



DESIGN, ENGINEERING, MANUFACTURING TECHNOLOGIES

Architecture & Construction
Manufacturing
Engineering, Design & Technology
Engine & Automotive Technology

ICON KEY



College Credit
Opportunity



Certification
Opportunity



Fine Arts
Credit

Watch for these symbols next to course descriptions throughout the catalog. They indicate that the course offers an opportunity to earn college credit, a professional certification, and/or meets the Burnsville High School Fine Arts requirement.

This page will help students find & choose courses that are related to a particular Pathway. Each column in the table represents a specific Pathway. Courses in that column build from introductory courses at the bottom, which might be taken in ninth grade, to more advanced courses at the top.

Grade	Architecture & Construction	Manufacturing	Design, Engineering & Technology	Engine & Automotive Technology
12		<ul style="list-style-type: none"> Advanced Placement Chemistry 		
11, 12	<ul style="list-style-type: none"> Engineering Design & Development Advanced Manufacturing Design & Fabrication 	<ul style="list-style-type: none"> Engineering Design & Development Advanced Manufacturing Design & Fabrication 	<ul style="list-style-type: none"> Engineering Design & Development Advanced Manufacturing Design & Fabrication 	<ul style="list-style-type: none"> Advanced Auto/Vehicle Services
10, 11, 12	<ul style="list-style-type: none"> Construction Trades I Construction Trades II Civil Engineering & Architecture Fab Lab Principals of Engineering 	<ul style="list-style-type: none"> Construction Trades I Construction Trades II Civil Engineering & Architecture Fab Lab Principals of Engineering Create-a-Skate (BAHS) 	<ul style="list-style-type: none"> Civil Engineering & Architecture Manufacturing Design & Fabrication (Fab Lab) Principals of Engineering Create-a-Skate (BAHS) 	<ul style="list-style-type: none"> Introduction to Consumer Auto Welding/Autobody Work & Refinishing
9, 10, 11, 12	<ul style="list-style-type: none"> Cabinet Making Introduction to Engineering Design Woodworking 	<ul style="list-style-type: none"> Cabinet Making Introduction to Engineering Design Woodworking 	<ul style="list-style-type: none"> Aerospace Cabinet Making Introduction to Engineering Design Woodworking 	<ul style="list-style-type: none"> Engine Technology

ADVANCED AUTO/VEHICLE SERVICES

Course Number: 7758

Grade Level: 11, 12

Prerequisite: Successful completion of Intro to Consumer Auto

The Advanced Auto/Vehicle Services course provides you with a more in-depth study of automobile maintenance and repair. While in the Introduction to Consumer Auto course, you focused on how the car works, in this course the focus is on how to work on the car. You will learn vehicle inspection, maintenance, and repairs and perform everything from basic services to advanced diagnosis and repair. This course meets two periods daily for one semester and students earn two credits. This course qualifies for two credits as concurrent enrollment at Hennepin Technical College.



program in mathematics in addition to AP Chemistry. Successful completion of the AP Chemistry examination may result in credit and/or advanced placement in college courses. Note: This course has a summer homework requirement.

ADVANCED PLACEMENT CHEMISTRY

Course Number: 3671/3682

Grade Level: 12

Prerequisite: Completion of Honors Chemistry and instructor approval. Successful completion of Algebra II or Honors Algebra II.

This is a second-year high school chemistry course that provides you with a more in-depth study of chemistry. It is designed to be equivalent to a general, first-year college chemistry course. Topics covered are atomic theory and atomic structure, chemical bonding, nuclear chemistry, states of matter, solutions, reaction types, stoichiometry, equilibrium, kinetics, thermodynamics and descriptive chemistry. There is an emphasis on chemical calculations, the mathematical formulation of principles and high quality laboratory experiences. The AP College Board recommends that students also take a high school physics course and a four-year college preparatory



AEROSPACE: A & B

Course Number: 7421/7422

Grade Level: 9, 10, 11, 12

Prerequisite: None

Through hands-on engineering projects developed with NASA, students learn about aerodynamics (which includes building and testing airplanes and drones), astronautics, space-life sciences, and systems engineering (which includes the study of intelligent vehicles like the Mars rovers Spirit and Opportunity).

CABINET MAKING

Course Number: 7563

Grade Level: 9, 10, 11, 12

Prerequisite: Successful completion of Woodworking

This course builds on the knowledge and skills learned in Woodworking to provide you with the opportunity to study the cabinetry and finish carpentry trades more in-depth. The course emphasizes precision manufacturing, safety, design, blueprint reading, and quality. You will identify basic tools and equipment used in the cabinetry trade, identify and describe materials used in cabinet making, understand and apply basic techniques, design and build a sample cabinet, and develop an understanding of the applied mathematics involved in cabinetry and finish carpentry. This course qualifies for one credit as concurrent enrollment at Hennepin Technical College.

CIVIL ENGINEERING AND ARCHITECTURE (CEA, 1 YEAR) A & B



Course Number: 7530/7531
Grade Level: 10, 11, 12
Prerequisite: None

This is a Project Lead The Way course. You will learn important aspects of building and site design and development in this course. You will apply math, science, and standard engineering practices to design both residential and commercial projects and document your work using 3-D architecture design software.

CONSTRUCTION TRADES I



Course Number: 7808
Grade Level: 10, 11, 12
Prerequisite: None

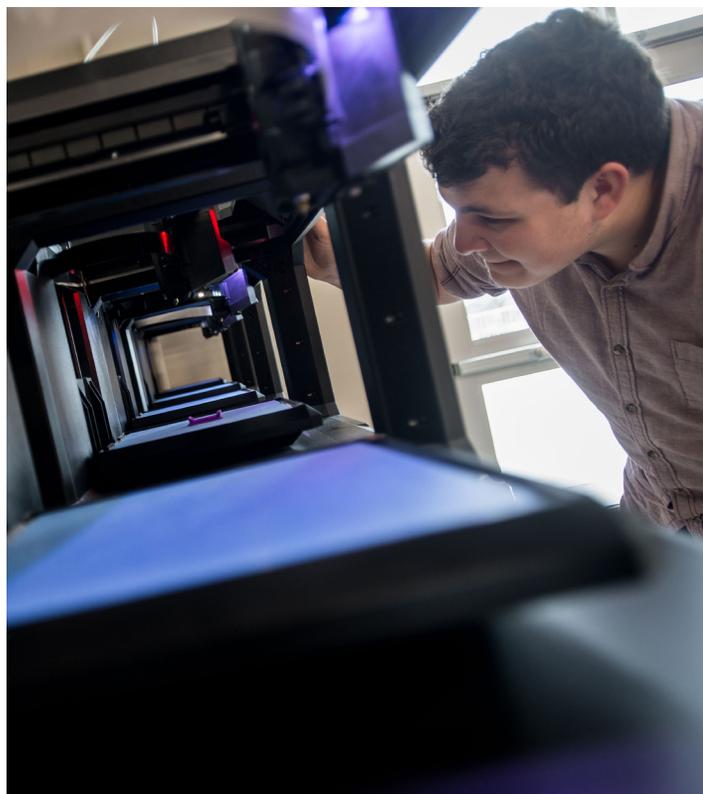
The Construction Trades Program (CTP) is a hands-on, project-based course where you will have both classroom and lab experiences to learn construction techniques. As part of this course, you will learn about and complete framing, sheathing, siding, roofing, window and door installation, and plumbing and electrical work. You will work together in this course with classmates to build a garden shed. This course meets two periods daily for one semester and students earn two credits. This course qualifies for two credits as concurrent enrollment at Hennepin County Technical College.

CONSTRUCTION TRADES II



Course Number: 7818
Grade Level: 10, 11, 12

Prerequisite: Successful completion of Construction Trades I
The Construction Trades II course provides you with a more in-depth study of the construction trades that you began to learn in Construction I. In addition, you will learn more basic plumbing and electrical repairs, sheet rock, taping, painting techniques, and finish carpentry. This course meets two periods daily for one semester and students earn two credits.



CREATE-A-SKATE

OFFERED AT BURNSVILLE ALTERNATIVE HIGH SCHOOL ONLY

Course Number: 7380
Grade Level: 10, 11, 12 BAHS Only
Prerequisite: None



In this course, you create your own personal skateboard deck using an interdisciplinary curriculum. You experience hands-on mathematics, science, history, culture, language skills, as well as, design and engineering principles, in a collaborative learning experience. You will leave the class with a high quality, durable skateboard that is ready to ride.

ENGINE TECHNOLOGY



Course Number: 7700
Grade Level: 9, 10, 11, 12
Prerequisite: None

In this course, you will learn the operating theory of basic 2-and 4-cycle engines, including carburetion, ignition, and compression systems. This course includes both classroom and lab experiences. In the lab, you will disassemble, inspect, and reassemble a 4-stroke engine. You will also gain an understanding of precision measuring, proper hand tool operation, compression ratios, octane ratings, stoichiometric air to fuel ratios, cylinder leakage testing and replacement part manufacturing, using 3D scanners and printers. This course qualifies for one credit as concurrent enrollment at Hennepin Technical College.

ENGINEERING DESIGN - INTRODUCTION (IED, 1 YEAR) A & B

Course Number: 7501/7512
Grade Level: 9, 10, 11, 12
Prerequisite: None

This is a Project Lead The Way course. You will dive deep into the engineering design process, applying math, science, and engineering standards to hands-on projects. You will work both individually and in teams to design solutions to a variety of problems using 3-D modeling software and an engineering notebook to document your work.

ENGINEERING DESIGN AND DEVELOPMENT A & B (CAPSTONE COURSE, EDD, 1 YEAR)

Course Number: 7551/7552
Grade Level: 11, 12

Prerequisite: Successful completion of at least two other PLTW courses prior to enrollment.

This is a Project Lead The Way course. Companies are continually thinking of ways to improve products. Project Lead the Way - Engineering Design and Development (PLTW-EDD) is the course that allows you to design a solution to a technical problem. This course is an engineering course in which you will work in teams to research, design, and construct a solution to an open-ended engineering problem. Engineering Design and Development serves as the capstone course within the Project Lead The Way course sequence and allows you to apply all the skills and knowledge learned in previous Project Lead The Way courses that you have taken during your high school career. Inventor, which is a state-of-the-art 3-D design software package from AutoDesk, will help you design solutions to the problem.

INTRODUCTION TO CONSUMER AUTO

Course Number: 7750
Grade Level: 10, 11, 12
Prerequisite: None

The Consumer Auto course begins with an overview of consumer knowledge related to vehicles, including buying, leasing, insuring, and maintaining a vehicle. You will then disassemble

an automobile and study its components and systems. While you will learn basic maintenance and repairs, emphasis in the course is placed on how the automobile and its systems function. After taking this course, you may choose to continue in the Automotive Vehicle Services course where you will build on your knowledge and skills by learning how to complete more complex repairs.

MANUFACTURING DESIGN & FABRICATION (FAB LAB)

Course Number: 7580
Grade Level: 9, 10, 11, 12
Prerequisite: None

Do you want to use state-of-the-art equipment to design, build and test almost anything? Would you like to develop the technological, problem-solving and hands-on skills desired by employers? If your answer is yes, then this course is for you. In Fab Lab, computer-controlled fabrication technologies such as 3D printers and scanners, laser engravers, CNC routers, vinyl cutters and milling machines will be used to transform a product idea into its tangible form. As part of this course experience, you will explore many interrelated career fields, such as engineering, science, mathematics, art and graphic design.

ADVANCED MANUFACTURING DESIGN & FABRICATION



Course Number: 7582
Grade Level: 11,12

Prerequisite: Manufacturing Design & Fabrication I or Introduction to Engineering Design

Do you want to use state-of-the-art equipment to design, build and test almost anything? Would you like to develop the technological, problem-solving and hands-on skills desired by employers? If your answer is yes, then this course is for you. In Advanced Manufacturing students are introduced to manufacturing methods commonly used to produce industrial parts. Students will gain skills and knowledge to become more proficient in "work-environment" areas of the curriculum. Students will have the opportunity to use robotic arms and fabrication machinery in an automated production setting. During their time in the class they will have the opportunity to take part in paid internships with manufacturing partners.

PRINCIPLES OF ENGINEERING (POE, 1 YEAR) A & B

Course Number: 7510/7520
Grade Level: 10, 11, 12
Prerequisite: None

This is a Project Lead The Way course. Through problems that engage and challenge, you will explore a broad range of engineering topics, including mechanisms, the strength of structures and materials, and automation as part of this course. You will also develop skills and strategies in problem solving, research, design process documentation, collaboration, and presentation.

WELDING/AUTO-BODYWORK AND REFINISHING

Course Number: 7748
Grade Level: 10, 11, 12
Prerequisite: None

The Welding/Auto-body course provides you experience with oxyacetylene, arc, MIG and TIG welding equipment and techniques, including auto-body repair. You may design and fabricate projects of your choosing. In the auto-body and

refinishing portion of the course, you will learn skills to inspect car bodies and panels and the proper technique for correcting damage due to collision and rust. You will have the opportunity to work on personal projects with instructor approval. You may be responsible for materials needed for take-home projects above the requirements of the course.

WOODWORKING

Course Number: 7560
Grade Level: 9, 10, 11, 12
Prerequisite: None

This course is an overview of basic woodworking knowledge, skills, and techniques. You will learn skills to help you understand technical reading and writing, and use hand tools, power tools, and woodworking machines. You will learn multiple cutting and joinery processes and finishing techniques using various species of wood. You will have the opportunity to demonstrate your knowledge and skills through the research, development, and production of products throughout the course. This course qualifies for one credit as concurrent enrollment at Hennepin Technical College.

KYLE MERRILL

AUTOMOTIVE TECH CLASS OF 2019

"IT'S REWARDING TO WORK ON A CAR SO THAT IT WORKS, AND KNOW THAT I DID THIS. I LIKE THE FEELING OF HAVING FIXED A VEHICLE."