

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

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

Aligned Advanced Academic Courses

AP or IB	AP Chemistry IB Chemistry Standard Level
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 toward Completer status for this program of study.

Work-Based Learning and Expanded Learning Opportunities

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

Industry-Based Certifications

- NCCER Core
- NCCER Electronic System Technician Level I
- NCCER Instrumentation Level I
- Certified Production Technician (CPT) 4.0
- Lean Six Sigma Green Belt Certification
- Industrial Technology Maintenance (ITM) - Process Control Systems



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>



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Statewide Program of Study: Refining and Chemical Processes

Course Information

	Course	Prerequisites Corequisites	Career Clusters
Level 1	Principles of Distribution and Logistics 13039260 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommend Corequisites: None	
	Foundations of Energy* 13040503 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommend Corequisites: None	
Level 2	Introduction to Process Technology 13040502 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommend Corequisites: None	
	Introduction to Instrumentation and Electrical N1303900 (1 credit)	Prerequisites: Integrated Chemistry and Physics (IPC) or Chemistry Corequisites: None Recommended Prerequisites: None Recommend Corequisites: None	
Level 3	Petrochemical Safety, Health, and Environment 13040504 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommend Corequisites: None	
	Advanced Instrument and Electrical N1303901 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Algebra I and Introduction to Instrumentation and Electrical Recommend Corequisites: 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 or visit <https://tea.texas.gov/cte>



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Statewide Program of Study: Refining and Chemical Processes

Course Information

Level 4

Course	Prerequisites Corequisites	Career Clusters
Applied Mathematics for Technical Professionals* 12701410 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: Algebra I and Geometry Recommend Corequisites: None	
Career and Technical Education Project-Based Capstone (First Time Taken) 12701500 (1 credit)	Prerequisites: None Corequisites: None Recommended Prerequisites: None Recommend Corequisites: None	
Practicum in Energy* N1303910 (2 credits)	Prerequisites: None Corequisites: None Recommended Prerequisites: 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 Recommend 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 Recommend 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 Recommend Corequisites: None	

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