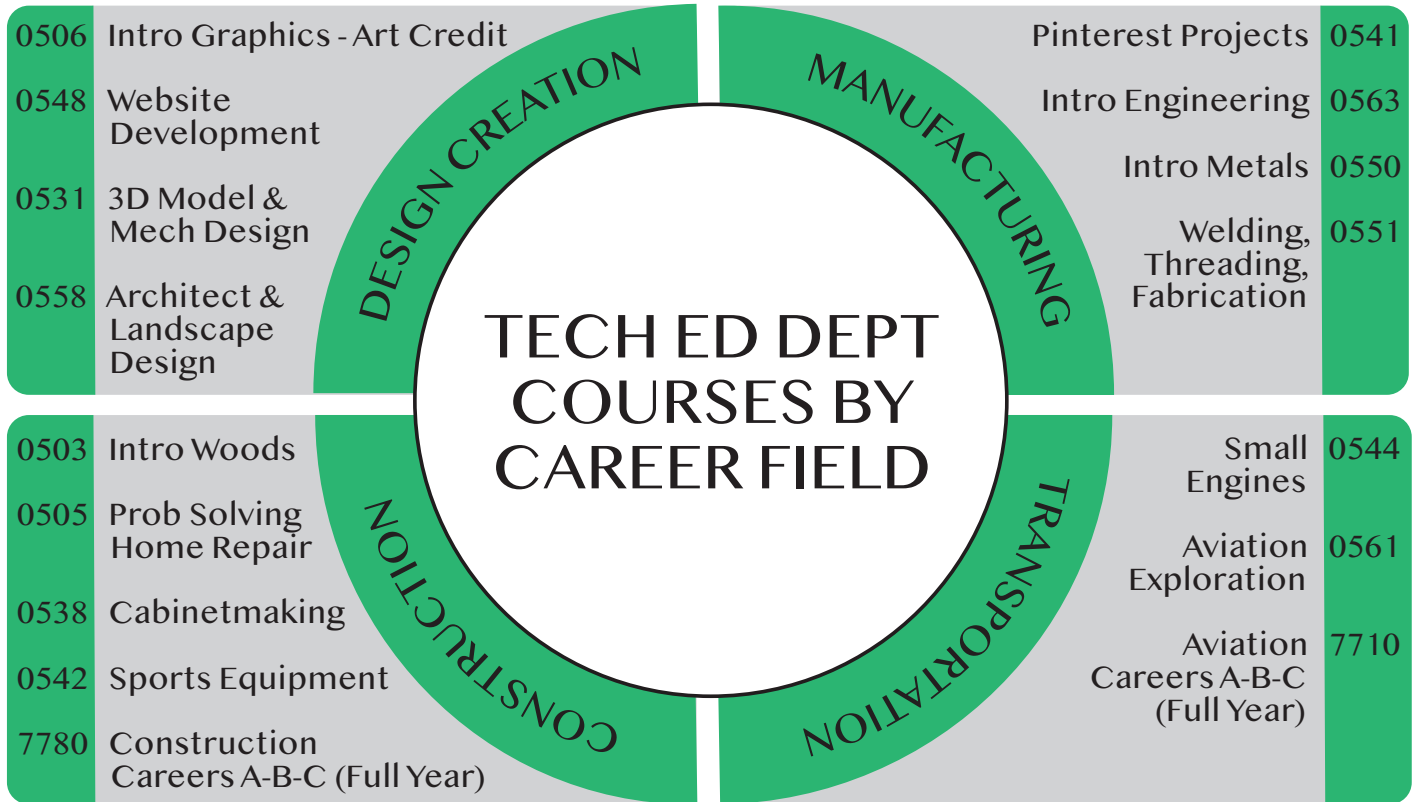


# CAREER AND TECHNICAL EDUCATION

Experience the Human-Made World



## TECHNOLOGY, ENGINEERING, & MANUFACTURING DEPARTMENT

*Courses in the Technology and Engineering Department are organized according to the MN Department of Education and MN State Colleges and Universities Career and Technical Education program parameters. These programs of study are designed for students to attain the specific knowledge, skills, and abilities needed to pursue a career of their choice. The trade and industry area of Career and Technical Education (CTE) is composed of four specific program areas: Design Creation, Construction, Manufacturing and Transportation. Each program area supports career and technical education courses that are related to that career field. These courses require no prerequisite and are meant to benefit a student's career or life skills. Construction Trades and Aviation Careers are year-long, double-hour courses that are a part of the District's Career Development course catalog and housed at Eagan High School.*

## ***COMMUNICATIONS COURSES***

0504 Intro to Graphics and Video - Arts  
(Meets MN Arts Standard Requirement)

Grades 9, 10,11,12  
Prerequisite: None

This survey course introduces the basics of graphic communications. Students learn to apply the graphic design process through use with vector and raster images, digital photography, animation, and video editing. Projects provide students with valuable computer, artistic and communication skills. Students will develop an understanding for negative space, color theory, composition, artistic elements and principles of design and put those concepts to use in their work. These skills can be applied immediately to personal projects in and out of high school.

**Projects: Vinyl stickers, T-shirt design and print, Letterform logo, magazine cover, and daydream video and animation.**

0531 3D Modeling and Mechanical Design

Grades 10,11,12  
Prerequisite: None

Students will master the fundamentals of drafting to create their own projects. Students will output their designs to 3D printers, to create an actual prototype of their work. Standard projection methods, dimensioning, 3D modeling norms and an introduction to CAM (Computer-aided manufacturing) will be covered.

**Projects: Mechanical drawings using OnShape, as well as numerous prototype projects using 3D printers, CNC router, and laser engraver.**

0548 Web Development

Grades 10,11,12  
Prerequisite: None

This course is an introduction to web page coding, structure and design. Laboratory activities will emphasize the use of the web authoring software Visual Studio Code & Adobe XD. Students will explore the structure of the design and build process of web authoring by learning to read and write function HTML and CSS code, both in a text editor and Dreamweaver. Emphasis will be placed on root folder organization and the sketching of site structure. JavaScript and jQuery will also be explored and discussed.

**Projects: Numerous websites and publications designed by the student.**

0558 Architectural and Landscape Design

Grades 10,11,12  
Prerequisite: None

Students will explore the fundamentals of interior and exterior design for both commercial and residential spaces. Key aspects of building design include grid layouts, elevations, walls, scaled floor plans, scaled foundation and column support plans. Essential knowledge of landscaping design and implementation will also be explored. Planning and construction of various landscapes, including hardscapes (retaining walls, patios, and pillars) and softscapes (Plants, trees, mulch, rock and edging).

**Projects: Architectural drawings using Revit, and landscape models including paver patio, concrete planters, house frame-up and site diorama.**

## ***CONSTRUCTION COURSES***

0503 Intro to Woods

Grades 9,10,11,12  
Prerequisite: None

This survey course provides students with basic skills in the safe and proper operation of power tools and techniques used in production. Classroom projects are designed to allow students the opportunity to use many of the production machines in the classroom while learning industry terminology. In addition, activities will include squaring stock, basic joinery, gluing techniques and finishing.

**Projects: Hardwood mantel clock, multi-device charging station, and pen turning.**

0505 Problem Solving Home Repair

Grades 9, 10, 11, 12  
Prerequisite: None

Our homes are rooted in human-made products that are prone to malfunction or breakage. It is important for students to gain confidence in troubleshooting and problem solving, so that they may be well prepared for a future that will most certainly require such talents. Concepts such as troubleshooting, redesign and retrofitting, process implementation, tools, systems and safety, will all help to answer the ultimate engineering question: "How does this work?" This course is based in residential construction and how our home's systems and structures function. Additionally, knowing how to perform repairs can save people thousands of dollars over a lifetime.

**Projects: Construction of a residential house wall; Students will learn framing, electrical, plumbing, drywall, painting, tiling, and caulking in addition to numerous troubleshooting and repair skills.**

0538 Cabinetmaking

Grades 10,11,12  
**Prerequisite: Intro Woods or Sports Equip**

This course focuses on the fundamental understanding of wood technology. Topics covered include wood harvesting and seasoning, species identification, project design, cost estimation, safety practices, joinery techniques, and wood finishing technologies.

**Projects: Wall hanging cabinet with door and drawer, campfire stool, and bowl turning.**

0542 Build Your Own Sports Equipment

Grades 10,11,12  
Prerequisite: None

This course will provide students with the opportunity to construct sports equipment of their choice using the Technology Education shop area. This course is aimed towards students who wish to construct non-traditional technology education projects.

**Projects: Canoe paddle, Mini Baseball bat, duck call and ping-pong paddle.**

7780 Construction Trades A

Grades: **Senior Only**

7781 Construction Trades B

Prerequisite: **Problem Solving Home Repair**

7r782 Construction Trades C

Length: Two Periods, Full Year Course

This course will provide students with an overview of professional building trades through a multi craft curriculum. Skills and knowledge will be developed in framing, roofing, electrical, plumbing, HVAC, drywall, painting, windows, trim, siding, and more. Students will also explore Minnesota apprenticeship programs, post-secondary training programs and the world of work. By the end of the course students will be able to make an educated decision about which trade, if any, would best fit their future career interests and goals. Additionally, students will be prepared to either go straight to work, apply to a post-secondary program, or enroll in an apprenticeship program.

**Students will earn their OSHA 10-hour safety certificate and build a house section throughout the entire school year as well as take field trips to industry sites. OSHA 10 safety certification must be earned first trimester to continue the year-long course.**

## ***MANUFACTURING COURSES***

### 0541 Pinterest Projects

Grades 9, 10, 11, 12  
Prerequisite: None

This intro course provides students with basic skills in safe tool operation while creating projects inspired by Pinterest Professionals. The projects of this course emphasize craft creation using primarily wood, but also mixed materials, like metal, vinyl, paint and engravings.

**Projects: Inspired by Popular Pinterest Posts - Geometric multi-colored wall art panel, Wood cutout sign, Famous Quote Engraved on Custom-built Crate, Painted stencil works, Wood Burning, Photo Pin Frame, and Upcycled shelf.**

### 0550 Intro to Metals

Grades 9,10,11,12  
Prerequisite: None

This course is an introduction and orientation to the field of metal, manufacturing and fabrication. Technical information in manufacturing and fabrication will be covered with emphasis on exercises for development of fundamental skills and knowledge.

**Projects: Fabricated sheet metal money clip, panel, clipboard, toolbox, and plasma cut name plate.**

### 0551 Welding, Threading and Fabricating

Grades 10,11,12  
Prerequisite: None

Hands-on exploratory experiences in the operation of metal welding practices. SPOT, SMAW, MIG and TIG welding processes will be explored. Students will also learn about material selection, processing and basic machining principles through thread cutting, fabrication, and CNC plasma operations.

**Projects: Numerous welding exercises, C-Clamp, Coat Hooks, Paper Towel Holder, Branding Iron, Bolt thread tool, Third Hand and Plasma cut logo plate.**

### 0563 Intro to Engineering

Grades 9,10,11,12  
Prerequisite: None

This course is an introduction to field of engineering. Through projects, students will explore civil, mechanical, and electrical concepts; three of the major branches of engineering. Numerous sub disciplines and interdisciplinary subjects are derived from concentrations, combinations or extensions of these three major branches of engineering.

**Projects: Bridge design-build, Wind Turbine Pump, & Soldered Circuit Tetris Game**

***TRANSPORTATION COURSES***0544 Small Engines

Grades 10,11,12  
Prerequisite: None

This course will cover theory of operation and component design of small gas engines. Students will disassemble, measure, clean and reassemble an internal combustion engine. In addition, troubleshooting and repair of two and four cycle engines will be covered.

**Projects: Stock small engine teardown/rebuild and personal engine troubleshooting.**

0561 Aviation Exploration

Grades 10,11,12  
Prerequisite: None

This is an exploratory course that introduces the student to the world of aviation. Concepts covered include aircraft design, systems and operation, airline management and career opportunities.

**Projects: Air traffic control and flight simulation, aircraft design and construction, orientation flights.**

7710 Aviation and Ground School A

Grades 11 & 12

7711 Aviation and Ground School B

Prerequisite: None

7712 Aviation and Ground School C

Length: Two Periods, Full Year Course

LEARN TO FLY HERE! Students will pilot single-engine airplanes, gliders, partner with NASA to engineer scale aircraft, and participate in numerous field trips to experience the world of aviation. During this course, students will develop the skill and knowledge required to pass the FAA written exam for a private pilot's license and explore some of the various careers in aviation, such as: Commercial & Military Pilot, Aircraft Maintenance Technician, Aerospace Engineering, Aircraft Manufacturing, Airport Operations, and Air Traffic Control.

**Projects: State of the art simulator time, and the possibility of actual flight time with instructors and sitting for the FAA Private Pilot written exam. Contact the instructor for more information regarding articulated college credits.**