

MoSTEP 1.2.1.1: Technology and Engineering (grades 5-9 and 9-12) Competencies
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The beginning (preservice) Technology and Engineering teacher will demonstrate knowledge of and/or competency in the following areas of study:

<p>1. Information and Communication Technologies: Principles, Concepts, and Applications 1997 SSC: 1.2, .4, .7, .8; 1997 SSC: 1. ; ITEA Standard 3, 4, 5; Praxis 0050: II 1-4; CR: III.L.1; Show Me Mathematics 1-3, Science 1, 2, 7, 8, Goal 2.6, 2.7</p>	1. (ITEA St. 3) process of troubleshooting, research and development, invention, innovation, and experimentation in developing solutions to a design problem.
	2. (ITEA St. 3; 0050: II.1) visual, aesthetic, and technological principles in the design of effective products (e.g., print, Web, video, audio, and multi- media).
	3. (1997 SSC: 1.2; ITEA St. 4; 0050: II.2) communication systems terminology, communication systems models, resources and inputs, and historical perspectives.
	4. (1997 SSC: 1.5, .7, .8; ITEA St. 4; 0050: II.3) communication processes: types, processes, equipment operation, adjustment, and servicing for graphic communications, electronic communications, and other communication processes (e.g, devices that use light & acoustics).
	5. (1997 SSC: 1. ITEA St. 4; 0050: II.4) communication outputs and impacts: products; social, cultural, and environmental impacts; forecasting in communication technology.
<p>2. Construction Technologies: Principles, Concepts, and Applications 1997 SSC: 1.2, .4, .6, .7, .8; ITEA Standard 3, 4, 5; Praxis 0050: III 1-6; Show Me Mathematics 1-3, Science 1, 2, 7, 8, Goal 2.6, 2.7</p>	1. (ITEA St. 3;) process of troubleshooting, research and development, invention, innovation, and experimentation in developing solutions to a design problem.
	2. (ITEA St. 3; 0050: III.1) structural, architectural, aesthetic and technological principles in the design of physical structures, models, and prototypes.
	3. (1997 SSC: 1.2; ITEA St. 4; 0050: III.2) construction systems terminology, construction systems models, and historical perspectives.
	4. (1997 SSC: 1.5, .6, .7, 8; ITEA St. 4; 0050: III.3) materials and manufactured products, human resources and knowledge, finance and capital.
	5. (ITEA St. 4; 0050: III.4) managerial functions, processes, and activities (e.g., designing, contracting, and marketing).
	6. (ITEA St. 4; 0050: III.5) construction and production processes (e.g., preparing the site, building the structure, installing utility systems, enclosing the structure, finishing the structure, completing the site).
	7. (ITEA St. 4; 0050: III.6) construction outputs and impacts: products, including residential, commercial, and civil projects; social, cultural, and environmental impacts; forecasting in construction technology.
<p>3. Manufacturing Technologies: Principles, Concepts, and Applications 1997 SSC: 1.2, .4, .6, .7, .8; ITEA Standard 3, 4, 5; Praxis 0050: IV 1-6; CR: III.L.3; Show Me</p>	1. (ITEA St. 3) process of troubleshooting, research and development, invention, innovation, and experimentation in developing solutions to a design problem.
	2. (ITEA St. 3; 0050: IV.1) mechanical, human factors, and aesthetic principles in the design of physical products and prototypes.
	3. (1997 SSC: 1.2; ITEA St. 4; 0050: IV.2) manufacturing systems terminology, manufacturing systems model, and historical perspectives.

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<p>Mathematics 1-3, Science 1, 2, 7, 8, Goal 2.6, 2.7</p>	<p>4. (1997 SSC: 1.5, .6, .7, .8; ITEA St. 4; 0050: IV.3) manufacturing resources and inputs: materials, human resources and knowledge, finance.</p> <p>5. (ITEA St. 4; 0050: IV.4) managerial functions, processes, and activities (e.g., designing production systems and manufacturing the product).</p> <p>6. (1997 SSC: 1.8; ITEA St. 4; 0050: IV.5) transformational processes (e.g., extracting raw materials; primary processing; secondary processing, including the conversion of industrial materials into finished products).</p> <p>7. (ITEA St. 4; 0050: IV.6) manufacturing outputs and impacts: types of outputs; social, cultural, and environmental impacts; forecasting in manufacturing.</p>
<p>4. Energy, Power, and Transportation Technologies: Principles, Concepts, and Applications 1997 SSC: 1.2, .4, .6, .7, .8; ITEA Standard 3, 4, 5; Praxis 0050: V 1-6; CR: III.L.2 ; Show Me Mathematics 1-3, Science 1, 2, 7, 8, Goal 2.6, 2.7</p>	<p>1. (ITEA St. 3) process of troubleshooting, research and development, invention, innovation, and experimentation in developing solutions to a design problem.</p> <p>2. (ITEA St. 3; 0050: V.1) mechanical, structural, control, and aesthetic principles in the design of products, systems, and models associated with controlling technological systems and moving people and materials safely and effectively.</p> <p>3. (1997 SSC: 1.2; ITEA St. 4; 0050: V.2) control systems: electrical (including computers), mechanical, hydraulics, and pneumatics.</p> <p>4. (1997 SSC: 1.6; ITEA St. 4; 0050: V.3) transportation systems terminology; transportation systems models; resources and inputs; land, water, air, and space transportation modes; historical perspectives.</p> <p>5. (1997 SSC: 1.5, .7, .8; ITEA St. 4; 0050: V.4) energy sources, conversions, measurements, and storage (e.g., conversion/storage systems, including internal and external combustion; measurement and control topics, including power distribution and heat flow).</p> <p>6. (ITEA St. 4; 0050: V.5) technical systems: propulsion, suspension, control and guidance, structure, support, servicing.</p> <p>7. (ITEA St. 4; 0050: V.6) transportation outputs and impacts: outputs, such as relocated goods; social, cultural, and environmental impacts; forecasting in transportation.</p>
<p>5. Impact of Technological Developments on Society and the Environment 1997 SSC: 3.2-5; ITEA Standard 1, 2; Praxis 0050: not overtly addressed; Show Me Science 8, Social Studies 4-6, Goal 2.6, 2.7</p>	<p>1. (ITEA, St. 1, 2) relationships between technology and social, cultural, political, and economic systems.</p> <p>2. (1997 SSC; 3.2; ITEA, St. 2) relationships among sustainable production, consumption, conservation, and maintenance of technological goods and services.</p> <p>3. (1997 SSC: 3.3) significant events in the development of technology.</p> <p>4. (1997 SSC: 3.4) forecasting future innovations and the consequences of their use, including trade-offs that result from technological decision-making.</p> <p>5. (1997 SSC: 3.5; ITEA, St. 2) various cultures' use of technology in solving problems.</p>

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	6. influences of globalization on the design and implementation of technological products and services.
6. Safety Issues in Industrial Technology Learning Environments 1997 SSC: 4.1-3; ITEA Standard 4; Praxis 0050: not overly addressed; Show Me Science 8, Social Studies 6, Health/PE 6, Goal 4.7	1. (1997 SSC: 4.1; ITEA St. 4) general safety procedures related to tools, equipment, materials, and processes.
	2. (1997 SSC: 4.2) legal responsibilities and liability issues.
	3. (1997 SSC: 4.3; ITEA St. 4) environmental factors contributing to safety (e.g., lighting, climate control, air quality, and organization and placement of equipment).
7. Current and Emerging Technologies Related to Industrial Technology Education 1997 SSC 1.9, 2.1-.3; Show Me Science 8, Goal 2.6, 2.7	1. (1997 SSC: 2.1) how electronic communications systems operate.
	2. (1997 SSC: 2.2) installation and maintenance procedures for computer systems (hardware and software).
	3. (1997 SSC: 2.3) industrial computer applications.
	4. (1997 SSC: 1.9) emerging issues and trends communicated via national and international trade organizations.
	5. basic knowledge of the technologies associated with medicine, agriculture, and biotechnologies.
8. Foundations of and Professionalism in Industrial Technology 1997 SSC: 1.9, 5.1-7; ITEA: not overtly addressed; Praxis 0050: I 1-5; CR: III.L.4	1. (1997 SSC: 5.1; ITEA, St. 1; 0050: I.1) varying philosophies and rationales, including the nature of technology and technology education as a discipline.
	2. (1997 SSC: 5.2; 0050: I.2) organizing and managing the industrial technology education program, including establishing mission statements, goals, and objectives based on national standards; developing and using external advisory boards; selecting content and developing concept-based activities; providing for interdisciplinary approaches.
	3. (1997 SSC: 5.4; 0050: I.4) assessing and evaluating the effectiveness of industrial education technology programs (e.g., evaluation of student progress, program evaluation, record-keeping and reporting, use of data for modification of instruction).
	4. (1997 SSC: 5.5) implementing and managing student organizations (e.g., Technology Student Association, Vocational Industrial Clubs of American, Junior Engineering Technical Society).
	5. (1997 SSC: 5.6) external funding sources and how to secure funding and equipment through grant submission.
	6. (1997 SSC: 5.7) program promotion (e.g., community service, student recognition activities, in-school activities).
	7. (0050: I.3) program implementation (e.g., consideration of student population, instructional strategies, facility organization and management, resource management, safety and health, public relations).

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	8. (0050: I.5) professional associations, continuing education, professional and technical literature.
9. Development and Implementation of Industrial Technology Education Curriculum 1997 SSC: 1.1, .3, 5.3; ITEA Standard 1; CR: III.L.4	1. (1997 SSC: 1.1) research that identifies and validates content structures for industrial technology education. 2 (1997 SSC: 1.3) applied mathematics and scientific concepts and principles. 3. developing and evaluating career student performance objectives in the cognitive, psychomotor, and affective domains. 4. designing, implementing, and evaluating a broad range of student-centered instructional strategies. 5. integrating academics in industrial technology education competencies. 6. instructional management systems. 7. (ITEA St. 1) interrelationships between industrial technology education and academic content areas. 8. (1997 SSC: 5.3) maintaining industrial technology education laboratories.
10. Career Opportunities in Technical Fields 1997 SSC: 1.4, 6.1-3	1. (1997 SSC: 6.1) educational preparation opportunities and careers. 2. (1997 SSC: 6.2) workplace expectations and professional dispositions. 3. (1997 SSC: 6.3) career adaptations needed for life-long learning in one's career field. 4. role and process of counseling in industrial technology education, including orientation, career awareness, career exploration, assessment, preparation, employment information and trends. 5. (1997 SSC: 1.4) technological applications in business, industry, and communities.