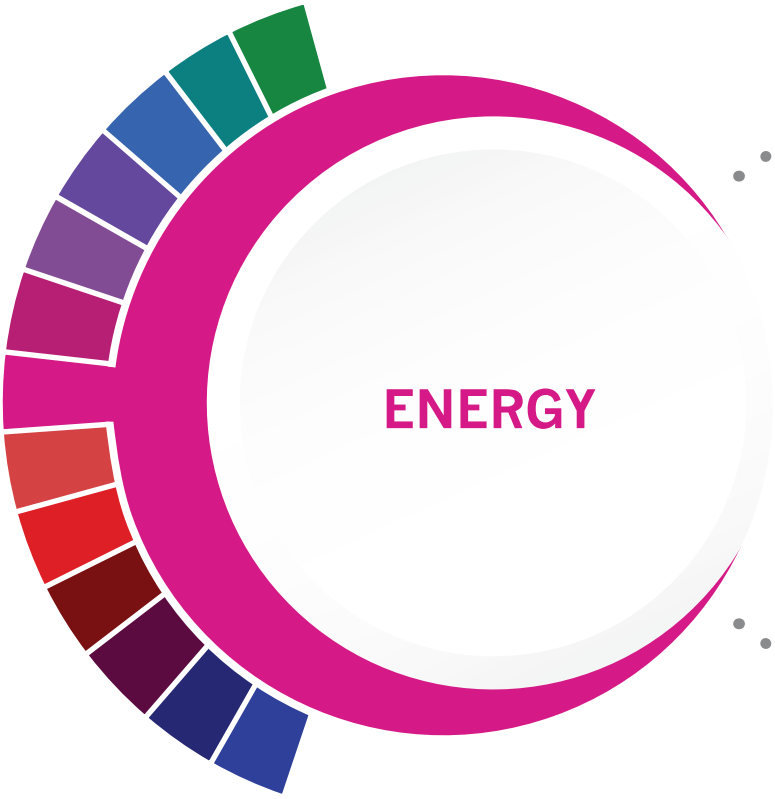

OIL AND GAS EXPLORATION AND PRODUCTION

REFINING AND CHEMICAL PROCESSES

RENEWABLE ENERGY

Local Implementation Considerations:

Students completing two or more courses for two or more credits within a program of study earn concentrator status for Perkins V federal accountability reporting.

Proposed Indicator: Students finishing three or more courses for four or more credits with one course from level 3 or 4 within a program of study earn completer status for federal accountability reporting.

TEA
Texas Education Agency

COURSES

LEVEL 1
Oil and Gas Production I
Foundations of Energy (TBD)

LEVEL 2
Oil and Gas Production II
Occupational Safety and Environmental Technology

LEVEL 3
Oil and Gas Production III
Occupational Safety and Environmental Technology II
Career Preparation I

LEVEL 4
Oil and Gas Production IV
Project-Based Research
Career Preparation II
Applied Mathematics for Technical Professionals
Practicum in Energy (TBD)

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
	Above Ground Storage Tanks Inspector Certification	Petroleum Engineering		
	Pressure Vessels Inspector Certification	Chemical Engineering		
	Piping Inspector Certification	Petroleum Technology/ Technician	Mechanical Engineering	
	API QUTE - Qualification of Ultrasonic Testing Examiners	Industrial Mechanics and Maintenance Technology	Industrial Engineering	

*Includes Level I and Level II Certificates

For more information on postsecondary options for this program of study, visit TXCTE.org

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Extraction Workers - All Other	$44,616	145	25%
Extraction Workers	$34,570	1,000	7%
Drill Operators, Oil and Gas	$52,083	925	14%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Career Preparation:
Intern at an oil or gas company, American Petroleum Institute Certification

Exploration Activities:
Conduct research regarding safety hazards associated with extraction
Read trade publications to understand economic and political issues

The Oil and Gas Exploration and Production program of study focuses on processing, refining, and distributing petroleum and gas. It introduces students to the process of regulating the flow of oil into pipelines, controlling pumping systems, and operating and maintaining machinery to generate electric power.

The Energy Career Cluster® prepares individuals for careers in the designing, planning, maintaining, generating, transmission, and distribution of traditional and alternative energy.

Successful completion of the Oil and Gas Exploration and Production program of study will fulfill requirements of the Business and Industry Endorsement.

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COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITES (PREQ) COREQUISITES (CREQ) RECOMMENDED PREREQUISITES (RPREQ) RECOMMENDED COREQUISITIES (CREQ)	GRADE
Oil and Gas Production I	13001250	None	9-12
Foundations of Energy	TBD	TBD	TBD
Oil and Gas Production II	13001260	PREQ: Oil and Gas Production I	10-12
Occupational Safety and Environmental Technology I	N1303680	RPREQ: Principles of Transportation Systems, Principles of Distribution and Logistics, or Principles of Manufacturing	9-12
Oil and Gas Production III	N1300256	PREQ: Oil and Gas Production II	11-12
Occupational Safety and Environmental Technology II	N1303681	RPREQ: Occupational Safety and Environmental Technology I	10-12
Career Preparation I	12701300 (2 credits) 12701300 (3 credits)	None	11-12
Oil and Gas Production IV	N1300257	PREQ: Oil and Gas Production III CREQ: Project-Based Research	11-12
Project-Based Research	12701500	None	11-12
Applied Mathematics for Technical Professionals	12701410	RPREQ: Algebra I and Geometry	11-12
Practicum in Energy	TBD	TBD	TBD

FOR ADDITIONAL INFORMATION ON THE ENERGY CAREER CLUSTER, PLEASE CONTACT:

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https://tea.texas.gov/cte

COURSES

LEVEL 1

Foundations of Energy (TBD)

LEVEL 2

Introduction to Process Technology
Introduction to Instrumentation and Electrical (TBD)

LEVEL 3

Petrochemical Safety, Health, and Environment

LEVEL 4

Project-Based Research
Applied Mathematics for Technical Professionals
Practicum in Energy (TBD)

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
	Process Technology Certificate Level II	Process Technology	Business Administration and Management, General	
	Petroleum Energy Technology Certificate	Process Operating Technololgy	Business/ Commerce, General	
	Qualification of Ultrasonic Testing Examiners (Sizing)	Logistics, Material, and Supply Chain Management	Industrial Engineering	
	Certified Plant Supervisor	Petroleum Technology/ Technician	Petroleum Engineering	

*Includes Level I and Level II Certificates

For more information on postsecondary options for this program of study, visit TXCTE.org.

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Gas Plant Operators	$62, 650	312	9%
Petroleum Pump System Operators, Refinery Operators, and Gaugers	$71,448	1,181	9%
Power Plant Operators	$71, 635	309	9%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Exploration Activities:
Tour a power plant or refinery

Career Preparation Activities:
Intern at a refinery or other operations plant

The Refining and Chemical Processes program of study helps students discover how to monitor, adjust, and control different equipment housed in petrochemical plants and refineries. It introduces students to the computer technology and instrumentation used to operate a variety of equipment systems and industrial processes, helping students build the skills needed to operate these systems.

The Energy Career Cluster® prepares individuals for careers in the designing, planning, maintaining, generating, transmission, and distribution of traditional and alternative energy.

Successful completion of the Refining and Chemical Processes program of study will fulfill requirements of the Business and Industry Endorsement.

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COURSE INFORMATION

COURSE NAME	SERVICE ID	PREREQUISITES (PREQ) COREQUISITES (CREQ) RECOMMENDED PREREQUISITES (RPREQ) RECOMMENDED COREQUISITIES (CREQ)	GRADE
Foundations of Energy	TBD	TBD	TBD
Introduction to Process Technology	N1300262	None	11-12
Introduction to Instrumentation and Electrical	TBD	TBD	TBD
Petrochemical Safety, Health, and Environment	N1300264	None	11-12
Project-Based Research	12701500	None	11-12
Applied Mathematics for Technical Professionals	12701410	RPREQ: Algebra I and Geometry	11-12
Practicum in Energy	TBD	TBD	TBD

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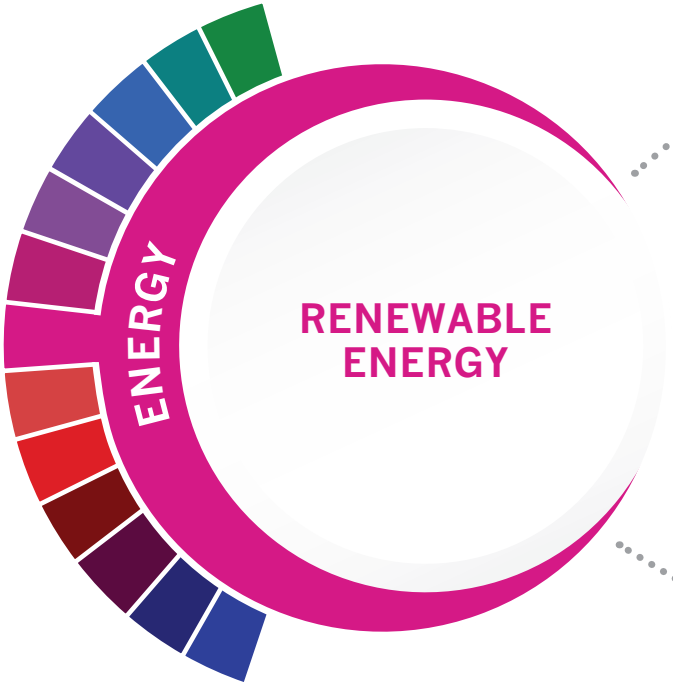

COURSES

LEVEL 1

Principles of Applied Engineering
Foundations of Energy (TBD)

LEVEL 2

AC/DC Electronics
Energy and Natural Resources Technology
Introduction to Renewable Energy (TBD)

LEVEL 3

Environmental Sustainability (PLTW)
Solid State Electronics
Scientific Research and Design

LEVEL 4

Digital Electronics
Engineering Design and Problem Solving
Project-Based Research
Applied Mathematics for Technical Professionals
Practicum in Energy (TBD)

POSTSECONDARY OPTIONS

HIGH SCHOOL/ INDUSTRY CERTIFICATION	CERTIFICATE/ LICENSE*	ASSOCIATE'S DEGREE	BACHELOR'S DEGREE	MASTER'S/ DOCTORAL PROFESSIONAL DEGREE
	Underground Store Tank Installer	Industrial Mechanics and Maintenance Technology	Surveying Engineering	
	Photovoltaic Installer - Level 1 or Professional	Solar Energy Technology/ Technician	Systems Engineering	
	Solar Photovoltaic Certification	Engineering Mechanics		Manufacturing Engineering
	Small Wind Installer - Level 1	Engineering, General		

*Includes Level I and Level II Certificates

For more information on postsecondary options for this program of study, visit TXCTE.org

OCCUPATIONS	MEDIAN WAGE	ANNUAL OPENINGS	% GROWTH
Wind Turbine Services Technicians	$51,334	387	108%
Solar Photovoltaic Installers	$43,957	470	81%

WORK BASED LEARNING AND EXPANDED LEARNING OPPORTUNITIES

Awareness Courses:
Investigating Careers
Exploration Activities:
Skills USA
Science Club
Environment Club
Explore Texas Renewables

Career Prep Activities:
Research top 4 renewable energy companies and compare them
Intern at a renewable energy company

The Renewable Energy program of study helps students discover how to assemble, inspect, maintain, and repair different equipment required for renewable energy. It introduces students to solar photovoltaic equipment and wind turbines, the systems and processes used to maintain and manage these types of equipment, and helps students develop the skills needed to do so.

The Energy Career Cluster® prepares individuals for careers in the designing, planning, maintaining, generating, transmission, and distribution of traditional and alternative energy.

Successful completion of the Renewable Energy program of study will fulfill requirements of the Science, Technology, Engineering, and Mathematics Endorsement.

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COURSE INFORMATION

COURSE NAME	SERVICE ID	PRE REQS CO REQS REC REQS	GRADE
Principles of Applied Engineering	13036200	None	9-12
Foundations of Energy	TBD	TBD	TBD
AC/DC Electronics	TBD	RPREQ: Principles of Applied Engineering	10-12
Energy and Natural Resources Technology	13001100	RPREQ: At least 1 credit from courses in the Agriculture, Food, and Natural Resources cluster	10-12
Introduction to Renewable Energy	TBD	TBD	TBD
Environmental Sustainability (PLTW)	N13003746	None	9-12
Solid State Electronics	13036900	PREQ: AC/DC Electronics	11-12
Scientific Research and Design	13037200	PREQ: Biology, Chemistry, Integrated Physics and Chemistry (IPC), or Physics	11-12
Digital Electronics	13037600	PREQ: Algebra I and Geometry	10-12
Engineering Design and Problem Solving	13037300	PREQ: Algebra I and Geometry; RPREQ: 2 credits from the Science, Technology, Engineering, & Math cluste	11-12
Project-Based Research	12701500	None	11-12
Applied Mathematics for Technical Professionals	1270410	RPREQ: Algebra I and Geometry	11-12
Practicum in Energy	TBD	TBD	TBD

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