Engineering, Automation and Manufacturing

- Current 9th grade students who want to pursue a future in Engineering, Design, Robotics or Manufacturing are encouraged to take Intro to Engineering Design during their 10th grade year.
- The above path is designed for students seeking a possible 4-year degree or extended coursework beyond high school. It ensures students are able to take Principles of Engineering their 11th grade year to learn about a wide range of Engineering opportunities.
- Students in 9th and 10th grade unsure of their path or who want to enter the workforce, should take either Intro to 3D Printing & Design and/or Intro to Robotics.

Course Sequence

	Engineering 4-year Degree	Advanced Manufacturing Engineering, Automation, Design
grade 7	Design & Modeling	
grade 8	Career Connections Career Tech Intro Lab	
grade 9	Intro to 3D Printing & Design Intro to Robotics	Intro to 3D Printing & Design Intro to Robotics
grade 10		
grade 10	Intro to Engineering Design (full-year)	
grade 11	Honors Principles of Engineering	Intro to Engineering
	[1] Computer Integrated Manufacturing (CIM)	Computer Integrated Manufacturing (CIM)
grade 12	Honors Digital Electronics	*TBD
	Honors Aerospace Engineering	*TBD
	[2] Engineering Capstone	

1. *Students in the 4-year degree path take Intro to Engineering Design their sophomore year to be able to enroll in Principles of Engineering—which is a prerequisite for Digital Electronics and Aerospace Engineering.*
2. *All students have the opportunity to swap the last course in the sequence with the capstone course, which allows for work-based learning and credentialing opportunities as well as a culminating end of course project.*

Credits and Credential Opportunities

Engineering 4-year Degree	Engineering, Automation and Manufacturing
Engineering Graphics: 3 credits Autodesk Inventor Certified User	
EET 131: Digital Electronics — 5 credits	
MET 1231: Intro to Engineering Design Using 3D CAD Motoman YRC 1000 Basic Programming with Material Handling	
AVT 1105: Orientation to Aviation—2 credits	

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75-1116 Introduction to Engineering Design — Year

Prerequisite: Algebra I
A fee is required.
Grades: 10,11
Credit: ½ per sem

Students will learn the application of the engineering design process. Topics include work-processes, optimization methods, design optimization and risk management tools. Students will use 2D and 3D modeling software to help them design solutions to problems, document their work and communicate solutions. Additionally, students will interpret industry prints and create working drawings from functional models. Emphasis is given to experimental problem solving in real systems. **Students are given the opportunity to earn college credit and the Autodesk Inventor Certified User Certification.**

75-1127 Computer Integrated Manufacturing — Year

Prerequisite: Introduction to Engineering Design
A fee is required.
Grades: 10, 11
Credit: ½ per sem

In this course, students will be introduced to all aspects of computer-integrated manufacturing. They will learn about robotics and automation, manufacturing processes, computer modeling, manufacturing equipment and flexible manufacturing systems. **Students are given the opportunity to earn college credit.**

75-1126 Honors Principles of Engineering — Year

Prerequisite: Introduction to Engineering Design
A fee is required.
Grades: 11, 12
Credit: ½ per sem

This class engages students in a rigorous study of manufacturing design, materials, and structural design. Students build and program machines with electronic sensors to monitor performance. Students study the properties of materials under compression, tension, and sheer forces. The course of study includes mechanics, energy sources, energy applications, electrical circuit analysis, machine control, fluid power, statics, material properties, material testing, statistics, and kinematics. This course is taught at an honors level and awards weighted grades. This course is also approved for NCAA credit. **Students are given the opportunity to earn college credit.**

75-1136 Honors Digital Electronics — Year

Prerequisite: Honors Principles of Engineering
A fee is required.
Grades: 11, 12
Credit: ½ per sem

Students are introduced to the process of combinational and sequential logic and design. The system uses a precise sequence of discrete voltages, representing numbers, non-numeric symbols or commands for input, processing, transmission, storage or display. Engineering standards and methods for technical documentation will also be learned. **Students are given the opportunity to earn college credit.**

75-1146 Honors Aerospace Engineering — Year

Prerequisite: Honors Principles of Engineering
A fee is required.
Grades: 11, 12
Credit: ½ per sem

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. **Students are given the opportunity to earn college credit.**

75-1156 Engineering Capstone — Year

Prerequisites: 3 Courses in Engineering Pathway
Grade: 12
Credit: ½ per sem

A fee is required.

The capstone course provides opportunities for students to apply knowledge, attitudes and skills that were learned in an Engineering program in a more comprehensive and authentic way. Capstones often include project/problem based learning opportunities that occur both in and away from school. Under supervision of the school through community partnerships, students may combine classroom learning with work experience.