Pre-Engineering

Evaluation Form

2025 Curricular Materials Review

# Publisher information

* Publisher Name:
* Title:
* ISBN #:
* Author:
* Copyright:
* Most Recently Published Edition and Website:
* Materials provided for evaluation:
* Intended Teacher Audience(s):
* Intended Student Audience(s):
* Is this curriculum in a digital format, print format, or both?

# Instruction

## Publishing Company

* Complete the curriculum evaluation form below. Please provide written justification as to how the material meets the criterion along with location references. If a justification requires additional space, please submit a response on an additional document.

## Review Team Member:

* Please use information and attachments to complete the curriculum evaluation form.
* Explain any discrepancies between your findings and the provided information.
* Findings, explanations, and comments should directly reflect the rubric.

Scoring for Alignment to Program Standards:

To evaluate each course’s materials for alignment to [**Pre-Engineering**](https://cte.idaho.gov/wp-content/uploads/2024/08/pre-engineering-standards-2024.pdf), analyze the materials against the relevant criteria in the tables below. Instructional materials must meet most criteria and metrics to align with program standards.

| 0 Points  No Alignment | 1 Point  Partial Alignment | 2 Points  High Alignment | NA  Not Applicable |
| --- | --- | --- | --- |
| Standard for Pre-Engineering is not evident. | There is some evidence of the Standard for Pre-Engineering. | Materials explicitly align to and support the Standard for Pre-Engineering through regular and authentic engagement opportunities for students. |  |

# CONTENT STANDARD CTE PE.1.0: Professional Organizations and Leadership

### Performance Standard CTE PE.1.1 Student Leadership in Career Technical Student Organizations (CTSO) and Professional Associations

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.1.1.1 Explore the role of professional organizations and/or associations in the engineering industry. | 0 1 2 N/A |  |
| 1. CTE PE.1.1.2 Define the value, role, and opportunities provided through career technical student organizations. | 0 1 2 N/A |  |
| 1. CTE PE.1.1.3 Engage in career exploration and leadership development. | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.2.0: lab workplace safety and tool use

### Performance Standard CTE PE.2.1 Safety

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.2.1.1 Describe the role of the Occupational Safety and Health Administration (OSHA). | 0 1 2 N/A |  |
| 1. CTE PE.2.1.2 Comply with requirements for personal protection equipment (PPE). | 0 1 2 N/A |  |
| 1. CTE PE.2.1.3 Describe material handling, storage, use, and disposal requirements. | 0 1 2 N/A |  |
| 1. CTE PE.2.1.4 Interpret safety data sheets (SDS) before using materials (i.e., handling, storage use, disposal requirements). | 0 1 2 N/A |  |
| 1. CTE PE.2.1.5 Interpret safety signage for hazards, evacuation routes, and safety areas. | 0 1 2 N/A |  |
| 1. CTE PE.2.1.6 Identify the location and the types of fire extinguishers and other fire equipment. | 0 1 2 N/A |  |
| 1. CTE PE.2.1.7 Describe procedures for using fire extinguishers and other fire safety equipment. | 0 1 2 N/A |  |
| 1. CTE PE.2.1.8 Describe the requirements for using eye-wash stations. | 0 1 2 N/A |  |
| 1. CTE PE.2.1.9 Describe electrical hazards and the effects of electrical shock on the human body. | 0 1 2 N/A |  |

### Performance Standard CTE PE.2.2 Tool Identification and Safe Use

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.2.2.1 Identify hand tools and power tools, including precision measuring tools. | 0 1 2 N/A |  |
| 1. CTE PE.2.2.2 Maintain tools. | 0 1 2 N/A |  |
| 1. CTE PE.2.2.3 Match tools to their intended use and purpose. | 0 1 2 N/A |  |
| 1. CTE PE.2.2.4 Perform a safety check before using tools. | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.3.0: impact of engineering

### Performance Standard CTE PE.3.1 Engineering Careers

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.3.1.1 Define engineering. | 0 1 2 N/A |  |
| 1. CTE PE.3.1.2 Research career opportunities and the educational requirements for a given engineering field. | 0 1 2 N/A |  |
| 1. CTE PE.3.1.3 Create an education and career plan for a career in engineering. | 0 1 2 N/A |  |
| 1. CTE PE.3.1.4 Describe the importance of collaboration in the engineering industry | 0 1 2 N/A |  |

### Performance Standard CTE PE.3.2 Ethics in Engineering

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.3.2.1 Identify current engineering codes of ethics and their purpose. | 0 1 2 N/A |  |
| 1. CTE PE.3.2.2 Describe ethical engineering issues. | 0 1 2 N/A |  |
| 1. CTE PE.3.2.3 Analyze the ethical issues involved in an engineering failure. | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.4.0: engineering design process

### Performance Standard CTE PE.4.1 Design Process Concepts

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.4.1.1 Apply the steps of the design process to solve a design problem (i.e., define the problem, generate concepts, develop a solution, develop a design proposal, construct and test a prototype, refine the design, evaluate a solution, and communicate the processes and results). | 0 1 2 N/A |  |
| 1. CTE PE.4.1.2 Describe how social, environmental, regulatory, and financial constraints influence the design process. | 0 1 2 N/A |  |
| 1. CTE PE.4.1.3 Describe the evolution and lifecycle of a product (i.e., introduction, growth, maturity, decline). | 0 1 2 N/A |  |

### Performance Standard CTE PE.4.2 Measuring and Scaling

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.4.2.1 Identify imperial/standard and metric/SI units of measure and level of accuracy requirements for an engineering problem/design. | 0 1 2 N/A |  |
| 1. CTE PE.4.2.2 Convert between imperial/standard and metric/SI units of measure in an engineering problem/design. | 0 1 2 N/A |  |
| 1. CTE PE.4.2.3 Determine scale on a blueprint. | 0 1 2 N/A |  |
| 1. CTE PE.4.2.4 Apply algebraic and geometric calculations to determine size, mass, volume, and surface area in an engineering problem/design. | 0 1 2 N/A |  |
| 1. CTE PE.4.2.5 Convert between fractions and decimals in an engineering problem/design. | 0 1 2 N/A |  |
| 1. CTE PE.4.2.6 Report measurements by using and reading precision measuring tools. | 0 1 2 N/A |  |

### Performance Standard CTE PE.4.3 Technical Sketching and Drawing

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.4.3.1 Communicate ideas, using freehand sketching (e.g., pictorial, multi-view) and annotations. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.2 Produce drawings from sketches. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.3 Identify the six primary orthographic views. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.4 Identify the alphabet of lines (i.e., styles, weights) and line conventions. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.5 Apply basic elements (e.g., title block information, dimensions, and line types) in a technical drawing. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.6 Identify basic industry standard symbols on sketches, drawings, and blueprints. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.7 Produce various types of drawings (e.g., part, assembly, pictorial, orthographic, isometric, and schematic), given an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.8 Arrange dimensions and annotations, using ANSI and ISO standards for an engineering problem/design. | 0 1 2 N/A |  |
| 1. CTE PE.4.3.9 Create a bill of materials or schedule from blueprints and specifications. | 0 1 2 N/A |  |

### Performance Standard CTE PE.4.4 Engineering Documentation

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.4.4.1 Describe documentation and communication methods used in engineering. | 0 1 2 N/A |  |
| 1. CTE PE.4.4.2 Maintain documentation during the engineering design process. | 0 1 2 N/A |  |
| 1. CTE PE.4.4.3 Describe the importance of proprietary documentation (e.g., copyright, patent) in engineering. | 0 1 2 N/A |  |
| 1. CTE PE.4.4.4 Create project-management timelines for an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.4.4.5 Write a technical report for an engineering design. | 0 1 2 N/A |  |

### Performance Standard CTE PE.4.5 Modeling

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.4.5.1 Identify the areas of modeling (e.g., physical, conceptual, mathematical). | 0 1 2 N/A |  |
| 1. CTE PE.4.5.2 Create a scale model or a working prototype. | 0 1 2 N/A |  |
| 1. CTE PE.4.5.3 Evaluate the accuracy of a scale model or a working prototype. | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.5.0: Materials

### Performance Standard CTE PE.5.1 Material Properties

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.5.1.1 Identify the major categories of materials (e.g., ceramics, composites, polymers, metals) and their applications. | 0 1 2 N/A |  |
| 1. CTE PE.5.1.2 Describe the characteristics of materials by their applications in engineering. | 0 1 2 N/A |  |
| 1. CTE PE.5.1.3 Describe the cost and environmental factors that affect choosing specific materials for a design process. | 0 1 2 N/A |  |
| 1. CTE PE.5.1.4 Differentiate among raw material, standard stock, and finished products. | 0 1 2 N/A |  |

### Performance Standard CTE PE.5.2 Materials Strength

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.5.2.1 Describe the various forms of stress (e.g., compression, tension, torque, and shear) and how they affect materials selection for an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.2 Describe the fundamental principles of a stress-strain curve. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.3 Create free-body diagrams of objects, identifying all forces acting on the object. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.4 Differentiate between scalar and vector quantities. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.5 Define magnitude, direction, and sense of a vector. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.6 Measure the magnitude, direction, and sense of a vector. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.7 Define moment and torque forces. | 0 1 2 N/A |  |
| 1. CTE PE.5.2.8 Calculate moment and torque forces in an engineering design. | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.6.0: fundamental power systems and energy principles

### Performance Standard CTE PE.6.1 Basic Mechanical Systems

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.6.1.1 Distinguish among the characteristics and components of the six simple machines. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.2 Measure forces and distances related to mechanisms in an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.3 Determine efficiency in a mechanical system. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.4 Calculate mechanical advantage and drive ratios of mechanisms. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.5 Calculate work, power, and torque/moment. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.6 Design a basic mechanical system. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.7 Assemble a basic mechanical system. | 0 1 2 N/A |  |
| 1. CTE PE.6.1.8 Test a basic mechanical system. | 0 1 2 N/A |  |

### Performance Standard CTE PE.6.2 Power Systems and Energy Forms

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.6.2.1 Identify the types of basic power systems, components, and related terminology (e.g., energy, potential energy, kinetic energy, power, work, horsepower, watts). | 0 1 2 N/A |  |
| 1. CTE PE.6.2.2 Describe the factors that affect the choice of power system in an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.6.2.3 Calculate the efficiency of power systems and conversion devices. | 0 1 2 N/A |  |
| 1. CTE PE.6.2.4 Categorize major forms of energy (e.g., thermal, radiant, nuclear, chemical, electrical, mechanical, fluid). | 0 1 2 N/A |  |
| 1. CTE PE.6.2.5 Define units used to measure energy. | 0 1 2 N/A |  |
| 1. CTE PE.6.2.6 Calculate conversions between common energy measurements in an engineering design. | 0 1 2 N/A |  |
| 1. CTE PE.6.2.7 Describe the purpose and function of an energy conversion device (e.g., solar panel, windmill, battery, turbine). | 0 1 2 N/A |  |

### Performance Standard CTE PE.6.3 Energy Sources and Applications

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.6.3.1 Categorize various energy sources as nonrenewable, renewable, or inexhaustible. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.2 Measure circuit values, using a multimeter. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.3 Calculate power in a system that converts energy from electrical to mechanical. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.4 Determine the efficiency of a system that converts an electrical input to a mechanical output. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.5 Describe the relationship of voltage, current, and resistance. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.6 Calculate values of current, resistance, and voltage in a circuit, using Ohm’s law. | 0 1 2 N/A |  |
| 1. CTE PE.6.3.7 Create series and parallel circuits, using the basic laws of electricity and Kirchhoff’s law. | 0 1 2 N/A |  |

### Performance Standard CTE PE.6.4 Automation Systems

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.6.4.1 Create detailed operational flowcharts and logic in a system-control program. | 0 1 2 N/A |  |
| 1. CTE PE.6.4.2 Select appropriate input and output devices, based on system specifications and constraints. | 0 1 2 N/A |  |
| 1. CTE PE.6.4.3 Differentiate between the attributes of digital and analog devices. | 0 1 2 N/A |  |
| 1. CTE PE.6.4.4 Compare open and closed loop systems. | 0 1 2 N/A |  |
| 1. CTE PE.6.4.5 Design a control system, based on specifications and constraints. | 0 1 2 N/A |  |

### Performance Standard CTE PE.6.5 Basic Fluid Systems

| Student Competencies by Performance Standard | Meets Criteria | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions in addition to page numbers. |
| --- | --- | --- |
| 1. CTE PE.6.5.1 Define fluid systems (e.g., hydraulic, pneumatic, vacuum). | 0 1 2 N/A |  |
| 1. CTE PE.6.5.2 Identify the components of fluid systems and their functions. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.3 Compare hydraulic and pneumatic systems. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.4 Identify the advantages and disadvantages of using fluid power systems. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.5 Describe the difference between gauge pressure and absolute pressure. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.6 Describe the safety concerns of working with liquids and gases under pressure. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.7 Calculate mechanical advantage, using Pascal’s law. | 0 1 2 N/A |  |
| 1. CTE PE.6.5.8 Calculate values in a pneumatic system, using the ideal gas law (i.e., general gas equation). | 0 1 2 N/A |  |

# CONTENT STANDARD CTE PE.7.0: analysis of designs and prototypes

### Performance Standard CTE PE.7.1 Statistics

| Student Competencies by Performance Standard | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. CTE PE.7.1.1 Define statistical terminology (e.g., mean, mode, median, range, standard deviation). | 0 1 2 N/A |  |
| 1. CTE PE.7.1.2 Illustrate frequency distribution. | 0 1 2 N/A |  |
| 1. CTE PE.7.1.3 Calculate the central tendency of a data array to include mean, median, and mode. | 0 1 2 N/A |  |
| 1. CTE PE.7.1.4 Calculate data variation to include range, standard deviation, and variance. | 0 1 2 N/A |  |

Scoring for Best Practices and Assessment

| 0 Points  No Alignment | 1 Point  Partial Alignment | 2 Points  High Alignment | NA  Not Applicable |
| --- | --- | --- | --- |
| There is no evidence of the teaching practice. | The teaching practice is embedded in some lessons. | Materials regularly embed supports for teachers to implement best practices and assessment. |  |

Scoring for Alignment to Best Practices and Assessment:

| Best Practices and Assessments | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. Materials contain clear statements and explanations of purpose, goals, and learning outcomes. | 0 1 2 N/A |  |
| 1. Materials are systematic and sequential – prerequisite skills taught first and vertically aligned appropriately. | 0 1 2 N/A |  |
| 1. Materials include formative and summative assessments and/or test data banks that allow the instructor to edit materials when appropriate. | 0 1 2 N/A |  |
| 1. Digital materials and assessments are easy to edit and revise and access to distribute and/or print. | 0 1 2 N/A |  |

Scoring for Additional Indicators of Quality Materials

| 0 Points  No Alignment | 1 Point  Partial Alignment | 2 Points  High Alignment | NA  Not Applicable |
| --- | --- | --- | --- |
| There is no evidence of differentiation elements or engaging tools. | There is some evidence of differentiation elements or engaging tools. | Materials include differentiation elements as well as engaging tools. |  |

Scoring for Alignment to Additional Indicators of Quality Materials:

| Indicators of Quality Materials | Meets Criteria | Justification or Comments |
| --- | --- | --- |
| 1. Materials provide instructional strategies to accommodate the learning differences of all students. | 0 1 2 N/A |  |
| 1. Materials are available in language(s) other than English. | 0 1 2 N/A |  |
| 1. The material has an aesthetically appealing appearance. | 0 1 2 N/A |  |
| 1. Digital and print materials are consistently formatted, visually focused, and uncluttered for efficient use. | 0 1 2 N/A |  |
| 1. The illustrations clearly cross-reference the text, are directly relevant to the content (not simply decorative), and promote thinking, discussion, and problem solving. | 0 1 2 N/A |  |

Scoring for Best Practices in the Use of Technology

| 0 Points  No Alignment | 1 Point  Partial Alignment | 2 Points  High Alignment | NA  Not Applicable |
| --- | --- | --- | --- |
| There is no evidence of best practices in using technology. | There is some evidence of best practices in using technology. | Materials include best practices in using technology. |  |

Use of Technology

| **Use of Technology** | **Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers.** |
| --- | --- |
| 1. Technology and digital media support, extend, and enhance learning experiences. |  |
| 1. The material has “platform neutral” technology (i.e., cloud based) and availability for networking. |  |
| 1. The material has a user-friendly and interactive interface allowing the user to control (shift among activities). |  |

For Questions Contact

Content & Curriculum – Curricular Materials

Idaho Department of Education

650 W State Street, Boise, ID 83702

208 332 6800 | www.sde.idaho.gov