Middle School Engineering and Science Technologies Systems Courses

Subject Code	Course Title	Curriculum Code/Hours VT	V3	VM
Engineering and Design (F6)				
175017	Engineering Logic	120-280	60	30-90
176010	Principles of Manufacturing	120-280	60	30-90
145025	Computer Hardware	120-280	60	30-90
175002	Engineering Principles	120-280	60	30-90
175003	Manufacturing Operations	120-280	60	30-90
175015	Pre-Engineering Technologies			30-90
178019	Plan Reading	120-280	60	30-90
177013	Aviation	120-280	60	30-90
990364	Career Connections (grade level 7-9 only)			30-60

Curriculum Code	Grades	CT Funded	Assessment	Counts toward Concentrator
VT	7-12	Yes	Required	Yes
V3	7-12	Yes	Not required	No
VM	7-10	Yes	Optional	No

- Career-Technical Middle School Courses require an approved CTE-26 and program of study.
- Middle School Courses must be aligned to an approve CTE-26 pathway at the High School/Joint Vocational School.
- Students enrolled in Career-Technical Middle School Courses (VT, VM) are eligible for participation in Career-technical Student Organizations (CTSO).
- Granting High School credit for Career-Technical Middle School Course high school courses is a local school district decision.
- VM Courses do not count towards four course minimum.
- All students enrolled in a correlated technical related class (V3 Curriculum Element option) must also be funded in an approved workforce development anchor class (VP or VT).

Engineering Logic

Subject Code: 175017

Students will apply the processes of digital circuit theory, combinational and sequential logic as it relates to circuit design and operation. Students will identify numbering systems, arithmetic and Boolean operations and apply simplification methods. Emphasis will be given to the analysis of wiring schematics and diagrams for accuracy and function. In addition, students will use electronic components to construct and troubleshoot digital circuits.

Principles of Manufacturing

Subject Code: 176010

Students will apply knowledge and skills required in the application of standard manufacturing practices including planning, design and visualization. Students will learn and apply skills related to interpreting drawings, creating documentation and performing measurements. Additionally, students will use principles and techniques of Computer Numerical Control (CNC), employ scheduling, and practice project evaluation.

Computer Hardware

Subject Code: 145025

Students will learn to install, repair, and troubleshoot computer hardware systems. They will perform preventative maintenance practices and learn techniques for maintaining computer hardware security. Communication skills and professionalism in troubleshooting situations will be emphasized.

Engineering Principles

Subject Code: 175002

This course will introduce students to fundamental engineering concepts and scientific principles associated with engineering design applications. Topics include mechanisms, energy statics, materials and kinematics. Additionally, students will learn material properties and electrical, control and fluid power systems. Students will learn to apply problem solving, research and design skills to create solutions to engineering challenges.

Manufacturing Operations

Subject Code: 175003

Students will learn the production processes applied across manufacturing operations. Students will be able to demonstrate a broad array of technical skills with an emphasis given to quality practices, measurement, maintenance and safety.

Pre-Engineering Technologies

Subject Code: 175015

Students will acquire knowledge and skills in problem solving, teamwork and innovation. Students explore STEM careers as they participate in a project-based learning process, designed to challenge and engage the natural curiosity and imagination of middle school students. Teams design and test their ideas using modeling, automation, robotics, mechanical and computer control systems, while exploring energy and the environment.

Plan Reading

Subject Code: 178019

Students learn blueprint reading as it relates to the architecture and construction. Students will use scaling, orthographic projections, dimensioning practices, symbols, notations, and abbreviations to perform area calculations and to interpret floor plan, section, and elevations. Using construction plans, students will identify problems or shortcomings related to the layout and installation of materials for the project.

Aviation

Subject Code: 177013

In this first course, students apply knowledge of aviation theory and navigation to flight performance and planning. Students will apply principles of simple machines and fluid mechanics to aircraft operations. Identification of aircraft engines and airframe related systems will be emphasized. Weather theories and concepts are used to interpret weather-briefing documents. Additionally, students will distinguish among airport environments, and understand rules, regulations and orders relevant to the airport industry.

Career Connections

Subject Code: 990364

This course shows students how classroom learning translates into marketable skills. Through hands-on learning and local business involvement, students will engage in career-related experiences to acquire basic skills in various career fields. This provides students with tangible experiences to begin career decision making. Teachers have the flexibility to select career fields related to Ohio's in-demand jobs represented in the community.