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Course: Oil and Gas Production IV
PEIMS Code: N1300257
Abbreviation: PRODSYS4
Grade Level(s): 11-12
Number of Credits: 1.0

Course description:

A study of the petroleum industry will be conducted from the data management perspective. Current knowledge and technical aspects of the oil and gas industry will be reviewed with regard to the various operational functionalities of well completions under various wellbore conditions. This course prepares students to assess the effects of drilling through the production formation and, choose tools and procedures for completing a drilled wellbore. This course may be taught with related courses in petroleum engineering technology.

Oil and Gas Production IV provides students industry based core competencies necessary for careers, certifications or degree programs in petroleum engineering technology.

Essential knowledge and skills:

(a) General requirements. This course is recommended for students in grades 11 and 12 and prerequisites of Oil and Gas III.
(b) Introduction.
(1) Career and technical education instruction provides content alignment with challenging academic standards and relevant knowledge and skills for students to further their education and succeed in current or emerging professions.
(2) The Agriculture, Food, and Natural Resources Career Cluster focuses on the production, processing, marketing, distribution, financing, and development of agricultural commodities and resources, including food, fiber, wood products, natural resources, horticulture, and other plant and animal products/resources.
(3) Oil and Gas Production IV is a challenging program that is designed to extend training for future petroleum engineering technicians in all areas of down and mid-stream operations. Students complete an intense core curriculum in areas that include hydrocarbon safety, drilling, petroleum geology, oil and gas exploration and production, reservoir operations, well head completions, petroleum data management operations and analysis, natural gas production, and economics. In
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Conjunction with this course, students employ the latest computer software in engineering and petroleum, operations, data mining, and geological mapping.

4. Students are encouraged to participate in extended learning experiences such as career and technical student organizations and other leadership or extracurricular organizations.

5. Statements that contain the word “including” reference content that must be mastered, while those containing the phrase “such as” are intended as possible illustrative examples.

(c) Knowledge and skills.

1. The student demonstrates professional standards/employability skills as required by business and industry. The student is expected to:
   (A) identify career development, education, and entrepreneurship opportunities in the field of agriculture, food, and natural resources;
   (B) identify careers in agriculture, food, and natural resources with required aptitudes in science, technology, engineering, mathematics, language arts, and/or social studies;
   (C) apply technology skills to create an electronic portfolio of skills and abilities;
   (D) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation in agriculture, food, and natural resources;
   (E) demonstrate knowledge of personal and occupational safety, health, environmental regulations, and first-aid policy in the workplace; and
   (F) analyze employers' expectations, including appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills.

2. The student develops a supervised agriculture experience program. The student is expected to:
   (A) plan, propose, conduct, document, and evaluate a supervised agriculture experience program as an experiential learning activity;
   (B) apply proper record-keeping skills as they relate to the supervised agriculture experience;
   (C) participate in youth leadership opportunities to create a well-rounded experience program; and
   (D) produce and participate in a local program of activities using a strategic planning process.

3. The students will explain the phases of well construction. The student is expected to:
   (A) describe the function of the well completion phase and the different hole tests used in well completions;
   (B) design the completion of the reservoir using technology such as computer designing software.
(C) describe the open hole completion and sand control completion processes; and

(D) describe conventional completions and their components and how they relate to production tubing.

(4) The student explains the concepts of safety in well completions and indicates tools and procedures for completing a drilled wellbore. The student is expected to:

(A) research health and safety standards for the workplace and environment provided by professional organizations in the oil and gas industry such as the American Chemical Society, American Institute of Chemical Engineers, Center for the Advancement of Process Technology, Gulf Coast Process Technology Alliance, American Petroleum Institute (API), Standards and Wireline Operations and Procedures and Occupational Safety & Health Administration (OSHA);

(B) identify well completion tools and equipment and their use during each well completion phase; and

(C) analyze the cost of safety during well completions.

(5) The student explains the concepts of hydraulic fracturing and its role during the well completion phase. The student is expected to:

(A) describe how the generic well design and drilling mud systems impact drilling;

(B) interpret ways in which generic platform wells, cuttings disposal routes, and drilling fluid design impact the generic well design; and

(C) evaluate the significance of reservoir formations.

(6) The student discusses the potential hazards and possible solutions of well and equipment testing. The student is expected to:

(A) evaluate potential hazards and formulate a safety plan that covers safety guidelines and equipment, including first-aid and safety uniforms;

(B) describe and accurately measure the flow of oil, gas, and water in real time;

(C) ensure precautions and measures are considered during the surface well testing; and

(D) discuss the importance of knowing the surrounding environment when well testing.

(7) The student researches the different types of coring and core analysis used in well completions and how it plays an important role in well completion. The student is expected to:

(A) describe the role of coring and core analysis in well completions;

(B) identify the relationship between the factors such as core analysis and well logging that play an active role in well completions;

(C) explain well logging and its importance in formation evaluation;
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(D) research different methods of formation testing by acquiring core samples;
(E) research drill stem testing;
(F) explain drill stem tests and their importance in measuring the flow of oil and gas in well completions; and
(G) evaluate the cost of completion operations for well completion

**Description of specific student needs this course is designed to meet:**

This course presents well completions in which formations on the well design must be evaluated to decide whether the well should be abandoned or completed for production purposes. Oil and Gas IV builds on knowledge and skills presented in Oil and Gas I-III. Students will evaluate formations on well designs to determine whether a well should be abandoned or completed.

**Major resources and materials:**


**Recommended course activities:**

On-site visits to industry sites, industry speakers, industry tools and equipment, multi-media videos, internet and library research, written compositions and group projects, formal and informal assessments.
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Suggested methods for evaluating student outcomes:

The methods for evaluating student outcomes will include student portfolios, class and homework assignments, individual and group projects, quizzes and course exams.

Teacher qualifications:

The instructor must have documented teaching and work experience in the Petroleum Engineering Technology industry and the appropriate certification(s) and postsecondary degree that enlists one or more of the following areas in the subject:

- Agriculture, Food, and Natural Resources: Grades 6-12.
- Agricultural Science and Technology: Grades 6-12.
- Any vocational agriculture certificate.
- Trade and Industrial Education: Grade 6-12. This assignment requires appropriate work approval.
- Trade and Industrial Education: Grade 68-12. This assignment requires appropriate work approval.

Additional information:

The Petroleum Engineering Technology courses were developed and enhanced to provide educational opportunities for students in grades 11 and 12 by exposing them to the academic and technical demands of career and technical education (CTE). The Permian Basin program provides 9-12 grade students opportunities for dual credit in partnership with Midland College toward Energy Technology Certification and an Associate’s Degree in Energy Technology. The Offshore Drilling Technician Certificate Program was created in collaboration with Southwest Schools in Houston, Houston Community College (HCC) – Northeast Campus, community and business industry leaders. Southwest Schools in Houston and West Texas schools were supported on this districtwide initiative from the following school stakeholders:

- Dr. Madeline Burrillo, HCC Associate Vice Chancellor – Workforce and Division of Extended Learning
- Dr. Joanna Kile, Executive Director of HCC’s Energy Institute
- Dr. Freddie Wade, HCC Director of Workforce Program Initiatives
- Dr. Ronald Dewlen, HCC – Northeast Dean of Instruction
- Curt Pervier – Dean of Career and Technical Programs for Midland College
- Mark Horner – Sr. Manager for Warren Equipment Company
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