



UNITED INDEPENDENT SCHOOL DISTRICT AGENDA ACTION ITEM

TOPIC: Request for approval of Innovative Courses for the Oil and Gas Academy

SUBMITTED BY: Alicia G. Carrillo, CTE Director **OF:** Curriculum & Instruction Department

APPROVED FOR TRANSMITTAL TO SCHOOL BOARD: _____

DATE ASSIGNED FOR BOARD CONSIDERATION: January 16, 2013

Recommendation:

Administration recommends that the Board of Trustees approve the Oil and Gas Academy as a new CTE innovative program offering beginning with the 2012-13 school year.

Rationale:

These courses are designed specifically to support the petroleum industry cluster. This rapidly growing business sector has demonstrated a shortage of workers and most importantly has a demand for trained employees. The United Independent School District (UISD) proposes to develop CTE courses where the student can learn the industry based core competencies necessary to acquire knowledge, skills, and attributes for entry level jobs, certifications and/or degree programs in the energy industry. The high school program will coordinate with the community colleges and universities to offer articulation and dual credit courses. Through industry surveys, job analyses, industry participation and community support, we are able to conclude a collective need for an increase in qualified workers and how those workers are produced.

The proposed innovative courses recommended for students in grades 9-12 are listed below:

I. Principles of Oil and Gas Production Systems (credits: 1/2 -1)

This course will introduce students to Oil and Gas professions including the distinction between the different career opportunities and the required certification and degree for each. Students will study the history, current, and future significance of the petroleum industry and the applications of associated tools, equipment, technologies and governing authorities. This course is recommended for students in grades 9-12.

II. Oil and Gas Production Systems I (credits: 1-2)

Students enrolled in this course will identify specific career opportunities, skills, abilities, tools, certification and safety measures associated with each career. Development of enhancing critical thinking skills and understanding components, systems, equipment, and production and safety regulations associated with oil and gas well production and maintenance. This course is recommended for students in grades 10-12

III. Oil and Gas Production Systems II (credits 1-3)

This course will provide an overview of specific requirements for entry into post-secondary education and employment in the oil industry. Students will research and discuss petroleum economics, modes of transportation, environmental, health and safety concerns, and different energy sources. This course will prepare students for industry certification and is recommended for students in grades 10-12.

Budgetary Information

Textbooks and technology for these programs will need to be purchased. Funding for the purchases will be through the Federal Carl Perkins Budget and Supplies and Materials will be purchased through the CTE campus allocation.

Board Policy Reference and Compliance:

EGA Legal
19 TAC 74.27(3)



Innovative Course Application 2013-2014

Instructions:

1. Complete this application with care, remembering that if the course earns state approval, this application will be shared with other districts that may want to offer the approved course. **Please Note:** This application is only to be used for newly developed courses or expired courses approved prior to 2007. Courses approved in 2007 and 2008 do not require district application.

Please see <http://www.tea.state.tx.us/curriculum/innovative/index.html> for more details.

2. Obtain the approval of your local board of trustees prior to submitting your application.
3. Submit your application via email as an attachment. Use "[District name] Innovative Course Application" as your subject line, and address the email to curriculum@tea.state.tx.us. Expect an email receipt confirmation within 5 business days.

Name of applying district or organization: United Independent School District

Complete mailing address: 4410 State Highway 359, Laredo, Texas 78043

Contact person: Mrs. Alicia Carrillo

Contact person's title: CTE Director

Contact person's email address: acarrill@uisd.net

Contact person's phone number, area code first: 956 473-2081

County District Number (if applicant is a Texas school district): 240903

Superintendent (if applicant is a Texas school district): Mr. Roberto J. Santos

Date of local board of trustees' approval of this innovative course application:

Pending Board Approval in January



Name of innovative course(s): Principles of Oil and Gas Production Systems, Oil and Gas Production Systems I, and Oil and Gas Production Systems II

(Only if this is an application for multiple levels of the same course may multiple course names be listed here. For example, an applicant may apply for approval of Latin Literature I and Latin Literature II with one submission.)

Subject area (Choose only one):

- | | |
|--|--|
| <input type="checkbox"/> English Language Arts | <input type="checkbox"/> P.E./Equivalent |
| <input type="checkbox"/> Speech | <input type="checkbox"/> Languages Other Than English |
| <input type="checkbox"/> Mathematics | <input type="checkbox"/> Fine Arts |
| <input type="checkbox"/> Science | <input type="checkbox"/> Technology Applications |
| <input type="checkbox"/> Social Studies | <input checked="" type="checkbox"/> Career and Technical Education |
| <input type="checkbox"/> Economics/Free Enterprise | <input type="checkbox"/> Other Electives |
| <input type="checkbox"/> Health | |

Number of credits that may be earned: See below **Grade level(s) to be served:** 9-11

Brief description of the course (150 words or less):

I. Principles of Oil and Gas Production Systems (credits: 1/2 -1)

This course will provide students an introduction to Oil and Gas professions including the distinction between the different career opportunities and the required certification and degree for each. Students will study the history, current, and future significance of the petroleum industry and the applications of associated tools, equipment, technologies and governing authorities. This course is recommended for students in 9-12th grade.

II. Oil and Gas Production Systems I (credits: 1-2)

Students enrolled in this program will identify specific career opportunities, skills, abilities, tools, certification and safety measures associated with each career. Development of enhancing critical thinking skills and understanding components, systems, equipment, production and safety regulations associated with oil and gas well production and maintenance. This course is recommended for students in 10-12th grade.

III. Oil and Gas Production Systems II (credits 1-3)

This course will provide students with an overview of specific requirements for entry into post-secondary education and employment in the oil industry. Research and discuss petroleum economics, modes of transportation, environmental, health and safety concerns, and different energy sources. This course prepares students for industry certification and is recommended for students in 10-12th grade.

Brief justification of how/why the course qualifies as “innovative” (i.e., essential knowledge and skills not covered in any other state-approved course) (150 words or less):

These courses are designed specifically to support the petroleum industry cluster. The current TEKS for Energy, Power, and Transportation Systems lack objectives related to this industry. This rapidly growing business sector has demonstrated a shortage of workers and most importantly has a demand for trained employees. The United Independent School District (UISD) proposes to develop CTE courses where the student can learn the industry based core competencies necessary to acquire knowledge, skills, and attributes for entry level jobs, certifications and/or degree programs in the energy industry. The high school program will coordinate with the community colleges and universities to offer articulation and dual credit courses. Through industry surveys, job analyses, industry participation and community support, we are able to conclude a collective need for an increase in qualified workers and how those workers are produced.

Essential Knowledge and Skills of the course:

These course standards should be presented in the same format as the State Board of Education-approved Texas Essential Knowledge and Skills (TEKS). You may find samples of this format in Chapters 110–130 of 19 Texas Administrative Code (TAC) at <http://www.tea.state.tx.us/rules/tac/index.html>.

Please Note: These standards should NOT be copied from the TEKS. Applications that include standards already found in the TEKS will not be approved.

Principles of Oil and Gas Production Systems (Credits: ½ to 1).

- (a) General requirements. This course is recommended for students in Grade 9
- (b) Introduction. The oil and gas industry has been rapidly expanding and is experiencing severe labor shortages due to a lack of qualified personnel. Students enrolled in this program will explore the different career opportunities and the required certification and degree for each career field. Students will also study the history, current, and future significance of the petroleum industry and the applications of the tools, equipment, technologies and governing authorities associated with the industry.
- (c) Knowledge and skills.
 - (1) The student will utilize employability characteristics that lead to success in a specified labor market. The student is expected to:
 - (A) Understand effective leadership styles, key concepts of group/team dynamics, team and individual decision-making, workforce diversity, and conflict resolution;
 - (B) Identify career development, certification, employment and entrepreneurship opportunities in the oil and gas industry, including how to search for and obtain employment and what qualifications are required for varying career fields;
 - (C) Understand how to make effective decisions, use career information, and begin to develop personal career plans;
 - (D) Understand health and safety and environmental policies, procedures, professional, ethical, and legal behavior consistent with applicable laws, regulations within oil and gas industry;
 - (E) Understand the ability to use technological resources in personal, community, and workplace environments;

- (F) Understand the oil and gas industry requirements regarding drug testing and background checks;
 - (G) Identify employers' expectations and appropriate work habits;
 - (H) Apply ethical reasoning to a variety of oil and gas workplace scenarios in order to make appropriate decisions;
 - (I) Apply competencies related to resources, information, systems, and technology;
 - (J) Understand effective oral and written communication skills with individuals from varied cultures;
 - (K) Understand the importance of compliance with safety, health, and environmental regulations.
- (2) The student learns the historical (past, present and future) significance of the petroleum industry. The student is expected to:
- (A) Understand the basic concepts/theories of the origin of oil and gas;
 - (B) Identify the scope and effect upon society of the oil and gas industry; and
 - (C) Identify potential future markets, jobs and trends for the oil and gas industry.
- (3) The student knows and understands the basic functions and applications of the tools, equipment, and materials and applies basic skills to simulated situations that are used in oil and gas operations. The student is expected to:
- (A) Identify basic tools and discuss the safe use of both hand and power tools and equipment commonly used in the oil and gas industry;
 - (B) Identify the major components in oil and gas industry systems;
 - (C) Identify necessary maintenance and service oil and gas equipment; and
 - (D) Discuss preventative maintenance plans and systems to keep oil and gas equipment systems in operation.
- (4) The student uses academic skills to understand the requirements of oil and gas operation systems and required documentation. The student is expected to:
- (A) Demonstrate communication skills in relation to customers, technicians, and others;

- (B) Prepare documentation such as quotes, invoices, bills of lading, work orders, and other reports;
- (C) Read and interpret appropriate documents such as schematics, charts, maps, diagrams, graphs, parts catalogs, and service-repair manuals and bulletins;
- (D) Identify the various methods of collecting data using survey tools and databases used in petroleum exploration;
- (E) Perform precision measurements to diagnose system components based on industry specifications;
- (F) Through the use of simulations the students will develop critical-thinking skills, and structured problem-solving skills to identify oil and gas system malfunctions, solve problems, and make decisions; and
- (G) Demonstrate knowledge of regulations that govern the construction, maintenance, and service of oil and gas systems.

Oil and Gas Production Systems I (Credits: 1-2).

(a) General requirements. This course is recommended for students in Grade 10. Prerequisite: Principles of Oil & Gas Production Systems

(b) Introduction. Students enrolled in this program will identify specific career opportunities and skills, abilities, tools, certification and safety measures associated with each career. Students will also understand components, systems, equipment, production and safety regulations associated with oil and gas wells

(c) Knowledge and skills.

(1) The student will continue to utilize employability characteristics that lead to success. The student is expected to: demonstrate effective communication skills and leadership styles.

- (A) Understand the certification requirements for entry into careers in the oil and gas industry;
- (B) Understand how to make effective decisions, use career information, and manage personal career plans;
- (C) Demonstrate the ability to use technological resources in diverse and changing personal, community, and workplace environments;

- (D) Demonstrate how to create alternative solutions by using critical and creative thinking skills;
- (E) Research and discuss health and safety policies, procedures, regulations, and practices of the oil industry; and
- (F) Research and discuss professional, ethical, and legal behavior consistent with applicable laws, regulations and organizational norms.

(2) The student will understand the history and process for drilling a well.

- (A) Describe the history of drilling for petroleum in the United States and abroad;
- (B) Describe and understand routine drilling operations, offshore drilling and new drilling technologies;
- (C) Describe the tools and techniques for directional and horizontal drilling;
- (D) Understand fishing, retrieving, and repairing pipe;
- (E) Describe the various methods for completing a well for production to begin;
- (F) Understand fluid pressure and how the flow is initiated in a new well and identify major components and discuss the purpose, design and operation of each component;
- (G) Describe activities associated with completing a well;
- (H) Briefly describe the various completion well processes and equipment;
- (I) Summarize the instruments and techniques used when logging and testing a well during drilling and completion;
- (J) List the factors that are analyzed when studying a poorly producing well; and
- (K) Identify the responsibilities, characteristics, abilities, and work behaviors of personnel that are involved in well service.

(3) The student will discuss and identify components, systems, equipment, production and safety regulations associated with oil and gas wells.

- (A) Identify the major systems and equipment used in the production of oil and gas;
- (B) Identify and describe the wellhead equipment that controls fluid flow;
- (C) Trace the process flow through the oil and gas production systems and equipment;
- (D) Discuss the purpose of the wellhead and identify the major component;
- (E) Describe the purpose, design and operation of each wellhead component;
- (F) Compare and contrast the major differences in wellhead construction between onshore and offshore facilities, as well as between various regions within the United States;
- (G) Describe the safety, health and environmental concerns, safety systems associated with working around a wellhead;
- (H) Explain how the wellhead system affects other production systems tied to the wellhead;
- (I) Describe the activities associated with monitoring and regulating well flow;
- (J) Explain the typical malfunctions associated with wellheads;
- (K) Describe the wellhead maintenance activities performed by the production technician;
- (L) Given a computer simulator, pilot plant or tabletop unit, operate and troubleshoot a wellhead; and
- (M) List the operating conditions that would warrant a manual or automatic shut-in of a well and steps involved in a manual shut-in of a well.

- (4) The students will discuss safety issues related to the oil and gas industry
 - (A) Describe the safety, health and environmental concerns associated with drilling, production and maintenance;
 - (B) Research agencies that govern the oil and gas industry.

Oil and Gas Production Systems II (Credits: 1-3).

(a) General requirements. This course is recommended for students in Grade 11. Prerequisite: Principles of Oil & Gas Production Systems and Oil and Gas Production Systems I.

(b) Introduction. Students enrolled in this program will outline specific requirements for entry into post-secondary education and employment in the oil industry; research and discuss petroleum economics; research and discuss the modes of transportation and environmental, health, safety concerns, different energy sources and prepare for industry certification.

(c) Knowledge and skills.

- (1) The student will continue to demonstrate communication skills to make effective career decisions. The student will also evaluate specific areas and sectors within the oil and gas industry to create a college/career plan for future employment with an understanding of upstream, midstream, and downstream components.
 - (A) Outline specific requirements for entry into post-secondary education and employment in the oil and gas industry;
 - (B) Apply technology skills to create an electronic portfolio of skills and abilities;
 - (C) Research the Bureau of Safety and Environmental Enforcement (BSEE), United States Coast Guard (USCG), American Petroleum Institute (API), Department of Transportation (DOT), Occupational Safety and Health Administration (OSHA), Environmental Protection Agency (EPA), American Society for Testing and Materials (ASTM), American National Standards Institute (ANSI) and others;
 - (D) Students will prepare for safety certification in required and operating areas.

(2) The student will research and discuss the modes of transportation and environmental, health, and safety concerns.

- (A) Describe evolution of transportation in the petroleum industry;
- (B) Research and access the various ground methods of transportation; and
- (C) Understand health and safety policies, procedures, regulations, and practices as it relates to transportation in the oil industry;
- (D) The student will research and discuss petroleum economics.
- (E) Understand product marketing, sales, and distribution of petroleum products;
- (F) Identify supply chain businesses that create new supplies of oil and gas;
- (G) Identify supply creation companies and how they operate;
- (H) Discuss the factors in investment decision-making; and
- (I) Be able to calculate rates of return to evaluate prospects

(3) The student will research the different methods of disposing of oil and gas waste and methods of cleanup.

- (A) Discuss the disposal methods of exploration and production wastes;
- (B) Identify cleanup methods for blowouts and spills; and
- (C) Identify refining processes that minimize environmental impact.

(4) The student will research and identify the different energy sources and priorities for the oil and gas industry;

- (A) Research the petroleum and renewable energy industry in to identify all sources;
- (B) Develop presentation of the challenges and priorities of the petroleum industry;
- (C) Research and present the critical technologies needed in the future; and
- (D) Research and present the nontechnical solutions to energy needs.

Description of the specific student needs this program is designed to meet:

According to the American Petroleum Institute, the US Oil and Gas Industry employed 2.5 million workers in 2010 with Texas holding the largest share of workers. Additionally, Texas is expected to have the largest increase in workers by 2030. Despite these numbers it has become increasingly clear that there is a significant lack of qualified workers both in the existing and expectant labor pool. In order to bridge this gap, students need to be presented with the opportunity to engage in the oil and gas industry from an earlier standpoint. Introducing the oil and gas field and its career paths at the high school level will create exposure and growing interest in the field. Moreover, since the skills taught in these courses were assessed from actual industry partners, students will be able to graduate as ready-to-work or with the necessary skills and qualification to pursue further education in related Oil and Gas fields.

Major resources and instructional materials to be used in the course:

Textbooks:

Denehy, Debby ed. Fundamentals of Petroleum 5th Edition, The University of Texas at Austin-PETEX, 2011

Conaway, Charles F. Petroleum Industry: A Non-technical Guide, PennWell Books, June 1, 1999

The Oil Patch Preparation Systems (OPPS)-Safety programs

Industry training materials: American Petroleum Institute-Classroom Curricula, Society of Petroleum Engineers-Classroom resources, Oklahoma Oil & Natural Gas resources, US Department of Energy-Toolkit for Teachers and Offshore Energy Center.

Required activities and sample optional activities to be used:

- (a) Research
- (b) Career assessment and career plan development
- (c) On-line learning
- (d) Industry speakers
- (e) Interviews with industry personnel
- (f) Multi-media-videos
- (g) On-site visit to industry sites
- (h) Written papers
- (i) Written tests
- (j) Attendance/grades
- (k) Tours/speakers of college campuses
- (l) Hands on with industry tools
- (m) Internships

**Methods for evaluating student outcomes:**

Student outcomes will be evaluated through classroom/homework assignments, independent and group projects, teacher-made tests and standardized tests. Additionally, students will create and maintain portfolios of their work

Recommended qualifications of teachers:

The district will assign certified teachers. Possible certification areas may include Agriculture Science, Business, Math, Technology Education, Trade and Industrial Education, Science or other areas determined appropriate by the district's Human Resources Department.

Additional information (optional):

UISD has the support of a cross section of the community that includes government, business and Industry to develop the oil and gas curriculum and incorporate them into our CTE program. The letters of support are from:

- (a) City of Laredo Mayor Pro tem
- (b) Webb County Judge Valdez
- (c) Laredo Chamber
- (d) Laredo Community College
- (e) Laredo Development Foundation
- (f) South Texas Development Council
- (g) Bob Zachariah-Hotels Industry
- (h) Jerry Schwebel from NASCO
- (i) Rogelio Trevino, the South Texas Workforce Solutions Board.