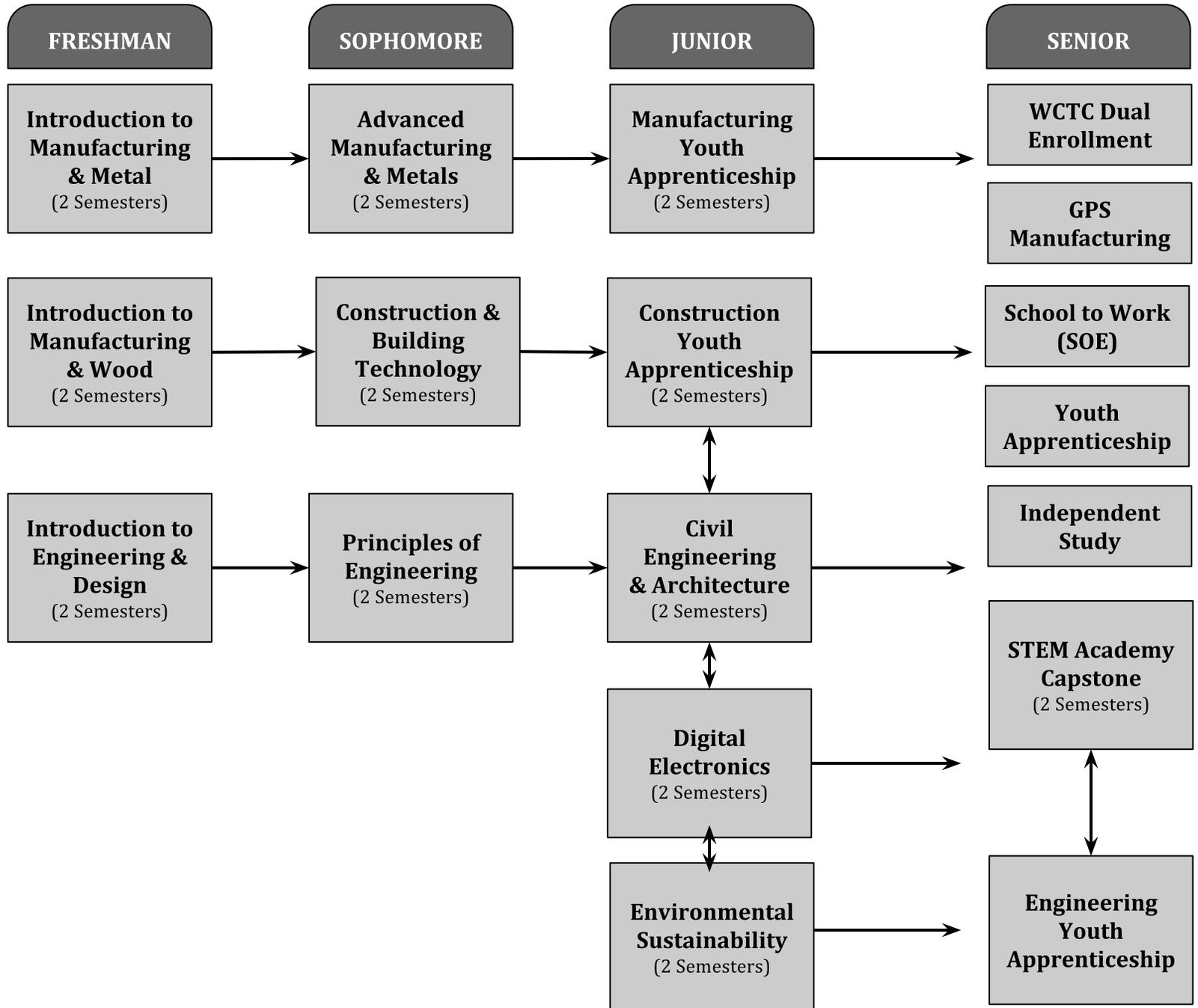


Menomonee Falls High School

Technology & Engineering Course Flowchart for 2017 - 2018 School Year



**APPLIED
TECHNOLOGY**

**ENGINEERING:
Project Lead the
Way**

Technology Education & Engineering

Mission Statement:

The Mission of the MFHS Technology Education & Engineering Department is to explore and develop technical literacy, content specific knowledge and application (S.T.E.M.), critical thinking and problem solving skills, career pathways, and the methods necessary to become successful life-long learners and users of modern technology in their future endeavors.

APPLIED TECHNOLOGY

Course Title	Course Number	Length	Year Taken
Introduction to Manufacturing & Metal	TE478/ TE479	Year	9-12
Introduction to Manufacturing & Wood	TE482/ TE483	Year	9-12
Advanced Manufacturing & Metals	TE461/ TE462	Year	10-12
Construction & Building Technology	TE216/TE217	Year	9-12
Manufacturing/Construction/Engineering Youth Apprenticeship	See page 26 for more information		
WCTC Dual Enrollment	See page 25 for more information		
GPS Manufacturing	See page 25 for more information		
Independent Study		Semester	12
SOE-(SUPERVISED OCCUPATIONAL EXPERIENCE)		Year	12
Youth Apprenticeship	See page 26 for more information	Year	12

ENGINEERING: PROJECT LEAD THE WAY (PLTW)

Course Title	Course Number	Length	Year Taken
Introduction to Engineering Design-Honors AS (PLTW)	TE397/ TE398	Year	9-12
Principles of Engineering-Honors AS (PLTW)*	TE418/TE419	Year	10-12
Civil Engineering & Architecture (PLTW)	TE258/TE259	Year	10-12
Digital Electronics-Honors AS (PLTW)**	TE434/TE435	Year	10-12
Environmental Sustainability (PLTW)	TE602/TE603	Year	11-12
STEM Academy Capstone	TE268/TE269	Year	12
Engineering Youth Apprenticeship	See page 26 for more information	Year	12

*By request, this course may be used to complete credits toward the Science Graduation Requirement.

**By request, this course may be used to complete credits toward the Math Graduation Requirement.

All Technology Education & Engineering courses require a class fee payable at registration or at the front office.

AS - Advanced Standing

APPLIED TECHNOLOGY

INTRODUCTION TO MANUFACTURING & METAL

One year Course

Grades 9-12

No Prerequisite

Course Numbers:

Semester 1: TE478

Semester 2: TE479

This course introduces students to Manufacturing focusing on the design and the processes necessary to manipulate metal into a finished product. As a class we will visit local manufacturers and technical colleges to gain insight on real world experiences.

In the classroom students will learn lab and tool safety, precision measuring tools, machine tool identification and operation, applied technical math, writing, and drawings, employability skills, resume & portfolio building, and careers and education choices in this pathway.

In the Lab students will learn how to work individually and in small diverse teams, safely operate machines and tools that cut, separate, bend, weld & fasten, use AutoCAD / Inventor software to design products, layout parts according to technical drawings, incorporate lean manufacturing into their design & production plan, measure with precision instruments and manage quality control, use precision machine tools including computer numerical control machines to produce projects.

INTRODUCTION TO MANUFACTURING & WOOD

One year Course

Grades 9-12

No Prerequisite

Course Numbers:

Semester 1: TE482

Semester 2: TE483

This course introduces students to Manufacturing focusing on the design and the processes necessary to manipulate wood into a finished product. As a class we will visit local manufacturers and technical colleges to gain insight on real world experiences.

In the classroom students will learn lab and tool safety, precision measuring tools, machine tool identification and operation, applied technical math, writing, and drawings, employability skills, resume & portfolio building, and careers and education choices in this pathway.

In the Lab students will learn how to work individually and in small diverse teams, safely operate machines and tools that cut, separate, & fasten, use AutoCAD / Inventor software to design products, layout parts according to technical drawings, incorporate lean manufacturing into their design and production plan, measure with precision instruments and manage quality control, use precision machine tools including computer numerical control machines to produce projects.

ADVANCED MANUFACTURING & METALS

One Year Course

Grades 10-12

Prerequisite: Intro to Manuf & Metal

Course Numbers:

Semester 1: TE461

Semester 2: TE462

This class is a continuation of Introduction to Manufacturing & Metal. Students will work in small groups to design and fabricate a large project such as (but not limited to) a mini chopper or go kart. Smaller individual projects are also a possibility.

The areas of instruction and equipment students will use include: precision measuring instruments, lathes, milling machines, saws, grinders, shears, jigs, fixtures, welding equipment, computer-aided plasma cutting, & 3D printer.

CONSTRUCTION & BUILDING TECHNOLOGY

One year Course

Grades 9-12

No Prerequisite

Course Numbers:

Semester 1: TE216

Semester 2: TE217

This course introduces students to the construction industry and the skilled trades. The projects that students complete require them to use each machine in the lab building their skill level, confidence, and overall knowledge of the machine and its capabilities. Students will learn about Lab and power tool safety as it relates to a jobsite. As the year progresses each student will learn more advanced processes and machine set-ups. Projects will be done step by step as a class as we learn how to read detailed technical drawings, measure, and properly use layout tools.

Students will learn about residential home construction and build scale model wall section. Students will also learn how to use Autodesk Revit, a 3D modeling program for architecture. We will complete a research project on a building trade career which is open to residential, commercial, and heavy & highway construction. Throughout the school year there will be various guest speakers / local contractors that will speak to the class about their profession and what each student can do to enter the specific trade.

ENGINEERING: PROJECT LEAD THE WAY (PLTW)

INTRODUCTION TO ENGINEERING DESIGN-HONORS AS

One year Course

Grades 9-12

No Prerequisite

Course Numbers:

Semester 1: TE397

Semester 2: TE398



WCTC 
Advanced Standing

This course emphasizes the development of a design. Students use computer software to produce, analyze and evaluate models of project solutions. They study the design concepts of form and function, and then use state-of-the-art technology to translate conceptual design into reproducible products. This course teaches students to:

- Understand and apply the design process to solve various problems in a team setting;
- Apply adaptive design concepts in developing sketches, features, parts and assemblies;
- Interpret their own sketches in using computer software to design models;
- Understand mass property calculations-such as volume, density, mass, surface area, principal axes and principal moments-and how they are used to evaluate a parametric model;
- Understand cost analysis, quality control, staffing needs, packing and product marketing;
- Explore career opportunities in design engineering and understand what skills and education these jobs really require; and
- Develop portfolios to display their designs and present them properly to peers, instructors and professionals

PRINCIPLES OF ENGINEERING-HONORS AS

One year Course

Grades 10-12

No Prerequisite:

Introduction to Engineering Design is recommended

Course Numbers:

Semester 1:TE418

Semester 2:TE419



WCTC 
Advanced Standing

This course provides an overview of engineering and engineering technology. Students develop problem-solving skills by tackling real-world engineering problems. Through theory and practical hands-on experiences, students address the emerging social and political consequences of technological change. The course of study includes:

- Overview and Perspective of Engineering. Students learn about the types of engineers and their contributions to society.
- Design Process. Students learn about problem solving and how products are developed to include how engineers work in teams.
- Communication and Documentation. Students collect and categorize data, produce graphic representations, keep an engineer's notebook and make written and oral presentations.
- Engineering Systems. Students learn about mechanical, electrical, fluid, pneumatic and control systems. Students learn about measurement, scalars and vectors, equilibrium,

structural analysis, and strength of materials.

- **Materials and Materials Testing.** Students learn the categories and properties of materials, how materials are shaped and joined, and material testing.
- **Thermodynamics.** Students will learn about units and forms of energy, energy conversion, cycles, efficiency and energy loss, and conservation techniques.
- **Engineering for Quality and Reliability.** Students will use precision measurement tools to gather and apply statistics for quality and process control. Students will also learn about reliability, redundancy, risk analysis, factors of safety, and liability and ethics.
- **Dynamics.** Students will be introduced to linear and trajectory motion.

By request, this course is eligible to fulfill 2 credits of the Science Graduation Requirement. Please see your counselor for complete information.

CIVIL ENGINEERING & ARCHITECTURE

One Year Course

Grades 10-12

No Prerequisite:

Principles of Engineering is recommended

Course Numbers:

Semester 1: TE258

Semester 2: TE259



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. Students will test soil samples for load bearing capabilities and learn how to survey a building site; calculating elevations and transferring that information into their final building design. 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.

DIGITAL ELECTRONICS-HONORS AS

One Year Course

Grades 10-12**No Prerequisite:*****Principles of Engineering is recommended***

Course Numbers:

Semester 1: TE434

Semester 2: TE435

***Advanced Standing***

This course in applied logic encompasses the application of electronic circuits and devices. Computer simulation software is used to design and test digital circuitry prior to the actual construction of circuits and devices. Students will learn basic electronic theories, digital gate theories, and apply those theories through hands-on activities ***Good math skills will enhance success.***

By request, this course is eligible to fulfill 2 credits of the Math Graduation Requirement. Please see your counselor for complete information.

ENVIRONMENTAL SUSTAINABILITY

One Year Course

Grades 11-12**No Prerequisite:*****Principles of Engineering is recommended***

Course Numbers:

Semester 1: TE602

Semester 2: TE603

In Environmental Sustainability, students investigate and design solutions in response to real-world challenges related to clean and abundant drinking water, food supply issues, and renewable energy. Applying their knowledge through hands-on activities and simulations, students research and design potential solutions to these true-to-life challenges.

STEM ACADEMY CAPSTONE

One Year Course

Grade 12***Prerequisite: Successful completion of 2 different STEM Academy courses.***

Semester 1: TE268

Semester 2: TE269

STEM Academy Capstone gives students the opportunity to work in teams to solve problems of their own choosing. Teams employ all the skills and knowledge gained through previous coursework to brainstorm, research, construct and test a model in real-life situations (or simulations); document their designs; and present and defend the designs to a panel of experts.

INDEPENDENT STUDY

One Semester Course

Grade 12***Prerequisite: Must have Department Approval form turned in before registering.***

Students wishing to register for independent credit in any area of study must:

1. Have completed all regular department courses in that area of study;
2. Submit a written request to the department to be signed by the instructor; and
3. Write a statement outlining personal achievement goals for the semester.

SOE-(SUPERVISED OCCUPATIONAL EXPERIENCE)

One year Course

Grade 12***Prerequisite: SOE Supervisor Approval*****(Hours 5-8)**

Course Numbers:

Semester 1: CTE301

Semester 2:C TE311

(Hours 6-8)

Course Numbers:

Semester 1: CTE302

Semester 2: CTE312

(Hours 7-8)

Course Numbers:

Semester 1: CTE303

Semester 2: CTE313

(Hour 8)

Course Numbers:

Semester 1: CTE304

Semester 2: CTE314

The Supervised Occupational Experience (SOE) program is a work experience program designed to complement and supplement courses in the Career and Technical Education areas: Business and Information Technology, Family and Consumer Education, and Technical Education and Engineering. SOE is available to Seniors Only.

Students enrolled in the SOE program work at school-approved job sites related to their career objectives. To complete the course successfully and earn credit students must complete the required documentation of their work experience during the course. SOE participants will receive ONE (1) credit per semester and will be excused for 1-4 school hours. Students who register for this program must be interviewed by the program supervisor before registration is final. **Students must have an appropriate job secured within the first two weeks of the school year or they will be dropped from the course. The work-site must be approved by the program supervisor. Students must work 180 hours per semester to earn credit.**

Students must be enrolled in a related Career and Technical Education (CTE) course each semester.

YA – Youth Apprenticeship

See description on page 26.