

INDUSTRIAL TECHNOLOGY – CAREER/TECH DEPT

WOODWORKING : - Semester Course

Course #: 0413

Credit: 1

Elective: Grades 9 - 12

Prerequisite: None

Course Description:

In Woodworking I students will learn how to safely use hand and power tools to complete two small projects. Students will be expected to complete weekly book assignments and follow safety rules in the classroom. Students will have to provide safety glasses.

Skills Needed To Be Successful In The Class:

Students must be able to read, write, measure, exhibit basic math skills, use fractions, and utilize some hand and machine tools.

Specific Outcomes -- The Student Will Be Expected To:

1. Identify common woods used in woodworking.
2. Demonstrate safe use of tools and equipment.
3. Demonstrate problem solving techniques and safe work habits.

Careers Related to Content:

Carpentry, Construction, Manufacturing, and Production.

CONSTRUCTION: - Semester Course

Course #: 0412

Credit: 1

Elective: Grades 9 - 12

Prerequisite: Woodworking

Course Description:

Construction—Comprehensive courses provide students with basic knowledge and skills required for construction of commercial, residential, and institutional structures. These courses provide experiences and information (typically including career opportunities and training requirements) regarding construction-related occupations such as carpentry, cabinetmaking, bricklaying, electrical trades, plumbing, concrete masonry, and so on. Students engage in activities such as reading blueprints, preparing building sites, starting foundations, erecting structures, installing utilities, finishing surfaces, and providing maintenance.

Skills Needed To Be Successful In The Class:

Students must be able to read, write, exhibit basic math skills relating to measurement, and utilize hand and machine tools.

Specific Outcomes -- The Student Will Be Expected To:

1. Clearly define ideas through written plans.
2. Identify sequential steps for project completion.
3. Understand materials and processes and their relationship to the manufacturing industry.
4. Demonstrate problem solving techniques and safe work habits.

Careers Related to Content:

Carpentry, Construction, Manufacturing, and Production

INDUSTRIAL TECHNOLOGY – CAREER/TECH DEPT

**Concurrent Enrollment Course-HS/College Credit Earned*

INTRODUCTION TO ENGINEERING DESIGN (PLTW): - Full Year

FHS Course #: 0801 – 0802

Project Lead the Way Course #: EGT 400

IHCC CREDIT HOURS: 3

FHS Credit: 2

Elective: Grades 9, 10, 11, 12

Pre/Co-requisite: Algebra 1

Course Description:

Introduction to Engineering Design is a partner of Project Lead the Way. Project Lead the Way is an up and coming program for students interested in engineering, design, CAD, and other related fields. This is a course that teaches problem-solving skills using a design development process. Models of products solutions are created, analyzed, and communicated using solid modeling computer design software (Auto Desk Inventor). Students learn how to solve problems using a design development process. Portfolios are created and include topics such as sketching and visualization, geometric relationships, three dimensional modeling, model analysis and verification, documentation, production and marketing.

Skills Needed To Be Successful In The Class:

Students must be able to read, write, follow directions in the lab, and have a basic understanding of mathematics and computers, and visualization.

Specific Outcomes: The Student Will Be Expected To:

1. Demonstrate problem-solving techniques to improve existing products.
2. Implement advanced three dimensional modeling software to communicate the details of the products.
3. Demonstrate the ability to research the chronological development and rate of change that innovation in tools and materials have produced for consumers.
4. Research, design, and evaluate projects and present findings to the class.

Careers Related To The Content:

Engineering/Industrial/Design

INDUSTRIAL TECHNOLOGY – CAREER/TECH DEPT

**Concurrent Enrollment Course-HS/College Credit Earned*

PRINCIPLES OF ENGINEERING (PLTW): - Full Year

FHS Course #: 0803 - 0804

Project Lead the Way Course #: EGT 108

IHCC CREDIT HOURS: 3

FHS Credit: 2

Elective: Grades 9, 10, 11, 12

Pre/Co-requisite: Algebra I and Introduction to Engineering Design, RECOMMENDED or with Instructor Approval

Course Description:

Another sequential course with Project Lead the Way, a program for students interested in engineering, design, computer aided drafting, and other related fields. This is a contextual, project and problem-based course that integrate national standards in mathematics, science, technology, and English/Language Arts. The course focuses on the practical application of the principles of mathematics to solve engineering problems.

Exploring various design process and structures help students learn how engineers and technicians use math, science and technology in an engineering problem solving process to benefit people. Topics include mechanical advantage and simple machines, control systems and programming, material testing, and an intro to dynamics/kinematics. The course also includes concerns about social and political consequences of technological change.

Skills Needed To Be Successful In The Class:

Communication skills

Problem solving skills

Desire to learn through hands-on projects

Strong work ethic

Mathematics success in Algebra 1

Specific Outcomes: The Student Will Be Expected To:

1. Learn about types of engineers and their contributions to society, past, present, and future.
2. Collect, categorize, and graphically represent data.
3. Document and communicate research findings.
4. Learn about problem solving and how products are developed.
5. Keep an engineer's notebook.
6. Create and present oral presentations.
7. Learn about mechanical, thermodynamics, fluid, electrical, and control systems.
8. Learn the categories and properties of materials, and how they are shaped, joined, and tested.
9. Use precision measurement tools to gather and apply statistics for quality and process control.
10. Learn about reliability, redundancy, risk analysis, safety factors, liability, and ethics.
11. Explore dynamics and kinematics.

Careers Related To The Content:

Engineering Technology: testing and evaluation, routine design, production, operation, service, and maintenance, distribution and sales

Engineering: research, complex analysis, complex design, development, manufacturing, computer integrated manufacturing, civil engineering and architecture

INDUSTRIAL TECHNOLOGY – CAREER/TECH DEPT

**Concurrent Enrollment Course-HS/College Credit Earned*

DIGITAL ELECTRONICS (PLTW): - Full Year

FHS Course #: 0805-0806

Project Lead the Way Course #: EGT 420

IHCC CREDIT HOURS: 3

FHS Credit: 2

Elective: Grades 9, 10, 11, 12

Pre/Co-requisite: Algebra 1 and Introduction to Engineering Design, RECOMMENDED or with Instructor Approval

Course Description:

This course introduces students to applied digital logic, a key element of careers in engineering and engineering technology. Students use computer software to test and analyze digital circuitry. They design circuits to solve problems, export their designs to digital boards for testing and use components to build circuits on proto-boards. Students use mathematics and science in solving real-world engineering problems. This course covers several topics, including:

- Analog and digital fundamentals
- Number systems and binary addition
- Logic gates and functions
- Boolean Algebra and circuit design
- Decoders, multiplexers and de-multiplexers

Skills Needed To Be Successful In The Class:

Communication skills

Problem solving skills

Desire to learn through hands-on projects

Strong work ethic

Mathematics success in Algebra 1

Specific Outcomes: The Student Will Be Expected To:

1. Learn about types of engineers and their contributions to society, past, present, and future.
2. Collect, categorize, and graphically represent data.
3. Document and communicate research findings.
4. Learn about electronic problem solving.
5. Keep an engineer's notebook.
6. Learn about electrical, and control systems.

Careers Related To The Content:

Engineering Technology: testing and evaluation, routine design, production, operation, service, and maintenance, distribution and sales

Engineering: research, complex analysis, complex design, development, manufacturing, computer integrated manufacturing

INDUSTRIAL TECHNOLOGY – CAREER/TECH DEPT

METALS TECHNOLOGY: - Semester Course

Course #: 2403

Credit: 1

Elective: Grades 10 – 12

Prerequisite: None

Course Description:

Learn the types of metals, their use in manufacturing, and metalworking. Study the operation and set-up of the major industrial machine shop tools. Learn specific metal working techniques and processes. Related areas include blueprint reading, precision measuring instruments, heat treating.

Skills Needed To Be Successful In The Class:

Students must be able to read, write, follow directions in the lab, **WORK SAFELY** and utilize hand and machine tools, make precision measurements.

Specific Outcomes -- The Student Will Be Expected To:

1. Identify ferrous and non-ferrous metals.
2. Operate various hand and power metal working machines.
3. Perform basic machinist skills on metalworking lathes and milling machines.
4. Interpret blueprints and working drawings.
5. Demonstrate proficiency in precision measurement.
6. Exhibit efficient and safe work habits.
7. Understand materials and processes and their relationship to the manufacturing industry.
8. Perform foundry processes.

Careers Related to Content:

Machinist, Tool and Die Maker, Foundry Worker, Sheet Metal Technician, General Factory Maintenance Repair.

INDUSTRIAL TECHNOLOGY – CAREER/TECH DEPT

WELDING: - Semester Course

Course #: 2404

Credit: 1

Elective: Grades 10 – 12

Prerequisite: None

Course Description:

Learn the structure of the welding industry, how to read, interpret and create welding symbols and drawings. Learn how to properly use precision measuring tools. Identify different types of materials and their use in welding. Study the operation and set-up of ARC, MIG, TIG and Oxyfuel welders and cutters. Learn specific welding techniques and processes.

Skills Needed To Be Successful In The Class:

Students must be able to read, write, and follow directions in the lab, work safely, and utilize welders, torches, cutters, hands tools, and precision measuring tools.

Specific Outcomes -- The Student Will Be Expected To:

1. Demonstrate an understanding of the various welding techniques.
2. Perform welding skills with ARC, MIG, TIG, and Oxyfuel welders.
3. Interpret welding symbols and welding prints.
4. Demonstrate proficiency in precision measurement.
5. Exhibit efficient and safe work habits.
6. Understand materials and processes used to weld their relationship to the welding industry.

Careers Related to Content:

Welder, cutter, welding machine operator, ironworker, pipefitter.

INDUSTRIAL TECHNOLOGY – CAREER/TECH DEPT

POWER MECHANICS 1: - Semester Course

Course #: 0903

Credit: 1

Elective: Grades 9 - 12

Prerequisite: None

Course Description:

Students will study power and energy systems energy conversion and transmission, transportation systems, energy production and consumption. Disassemble and reassemble two- and four-stroke cycle small engines. Study mechanical, fuel, and electrical systems common to small engines. Perform troubleshooting, repair, and tune-up operations.

Skills Needed To Be Successful In The Class:

Students must be able to read, write, and follow directions in the classroom and lab areas.

Specific Outcomes -- The Student Will Be Expected To:

1. Students will understand power and energy systems as they relate to the world.
2. Exhibit knowledge of basic operational theory of small engines.
3. Identify common parts and their placement in small engine construction.
4. Use tools and equipment related to small engine repair and maintenance.
5. Demonstrate problem solving techniques and safe work habits.

Careers Related to Content:

Small Engine Service Technician, Mechanic.

POWER MECHANICS 2: - Semester Course

Course #: 0913

Credit: 1

Elective: Grades 10 - 12

Prerequisite: Power Mechanics 1

Course Description:

Students will concentrate on auto care through servicing, maintenance, and tune-up procedures. Exposure to automotive engine construction and drive-train components, ignition and fuel systems.

Skills Needed To Be Successful In The Class:

Students must be able to read, write, and follow directions in the classroom and lab areas.

Specific Outcomes -- The Student Will Be Expected To:

1. Understand how a vehicle is supposed to work.
2. Demonstrate correct vehicle maintenance procedures.
3. Demonstrate troubleshooting techniques for auto-related problems.
4. Safely use tools and equipment related to auto technology.

Careers Related to Content:

Auto Mechanic, Automotive Service Technician.

INDUSTRIAL TECHNOLOGY – CAREER/TECH DEPT

AUTOMOTIVE TECHNOLOGY: - Year Long Course

Course #: 0921 – 0922

Credit: 1

Elective: Grade 12

Prerequisite: Power Mechanics 2 and acceptable instructor interview

Course Description:

Study of automotive systems including fuel injection, electronic ignition, hydraulic and pneumatic power systems. Lab activities will include repair and troubleshooting on student or lab vehicles.

Skills Needed To Be Successful In The Class:

Students must be able to read, write, and follow directions in the classroom and lab areas, read and understand measurement instruments and understand basic automotive operating principles.

Specific Outcomes -- The Student Will Be Expected To:

1. Explain and demonstrate auto engine fundamentals and service.
2. Explain and demonstrate auto fuel systems and tune-up procedures.
3. Demonstrate troubleshooting techniques for auto related problems.
4. Safely use the tools and equipment related to auto technology.

Careers Related to Content:

Auto Mechanic, Automotive Service Technician, Auto Parts Counter person.