Engineering Career Cluster

The Engineering career cluster focuses on planning, designing, testing, building, and maintaining of machines, structures, materials, systems, and processes using empirical evidence and science, technology, and math principles. This career cluster includes occupations ranging from mechanical engineer and drafter to electrical engineer and to mapping technician.

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 incudes 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 • Physics for Engineering • Introduction to Computer-Aided Design and Drafting • Engineering Design Process
Level 2	• Intermediate Computer-Aided Design and Drafting • Manufacturing Engineering Technology I • Robotics I • Engineering Project Management • Aerospace Design I
Level 3	• Engineering Design and Presentation • Robotics II • Engineering Mathematics • Engineering Science • Digital Electronics • Environmental Engineering • Architectural Engineering • Computer Integrated Manufacturing (PLTW) • Fluid Mechanics • Mechanics of Materials • Statics • Programming for Engineers • Aerospace Design II
Level 4	• Advanced Engineering Design and Presentation • Engineering Design and Problem Solving • Career and Technical Education Project-Based Capstone • Practicum in Engineering • Practicum in Engineering + Extended Practicum in Engineering • Career Preparation for Programs of Study • Career Preparation for Programs of Study + Extended Career Preparation • Scientific Research and Design

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 SkillsUSA or TSA • Join a local engineering association and attend meetings.

Aligned Industry-Based Certifications

- Applied Robotics
- 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
- Autodesk Certified User AutoCAD
- Autodesk Certified User Fusion 360
- Autodesk Certified User Inventor
- Autodesk Certified User Revit
- C-103 Certified 4.0 Associate III - Robot System Operations
- Certified Industrial Robotics Programmer (CIRP)
- Certified Industry 4.0 Technician Level 1
- Certified Industry 4.0 Technician Level 2
- Certified Industry 4.0 Technician Level 3
- Certified Logistics Technician (CLT)
- Certified Mechanical Technician Level 1
- Certified Mechanical Technician Level 2
- Certified Mechanical Technician Level 3
- Certified Process Control Technician Level 1
- Certified Process Control Technician Level 2
- Certified Process Control Technician Level 3
- Certified Production Technician (CPT) 4.0
- Certified Robotics Technician Level 1
- Certified Robotics Technician Level 2
- Certified Robotics Technician Level 3
- Certified SOLIDWORKS Additive Manufacturing Associate (CSWA-AM)
- Certified SOLIDWORKS Associate (CSWA) - Academic
- Certified SOLIDWORKS Associate (CSWA) - Electrical
- Certified SOLIDWORKS CAD Design Associate (CSWA) - Academic
- Certified SOLIDWORKS CAD Design Professional (CSWP) - Academic
- Certified SOLIDWORKS Professional (CSWP) - Model Based Design
- Certified SOLIDWORKS Professional (CSWP) - Simulation
- Certified SOLIDWORKS Professional (CSWPA) - Drawing Tools
- Engineering Technology Foundations
- FANUC Certified Robot Operator with ROBOGUIDE
- FDM Certification for EDU - Level 1
- Fundamentals of Robotics
- Introduction to Aerodynamics
- Introduction to Electricity
- Intuit Design for Delight Innovator
- Lean Six Sigma Green Belt Certification
- Pre-Engineering/Engineering Technology - Job Ready
- Robot Operations I
- Tosa Certification for Autodesk AutoCAD (Advanced or Expert)

Successful completion of the Engineering Foundations program of study will fulfill requirements of the STEM endorsement if the math and science requirements are met or the Business and Industry endorsement.

Example Postsecondary Opportunities

Apprenticeships
- Industrial Engineering Technician Apprenticeship

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

Civil Engineering Technologists and Technicians
Median Wage: $60,297
Annual Openings: 899
10-Year Growth: 11%

Civil Engineers
Median Wage: $82,483
Annual Openings: 2,223
10-Year Growth: 18%

Mechanical Engineers
Median Wage: $103,189
Annual Openings: 1,455
10-Year Growth: 19%

Data Source: TexasWages, Texas Workforce Commission. Retrieved 3/8/2024.

For more information visit:
https://tea.texas.gov/academics/college-career-and-military-prep/career-and-technical-education/eng-engineering-foundations-extended.pdf

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 **Recommended Prerequisites:** None **Recommended Corequisites**: None	
Physics for Engineering* 13037150 (1 credit)	**Prerequisites:** One credit of Algebra I and one credit of chemistry, physics, or Integrated Physics and Chemistry (IPC) **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites**: None	
Introduction to Computer-Aided Design and Drafting* 13037350 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Principles of Applied Engineering, Principles of Architecture and Design, or Principles of Manufacturing **Recommended Corequisites**: None	
Engineering Design Process* 12756001 (1 credit)	**Prerequisites:** Algebra I **Corequisites:** None **Recommended Prerequisites:** Principles of Applied Engineering **Recommended Corequisites:** None	

Level 2

Course	Prerequisites | Corequisites	Career Clusters
Intermediate Computer-Aided Design and Drafting* 13037360 (1 credit)	**Prerequisites:** Architectural Design I, Introduction to Computer-Aided Design and Drafting, or Engineering Design and Presentation **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites**: None	
Manufacturing Engineering Technology I* 13032900 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Algebra I **Recommended Corequisites:** None	
Robotics I* 13037000 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Principles of Applied Engineering **Recommended Corequisites:** None	

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

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Engineering Career Cluster

Statewide Program of Study: Engineering Foundations

Course Information

Level 2

Course	Prerequisites | Corequisites	Career Clusters
Engineering Project Management* 12756060 (1 credit)	**Prerequisites:** Algebra I **Corequisites:** None **Recommended Prerequisites:** English II **Recommended Corequisites:** None	
Aerospace Design I* 12756040 (1 credit)	**Prerequisites:** Algebra I **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** Geometry	

Level 3

Course	Prerequisites | Corequisites	Career Clusters
Engineering Design and Presentation* 13036500 (1 credit)	**Prerequisites:** Algebra I and at least one credit in a course from the Engineering career cluster **Corequisites:** None **Recommended Prerequisites:** Principles of Applied Engineering **Recommended Corequisites:** None	
Robotics II* 13037050 (1 credit)	**Prerequisites:** Robotics I **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Engineering Mathematics* 13036700 (1 credit)	**Prerequisites:** Algebra II **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Engineering Science* 13037500 (1 credit)	**Prerequisites:** Algebra I, one credit in biology, and at least one credit in a course from the Engineering career cluster **Corequisites:** None **Recommended Prerequisites:** Geometry, Integrated Physics and Chemistry (IPC), one credit in chemistry, or one credit in physics **Recommended Corequisites:** None	
Digital Electronics* 13037600 (1 credit)	**Prerequisites:** Algebra I and Geometry **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	

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Engineering Career Cluster

Statewide Program of Study: Engineering Foundations

Level 3

Course Information

Course	Prerequisites | Corequisites	Career Clusters
Environmental Engineering 12756010 (1 credit)	**Prerequisites:** At least one credit in a course from the Engineering or Energy career cluster **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Architectural Engineering* 12756065 (2 credits)	**Prerequisites:** Civil Engineering I **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Computer Integrated Manufacturing (PLTW)* N1303748 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** Introduction to Engineering Design **Recommended Corequisites:** College preparatory mathematics and science courses	
Fluid Mechanics 12756015 (1 credit)	**Prerequisites:** At least one credit in a course from the Engineering career cluster and physics or chemistry **Corequisites:** None **Recommended Prerequisites:** Algebra II **Recommended Corequisites:** Algebra II	
Mechanics of Materials 12756020 (1 credit)	**Prerequisites:** At least one credit from the Engineering career cluster and physics; Algebra II **Corequisites:** Algebra II **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Statics 12756025 (1 credit)	**Prerequisites:** At least one credit in a course from the Engineering career cluster and physics; Algebra II **Corequisites:** Algebra II **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Programming for Engineers* 12756005 (1 credit)	**Prerequisites:** Algebra I and Principles of Applied Engineering, Physics for Engineering, Introduction to Computer-Aided Design and Drafting, or Introduction to Engineering Design **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Aerospace Design II* 12756045 (2 credits)	**Prerequisites:** Geometry and Aerospace Design I **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	

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Engineering Foundations

Engineering Career Cluster

Statewide Program of Study: Engineering Foundations

Level 4

Course Information

Course	Prerequisites | Corequisites	Career Clusters
Advanced Engineering Design and Presentation* 13036600 (2 credits)	**Prerequisites:** Algebra I, Geometry, and Engineering Design and Presentation **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
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 Engineering career cluster **Corequisites:** None **Recommended Prerequisites:** Engineering Science, chemistry, or physics **Recommended Corequisites:** Engineering Science, chemistry, or physics	
Career and Technical Education Project-Based Capstone* First Time Taken: 12701101 (1 credit)	**Prerequisites:** None **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites**: None	
Practicum in Engineering* First Time Taken: 12756080 (2 credits) Second Time Taken: 12756090 (2 credits)	**Prerequisites:** Algebra I and Geometry and a minimum of two credits with at least one course in a Level 2 or higher course from the Engineering career cluster **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites**: None	
Practicum in Engineering + Extended Practicum in Engineering* First Time Taken: 12756085 (3 credits) Second Time Taken: 12756095 (3 credits)	**Prerequisites:** Algebra I and Geometry and a minimum of two credits with at least one course in a Level 2 or higher course from the Engineering career cluster **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites**: None	

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Engineering Career Cluster

Statewide Program of Study: Engineering Foundations

Level 4

Course Information

Course	Prerequisites | Corequisites	Career Clusters
Career Preparation for Programs of Study* First Time Taken: 12701121 (2 credits)	**Prerequisites**: At least one Level 2 or higher CTE course **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Career Preparation for Programs of Study + Extended Career Preparation* First Time Taken: 12701141 (3 credits)	**Prerequisites:** At least one Level 2 or higher CTE course **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites:** None	
Scientific Research and Design* 13037200 (1 credit)	**Prerequisites:** Biology, and one credit of the following: Physics for Engineering, chemistry, Integrated Physics and Chemistry (IPC), or physics **Corequisites:** None **Recommended Prerequisites:** None **Recommended Corequisites**: None	

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