

# 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

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

- |                |   |
|----------------|---|
| <b>Level 1</b> | <ul style="list-style-type: none"> <li>Principles of Applied Engineering</li> <li>Principles of Architecture</li> </ul>   |
| <b>Level 2</b> | <ul style="list-style-type: none"> <li>Geographic Information Systems</li> <li>Raster Based Geographic Information Systems</li> </ul>   |
| <b>Level 3</b> |   |
| <b>Level 4</b> | <ul style="list-style-type: none"> <li>Scientific Research and Design</li> <li>Practicum in Science, Technology, Engineering, and Mathematics</li> <li>Practicum in Science, Technology, Engineering, and Mathematics + Extended Practicum in Science, Technology, Engineering, and Mathematics</li> <li>Career Preparation for Programs of Study</li> <li>Career Preparation for Programs of Study + Extended Career Preparation</li> <li>Career and Technical Education Project-Based Capstone</li> </ul> |

### 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

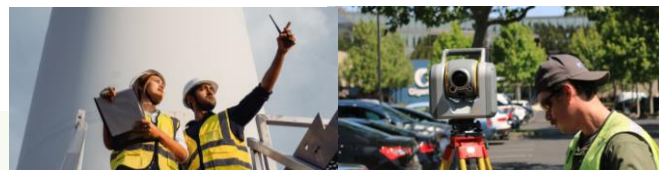
- Intern as a surveyor to learn how to prepare plots, maps, and reports
- Shadow a geographic information system (GIS) analyst on a field project
- Execute a mapping project for a local company or community organization

#### Expanded Learning Opportunities

- Participate in SkillsUSA
- 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/Licensures

- 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: 14q  
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

#### Level 1

Course	Prerequisites   Corequisites	Career Clusters
<b>Principles of Applied Engineering*</b> 13036200 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
<b>Principles of Architecture*</b> 13004210 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	

#### Level 2

Course	Prerequisites   Corequisites	Career Clusters
<b>Geographic Information Systems*</b> N1302805 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Principles of Art, Audio/Video Technology, Principles of Information Technology or Principles of Technology <b>Recommended Corequisites:</b> None	
<b>Raster Based Geographic Information Systems*</b> N1302806 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Geographic Information Systems <b>Recommended Corequisites:</b> None	

#### Level 3

Course	Prerequisites   Corequisites	Career Clusters

#### Level 4

Course	Prerequisites   Corequisites	Career Clusters
<b>Scientific Research and Design*</b> 13037200 (1 credit)	<b>Prerequisites:</b> Biology, Chemistry, Integrated Physics and Chemistry (IPC), or Physics <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommended Corequisites:</b> None	
<b>Practicum in Science, Technology, Engineering, and Mathematics*</b> First Time Taken: 13037400 (2 credits) Second Time Taken: 13037410 (2 credits)	<b>Prerequisites:</b> Algebra I and Geometry <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> two STEM Career Cluster Credits <b>Recommended Corequisites:</b> None	
<b>Practicum in Science, Technology, Engineering, and Mathematics/Extended Practicum in Science, Technology, Engineering, and Mathematics*</b> First Time Taken: 13037405 (3 credits) Second Time Taken: 13037415 (3 credits)	<b>Prerequisites:</b> Algebra I and Geometry <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> two STEM Career Cluster Credits <b>Recommended Corequisites:</b> 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](mailto:cte@tea.texas.gov) or visit <https://tea.texas.gov/cte>



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# Engineering Career Cluster

## Regional Program of Study: Geospatial Engineering and Land Surveying

### Course Information

Level 4	Course	Prerequisites   Corequisites	Career Clusters
	<b>Career Preparation for Programs of Study*</b> First Time Taken: 12701121 (2 credits)	<b>Prerequisites:</b> at least one Level 2 or higher Career and Technical Education course <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None	
	<b>Career Preparation for Programs of Study/ Extended Career Preparation*</b> First Time Taken: 12701141 (3 credits)	<b>Prerequisites:</b> at least one Level 2 or higher Career and Technical Education course <b>Corequisites:</b> Career Prep General or Career Prep for Programs of Study <b>Recommended Prerequisites:</b> None	
	<b>Career and Technical Education Project-Based Capstone First Time Taken*</b> First Time Taken: 12701101 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None	

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