



Mill's





# Engineering Program



Moore Norman Technology Center's Engineering program offers students in Moore and Norman Public Schools (MPS and NPS) the opportunity to challenge themselves through a college-prep program that focuses on the relevant, foundational principals of Science, Technology, Engineering and Math (STEM).

Our Engineering courses deliver the national Project Lead The Way (PTLW) curriculum. Courses are designed to give students direct hands-on experience and self-discovery about a range of engineering disciplines that can help them consider various engineering college degree programs.

More importantly, statistics show that when a high school student invests time and energy into a engineering program prior to college entrance, they increase their chance of successfully completing an engineering degree, and working directly in the engineering career of their choice.

### The Reality of College and the Job Market

Job opportunities in the U.S. related to STEM continue to grow, with employers reporting a shortage of talent for these higher-paying positions related to these foundational areas. However, according to research:



**44**%

of all Oklahoma ACT-tested graduates were interested in STEM degrees.





of the 2019 Oklahoma ACTtested high school graduates met the College Readiness & STEM Benchmark Attainment levels.



#### ACT.org 2019 Oklahoma data

The way to chip away at these underlying issues and prepare students for successful completion of both high school and college is to offer rigorous high school courses that target their growth specifically in core STEM areas. That is exactly what MNTC's Engineering program is designed to do.

Students begin the program with foundation-based courses, and gain instruction and key components of math and science that carry them through the more rigorous challenges they encounter as they move through the sequence of classes. By their senior year, students apply all of their knowledge, skills and ideas to solve a real-world problem by designing a working prototype for their Engineering Design & Development capstone project.

Learn more about the importance of a balanced STEM education at: **stemedcoalition.org**. To find out more about Project Lead The Way programs and curriculum visit: **pltw.org**.



#### When Can my Student Take Engineering Classes?

Engineering is available to students enrolled at Norman, Norman North, Moore, Southmoore, and Westmoore high schools.

Students may take a one (1) hour Engineering foundational course at their high school during their freshman and sophomore years. The foundational courses are taught by MNTC Engineering instructors at the student's high school, and may count toward computer science credit.

Beginning their junior year, students may either drive themselves or ride an MNTC bus to the Franklin Road Campus in Norman for class.

During their junior and senior years, students take two (2) hours of Engineering and may take advanced math and science courses at MNTC each school day. While students have the option to begin the program their sophomore or junior year, they will not be able to complete as many classes as those who begin as freshmen.

Occasionally a student is permitted to begin their senior year. They may only begin as a senior if:

- The student has completed all other required coursework and is on-track for graduation.
- There are open seats in the program.\*

\*Class seats will be made available first to senior Engineering students who are advancing from the junior year program.

# What is the cost for the Engineering Program?

The Engineering program has no tuition costs for high school students from Norman and Moore public high schools. Students may still be responsible for certain fees and classroom expenses.

#### What About Transportation to MNTC's Campus?

MNTC provides bus transportation to-and-from all of the Norman and Moore public high schools.

#### **Entry Points and Course Examples**

This chart shows three (3) entry point options and *examples* of courses that could be completed based on when a student begins a program.

**Foundation Courses:** Introduction to Engineering Design, Principles of Engineering **Selective Courses:** Aerospace Engineering, Civil Engineering and Architecture, Computer Integrated Manufacturing, Computer Science Principles, Digital Electronics **Capstone:** Engineering Design and Development

**Core Math/Science:** Physics, AP Physics C, BC Calculus

Four-Year Program	FALL SEMESTER	SPRING SEMESTER
9th Grade	Foundation Course	Foundation Course
10th Grade	Foundation Course	Foundation Course
11th Grade	Selective Course — Core Math/Science	Selective Course — Core Math/Science
12th Grade	Selective Course — Capstone	Selective Course — Capstone

Three-Year Program	FALL SEMESTER	SPRING SEMESTER
10th Grade	Foundation Course/Selective Course  Core Math/Science	Foundation Course/Selective Course — Core Math/Science
11th Grade	Selective Course — Core Math/Science	Selective Course — Core Math/Science
12th Grade	Selective Course — Capstone	Selective Course — Capstone

Two-Year Program	FALL SEMESTER	SPRING SEMESTER
11th Grade	Foundation Course/Selective Course Core Math/Science	Foundation Course/Selective Course Core Math/Science
12th Grade	Selective Course — Core Math/Science or Capstone	Selective Course — Core Math/Science or Capstone

# Foundation Courses

### Introduction to Engineering Design (IED)



Students dig deep into the engineering design process, applying math, science, and engineering standards to hands-on projects. They work in teams and individually to design solutions to a variety of problems using 3-D modeling software. They document their work in an engineering notebook. Students who begin as freshmen will take this class at their high school.

#### What Students Learn

Design Process, Measurement and Statistics, 3-D Design, Mechanical Drawing, Reverse Engineering and Engineering Design Ethics

#### **What Students Earn**

**MPS:** This class fulfills the computer science requirement, and Engineering counts as one (1) unit of Honors Computer Science **NPS:** One (1) College Prep Computer Science Credit

## Principles of Engineering (POE)



Through engaging and challenging problems, students explore a broad range of engineering topics, including mechanisms, the strength of structures and materials, and automation. Students develop skills in problem solving, research, and design while learning strategies for design process documentation, collaboration, and presentation. Students who have taken IED as a freshman may continue with POE at their high school their sophomore year.

#### **What Students Learn**

DC Circuit Analysis, Kinematics, Linear Motion, Trajectory Motion, Vectors, Simple Machines, and Statics and Strength of Materials

#### **What Students Earn**

**MPS:** This class fulfills the computer science requirement, and Engineering counts as one (1) unit of Honors Computer Science **NPS:** One (1) College Prep Computer Science Credit

# Specialized Courses

## **Digital Electronics**



From smart phones to appliances, digital circuits are all around us. This course provides a foundation for students who are interested in electrical engineering, electronics, or circuit design. Students study topics such as combinational and sequential logic, and are exposed to circuit design tools used in industry including logic gates, integrated circuits, and programmable logic devices.

## **Aerospace Engineering**



This course propels students' learning in the fundamentals of atmospheric and space flight. As they explore the physics of flight, students bring the concepts to life by designing an airfoil, propulsion system, and rockets. They learn basic orbital mechanics using industry-standard software. They also explore robot systems through projects such as remotely-operated vehicles.

### Computer Science Principles



Using Python<sup>®</sup> as a primary tool and incorporating multiple platforms and languages for computation, this course aims to develop computational thinking, generate excitement about career paths that utilize computing, and introduce professional tools that foster creativity and collaboration. Computer Science Principles helps students develop programming expertise and explore the workings of the internet. Projects and problems include app development, visualization of data, cybersecurity, and simulation. PLTW is recognized by the College Board as an endorsed provider of curriculum and professional development for **AP<sup>®</sup> Computer Science Principles (AP CSP)**. This endorsement affirms that all components of PLTW CSP's offerings are aligned to the AP Curriculum Framework standards and the AP CSP assessment.





### Computer Integrated Manufacturing



This course illuminates the opportunities related to understanding manufacturing. At the same time, it teaches students about manufacturing processes, product design, robotics, and automation. Manufactured items are part of everyday life, yet most students have not been introduced to the high-tech, innovative nature of modern manufacturing. Students can earn a virtual manufacturing badge recognized by the National Manufacturing Badge system.



### Civil Engineering & Architecture



Students learn important aspects of building and site design and development. They apply math, science, and standard engineering practices to design both residential and commercial projects and document their work using 3-D architectural design software.



## Engineering Design & Development (EDD)



The knowledge and skills students acquire throughout PLTW Engineering come together in EDD as they identify an issue and then research, design, and test a solution, ultimately presenting their solution to a panel of engineers. Students apply the professional skills they have developed to document a design process to standards, complete EDD, and take on any post-secondary program or career.



### Technology Student Association & Skills USA



Join a Career Tech Student Organization through your MNTC Engineering program!

- The Technology Student Association (TSA) and SkillsUSA are national student leadership organizations that connects students to 250,000+ members.
- Students are challenged through state and national competitions in areas like 3D animation, architectural design, flight endurance, computeraided manufacturing, and more.



# **Ready to Apply?**

- The online application goes live at 9 a.m. the day after school presentations.
- Complete the online application at mntc.edu/eng-apply or scan the QR code to the right.



 Students are strongly encouraged to submit their application as soon as possible after their school's [Insert photo of students engaged in PLTW] presentation.

This is a competitive program with a limited number of spaces available.

## For more information 405.801.5000 | mntc.edu











# Our students 2021-2 are engaged and inspired!

Moore Norman Technology Center has earned the 2021-22 PLTW Distinguished School for our MNTC campus and our five PLTW high school programs in Moore Public School and Norman Public School districts. Read more at: mntc.edu

HIGH SCHOOL DISTINGUISHED SCHOOL