

Engineering Career Cluster

The Engineering Career Cluster focuses on the planning, designing, testing, building, and maintaining of machines, structures, materials, systems, and processes using empirical evidence and science, technology, and math principles.

Statewide Program of Study: Engineering Foundations

The Engineering Foundations program of study focuses on occupational and educational opportunities associated with a wide range of skills applied in the Engineering industry. Students will design, test, and evaluate projects related to engines, machines, and structures. This program of study includes applying scientific, mathematical, and empirical evidence to solve problems through innovation, design, construction, operation, and maintenance of different engineering systems.



Secondary Courses for High School Credit

Level 1	- Principles of Applied Engineering - Principles of Technology - Introduction to Computer-Aided Design and Drafting - Introduction to Engineering Design (PLTW) - Engineering Essentials (PLTW)
Level 2	- Robotics I - Manufacturing Engineering Technology I - Intermediate Computer-Aided Design and Drafting - Construction Engineering (TBD) - Engineering Design Process (TBD)
Level 3	- Robotics II - Engineering Design and Presentation I - Engineering Mathematics - Engineering Science - Digital Electronics - Aerospace Engineering (PLTW) - Environmental Sustainability (PLTW) - Civil Engineering and Architecture (PLTW) - Computer Integrated Manufacturing (PLTW) - Engineering Design and Development (PLTW) - Introduction to Fluids (TBD) - Introduction to Mechanics of Materials (TBD) - Introduction to Statics (TBD) - Programming for Engineers (TBD)
Level 4	- Engineering Design and Problem Solving - Engineering Design and Presentation II - Practicum in Science, Technology, Engineering, and Mathematics - Practicum in Science, Technology, Engineering, and Mathematics + Extended - Practicum in Engineering (TBD) - Career Preparation for Programs of Study + Extended Career Preparation - Scientific Research and Design - Career and Technical Education Project-Based Capstone

Aligned Advanced Academic Courses

AP or IB	AP Calculus AB AP Computer Science A AP Physics 1	AP Physics 2 AP Statistics IB Physics SL	IB Physics HL IB Computer Science SL IB Computer Science HL
Dual Credit	Dual credit offerings will vary by Local Education Agency.		

Students should be advised to consider these course opportunities to enrich their preparation. AP or IB courses not listed under the Secondary Courses for High School Credit section of this framework document do not count towards Concentrator/Completer status for this program of study.

Work-Based Learning and Expanded Learning Opportunities

Work-Based Learning Activities	- Intern at an engineering, robotics, or aerospace company - Visit an engineering firm and shadow multiple types of engineers
Expanded Learning Opportunities	- Participate in TSA or SkillsUSA - Join a local engineering association and attend meetings.

Aligned Industry-Based Certifications

- Autodesk Associate (Certified User) AutoCAD
- Autodesk Associate (Certified User) Fusion 360
- Autodesk Associate (Certified User) Inventor for Mechanical Design
- Autodesk Associate (Certified User) Revit Architecture
- Autodesk Associate (Certified User) Revit for Electrical
- Autodesk Associate (Certified User) Revit for Structural Design
- Autodesk Certified Professional Fusion 360
- Autodesk Certified Professional in AutoCAD for Design and Drafting
- Autodesk Certified Professional in Civil 3D for Infrastructure Design
- Autodesk Certified Professional in Inventor for Mechanical Design
- Autodesk Certified Professional in Revit for Architectural Design
- Autodesk Certified Professional in Revit for Electrical Design
- Autodesk Certified Professional in Revit for Structural Design
- C-103 Certified Industry 4.0 Associate – Robot System Operations
- Certified SOLIDWORKS Associate (CSWA) – Academic
- Certified SOLIDWORKS Associate (CSWA) – Electrical
- Certified SOLIDWORKS Associate (CSWA) – Mechanical Design
- Certified SOLIDWORKS Associate (CSWA) – Simulation
- Certified SOLIDWORKS Associate (CSWA) – Sustainability
- Certified SOLIDWORKS Professional (CSWP) – Academic
- Certified SOLIDWORKS Professional (CSWP) – Mechanical Design
- Certified SOLIDWORKS Professional (CSWP) – Model Based Definition
- Certified SOLIDWORKS Professional (CSWP) – Simulation
- Certified SOLIDWORKS Professional (CSWPA) – Drawing Tools
- Engineering Technology Foundations
- Pre-Engineering/Engineering Technology – Job Ready
- FANUC Robot Operator 1
- Certified Logistics Technician (CLT)
- Certified Production Technician (CPT) 4.0



Example Postsecondary Opportunities

Apprenticeships

- Industrial Engineering Technician

Associate Degrees

- Manufacturing Engineering Technology/Technician
- Robotics Technology/Technician

Bachelor's Degrees

- Electrical and Electronics Engineering
- Engineering, General

Master's, Doctoral, and Professional Degrees

- Electrical and Electronics Engineering
- Engineering, General

Additional Stackable IBCs/Licensures

- Professional Engineer (PE License)
- Engineer in Training Certification (EIT)



Example Aligned Occupations

Engineering Technologists and Technicians, Except Drafters

Median Wage: \$60,138

Annual Openings: 1,024

10-Year Growth: 13%

Engineers

Median Wage: \$102,365

Annual Openings: 1,132

10-Year Growth: 20%

Mechanical Engineers

Median Wage: \$100,489

Annual Openings: 1,852

10-Year Growth: 15%

Data Source: Lightcast™. (2022). Occupation Table. Retrieved 9/27/2022.



For more information visit:

<https://tea.texas.gov/academics/college-career-and-military-prep/career-and-technical-education/programs-of-study-additional-resources>



Engineering Career Cluster

Statewide Program of Study: Engineering Foundations

Course Information

Level 1

Course	Prerequisites Corequisites	Career Clusters
Principles of Applied Engineering 13036200 (1 credit)	Prerequisites: None Corequisites: None	  
Principles of Technology* 13037100 (1 credit)	Prerequisites: One credit of high school science and Algebra I Corequisites: None	
Introduction to Computer-Aided Design and Drafting* N1303769 (1 credit)	Prerequisites: None Corequisites: None	
Introduction to Engineering Design (PLTW)* N1303742 (1 credit)	Prerequisites: None Corequisites: None	
Engineering Essentials (PLTW)* N1303760 (1 credit)	Prerequisites: None Corequisites: None	

Level 2

Course	Prerequisites Corequisites	Career Clusters
Manufacturing Engineering Technology I 13032900 (1 credit)	Prerequisites: None Corequisites: None	 
Robotics I 13037000 (1 credit)	Prerequisites: None Corequisites: None	  
Intermediate Computer-Aided Design and Drafting* N1303770 (1 credit)	Prerequisites: Architectural Design I or Introduction to Computer-Aided Design and Drafting Corequisites: None	
Construction Engineering TBD (TBD credit)	Prerequisites: TBD Corequisites: TBD	
Engineering Design Process TBD (TBD credit)	Prerequisites: TBD Corequisites: TBD	

* Indicates course is included in more than one program of study.

For additional information on the **Engineering Career Cluster**, contact cte@tea.texas.gov or visit <https://tea.texas.gov/cte>



Engineering Career Cluster

Statewide Program of Study: Engineering Foundations

Course Information

Level 3

Course	Prerequisites Corequisites	Career Clusters
Engineering Design and Presentation I 13036500 (1 credit)	Prerequisites: Algebra I and at least one credit in a course from the science, technology, engineering, and mathematics career cluster Corequisites: None	
Engineering Mathematics* 13036700 (1 credit)	Prerequisites: Algebra II Corequisites: None	
Robotics II 13037050 (1 credit)	Prerequisites: Robotics I Corequisites: None	
Engineering Science 13037500 (1 credit)	Prerequisites: Algebra I, one credit in Biology, and at least one credit in a course from the Science, Technology, Engineering, and Mathematics Career Cluster Corequisites: None	
Digital Electronics 13037600 (1 credit)	Prerequisites: Algebra I and Geometry Corequisites: None	
Aerospace Engineering (PLTW) N1303745 (1 credit)	Prerequisites: None Corequisites: None	
Environmental Sustainability (PLTW) N1303746 (1 credit)	Prerequisites: None Corequisites: None	
Civil Engineering and Architecture (PLTW) N1303747 (1 credit)	Prerequisites: None Corequisites: None	
Computer Integrated Manufacturing (PLTW) N1303748 (1 credit)	Prerequisites: None Corequisites: None	
Engineering Design and Development (PLTW)* N1303749 (1 credit)	Prerequisites: None Corequisites: None	
Introduction to Fluids TBD (credit TBD)	Prerequisites: TBD Corequisites: TBD	

Continued on next page

* Indicates course is included in more than one program of study.

For additional information on the **Engineering Career Cluster**, contact cte@tea.texas.gov or visit <https://tea.texas.gov/cte>



Engineering Career Cluster

Statewide Program of Study: Engineering Foundations Course Information

Level 3

Course	Prerequisites Corequisites	Career Clusters
Introduction to Mechanics of Materials TBD (credit TBD)	Prerequisites: TBD Corequisites: TBD	
Introduction to Statics TBD (credit TBD)	Prerequisites: TBD Corequisites: TBD	
Programming for Engineers* TBD (credit TBD)	Prerequisites: TBD Corequisites: TBD	

Level 4

Course	Prerequisites Corequisites	Career Clusters
Engineering Design and Problem Solving 13037300 (1 credit)	Prerequisites: Algebra I, Geometry, and at least one credit in a Level 2 or higher course in the Science, Technology, Engineering, and Mathematics Career Cluster Corequisites: None	
Engineering Design and Presentation II* 13036600 (2 credits)	Prerequisites: Principles of Applied Engineering or Engineering Design and Presentation I, Algebra I, and Geometry Corequisites: None	
Practicum in Science, Technology, Engineering, and Mathematics First Time Taken: 13037400 (2 credits) Second Time Taken: 13037410 (2 credits)	Prerequisites: Algebra I and Geometry Corequisites: None	
Practicum in Science, Technology, Engineering, and Mathematics/Extended Practicum in Science, Technology, Engineering, and Mathematics First Time Taken: 13037405 (3 credits) Second Time Taken: 13037415 (3 credits)	Prerequisites: Algebra I and Geometry Corequisites: None	
Practicum in Engineering* TBD (credit TBD)	Prerequisites: TBD Corequisites: TBD	

* Indicates course is included in more than one program of study.

For additional information on the **Engineering Career Cluster**, contact cte@tea.texas.gov or visit <https://tea.texas.gov/cte>



Engineering Career Cluster

Statewide Program of Study: Engineering Foundations Course Information

Level 4

Course	Prerequisites Corequisites	Career Clusters
Career Preparation for Programs of Study (2 credits)	Prerequisites: at least one Level 2 or higher Career and Technical Education course Corequisites: None	
Career Preparation for Programs of Study/ Extended Career Preparation (3 credits)	Prerequisites: at least one Level 2 or higher Career and Technical Education course Corequisites: None	
Scientific Research and Design 13037200 (1 credit)	Prerequisites: Biology, Chemistry, Integrated Physics, Chemistry (IPC), or Physics Corequisites: None	
Career and Technical Education Project-Based Capstone First Time Taken: (1 credit)	Prerequisites: None Corequisites: None	

* Indicates course is included in more than one program of study.

For additional information on the **Engineering Career Cluster**, contact cte@tea.texas.gov or visit <https://tea.texas.gov/cte>