Engineering Design & Presentation I (Proc 24)

PRE-TEST/POST-TEST TEKS BLUEPRINT

Pre-Test/Post-Test Development Overview

TEKS Addressed Selection Process

The Texas Essential Knowledge & Skills (TEKS) included in the course pre-test and post-test were selected for their direct relevance to the course content. This selection process was guided by the goal of assessing learners' understanding of specific topics and skills that are integral to the course. As a result, TEKS related to general employability skills or broader topics were often excluded. This focus ensures that the assessments accurately measure students' mastery of the subject matter, allowing educators to gain a clear insight into areas where students excel or may need additional support. By concentrating on content-specific TEKS, the tests provide a more precise evaluation of the students' knowledge and understanding of the core material.

Test Question Development Process

The questions created for the pre-test and post-test were designed using psychometric principles to ensure they are of high quality and fairness. This approach helps to accurately assess student understanding. These principles guide the development of questions to be reliable, valid, and free from bias, ensuring that they effectively measure the knowledge and skills the students are expected to acquire in the course.

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Knowledge & Skills Statement	Student Expectation	iCEV Lesson Title
(2) The student gains knowledge of and demonstrates the skills necessary for success in the workplace. The student is expected to:	(D) demonstrate the principles of teamwork related to engineering and technology;	Engineering Teams
(2) The student gains knowledge of and demonstrates the skills necessary for success in the workplace. The student is expected to:	(E) research and describe governmental regulations, including health and safety;	Ethics in Engineering Design
(2) The student gains knowledge of and demonstrates the skills necessary for success in the workplace. The student is expected to:	(F) analyze ethical issues related to engineering and technology and incorporate proper ethics in submitted project;	Ethics in Engineering Design
(3) The student participates in team projects in various roles. The student is expected to:	(B) apply teamwork to solve problems; and	Engineering Teams
(3) The student participates in team projects in various roles. The student is expected to:	(C) serve as both a team leader and member and demonstrate appropriate attitudes while participating in team projects.	Engineering Teams
(4) The student develops skills for managing a project. The student is expected to:	(A) implement project management methodologies, including initiating, planning, executing, monitoring and controlling, and closing	Engineering Design Methodologies
(4) The student develops skills for managing a project. The student is expected to:	(B) develop a project schedule and complete work according to established criteria;	Engineering Design Methodologies
(4) The student develops skills for managing a project. The student is expected to:	(C) participate in the organization and operation of a real or simulated engineering project; and	Engineering Design Methodologies
(4) The student develops skills for managing a project. The student is expected to:	(D) develop a plan for production of an individual product.	Engineering Design Methodologies
(5) The student practices safe and proper work habits. The student is expected to:	(A) master relevant safety tests;	Lab Safety: Engineering Presentation
(5) The student practices safe and proper work habits. The student is expected to:	(B) comply with safety guidelines as described in various manuals, instructions, and regulations;	Lab Safety: Engineering Presentation
(5) The student practices safe and proper work habits. The student is expected to:	(C) identify and classify hazardous materials and wastes according to Occupational Safety and Health Administration (OSHA) regulations;	Lab Safety: Engineering Presentation
(5) The student practices safe and proper work habits. The student is expected to:	(D) describe the appropriate disposal of hazardous materials and wastes appropriately;	Lab Safety Procedures: Engineering Presentation
(5) The student practices safe and proper work habits. The student is expected to:	(E) perform maintenance on selected tools, equipment, and machines;	Lab Safety: Engineering Presentation
(5) The student practices safe and proper work habits. The student is expected to:	(F) handle and store tools and materials correctly; and	Production Design
(5) The student practices safe and proper work habits. The student is expected to:	(G) describe the results of negligent or improper maintenance.	Lab Safety: Engineering Presentation
(6) The student applies skills associated with computer-aided drafting and design.The student is expected to:	(A) use single and multi-view projections;	Principles of Computer-Aided Drawing
(6) The student applies skills associated with computer-aided drafting and design.The student is expected to:	(B) use orthographic and pictorial views;	Principles of Computer-Aided Drawing
(6) The student applies skills associated with computer-aided drafting and design.The student is expected to:	(C) use auxiliary views;	Principles of Computer Aided-Drawing
(6) The student applies skills associated with computer-aided drafting and design.The student is expected to:	(D) use section views;	Principles of Computer-Aided Drawing
(6) The student applies skills associated with computer-aided drafting and design.The student is expected to:	(E) use advanced construction techniques;	Principles of Computer-Aided Drawing
(6) The student applies skills associated with computer-aided drafting and design.The student is expected to:	(F) prepare and revise annotated multi dimensional production drawings in computer aided drafting and design to industry standards;	Principles of Computer-Aided Drawing
(6) The student applies skills associated with computer-aided drafting and design.The student is expected to:	(G) apply best practices for effective file structure and management;	Principles of Computer-Aided Drawing
(6) The student applies skills associated with computer-aided drafting and design.The student is expected to:	(H) use advanced dimensioning techniques;	Principles of Computer-Aided Drawing

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(6) The student applies skills associated with computer-aided drafting and design.The student is expected to:	(I) construct and use basic 3D parametric drawings; and	Principles of Computer-Aided Drawing
(6) The student applies skills associated with computer-aided drafting and design.The student is expected to:	(J) develop and use prototype drawings for presentation.	Principles of Computer-Aided Drawing
(7) The student uses engineering design methodologies. The student is expected to:	(A) describe principles of ideation and apply ideation techniques for an engineering project;	Engineering Design Methodologies
(7) The student uses engineering design methodologies. The student is expected to:	(B) demonstrate critical thinking, identify the solution constraints, and make fact-based decisions;	Engineering Design Methodologies
(7) The student uses engineering design methodologies. The student is expected to:	(C) develop or improve a product using rational thinking;	Engineering Design Methodologies
(7) The student uses engineering design methodologies. The student is expected to:	(D) apply decision-making strategies when developing solutions;	Engineering Design Methodologies
(7) The student uses engineering design methodologies. The student is expected to:	(E) use an engineering notebook to record prototypes, corrections, and/or mistakes in the design process; and	Engineering Design Methodologies
(7) The student uses engineering design methodologies. The student is expected to:	(F) use an engineering notebook or portfolio to record the final design, construction, and manipulation of finished projects.	Production Design
(8) The student applies concepts of engineering to specific problems. The student is expected to:	(A) design components using a variety of technologies;	Protyping
(8) The student applies concepts of engineering to specific problems. The student is expected to:	(B) investigate the applications of different types of computer-aided drafting and design software for various engineering problems; and	Protyping
(8) The student applies concepts of engineering to specific problems. The student is expected to:	(C) use multiple software applications for concept presentations.	Prototyping
(9) The student designs products using appropriate design processes and techniques. The student is expected to:	(B) identify areas where quality, reliability, and safety can be designed into a product;	Prototyping
(9) The student designs products using appropriate design processes and techniques. The student is expected to:	(C) modify a product design to meet a specified need;	Prototyping
(9) The student designs products using appropriate design processes and techniques. The student is expected to:	(D) produce engineering drawings to industry standards; and	Principles of Computer-Aided Drawing
(9) The student designs products using appropriate design processes and techniques. The student is expected to:	(E) describe potential patents and the patenting process.	Production Design
(9) The student designs products using appropriate design processes and techniques. The student is expected to:	A) interpret engineering drawings;	Principles of Computer-Aided Drawing
(10) The student builds a prototype using the appropriate tools, materials, and techniques. The student is expected to:	(A) identify and describe the steps needed to produce a prototype;	Prototyping
(10) The student builds a prototype using the appropriate tools, materials, and techniques. The student is expected to:	(B) identify and use appropriate tools, equipment, machines, and materials to produce the prototype; and	Prototyping
(10) The student builds a prototype using the appropriate tools, materials, and techniques. The student is expected to:	(C) present the prototype using a variety of media.	Prototyping
(11) The student creates justifiable solutions to open-ended real-world problems using engineering design practices and processes. The student is expected to:	(A) identify and define an engineering problem;	Production Design
(11) The student creates justifiable solutions to open-ended real-world problems using engineering design practices and processes. The student is expected to:	(B) formulate goals, objectives, and requirements to solve an engineering problem;	Engineering Design Methodologies
(11) The student creates justifiable solutions to open-ended real-world problems using engineering design practices and processes. The student is expected to:	(C) determine the design parameters such as materials, personnel, resources, funding, manufacturability, feasibility, and time associated with an engineering problem;	Production Design
(11) The student creates justifiable solutions to open-ended real-world problems using engineering design practices and processes. The student is expected to:	(D) establish and evaluate constraints, including health, safety, social, environmental, ethical, political, regulatory, and legal, pertaining to a problem;	Engineering Design & Presentation

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Knowledge & Skills Statement	Student Expectation	iCEV Lesson Title
(11) The student creates justifiable solutions to open-ended real-world problems using engineering design practices and processes. The student is expected to:	(E) identify or create alternative solutions to a problem using a variety of techniques such as brainstorming, reverse engineering, and researching engineered and natural solutions;	Engineering Design & Presentation
(11) The student creates justifiable solutions to open-ended real-world problems using engineering design practices and processes. The student is expected to:	(F) test and evaluate proposed solutions using tools and methods such as models, prototypes, mock-ups, simulations, critical design review, statistical analysis, or experiments; and	Engineering Design Methodologies
(11) The student creates justifiable solutions to open-ended real-world problems using engineering design practices and processes. The student is expected to:	(G) apply structured techniques such as a decision tree, design matrix, or cost-benefit analysis to select and justify a preferred solution to a problem.	Engineering Design & Presentation