

# Energy Career Cluster

The Energy career cluster prepares individuals for careers in the designing, processing, planning, maintaining, generating, transmission, and distribution of traditional and alternative energy. This career cluster includes occupations ranging from petroleum engineers, rotary drill operators, chemical technicians and, power plant operators to solar photovoltaic installers and wind turbine service technicians.

## Statewide Program of Study: Refining and Chemical Processes

The Refining and Chemical Processes program of study focuses on occupational and educational opportunities associated with how to monitor, adjust, and operate equipment housed in petrochemical plants and refineries. This program of study includes exploration of computer technology and instrumentation used to operate a variety of systems and industrial processes.

### Secondary Courses for High School Credit

- |                |   |
|----------------|---|
| <b>Level 1</b> | <ul style="list-style-type: none"> <li>Foundations of Energy</li> <li>Principles of Distribution and Logistics</li> </ul>   |
| <b>Level 2</b> | <ul style="list-style-type: none"> <li>Introduction to Process Technology</li> <li>Introduction to Instrumentation and Electrical</li> </ul>  |
| <b>Level 3</b> | <ul style="list-style-type: none"> <li>Petrochemical Safety, Health, and Environment</li> <li>Advanced Instrument and Electrical</li> </ul>   |
| <b>Level 4</b> | <ul style="list-style-type: none"> <li>Applied Mathematics for Technical Professionals</li> <li>Career and Technical Education Project-Based Capstone</li> <li>Practicum in Energy</li> <li>Career Preparation for Programs of Study</li> <li>Career Preparation for Programs of Study + Extended Career Preparation</li> </ul> |

### Aligned Advanced Academic Courses

<b>AP or IB</b>	AP Chemistry IB Chemistry Standard Level
<b>Dual Credit</b>	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 toward concentrator/completer status for this program of study.

### Work-Based Learning and Expanded Learning Opportunities

<b>Work-Based Learning Activities</b>	<ul style="list-style-type: none"> <li>Shadow a chemical technician in a laboratory at a chemical manufacturing plant</li> <li>Intern at a power plant to learn about industrial processes and plant operations</li> </ul>
<b>Expanded Learning Opportunities</b>	<ul style="list-style-type: none"> <li>Tour a refining and chemical plant</li> <li>Participate in SkillsUSA</li> </ul>

### Aligned Industry-Based Certifications

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>NCCER Core</li> <li>NCCER Electronic System Technician Level I</li> <li>NCCER Instrumentation Level I</li> </ul> | <ul style="list-style-type: none"> <li>Certified Production Technician (CPT) 4.0</li> <li>Lean Six Sigma Green Belt Certification</li> <li>Industrial Technology Maintenance (ITM) - Process Control Systems</li> </ul> |
|---|---|



### Example Postsecondary Opportunities

#### Associate Degrees

- Chemical Process Technology
- Instrumentation Technology/Technician
- Manufacturing Engineering Technology/Technician
- Industrial Technology/Technician

#### Bachelor's Degrees

- Chemical Engineering
- Engineering/Industrial Management
- Industrial Engineering
- Manufacturing Engineering

#### Master's, Doctoral, and Professional Degrees

- Mechanical Engineering
- Chemical Engineering
- Engineering/Industrial Management
- Industrial Engineering



### Example Aligned Occupations

#### Chemical Technicians

Median Wage: \$58,129  
Annual Openings: 892  
10-Year Growth: 17%

#### Power Plant Operators

Median Wage: \$94,669  
Annual Openings: 231  
10-Year Growth: 3%

#### Petroleum Engineers

Median Wage: \$134,225  
Annual Openings: 1,443  
10-Year Growth: 27%

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>






# Energy Career Cluster



## Statewide Program of Study: Refining and Chemical Processes

### Course Information



#### Level 1

Course	Prerequisites   Corequisites	Career Clusters
<b>Foundations of Energy*</b> 13040503 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommend Corequisites:</b> None	
<b>Principles of Distribution and Logistics</b> 13039260 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommend Corequisites:</b> None	 

#### Level 2

Course	Prerequisites   Corequisites	Career Clusters
<b>Introduction to Process Technology</b> 13040502 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommend Corequisites:</b> None	
<b>Introduction to Instrumentation and Electrical</b> N1303900 (1 credit)	<b>Prerequisites:</b> Integrated Chemistry and Physics (IPC) or Chemistry <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommend Corequisites:</b> None	

#### Level 3

Course	Prerequisites   Corequisites	Career Clusters
<b>Petrochemical Safety, Health, and Environment</b> 13040504 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommend Corequisites:</b> None	
<b>Advanced Instrument and Electrical</b> N1303901 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Algebra I and Introduction to Instrumentation and Electrical <b>Recommend Corequisites:</b> None	

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

For additional information on the **Energy** career cluster, contact [cte@tea.texas.gov](mailto:cte@tea.texas.gov) or visit <https://tea.texas.gov/cte>

[LEA name] does not discriminate on the basis of race, color, national origin, sex, or disability in its programs or activities and provides equal access to the Boy Scouts and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: [title], [address], [telephone number], [email]. Further nondiscrimination information can be found at [Notification of Nondiscrimination in Career and Technical Education Programs](#).



# Energy Career Cluster

## Statewide Program of Study: Refining and Chemical Processes

### Course Information

Level 4

Course	Prerequisites   Corequisites	Career Clusters
<b>Applied Mathematics for Technical Professionals*</b> 12701410 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> Algebra I and Geometry <b>Recommend Corequisites:</b> None	 
<b>Career and Technical Education Project-Based Capstone*</b> First Time Taken: 12701101 (1 credit)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommend Corequisites:</b> None	         
<b>Practicum in Energy*</b> N1303910 (2 credits)	<b>Prerequisites:</b> None <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> At least one of the following courses Oil and Gas Production II/Lab, Occupational Safety and Environmental Technology I, Oil and Gas Production III, Occupational Safety and Environmental Technology II, Career Preparation, Oil and Gas Production IV, Introduction to Process Technology, Introduction to Instrumentation and Electrical, Petrochemical Safety, Health, and Environment, Advanced Instrument and Electrical, AC/DC Electronics, Introduction to Renewable Energy, Energy and Natural Resources Technology/Lab, Environmental Sustainability (PLTW), Solid State Electronics, Scientific Research and Design, or Digital Electronics <b>Recommend Corequisites:</b> None	
<b>Career Preparation for Programs of Study*</b> First Time Taken: 12701121 (2 credits)	<b>Prerequisites:</b> At least one Level 2 or higher CTE course <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommend Corequisites:</b> None	            
<b>Career Preparation for Programs of Study + Extended Career Preparation for Programs of Study*</b> First Time Taken: 12701141 (3 credits)	<b>Prerequisites:</b> At least one Level 2 or higher CTE course <b>Corequisites:</b> None <b>Recommended Prerequisites:</b> None <b>Recommend Corequisites:</b> None	            

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

For additional information on the Energy career cluster, contact [cte@tea.texas.gov](mailto:cte@tea.texas.gov) or visit <https://tea.texas.gov/cte>

[LEA name] does not discriminate on the basis of race, color, national origin, sex, or disability in its programs or activities and provides equal access to the Boy Scouts and other designated youth groups. The following person has been designated to handle inquiries regarding the nondiscrimination policies: [title], [address], [telephone number], [email]. Further nondiscrimination information can be found at [Notification of Nondiscrimination in Career and Technical Education Programs](#).