

# Oil and Gas Production IV

Subject: Career Development and Career and Technical Education

Grade: 11

Expectations: 27

Breakouts: 69

## (a) 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 Energy Career Cluster focuses on Texas's diverse economic landscape, geography and natural resources, including renewable energy potential, transportation system, labor force, and leadership in environmental research.
3. Oil and Gas Production IV 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 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.

## (b) Knowledge and Skills Statements

- (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 oil and gas production field;
    - (i) identify career development opportunities in the oil and gas production field
    - (ii) identify education opportunities in the oil and gas production field
    - (iii) identify entrepreneurship opportunities in the oil and gas production field
  - (B) identify careers in oil and gas production with required aptitudes in science, technology, engineering, mathematics, language arts, and/or social studies;
    - (i) identify careers in oil and gas production 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;
    - (i) apply technology skills to create an electronic portfolio of skills
    - (ii) apply technology skills to create an electronic portfolio of abilities
  - (D) apply competencies related to resources, information, interpersonal skills, problem solving, critical thinking, and systems of operation;
    - (i) apply competencies related to resources

- (ii) apply competencies related to information
  - (iii) apply competencies related to interpersonal skills
  - (iv) apply competencies related to problem solving
  - (v) apply competencies related to critical thinking
  - (vi) apply competencies related to resources systems of operation
- (E) demonstrate knowledge of personal and occupational safety, health, environmental regulations, and first-aid policy in the workplace; and
- (i) demonstrate knowledge of personal safety in the workplace
  - (ii) demonstrate knowledge of occupational safety in the workplace
  - (iii) demonstrate knowledge of health in the workplace
  - (iv) demonstrate knowledge of environmental regulations in the workplace
  - (v) demonstrate knowledge of first-aid policy in the workplace
- (F) analyze employers' expectations, including appropriate work habits, ethical conduct, legal responsibilities, and good citizenship skills.
- (i) analyze employers' expectations, including appropriate work habits
  - (ii) analyze employers' expectations, including ethical conduct
  - (iii) analyze employers' expectations, including legal responsibilities
  - (iv) analyze employers' expectations, including appropriate good citizenship skills
- (2) The student explains 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;
- (i) describe the function of the well completion phase
  - (ii) describe the different hole tests used in well completions
- (B) design the completion of the reservoir using technology such as computer designing software;
- (i) design the completion of the reservoir using technology
- (C) describe the open hole completion and sand control completion processes; and
- (i) describe the open hole completion processes
  - (ii) describe the sand control completion processes
- (D) describe conventional completions and their components and how they relate to production tubing.
- (i) describe conventional completions
  - (ii) describe [the] components [of conventional completions]
  - (iii) describe how [the components of conventional completions] relate to production tubing

- (3) 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 such as Standards and Wireline Operations and Procedures and Occupational Safety and Health Administration (OSHA) and standards 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, and American Petroleum Institute (API);
    - (i) research health standards for the workplace
    - (ii) research health standards for the environment
    - (iii) research safety standards for the workplace
    - (iv) research safety standards for the environment
  - (B) identify well completion tools and equipment and their use during each well completion phase; and
    - (i) identify well completion tools
    - (ii) identify well completion equipment
    - (iii) identify [the] use [of well completion tools] during each well completion phase
    - (iv) identify [the] use [of well completion equipment] during each well completion phase
  - (C) analyze the cost of safety during well completions.
    - (i) analyze the cost of safety during well completions
- (4) 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;
    - (i) describe how the generic well design impact[s] drilling
    - (ii) describe how the 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
    - (i) interpret ways in which generic platform wells impact the generic well design
    - (ii) interpret ways in which cuttings disposal routes impact the generic well design
    - (iii) interpret ways in which drilling fluid design impacts the generic well design
  - (C) evaluate the significance of reservoir formations.
    - (i) evaluate the significance of reservoir formations
- (5) 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;
    - (i) evaluate potential hazards
    - (ii) formulate a safety plan that covers safety guidelines, including first-aid

- (iii) formulate a safety plan that covers safety guidelines, including safety uniforms
  - (iv) formulate a safety plan that covers safety equipment, including first-aid
  - (v) formulate a safety plan that covers safety equipment, including safety uniforms
- (B) describe and accurately measure the flow of oil, gas, and water in real time;
- (i) describe the flow of oil in real time
  - (ii) describe the flow of gas in real time
  - (iii) describe the flow of water in real time
  - (iv) accurately measure the flow of oil in real time
  - (v) accurately measure the flow of gas in real time
  - (vi) accurately measure the flow of water in real time
- (C) ensure precautions and measures are considered during the surface well testing; and
- (i) ensure precautions are considered during the surface well testing
  - (ii) ensure measures are considered during the surface well testing
- (D) discuss the importance of knowing the surrounding environment when well testing.
- (i) discuss the importance of knowing the surrounding environment when well testing
- (6) The student researches the different types of coring and core analysis used in well completions and how they play an important role in well completion. The student is expected to:
- (A) describe the role of coring and core analysis in well completions;
- (i) describe the role of coring in well completions
  - (ii) describe the role of 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;
- (i) identify the relationship between the factors that play an active role in well completions
- (C) explain well logging and its importance in formation evaluation;
- (i) explain well logging
  - (ii) explain [well logging's] importance in formation evaluation
- (D) research different methods of formation testing by acquiring core samples;
- (i) research different methods of formation testing by acquiring core samples
- (E) research drill stem testing;
- (i) research drill stem testing
- (F) explain drill stem tests and their importance in measuring the flow of oil and gas in well completions; and
- (i) explain drill stem tests of oil and gas in well completions
  - (ii) explain [the] importance [of drill stem tests] in measuring the flow of oil in well completions
  - (iii) explain [the] importance [of drill stem tests] in measuring the flow of gas in well completions

(G) evaluate the cost of completion operations for well completion.

(i) evaluate the cost of completion operations for well completion