Alignment of Texas Pre-Admission Content Test (PACT) Technology Education: Grades 6–12 (771) Framework with Texas Essential Knowledge and Skills

This alignment study identifies the Texas Essential Knowledge and Skills that are addressed in whole or in part by each competency of the exam framework. An indication of alignment does not necessarily imply complete congruence of the content of an exam competency with the relevant standard. The information in this document is subject to change if revisions are made to the exam framework. Any changes will fully supersede the information contained in this document.

Competencies		Texas Essential Knowledge and Skills
Field: 771: TX PACT: Technology Education: Grades 6–12		**Texas Essential Knowledge and Skills for Career and Technical Education**
Content Domain I **FOUNDATIONS AND DESIGN**		
001	Understand the scope and core concepts of technology education.	**Grades 6–12:** **130.302 c 1** Principles of Information Technology. The student demonstrates professional standards/employability skills as required by business and industry. **130.302 c 3** Principles of Information Technology. The student uses evolving and emerging technologies to exchange information. **130.311 c 7** Computer Technician Practicum. The student applies the essential knowledge and skills for computer technologies to career preparation, job shadowing, mentoring, or apprenticeship training in simulated and actual work situations. **130.312 c 5** Practicum in Information Technology. The student creates a technological solution for a problem in the field of IT.

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002	Understand the relationships among technology, society and the environment, and connections between technology and other fields.	**Grades 6–12:** **130.404 c 1** Principles of Technology. The student demonstrates professional standards/employability skills as required by business and industry. **130.82 c 2** The student applies English language arts in Arts, Audio/Video Technology, and Communication projects. **130.83 c 2; 130.84 c 2; 130.85 c 2; 130.86 c 2** The student applies academic knowledge and skills in animation projects. **130.87 c 2; 130.88 c 2; 130.91 c 2; 130.92 c 2** The student applies academic knowledge and skills in audio and video projects. **130.89 c 2; 130.90 c 2** The student applies academic knowledge and skills in production projects. **130.94 c 2; 130.95 c 2; 130.96 c 2; 130.97 c 2; 130.98 c 2; 130.99 c 2; 130.100 c 2; 130.101 c 2** The student applies academic knowledge and skills in printing and imaging projects.
003	Understand engineering design and its role in technology.	**Grades 6–12:** **130.402 c 2** Principles of Applied Engineering. The student investigates the components of engineering and technology systems. **130.402 c 6** Principles of Applied Engineering. The student thinks critically and applies fundamental principles of system modeling and design to multiple design projects. **130.408 c 9** Robotics I. The student uses engineering design methodologies. **130.409 c 10** Robotics II. The student uses engineering design methodologies. **130.410 c 7** Engineering Design and Presentation I. The student uses engineering design methodologies. **130.411 c 7** Engineering Design and Presentation II. The student uses engineering design methodologies. **130.412 c 5** Engineering Design and Problem Solving. The student applies knowledge of science and mathematics and the tools of technology to solve engineering design problems.

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		130.412 c 8 Engineering Design and Problem Solving. The student creates justifiable solutions to open-ended real-world problems using engineering design practices and processes. **130.412 c 9** Engineering Design and Problem Solving. The student manages an engineering design project. **130.413 c 9** Engineering Mathematics. The student applies mathematical principles of material engineering, including tensile strength analysis, data acquisition systems, compression testing and analysis, shear and hardness testing and analysis, and design evaluation. **130.414 c 15** Engineering Science. The student demonstrates an understanding of statistics and applies the concepts to real-world engineering design problems. **130.414 c 16** Engineering Science. The student demonstrates an understanding of kinematics in one and two dimensions and applies the concepts to real-world engineering design problems.
004	Understand the role of research and development, experimentation and invention, and troubleshooting in technology.	**Grades 6–12:** **130.302 c 6** Principles of Information Technology. The student analyzes network systems. **130.302 c 8** Principles of Information Technology. The student applies spreadsheet technology. **130.302 c 13** Principles of Information Technology. The student understands and demonstrates legal and ethical procedures as they apply to the use of information technology. **130.304 c 2** Computer Maintenance Lab. The student applies academic skills to the requirements of computer technologies. **130.304 c 3** Computer Maintenance Lab. The student demonstrates the proper function and application of the tools, equipment, and materials used in computer technologies. **130.402 c 2** Principles of Applied Engineering. The student investigates the components of engineering and technology systems.

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		130.402 c 3 Principles of Applied Engineering. The student presents conclusions, research findings, and designs using a variety of media throughout the course. **130.403 c 2** Principles of Biosciences. The student explores biotechnology career opportunities. **130.403 c 7** The student investigates the origins of waste and examines the relationship of biotechnology to resource recovery. **130.404 c 4; 130.412 c 4; 130.414 c 4; 130.415 c 4; 130.416 c 4; 130.417 c 4** The student uses critical thinking, scientific reasoning, and problem solving to make informed decisions within and outside the classroom. **130.410 c 8** Engineering Design and Presentation I. The student applies concepts of engineering to specific problems. **130.412 c 8** Engineering Design and Problem Solving. The student creates justifiable solutions to open-ended real-world problems using engineering design practices and processes. **130.414 c 3; 130.415 c 3; 130.416 c 3; 130.417 c 3** The student uses scientific methods and equipment during laboratory and field investigations. **130.416 c 10** Biotechnology II. The student communicates conclusions clearly and concisely to an audience of professionals.
005	Understand safety.	**Grades 6–12:** **130.82 c 14; 130.87 c 7; 130.89 c 7** The student applies safety regulations. **130.83 c 6** The student applies cyber safety procedures. The student is expected to implement personal and professional safety rules and regulations. **130.311 c 6** Information Technology. The student knows the proper function and application of the tools, equipment, technologies, and materials used in computer technologies. **130.352 c 5; 130.353 c 6; 130.354 c 7** The student practices safe work habits.
Content Domain II **ENERGY AND POWER TECHNOLOGY**		

Competencies		Texas Essential Knowledge and Skills
Field: 771: TX PACT: Technology Education: Grades 6–12		**Texas Essential Knowledge and Skills for Career and Technical Education**
006	Understand principles and characteristics of energy and power technology and of energy resources.	**Grades 6–12:** **130.11 c 1; 130.460 c 1** Energy and Natural Resource Technology. The student demonstrates professional standards/employability skills as required by business and industry. **130.11 c 4** Energy and Natural Resource Technology. The student discusses the importance and scope of natural resources. **130.12 c 12** Advanced Energy and Natural Resource Technology. The student learns the processes for producing energy and green products from agricultural, biomass, fossil fuel, wind, solar, and geothermal sources.
007	Understand principles and processes related to electrical energy.	**Grades 6–12:** **130.26 c 4** Mechanics and Metal Technologies. The student identifies and performs electrical wiring skills. **130.27 c 4** Agricultural Structures, Design, and Fabrication. The student explores the different types of power systems used in agricultural structures. **130.57 c 5** Electrical Technology I. The student learns the electrical concepts used in Ohm's law applied to direct current and series circuits and understands series parallel circuits, resistive circuits, Kirchhoff's voltage and current laws, and circuit analysis. **130.57 c 6** Electrical Technology I. The student gains knowledge in selecting, using, and safely maintaining common electrical test equipment. **130.57 c 11** Electrical Technology I. The student learns the electrical devices and wiring techniques used in commercial and industrial construction and maintenance. **130.356 c 4** Manufacturing Engineering Technology II. The student performs functions and solves problems in the electricity and electronics field.

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008	Understand components and operating principles of motors, engines, and mechanical systems.	**Grades 6–12:** **130.445 c 8** Small Engine Technology I. The student demonstrates an understanding of technical knowledge and skills of small engine technology. **130.445 c 9** Small Engine Technology I. The student applies technical knowledge and skills in simulated or actual work situations. **130.446 c 5** Small Engine Technology II. The student identifies the skills used to maintain and operate a small engine maintenance facility. **130.446 c 6** Small Engine Technology II. The student applies appropriate research methods to small engine technology topics. **130.446 c 9** Small Engine Technology II. The student demonstrates advanced technical knowledge and skills of small engine technology. **130.446 c 10** Small Engine Technology II. The student demonstrates advanced technical knowledge and skills in simulated or actual work situations.
Content Domain III **INFORMATION AND COMMUNICATION TECHNOLOGY**		

Competencies		Texas Essential Knowledge and Skills
Field: 771: TX PACT: Technology Education: Grades 6–12		**Texas Essential Knowledge and Skills for Career and Technical Education**
009	Understand principles and characteristics of information and communication technology.	**Grades 6–12:** **130.302 c 1; 130.304 c 1; 130.305 c 1; 130.306 c 1; 130.307 c 1; 130.308 c 1; 130.311 c 1; 130.312 c 1** Information Technology. The student demonstrates professional standards/employability skills as required by business and industry. **130.302 c 2** Information Technology. The student identifies various employment opportunities in the IT field. **130.302 c 3** Information Technology. The student uses evolving and emerging technologies to exchange information. **130.302 c 4** Information Technology. The student demonstrates knowledge of the hardware components associated with information systems. **130.302 c 5** Information Technology. The student demonstrates knowledge of the different software associated with information systems. **130.302 c 6** Information Technology. The student analyzes network systems. **130.303 c 2** Information Technology. The student identifies various employment opportunities in the IT field. **130.303 c 4** Information Technology. The student acquires an understanding of computer hardware technologies. **130.303 c 7** Information Technology. The student acquires knowledge of the theory behind the installation, configuration of software programs, and updates in IT systems. **130.303 c 8** Information Technology. The student acquires knowledge of the installation and configuration of network connections. **130.304 c 4** Information Technology. The student applies the concepts and skills of the trade in simulated work situations. **130.304 c 6** Information Technology. The student uses troubleshooting skills to solve client problems. **130.305 c 4** Information Technology. The student analyzes various types of configurations and upgrading. **130.307 c 2** Information Technology. The student identifies employment opportunities in the IT field with a focus in the area of digital media.

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010	Understand drafting processes.	**Grades 6–12:** **130.48 c 4** Construction Technology. The student interprets architectural and engineering working drawings and specifications. **130.53 c 2** Architectural Design I. The student applies key cognitive skills and academic behaviors to the requirements of architectural studies. **130.53 c 3** Architectural Design I. The student knows the concepts and skills that form the technical knowledge of architectural design. **130.53 c 4** Architectural Design I. The student knows the function and application of the tools, equipment, technologies, and materials used in architectural drawing. **130.53 c 5** Architectural Design I. The student applies the concepts and skills of the profession to simulated or actual work situations. **130.54 c 4** Architectural Design II. The student knows the function and application of the tools, equipment, technologies, and materials used in architectural computer-aided design. **130.54 c 5** Architectural Design II. The student applies the concepts and skills of the trade to simulated and actual work situations. **130.106, 107 c 11** Graphic Design and Illustration I, and Graphic Design and Illustration I Lab. The student develops an increasing understanding of graphic design and illustration. **130.108 c 9** Graphic Design and Illustration II. The student develops an advanced understanding of graphic design and illustration. **130.122 c 6** Extended Practicum in Graphic Design and Illustration. The student participates in a graphic design and illustration experience.

Competencies		Texas Essential Knowledge and Skills
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011	Understand principles and characteristics of graphic communication.	**Grades 6–12:** **130.308 c 6** Information Technology. The student creates and modifies web and digital media designs. **130.82 c 10** Principles of Arts, Audio/Video Technology, and Communications. The student understands principles of graphic design and illustration. **130.106, 107 c 11** Graphic Design and Illustration I, and Graphic Design and Illustration I Lab. The student develops an increasing understanding of graphic design and illustration. **130.106, 107 c 12** Graphic Design and Illustration I, and Graphic Design and Illustration I Lab. The student researches the history and evolution of art and design. **130.106, 107 c 13** Graphic Design and Illustration I, and Graphic Design and Illustration I Lab. The student conducts oral or written critiques of designs. **130.106, 107 c 14** Graphic Design and Illustration I, and Graphic Design and Illustration I Lab. The student demonstrates an understanding of artistic design. The student is expected to analyze and apply art elements and principles in photographic works, multimedia applications, and digital and print media. **130.106, 107 c 15** Graphic Design and Illustration I, and Graphic Design and Illustration I Lab. The student employs a creative design process to create original two- or three-dimensional projects. **130.108 c 9** Graphic Design and Illustration II. The student develops an advanced understanding of graphic design and illustration. **130.109 c 8** Graphic Design and Illustration II Lab. The student develops an advanced understanding of graphic design and illustration. **130.109 c 9** Graphic Design and Illustration II Lab. The student participates in oral or written critiques of designs. **130.109 c 10** Graphic Design and Illustration II Lab. The student employs a creative design process to create original two- or three-dimensional projects. **130.122 c 6** Extended Practicum in Graphic Design and Illustration. The student participates in a graphic design and illustration experience.

Competencies		Texas Essential Knowledge and Skills
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012	Understand the processes and procedures of electronic communication.	**Grades 6–12:** **130.110 c 11** Professional Communications. The student develops an understanding of professional communications through exploration of the Arts, Audio/Video Technology, and Communications Career Cluster.
Content Domain IV **TRANSPORTATION TECHNOLOGY**		
013	Understand principles and characteristics of transportation technology.	**Grades 6–12:** **130.442 c 1** Principles of Transportation Systems. The student demonstrates professional standards/employability skills as required by business and industry. **130.442 c 2** Principles of Transportation Systems. The student develops leadership experience as it relates to transportation systems. **130.442 c 3** Principles of Transportation Systems. The student explores concepts related to cultural diversity. **130.442 c 4** Principles of Transportation Systems. The student understands the historical, current, and future significance of the transportation industries. **130.442 c 6** Principles of Transportation Systems. The student explains the transportation industries at the local, state, national, and international levels.

Competencies		Texas Essential Knowledge and Skills
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014	Understand the processes and procedures used in transportation technology.	**Grades 6–12:** **130.442 c 8** Principles of Transportation Systems. The student applies appropriate research methods for transportation systems. **130.442 c 12** Principles of Transportation Systems. The student examines Texas Department of Public Safety regulations as related to the transportation industry.
015	Understand the appropriate selection and use of resources in transportation technology industries.	**Grades 6–12:** **130.442 c 4** Principles of Transportation Systems. The student understands the historical, current, and future significance of the transportation industries. **130.442 c 6** Principles of Transportation Systems. The student explains the transportation industries at the local, state, national, and international levels. **130.444 c 4** Principles of Transportation Systems. The student knows the functions and applications of the tools, equipment, technologies, and materials used in transportation technology.
Content Domain V **MANUFACTURING TECHNOLOGY**		

Competencies		Texas Essential Knowledge and Skills
Field: 771: TX PACT: Technology Education: Grades 6–12		**Texas Essential Knowledge and Skills for Career and Technical Education**
016	Understand principles and characteristics of manufacturing technology.	**Grades 6–12:** **130.352-367 c 1** The student demonstrates professional standards/employability skills as required by business and industry. **130.352 c 5** Principles of Manufacturing. The student practices safe work habits. **130.352 c 8** Principles of Manufacturing. The student selects and reports on career opportunities, requirements, and expectations in manufacturing and technology. **130.353-354 c 2** The student applies academic skills to the requirements of manufacturing. **130.357 c 2** Metal Fabrication and Machining I. The student applies academic skills to the requirements of metal manufacturing. **130.357 c 3** Metal Fabrication and Machining I. The student differentiates the technical concepts that form the knowledge and skills of metal manufacturing. **130.358 c 2** Metal Fabrication and Machining II. The student describes the importance of teamwork, leadership, integrity, honesty, work habits, and organizational skills. **130.358 c 3** Metal Fabrication and Machining II. The student applies advanced academic skills to the requirements of metal fabrication and machining. **130.363 c 3** Welding I. The student applies academic skills to the requirements of welding. **130.366 c 5** Practicum in Manufacturing. The student demonstrates technical knowledge and skills required to pursue a career in the manufacturing cluster.

Competencies		Texas Essential Knowledge and Skills
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017	Understand the processes and procedures of manufacturing technology.	**Grades 6–12:** **130.353 c 7** Diversified Manufacturing I. The student participates in a mass manufacturing project. **130.354 c 4; 130.355 c 5; 130.356 c 5** Diversified Manufacturing II. The student learns skills in production and programming of computer numerical control (CNC) operations. **130.354 c 6** Diversified Manufacturing II. The student manufactures products or systems using the appropriate tools, equipment, machines, materials, and technical processes. **130.354 c 8** Diversified Manufacturing II. The student participates in the manufacturing of a mass-produced product. **130.355 c 2** Manufacturing Engineering Technology I. The student applies software skills to manufacturing. **130.355 c 6; 130.356 c 6** Manufacturing Engineering Technology I and II. The student knows mechanical and fluid systems. **130.355 c 8; 130.356 c 8** Manufacturing Engineering Technology I. The student understands quality-control systems. **130.356 c 3** Manufacturing Engineering Technology II. The student applies design skills to manufacturing. **130.360 c 11** Precision Metal Manufacturing II. The student learns to manually program a CNC lathe without the help of computer-aided design or manufacturing (CAD/CAM) software. **130.360 c 12; 130.361 c 7** Precision Metal Manufacturing II. The student learns to manually program a CNC mill (without the help of CAD/CAM software).

Competencies		Texas Essential Knowledge and Skills
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018	Understand the appropriate selection and use of resources in manufacturing technology.	**Grades 6–12:** **130.352 c 4** Principles of Manufacturing. The student manufactures products using the appropriate tools, equipment, machines, materials, and technical processes. **130.353 c 5** Diversified Manufacturing I. The student manufactures products or systems using the appropriate tools, equipment, machines, materials, and technical processes. **130.353 c 8** Diversified Manufacturing I. The student identifies the factors that influence the cost of an item or service. **130.354 c 5** Diversified Manufacturing II. The student investigates emerging and innovative applications of technology in manufacturing. **130.354 c 9** Diversified Manufacturing II. The student identifies the factors that influence the cost of an item. **130.357 c 3** Metal Fabrication and Machining I. The student differentiates the technical concepts that form the knowledge and skills of metal manufacturing. **130.358 c 4** Metal Fabrication and Machining II. The student knows the advanced concepts that form the technical knowledge and skills of metal fabrication and machining. **130.360 c 3** Precision Metal Manufacturing II. The student applies the technical knowledge and skills of advanced precision metal manufacturing. **130.362 c 5** Introduction to Welding. The student applies academic skills in relationship to welding. **130.362 c 9** Introduction to Welding. The student performs gas metal arc welding principles and practices. **130.363 c 3** Welding I. The student applies academic skills to the requirements of welding. **130.364 c 3** Welding II. The student applies academic skills to the requirements of welding. **130.366 c 4** Practicum in Manufacturing. The student demonstrates oral and written communication skills.

Competencies		Texas Essential Knowledge and Skills
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Content Domain V **CONSTRUCTION TECHNOLOGY**		
019	Understand principles and characteristics of construction technology.	**Grades 6–12:** **130.49 c 2** Construction Technology. The student is provided with the knowledge to interpret various types of working drawings as they pertain to commercial construction.
020	Understand the processes and procedures of construction technology.	**Grades 6–12:** **130.48 c 1** Construction Technology. The student demonstrates professional standards/employability skills as required by business and industry. **130.48 c 7** Construction Technology. The student gains knowledge of wood framing and the layout and construction of wood-framed floor systems using common and engineered lumber.
021	Understand the appropriate selection and use of resources in construction technology.	**Grades 6–12:** **130.48 c 4** Construction Technology I. The student gains knowledge about building materials used in the construction industry. **130.48 c 5** Construction Technology I. The student applies the proper and safe use of hand and power tools associated with carpentry. **130.49 c 4** Construction Technology II. The student selects and installs various types of insulation in walls, floors, and attics.