

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: Electrical Engineering

The Electrical Engineering program of study focuses on occupational and educational opportunities associated with the design, development, testing, and supervision of electrical equipment and systems. Students will design, test, and evaluate projects related to electrical motors, radar, navigation systems, and communication systems. This program of study includes applying scientific, mathematical, and empirical evidence to solve problems in electrical systems associated with instruments, facilities, components, and equipment.

Secondary Courses for High School Credit

Level 1	<ul style="list-style-type: none"> Principles of Applied Engineering Principles of Technology Introduction to Computer-Aided Design and Drafting Introduction to Engineering Design (PLTW) Engineering Essentials (PLTW)
Level 2	<ul style="list-style-type: none"> Intermediate Computer-Aided Design and Drafting Robotics I Programmable Logic Controller I Manufacturing Engineering Technology I AC/DC Electronics
Level 3	<ul style="list-style-type: none"> Engineering Design and Presentation I Robotics II Programmable Logic Controller II Engineering Mathematics Solid State Electronics Engineering Science Digital Electronics Computer Integrated Manufacturing (PLTW) Engineering Design and Development (PLTW)
Level 4	<ul style="list-style-type: none"> Engineering Design and Presentation II Engineering Design and Problem Solving Career and Technical Education Project-Based Capstone Practicum in Science, Technology, Engineering, and Mathematics Practicum in Science, Technology, Engineering, and Mathematics + Extended Practicum in Science, Technology, Engineering, and Mathematics Practicum in Engineering (TBD) Career Preparation for Programs of Study Career Preparation for Programs of Study + Extended Career Preparation Scientific Research and Design

Aligned Advanced Academic Courses

AP or IB	AP Calculus AB AP Calculus BC AP Computer Science Principles	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	<ul style="list-style-type: none"> Intern for a construction company and use computer-aided design (CAD) to draw electrical blueprints Shadow an electrical engineering professional
Expanded Learning Opportunities	<ul style="list-style-type: none"> Tour a telecommunications site Participate in SkillsUSA or TSA Join a local engineering association and attend meetings

Aligned Industry-Based Certifications

- C-200 Certified Industry 4.0 Automation Systems Specialist 1–208 Programmable Controller Troubleshooting 1
- C-200 Certified Industry 4.0 Automation Systems Specialist 1–201 Electrical Systems 1
- Autodesk Associate (Certified User) Revit for Electrical
- Autodesk Certified Professional in Revit for Electrical Design
- Certified SOLIDWORKS Associate (CSWA) – Electrical
- NCCER Electrical Level I
- NCCER Electrical Level II
- Engineering Technology Foundations
- Pre-Engineering/Engineering Technology – Job Ready
- FANUC Robot Operator 1
- 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 Certified Professional in AutoCAD for Design and Drafting
- Autodesk Certified Professional Fusion 360
- Autodesk Certified Professional in Inventor for Mechanical Design
- Certified SOLIDWORKS Associate (CSWA) - Academic
- Certified SOLIDWORKS Associate (CSWA) - Mechanical Design
- Certified SOLIDWORKS Associate (CSWA) - Simulation
- Certified SOLIDWORKS Associate (CSWA) - Sustainability
- Certified SOLIDWORKS (CSWP) - Academic
- Certified SOLIDWORKS Professional (CSWP) - Mechanical Design
- Certified SOLIDWORKS Professional (CSWP) - Model Based Definition
- Certified SOLIDWORKS (CSWP) - Drawing Tools
- Lean Six Sigma Green Belt Certification
- Certified SOLIDWORKS (CSWP) - Simulation



Example Postsecondary Opportunities

Apprenticeship

- Electrical Technician Apprenticeship

Associate Degrees

- Electrical, Electronic, and Communications Engineering Technology/Technician
- Electromechanical/Electromechanical Engineering Technology/Technician

Bachelor's Degrees

- Electrical and Electronics Engineering
- Systems Engineering

Master's, Doctoral, and Professional Degrees

- Electrical and Electronics Engineering
- Bioengineering and Biomedical Engineering

Additional Stackable IBCs/License

- Professional Electrical Engineer (EE License)
- Electrical Apprenticeship Certificate Level 1 (520)



Example Aligned Occupations

Electrical and Electronic Engineering Technologists and Technicians

Median Wage: \$62,968
Annual Openings: 1,156
10-Year Growth: 14%

Electrical and Electronics Drafters

Median Wage: \$58,987
Annual Openings: 406
10-Year Growth: 16%

Electrical Engineers

Median Wage: \$102,534
Annual Openings: 1,271
10-Year Growth: 21%

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/programs-of-study-additional-resources>

Engineering Career Cluster

Statewide Program of Study: Electrical Engineering

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	
Principles of Technology* 13037100 (1 credit)	Prerequisites: One credit of high school science and Algebra I 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	
Introduction to Engineering Design (PLTW)* N1303742 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Engineering Essentials (PLTW)* N1303760 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

Level 2

Course	Prerequisites Corequisites	Career Clusters
Intermediate Computer-Aided Design and Drafting* 13037360 (1 credit)	Prerequisites: Architectural Design I and Introduction to Computer-Aided Design and Drafting Corequisites: None Recommended Prerequisites: None 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.

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: Electrical Engineering

Course Information

Level 2

Course	Prerequisites Corequisites	Career Clusters
Programmable Logic Controller I N1303689 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Principles of Applied Engineering or Principles of Manufacturing Recommended Corequisites: None	
Manufacturing Engineering Technology I* 13032900 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Algebra I Recommended Corequisites: None	
AC/DC Electronics 13036800 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Principles of Applied Engineering Recommended Corequisites: None	

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 STEM 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	
Programmable Logic Controller II N1303690 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Principles of Applied Engineering or Principles of Manufacturing and Programmable Logic Controllers (PLC) I Recommended Corequisites: None	
Engineering Mathematics* 13036700 (1 credit)	Prerequisites: Algebra II Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

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Engineering Career Cluster

Statewide Program of Study: Electrical Engineering

Course Information

Level 3

Course	Prerequisites Corequisites	Career Clusters
Solid State Electronics 13036900 (1 credit)	Prerequisites: AC/DC Electronics 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 STEM career cluster Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Digital Electronics* 13037600 (1 credit)	Prerequisites: Algebra I and Geometry Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Computer Integrated Manufacturing (PLTW)* N1303748 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	
Engineering Design and Development (PLTW)* N1303749 (1 credit)	Prerequisites: None Corequisites: College preparatory mathematics and science courses Recommended Prerequisites: Engineering Design Recommended Corequisites: None	

Level 4

Course	Prerequisites Corequisites	Career Clusters
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 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 STEM career cluster Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

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Engineering Career Cluster

Statewide Program of Study: Electrical Engineering

Course Information

Level 4

Course	Prerequisites Corequisites	Career Clusters
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 Science, Technology, Engineering, and Mathematics* First Time Taken: 13037400 (2 credits) Second Time Taken: 13037410 (2 credits)	Prerequisites: Algebra I and Geometry Corequisites: None Recommended Prerequisites: None Recommended 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 Recommended Prerequisites: None Recommended Corequisites: None	
Practicum in Engineering* TBD (TBD credit)	Prerequisites: TBD Corequisites: TBD Recommended Prerequisites: TBD Recommended Corequisites: TBD	
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	

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Engineering Career Cluster

Statewide Program of Study: Electrical Engineering

Course Information

Level 4

Course	Prerequisites Corequisites	Career Clusters
Scientific Research and Design* 13037200 (1 credit)	Prerequisites: Biology, Chemistry, Integrated Physics and Chemistry (IPC), or Physics Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	

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