Introduction to Process Technology

Subject: Career Development and Career and Technical Education
Grade: 11
Expectations: 44
Breakouts: 165

(a) Introduction.

1. Career and technical education instruction provides content aligned with challenging academic standards and relevant technical 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. In Introduction to Process Technology, students will learn the social significance and workforce impact of process

(2) The student understands common definitions, terminology, and the basic foundations related to process technology. The student is expected to:

(A) describe the types of industry utilizing process technology and identify fields related to process technology;

(i) describe the types of industry utilizing process technology

(ii) identify fields related to process technology

(B) identify and describe the career opportunities in process technology, pathways to career development, and certification requirements of industries utilizing process technology, including job responsibilities, typical work schedules, and career opportunities;

(i) identify the career opportunities in process technology

(ii) identify the pathways to career development [in process technology]

(iii) identify the certification requirements of industries utilizing process technology

(iv) describe the career opportunities in process technology, including job responsibilities

(v) describe the career opportunities in process technology, including typical work schedules

(vi) describe the career opportunities in process technology, including [various] careers

(vii) describe the pathways to career development [in process technology]

(viii) describe the certification requirements of industries utilizing process technology

(C) demonstrate the use of content such as technical concepts and vocabulary when analyzing information and following directions

(i) demonstrate the use of content when analyzing information

(ii) demonstrate the use of content when following directions

(D) identify currently emerging issues in process technology; and

(i) identify currently emerging issues in process technology

(E) identify principles of instruments and instrument technology used in industrial process technology.

(i) identify principles of instruments used in industrial process technology

(ii) identify instrument technology used in industrial process technology

(3) The student identifies and discusses types of industrial piping, valves, and basic process equipment. The student is expected to:

(A) discuss the basics of piping, valves, and equipment used in industry; and

(i) discuss the basics of piping used in industry

(ii) discuss the basics of valves used in industry

(iii) discuss the basics of equipment used in industry

(B) demonstrate the ability to read and interpret the various types of industrial drawings, diagrams, and data sheets related to industrial piping, valves, and equipment.

(i) demonstrate the ability to read the various types of industrial drawings related to industrial piping

(ii) demonstrate the ability to read the various types of industrial drawings related to industrial valves

(iii) demonstrate the ability to read the various types of industrial drawings related to industrial equipment

(iv) demonstrate the ability to read the various types of industrial diagrams related to industrial piping

(v) demonstrate the ability to read the various types of industrial diagrams related to industrial valves

(vi) demonstrate the ability to read the various types of industrial diagrams related to industrial equipment

(vii) demonstrate the ability to read the various types of industrial data sheets related to industrial piping

(viii) demonstrate the ability to read the various types of industrial data sheets related to industrial valves

(ix) demonstrate the ability to read the various types of industrial data sheets related to industrial equipment

(x) demonstrate the ability to interpret the various types of industrial drawings related to industrial piping

(xi) demonstrate the ability to interpret the various types of industrial drawings related to industrial valves

(xii) demonstrate the ability to interpret the various types of industrial drawings related to industrial equipment

(xiii) demonstrate the ability to interpret the various types of industrial diagrams related to industrial piping

(xiv) demonstrate the ability to interpret the various types of industrial diagrams related to industrial valves

(xv) demonstrate the ability to interpret the various types of industrial diagrams related to industrial equipment

(xvi) demonstrate the ability to interpret the various types of industrial data sheets related to industrial piping

(xvii) demonstrate the ability to interpret the various types of industrial data sheets related to industrial valves

(xviii) demonstrate the ability to interpret the various types of industrial data sheets related to industrial equipment

(4) The student identifies and discusses the types of industrial electrical equipment and instrumentation used in process technology. The student is expected to:

(A) demonstrate the ability to read and interpret the various types of industrial drawings, diagrams, charts, and data sheets related to industrial electrical equipment;

(i) demonstrate the ability to read the various types of industrial drawings related to industrial electrical equipment

(ii) demonstrate the ability to read the various types of industrial diagrams related to industrial electrical equipment

(iii) demonstrate the ability to read the various types of industrial charts related to industrial electrical equipment

(iv) demonstrate the ability to read the various types of industrial data sheets related to industrial electrical equipment

(v) demonstrate the ability to interpret the various types of industrial drawings related to industrial electrical equipment

(D) discuss and demonstrate how precision measuring instruments are used in industrial process technology; and

(i) discuss how precision measuring instruments are used in industrial process technology

(ii) demonstrate how precision measuring instruments are used in industrial process technology

(E) research agencies that govern safety in industrial process technology, including their authority and requirements.

(i) research agencies that govern safety in industrial process technology, including their authority

(ii) research agencies that govern safety in industrial process technology, including their requirements

(6) The student demonstrates understanding of basic industrial mathematics. The student is expected to:

(A) perform common computations required in industrial process technology using mastered calculator skills;

(i) perform common computations required in industrial process technology using mastered calculator skills

(B) determine when to convert between fractions, decimals, whole numbers, and percentages mentally, on paper, or with a calculator when required in industrial process technology

(i) determine when to convert between fractions, decimals, whole numbers, and percentages mentally, on paper, or with a calculator when required in industrial process technology

(C) identify and quantify causes and effects of uncertainties in measured data;

(i) identify causes of uncertainties in measured data

(ii) identify effects of uncertainties in measured data

(iii) quantify causes of uncertainties in measured data

(iv) quantify effects of uncertainties in measured data

(D) demonstrate how exponents, symbols, and the order of operations are used to solve real world word problems commonly seen in process technology;

(i) demonstrate how exponents are used to solve real world word problems commonly seen in process technology

(ii) demonstrate how symbols are used to solve real world word problems commonly seen in process technology

(iii) demonstrate how the order of operations are used to solve real world word problems commonly seen in process technology

(E) determine appropriate formulas to compute cross sections, surface areas, and volumes of geometric figures such as circles, squares, and cylinders;

(i) determine appropriate formulas to compute cross sections of geometric figures

(ii) determine appropriate formulas to compute surface areas of geometric figures

(iii) determine appropriate formulas to compute volumes of geometric figures

(F) estimate measurements and solve application problems involving industry drawings and data sheets using consistent units for all measurements and computation;

(i) estimate measurements involving industry drawings using consistent units for all measurements

(ii) estimate measurements involving industry drawings using consistent units for all computation

(iii) estimate measurements involving industry data sheets using consistent units for all measurements

(iv) estimate measurements involving industry data sheets using consistent units for all computation

(v) solve application problems involving industry drawings using consistent units for all mea ts

(vi) solve application problems involving industry drawings using consistent units for all com

(vii) solve application problems involving industry data sheets using consistent units for all m ents

(viii) solve application problems involving industry data sheets using consistent units for all co on

(I) determine a dimension of an object given a scaled drawing having no dimensions; and

(i) determine a dimension of an object given a scaled drawing having no dimensions

(J) represent and solve problems involving proportional relationships, including conversions between measurement systems using multiplication by a given constant factor such as unit rate.

(i) represent problems involving proportional relationships, including conversions between measurement systems using multiplication by a given constant factor

(ii) solve problems involving proportional relationships, including conversions between measurement systems using multiplication by a given constant factor

(7) The student applies concepts of critical thinking and problem solving. The student is expected to:

(A) analyze elements of a problem to develop innovative solutions;

(i) analyze elements of a problem to develop innovative solutions

(B) critically analyze information to determine value to the problem-solving task;

(i) critically analyze information to determine value to the problem-solving task

(C) analyze a variety of problem-solving strategies and critical-thinking skills; and

(E) identify and apply mathematical operations to complete calculations and specified computations, including unit conversions for a simulated process system;

(i) identify mathematical operations to complete calculations, including unit conversions for a simulated process system

(ii) identify mathematical operations to complete specified computations, including unit conversions for a simulated process system

(iii) apply mathematical operations to complete calculations, including unit conversions for a simulated process system

(iv) apply mathematical operations to complete specified computations, including unit conversions for a simulated process system

(F) explain how visual depictions, data readouts, and trends in a computer-based process simulator relate to actual valves, piping, equipment, electrical gear, and instrumentation in a process system; and

(i) explain how visual depictions in a computer-based process simulator relate to actual valves

(ii) explain how visual depictions in a computer-based process simulator relate to actual piping

(iii) explain how visual depictions in a computer-based process simulator relate to actual equipment

(iv) explain how visual depictions in a computer-based process simulator relate to actual electrical gear

(v) explain how visual depictions relate to actual instrumentation in a process system

(vi) explain how data readouts in a computer-based process simulator relate to actual valves

(vii) explain how data readouts in a computer-based process simulator relate to actual piping

(viii) explain how data readouts in a computer-based process simulator relate to actual equipment

(ix) explain how data readouts in a computer-based process simulator relate to actual electrical gear

(x) explain how data readouts depictions relate to actual instrumentation in a process system

(xi) explain how trends in a computer-based process simulator relate to actual valves

(xii) explain how trends in a computer-based process simulator relate to actual piping

(xiii) explain how trends in a computer-based process simulator relate to actual equipment

(xiv) explain how trends in a computer-based process simulator relate to actual electrical gear

(xv) explain how trends in a computer-based process simulator relate to actual instrumentation in a process system

(G) develop critical-thinking skills using simulations to identify and solve problems associated with process technology.

(i) develop critical-thinking skills using simulations to identify problems associated with process technology

(ii) develop critical-thinking skills using simulations to solve problems associated with process technology

(9) The student presents conclusions, research findings, and designs using a variety of media throughout the course. The student is expected to: