

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.

Regional Program of Study: Geospatial Engineering and Land Surveying

Approved in ESC Regions 2, 4, 10, 11, 13, and 20

**The list of approved ESC regions is updated every school year. Be sure to check the CTE regional program of study website for updates.*

The Geospatial Engineering and Land Surveying regional program of study focuses on occupational and educational opportunities associated with surveying, automated computer aided drafting, geographical information systems and raster-based geographic information systems. This program of study includes the exploration of remote sensing, geoscience, and mapping.



Secondary Courses for High School Credit

- | | |
|----------------|---|
| Level 1 | <ul style="list-style-type: none"> Principles of Applied Engineering Principles of Architecture |
| Level 2 | <ul style="list-style-type: none"> Geographic Information Systems Raster Based Geographic Information Systems |
| Level 3 | |
| Level 4 | <ul style="list-style-type: none"> 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 Career Preparation for Programs of Study Career Preparation for Programs of Study + Extended Career Preparation Scientific Research and Design |

Aligned Advanced Academic Courses

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

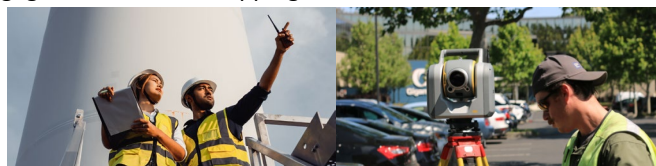
- Intern as a surveyor to learn how to prepare plots, maps, and reports
- Shadow a geographic information system (GIS) analyst on a field project
- Execute a mapping project for a local company or community organization

Expanded Learning Opportunities

- Participate in SkillsUSA or TSA
- Participate in ArcGIS Online School Competition

Aligned Industry-Based Certifications

- Engineering Technology Foundations
- LEED Green Associate
- Pre-Engineering/Engineering Technology - Job Ready
- ArcGis Desktop Associate



Example Postsecondary Opportunities

Apprenticeships

- Surveyor Instrument Apprentice

Associate Degrees

- Geographic Information Science and Cartography
- Surveying Technology/Surveying

Bachelor's Degrees

- Geographic Information Science and Cartography
- Surveying Engineering

Master's, Doctoral, and Professional Degrees

- Geology/Earth Science, General
- Surveying Engineering

Additional Stackable IBCs/License

- Registered Professional Land Surveyor RPLS
- GISCI-GISP Certified GIS Professional



Example Aligned Occupations

Surveying and Mapping Technicians

Median Wage: \$45,804
Annual Openings: 1,487
10-Year Growth: 18%

Surveyors

Median Wage: \$59,659
Annual Openings: 543
10-Year Growth: 13%

Cartographers and Photogrammetrists

Median Wage: \$74,521
Annual Openings: 141
10-Year Growth: 16%

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

Regional Program of Study: Geospatial Engineering and Land Surveying

Course Information

	Course	Prerequisites Corequisites	Career Clusters
Level 1	Principles of Applied Engineering* 13036200 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	  
	Principles of Architecture 13004210 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommended Corequisites: None	 
Level 2	Geographic Information Systems* N1302805 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Principles of Art, Audio/Video Technology, Principles of Information Technology, or Principles of Technology Recommended Corequisites: None	 
	Raster Based Geographic Information Systems N1302806 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Geographic Information Systems Recommended Corequisites: None	  
Level 3			
Level 4	Career and Technical Education Project-Based Capstone* First Time Taken: 12701101 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None 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

Regional Program of Study: Geospatial Engineering and Land Surveying

Course Information

Level 4

Course	Prerequisites Corequisites	Career Clusters
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: Two STEM career cluster credits 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: Two STEM career cluster credits Recommended Corequisites: None	
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: Career Preparation for Programs of Study Recommended Prerequisites: None Recommended Corequisites: None	
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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