limited body repair. Prerequisites are

Benchmarks
The students will:
- •identify specific career opportunities in the field of automotive.
- •practice the key components of an industrial work ethic.
- •discuss the different types of engine classifications.
- •demonstrate the ability to solve problems and demonstrate trouble shooting skills.
- •learn how to select, purchase, finance, license, and insure an auto.
- •define and identify the components of an engine lubrication, cooling, ignition, and fuel system.
- •discuss how an engine works and the purpose of each part.
- •learn tool use and identification.
- •learn tire care - including checking, rotating, balancing, and patching (plugging).
- •learn car care including washing and waxing.
- •learn how to inspect the brakes.
- •learn to care for wipers and weep hole.
- •learn auto history, economics of transportation.

CONSTRUCTION SKILLS **040211** **GRADES: 11-12**
***PREREQUISITE: NONE** **2 CREDITS/4 TERMS**
Class is taught at Pleasant Valley high School and students need to provide their own transportation.

This course is practical and valuable to juniors and seniors who are interested in a career in the construction industry. Areas covered will include: blueprint reading, carpentry, concrete, masonry, building layout, HVAC, plumbing, electrical, drywall, and tile work. Related information also covered will be building materials, building codes, and opportunities in the trades. Students will also spend time on an actual construction site exploring the different trades.

Benchmarks
The students will:
- •identify specific career opportunities in the field of the construction industry.
- •demonstrate the ability to function in self-directed work team.
- •demonstrate the ability to master skills in areas such as plumbing, electricity, masonry, concrete, dry wall, tile, site layout, and carpentry.
- •practice actual construction skills through an exploratory industrial setting.
- •practice the key components of the industrial work ethic.

NOT OFFERED 2018-2019

ELECTRONICS **044111** **GRADES: 10-12**

***PREREQUISITE: NONE** **.5 CREDIT/1 TERM**

This course provides a foundation in the fundamental theories and laws of electricity and electronics. Topics covered include: theories, laws and devices, testing and measuring procedures, circuit assembly, wiring and analysis, electronic drafting, safety and troubleshooting plus completion of an electronic soldering project.

Benchmarks

The students will:

- •appreciate working accurately, neatly, and safely.
- •research career opportunities in the electricity and electronic fields.
- •learn theories, laws, and devices used in electricity and electronics.
- •test and measure various circuits, components, and devices.
- •wire and solder various circuits and printed circuit boards.
- •produce electronic schematics using standard symbols and techniques.
- •produce an electronics project.

ENGINEERING PROBLEMS **162711** **GRADES: 11-12**

***PREREQUISITE: CAD** **1 CREDIT/2 TERMS**

RECOMMENDATION INDUSTRIAL MANUFACTURING OR STAFF PERMISSION

This course is designed to meet the educational needs of students who are planning to enroll in engineering or related fields at the college or technical school level. Emphasis will be placed on the use of CAD software as well as design and problem solving skills for the engineer.

Benchmarks

The students will:

- •develop problem solving strategies and skills.
- •improve communication skills.
- •identify the components of total quality management (TQM).
- •define common mechanical engineering terms.
- •utilize computer technology through CAD/CAM programs.
- •perform field research by collecting, recording, and analyzing data.
- •complete and solve various mechanical engineering projects and problems.

ENGINEERING TECHNOLOGY **162511** **GRADES: 9-12**

***PREREQUISITE: NONE** **.5 CREDIT/1 TERM**

This course is designed to provide students with introductory level concepts and activities in several related fields. Students enrolling in this course should be highly task-oriented and very focused on their educational future. The course focuses its attention on describing and explaining robotics, electricity, bridge building, problem solving, fiber optics, basic lasers, pneumatics, CNC milling, computer repair, flight aviation, animation, weather and cooperative learning. This course is recommended for all freshmen and sophomores. It focuses on engineering concepts and hands on application. This is a real world class.

Benchmarks

The students will:

- •identify specific career opportunities in the fields of engineering, manufacturing, construction, transportation, and other technical fields.
- •demonstrate the ability to function in work teams.
- •demonstrate the ability to use critical thinking skills in problem solving.
- •apply a working knowledge of mechanics, pneumatics, and electricity to industrial applications.
- •apply a working knowledge of robotics, lasers, and fiber optics to industrial applications.
- •apply a working knowledge of CAD, CAM, and CNC to industrial applications.
- •apply a working knowledge of computer simulations in industry.
- •practice the key components of an industrial work ethic.

INDUSTRIAL MANUFACTURING **161211** **GRADES: 9-12**
***PREREQUISITE: NONE** **.5 CREDIT/1 TERM**
FORMALLY MATERIALS AND PROCESSES

This course is recommended for all freshmen and sophomores wanting to enter the Industrial Technology curriculum in construction, automotive, and manufacturing. Students will learn fundamentals of drafting, machine metals, woodworking, and welding through various hands-on projects. Required for Engineering Problems.

Benchmarks
The students will:

- identify specific career opportunities in the fields of engineering, manufacturing, construction, transportation, and other technical fields.
- correctly use and identify correct safety procedures of basic hand tools and power equipment.
- understand procedures used in industry for production of various components and products.
- participate as an individual and as a team in problem solving activities involving applied mathematics as it relates to production and engineering.
- identify processes used to form, shape, join, and separate a variety of different materials.
- identify characteristics of manufactured materials such as woods, plastics, and metals.
- practice the key components of an individual work ethic.

COMPUTER AIDED DRAFTING (CAD) **070611** **GRADES: 9-12**
***PREREQUISITE: RECOMMEND ENGINEERING TECH** **1 CREDITS/2 TERMS**

Students taking this course will learn AutoCAD and SolidWorks. This course is highly recommended for those students who may be pursuing engineering or architectural careers. This class is recommended for sophomore students entering the Industrial Technology curriculum in the manufacturing area and is also a requirement for Engineering Problems.

Benchmarks
The students will:

- utilize basic drafting equipment and materials.
- utilize standard drafting, lettering, and line work.
- practice standard drafting dimensioning procedures.
- practice standard drafting procedures involved in orthographic projection, pictorial drawing, sectional views, auxiliary views, and basic working drawings.
- demonstrate a basic knowledge of CAD equipment, software, and operations.
- produce drawings using CAD software and a hard copy/plot of drawings generated by the CAD software.
- produce a student managed portfolio.

METALS TECHNOLOGY **241211** **GRADES: 10-12**
RECOMMEND: NONE **.5 CREDIT/1 TERM**

Metals Technology will explore career opportunities, metal properties, safety, and the proper use of tools and machines in the metal working area. The three main areas covered in this class will be machining (use of lathes, vertical mills and horizontal mills), foundry, and sheet metal.

Benchmarks
The students will:

- identify career opportunities in the fields of machining, foundry and sheet metal.
- learn and practice safety in the metal working areas.
- demonstrate knowledge of metal properties and characteristics.
- set up and perform various operations on mills and lathes.
- create forms and patterns and cast them in the foundry.
- work accurately and precisely to 1/1000” with measuring tools.
- demonstrate the proper use of tools and techniques in the sheet metal area.

POWER MECHANICS **091811** **GRADES: 9-12**
***PREREQUISITE: NONE** **.5 CREDIT/1 TERM**

Power Mechanics is a one term course providing a background for Auto Maintenance. This course is a study and repair, maintenance, and operation of small gasoline engines. Lab exercises will be performed on small gasoline engines. Exploratory rocketry and CO2 cars will also be offered as projects. This class is recommended for sophomore students entering the Industrial Technology curriculum in the automotive area.

Benchmarks

The students will:

- identify career opportunities in the fields of manufacturing, engineering, and other major technical fields.
- use and identify correct safety procedures of basic hand tools and power equipment to manufacture various assigned projects including CO2 cars and model rockets.
- use precision measuring devices used in industry.
- disassemble, identify components, and reassemble a Briggs and Stratton four stroke engine.
- demonstrate a working knowledge of basic drafting principles of two dimensional drafting, dimensioning, and design process to design a CO2 powered dragster.
- demonstrate and use applied math and science principles as applied to aerospace technology and model rocketry.
- practice the key components of an industrial work ethic.

ROBOTICS **161311** **GRADES: 9-12**
***PREREQUISITE: NONE** **.5 CREDIT/1 TERM**

Introduction to robotics including programming, designing, fabricating, and understanding the multiple sensors used to manipulate a robot. Students will be organized in teams and go through an in depth strategy based curriculum.

Benchmarks

The students will:

- Students will work in a real world team based process identifying team oriented responsibilities.
- Students will learn to identify all program sensors and demonstrate their operations.
- Students will fabricate using various materials such as aluminum, plastic, and fasteners to construct a working robot chassis.
- Students will learn the construction and use of simple machines to interact using robotic working strategies.
- Students will break down a given problem and build a strategy to compete in a competitive environment using technology, problem solving, and troubleshooting techniques.

TRANSPORTATION TECHNOLOGY **099901** **GRADE: 12**
***PREREQUISITE: AUTO MAINTENANCE,** **2 CREDITS/4 TERMS**
POWER MECHANICS AND ADMINISTRATIVE APPROVAL
DUAL CREDIT
Class is taught off sight and students need to provide their own transportation.

Transportation Technology is a course designed to prepare students to enter the world of work in automotive repair. This course will be taught at Scott Community College and will run for thirty-two consecutive weeks. The course will be divided into the following units:

Basic Core Skills (3 weeks) - This module of the course is designed to acquaint the student with the proper personal and shop procedures needed to function in a repair shop.

Diesel Power Equipment (9 weeks) - This module of the course is designed to acquaint the student with modern diesel powered equipment operation and service.

Automotive Technology (9 weeks) - This module of the course is designed to acquaint the student with basic maintenance and service.

Automotive Collision Repair (9 weeks) - This module will be divided into four segments and will include instruction in each of the following areas: Detailing and Trim service, Metal Finishing, Panel Alignment, and Basic Refinishing.

The students enrolled in this course will participate in job shadowing in addition to participating in the modules listed above. One day a week the student will visit a repair facility to observe the typical duties and responsibilities of individuals employed in the various areas covered by the course modules. The School-To-Work Coordinator will coordinate and supervise this activity.

WELDING TECHNOLOGY I **241411** **GRADES: 9-12**
***PREREQUISITE: NONE** **.5 CREDIT/1 TERM**

Welding Technology I is designed to provide the basic fundamental skills of welding. AC and DC electric arc welding, MIG, TIG, oxy-acetylene gas welding, flame cutting, and brazing will be covered. This course is open to all students. This class is recommended for sophomore students entering the Industrial Technology curriculum in the Industrial Technology area.

Benchmarks
The students will:
- identify specific career opportunities in the fields of metal fabrication and welding.
- safely use the basic hand tools, power equipment, and welding equipment.
- identify and understand welding symbols used on basic production drawings.
- set up and operate gas and electric arc welding equipment and perform a list of competencies.
- practice problem solving techniques to improve success in various competencies.
- practice the key components of industrial work ethic.

WELDING TECHNOLOGY II **241421** **GRADES: 10-12**
***PREREQUISITE: WELDING TECHNOLOGY I WITH "C" OR BETTER** **.5 CREDIT/1 TERM**
DUAL CREDIT - WEL-126/WEL-129 (9 College Credits)

Welding Technology II is designed to provide the fundamental skills of welding. Areas Covered: AC and DC electric arc welding and MIG. Welding skills will build upon those learned in welding I. Emphasis on out of position welds in SMAW and MIG. MIG short circuit transfer and spray arc will also be covered. This class is recommended for junior and senior students entering the Industrial Technology curriculum leading to career employment and/or Engineering/Architectural careers. Students earning a grade below a "C" in Welding Technology I must have instructor approval to sign up for this class.

Benchmarks
The students will:
- identify career opportunities in the fields of metal fabrication and welding.
- define and safely use the basic hand tools, power equipment, and welding equipment.
- learn, identify, and use A.W.S. welding symbols.
- identify and understand welding symbols used on basic production drawings.
- set up and operate gas/electric arc welding equipment and perform competencies in each area.
- practice problem solving techniques to improve success in various competencies.
- practice the key components of industrial work ethic.
- identify various metals and their weldability.
- learn and practice the four welding positions.
- learn about Unions, piece work, and welding certification.
- develop a higher skill level in MIG and TIG welding.
- develop knowledge of various filler materials.
- develop blueprint reading skills.

WOODWORKING DESIGN **041711** **GRADES: 10-12**
***PREREQUISITE: NONE** **.5 CREDIT/1 TERM**
FORMALLY WOODS TECHNOLOGY I

This course is designed to introduce the student to the fundamentals of woodworking. Topics covered include: safety, wood technology, career opportunities, care and use of tools, design and construction of furniture, and finishing. This course will provide the student with the basic knowledge, skills, and procedures to be utilized in the woodworking field. It is also designed to give the student insight into the major areas of woodworking and to serve as a reference for design and construction principles and methods.

Benchmarks
The students will:
- appreciate working accurately, neatly, and safely.
- use hand and power tools correctly and safely.
- learn wood construction techniques and terminology.
- use thinking and problem solving skills by planning a wood furniture project.

•plan and produce a wood project.

ADVANCED WOODWORKING 041712 GRADES: 10-12
***PREREQUISITE: WOODWORKING DESIGN WITH "C" OR BETTER .5 CREDIT/1 TERM**
FORMALLY WOODS TECHNOLOGY II

Woods Technology II is designed to further advance the fundamentals and skills of woodworking. This course will provide basic knowledge and skills of the furniture building trade. Students will design, draw, build, and finish a furniture project using a drawing and plan of procedures. Students earning a grade below a "C" in Woods Technology I must have instructor approval to sign up for this class.

Benchmarks
The students will:

- understand woodworking materials.
- follow a set of drawings and plan of procedures.
- identify wood species.
- identify furniture styles.
- demonstrate safe practices of woodworking equipment.