

INDUSTRIAL ENGINEERING TECHNOLOGY CORE STANDARDS

Core Standard	Core Concept	Performance Standard/ Performance Indicator
IC-1: SYSTEMS Relate technology systems to needs and functions of society as users of various technological systems and processes.	✓ <i>Technology Systems</i>	IC-1.1 Describe the common characteristics of the following technology systems: construction, transportation, manufacturing, and communication. <ul style="list-style-type: none"> • Identify the output/function of each. • Explain the primary processes common to these systems. • Describe the essential components of one of these technology systems. • Analyze the relationships among these technology systems and give an example of how a change in one system affects the others.
	✓ <i>Impact of Technology/ Innovation</i>	IC-1.2 Describe the impact of technology on individuals, a community, and society. <ul style="list-style-type: none"> • Trace the development of an innovation within one of the technology systems, and predict what new innovation may result in the future. • Analyze the impact of the innovation on the technology system itself, on other systems, on people, and on the environment. • Examine the reasons or impetus for three technological innovations, spread over time, and describe the positive and negative effects of each.
	✓ <i>Application of Technology</i>	IC-1.3 Demonstrate the ability to use a component of a technological system and apply its processes in the completion of a project. <ul style="list-style-type: none"> • Identify the needs in an assigned project that can be met by one of the technology systems studied. • Plan for the completion of the project, identifying the technological components and processes to be applied. • Evaluate the completed project and determine the effect that technology had on the quality of the project.
IC-2: DESIGN Demonstrate the skills and knowledge of a technological problem solver by effectively applying the design process.	✓ <i>Design Process</i>	IC-2.1 Apply the design process to the development of a new product or system and document the steps of the process. <ul style="list-style-type: none"> • Define the problem. • Research and generate ideas. • Identify criteria, specify parameters, and select approach. • Make a model or prototype, appropriately using tools and processes of industry. • Test, evaluate, and refine the design using specifications. • Create or make the product or system. • Communicate the processes and results in relation to the criteria and parameters.
	✓ <i>Design Attributes</i>	IC-2.2 Compare and contrast, using the desired attributes of design, two products or technologies that meet the same need or problem. <ul style="list-style-type: none"> • Identify their original purposes. • Summarize the problem or need it was meant to address. • Outline how the design may have evolved over time and what systematic process may have been used to come up with the design. • Describe a creative aspect of each.

INDUSTRIAL ENGINEERING TECHNOLOGY CORE STANDARDS

	✓ <i>Design as Problem-Solving Process</i>	<p>IC-2.3 Demonstrate the ability to solve a problem by modifying, improving, or developing an existing product or system using the design process.</p> <ul style="list-style-type: none"> • Define the problem. • Document ideas and research findings. • Identify criteria for determining effectiveness of solution. • Identify constraints and select approach toward solution. • Make a model or prototype, using appropriate, well-maintained tools. • Test, evaluate, and refine the design using criteria and specifications. • Create or make the product or system. • Report the processes used and the results according to the attributes of design.
<p>IC-3: TECHNOLOGY</p> <p>Use and/or apply technical terms, symbols, conventions, and resources to understand and express ideas and solve technological problems.</p>	✓ <i>Technical Information</i>	<p>IC-3.1 Demonstrate the appropriate use of technical terms, symbols, and conventions to complete a project and/or solve a problem.</p> <ul style="list-style-type: none"> • Develop, read, and interpret sketches, drawings, graphs, diagrams, and models. • Complete forms and procedures using the proper format and terminology (e.g., order forms, estimations, inventory, reports and repair logs). • Accurately interpret and summarize written technical materials from repair manuals, technical bulletins, or periodicals/journals. • Listen and follow oral instructions or requests from employer/employee and peer dialogue and from customer concerns and requests.
		<p>IC-3.2 Incorporate technical terms, symbols, and conventions into products or solutions that adequately communicate technological information to others.</p> <ul style="list-style-type: none"> • Use current technological communication devices to effectively gather information and communicate with others. • Complete a multimedia presentation on a product or solution that effectively provides findings, information, and solutions/products to an audience of practitioners.
<p>IC – 4: PROFESSIONAL DEVELOPMENT</p> <p>Develop plans for and progress toward IET careers, including the demonstration of understanding and skills</p>	✓ <i>Career Planning</i>	<p>IC-4.1 Select and plan for possible IET careers based on personal interests, strengths, and values.</p> <ul style="list-style-type: none"> • Develop a career plan and portfolio. • Identify a program of study that will develop the essential skills and knowledge for a selected career(s). • Evaluate the selected career(s) in terms of advantages and disadvantages, advancement opportunities, job growth and outlook, etc.
		<p>IC-4.2 Assess progress toward completing career plans and maintaining a career portfolio.</p> <ul style="list-style-type: none"> • Select and maintain products of work completed in a career portfolio. • Review career plans and identify completed activities, barriers, and changes. • Revise plans consistent with assessment findings.

INDUSTRIAL ENGINEERING TECHNOLOGY CORE STANDARDS

	<p>✓ <i>Organization/ Industry Effectiveness</i></p>	<p>IC-4.3 Describe each of the following components of an organization/industry, and explain how it contributes to the effectiveness of the organization.</p> <ul style="list-style-type: none"> • PLANNING (Strategic Planning, Goals, Objectives) • MANAGEMENT (Organizational Structure/Culture, Mission Statement) • HEALTH, SAFETY, AND ENVIRONMENT (Regulatory Issues, Safety in the Workplace) • COMMUNITY ISSUES (Impact of the company on the community) • PRINCIPLES OF TECHNOLOGY (Technology in the workplace, continued professional training) • PERSONAL WORK HABITS (Positive attitude, physical fitness and appearance, readiness to work) • TECHNICAL PRODUCTION SKILLS (Team player skills, specific production skills) • LABOR (Employee's rights and responsibilities, role of labor organizations) • FINANCE (Capital acquisitions, financial operations)
		<p>IC-4.4 Demonstrate the knowledge and skills expected of contributing members of an organization/industry, including:</p> <ul style="list-style-type: none"> • HEALTH, SAFETY, AND ENVIRONMENT (Safety Practices in the Workplace) • PERSONAL WORK HABITS (Positive attitude, physical fitness and appearance, readiness to work) • TECHNICAL PRODUCTION SKILLS (Team player skills, specific production skills)
<p>IC-5: ENERGY AND ENERGY TRANSFORMATION</p> <p>Apply concepts of Physics in product/system maintenance, repair, design, and construction.</p>	<p>✓ <i>Energy</i></p>	<p>IC-5.1 Analyze the total energy needs of a product/system, accounting for energy input and output due to motion, position, and temperature changes as indicators of chemical and electrical characteristics.</p> <ul style="list-style-type: none"> • Measure the energy of a system for all measurable qualities, including, but not limited to, force, position, motion, voltage, current, temperature, mass, and volume. • Measure the power output of the system using appropriate units (e.g., horsepower of an automotive system or the electrical power of a circuit system).
	<p>✓ <i>Energy Transformation</i></p>	<p>IC-5.2 Identify points in the system where energy transformation occurs, analyze the energy input/output, and evaluate the efficiency of the system based on evidence.</p> <ul style="list-style-type: none"> • Measure and describe the efficiency of a system, given the energy input and usable energy transformed out (e.g., measure the gas efficiency of a gas-run system by analyzing the energy used to move the vehicle and the unusable energy lost to the environment). • Use technical terms, such as heat, sound, and friction properly in the analyses.

INDUSTRIAL ENGINEERING TECHNOLOGY CORE STANDARDS

		<p>IC-5.3 Design and construct a product or system that is based on efficient energy transformation.</p> <ul style="list-style-type: none"> • Determine possible causes of unusable energy loss in existing products/systems. • Analyze the design, structure, or process flaws that relate to the loss. • Identify alternatives for minimizing the losses and select the alternative that tests out to have significant potential for improvement. • Plan and construct a prototype to demonstrate improved energy transformation efficiency.
<p>IC-6: FORCES AND MOTION</p> <p>Apply concepts of forces and motion in product/system maintenance, repair, design, and construction.</p>	<p>✓ <i>Forces and Motions</i></p>	<p>IC-6.1 Identify and analyze the forces acting on and generated within technology systems (e.g., bridges, hydraulic systems).</p> <ul style="list-style-type: none"> • Calculate and/or measure the forces acting on and generated within a system. • Analyze the forces of static (stable, no change in motion) and dynamic (changing rotationally and/or linearly) systems. • Explain numerically or physically what the net force of a stable system is.
		<p>IC-6.2 Account for effects of forces in the maintenance, repair, design, and/or construction of an IET-related tool, product, or system.</p> <ul style="list-style-type: none"> • Apply the concepts that forces must be balanced/unbalanced to produce a stable/dynamic system, respectively • Describe the effects of those forces on the system. • Make up for negative effects of forces in working on the tool, product, or system.
<p>IC-7: MATERIAL SCIENCE</p> <p>Demonstrate understanding that physical properties make some substances better for certain uses than others, and that physical properties may be</p>	<p>✓ <i>Nature of Matter</i></p>	<p>IC-7.1 Describes objects or materials by the properties of matter from which they are made, and how physical properties can be altered to change the material.</p> <ul style="list-style-type: none"> • Give examples of how the properties of a material can be used to predict how that material will behave under different conditions. • Demonstrate how physical properties can be altered and explain the changes made to the original material. • Demonstrate the combination of materials where physical properties are altered and/or different materials result.
	<p>✓ <i>Material Analysis and Selection</i></p>	<p>IC-7.2 Evaluate the needs of a designed system and select the appropriate materials in repairing and maintaining, or constructing and building a product or system to specification.</p> <ul style="list-style-type: none"> • Analyze and evaluate materials' physical properties in comparison with the designed system's specification. • Describe possible changes to the material(s) and its physical properties to improve effectiveness in the designed system. • Select the appropriate material and tool or technology to alter or work on the material. • Complete the project, in keeping with the specification.

INDUSTRIAL ENGINEERING TECHNOLOGY CORE STANDARDS

<p>IC-8: WORKPLACE COMMUNICATION</p> <p>Practice oral, written, and comprehension skills to communicate effectively in setting appropriate to the IET work environments.</p>	<p>✓ <i>Communication</i></p>	<p>IC-8.1 Understand written sentences and paragraphs in work-related documents.</p> <ul style="list-style-type: none"> • Summarize information from technical documents, research articles, policy/procedural manuals. • Interpret technical materials used for Industrial Engineering Technology practices and procedures. • Demonstrate use of technologies best suited for information processing, including reading.
		<p>IC 8.2 Communicate technical information and ideas effectively in writing in a clear, logical, and convincing style so others in the will understand.</p> <ul style="list-style-type: none"> • Compose written communication using correct terminology, spelling, grammar, and form (letter, memorandum, email, etc.) • Write a report detailing the events of a work-based learning experience. • Collect data and write a report on a Industrial Engineering Technology topic using information from a range of sources. • Demonstrate use of technologies best suited for communication through writing.
		<p>IC-8.3 Communicate to convey technical information and ideas effectively.</p> <ul style="list-style-type: none"> • Communicate technical information and ideas in speaking in a clear, logical, and convincing style so others will understand. • Demonstrate how non-verbal behaviors affect the message being sent. • Give full attention to what other people are saying by taking time to understand the points being made, asking questions as appropriate, and by not interrupting at inappropriate times.
<p>IC-9: SAFETY, HEALTH, AND ENVIRONMENT</p> <p>Recognize risks and potentially hazardous</p>	<p>✓ <i>Regulatory Guidelines</i></p>	<p>IC 9.1 Apply health and safety policies, procedures, and regulations to promote safe IET worksites.</p> <ul style="list-style-type: none"> • Report health and safety policies and procedures to HIOSH. • Maintain an environment that meets HIOSH regulations. • Research and report on maintenance and consequence of safety, health, and environmental work practices.
	<p>✓ <i>Risk Identification</i></p>	<p>IC-9.2 Identify potential hazardous and emergency situations to determine intervention strategies.</p> <ul style="list-style-type: none"> • Document and apply worksite safety plan and procedures. • Survey work environment on a regular basis. • Identify potential hazards and determine appropriate plan of action.

INDUSTRIAL ENGINEERING TECHNOLOGY CORE STANDARDS

	<p>✓ <i>Body Mechanics</i></p>	<p>IC-9.3 Demonstrate the principles of proper body mechanics for a range of activities in the workplace.</p> <ul style="list-style-type: none"> • Apply the principles of proper body mechanics and ergonomics for a range of activities in the worksite. • Design practices and maintain worksites to reduce repetitive stress injury and other ergonomic related conditions.
<p>IC-10: EXCELLENCE IN SERVICE</p> <p>Demonstrate awareness of meeting needs through IET career services.</p>	<p>✓ <i>Achieving Customer Satisfaction</i></p>	<p>IC-10.1 Understand the concepts involved in the process of meeting a need for an external audience and quality service.</p> <ul style="list-style-type: none"> • Learn principles of Total Customer Satisfaction and professionalism. • Identify the internal and external clients in the Total Quality Management process. • Practice providing quality service for others.
	<p>✓ <i>Customer Focused Problem Solving</i></p>	<p>IC-10.2 Demonstrate the process of customer-focused problem solving.</p> <ul style="list-style-type: none"> • Overview of the process. • Define customer requirements. • Map conventions and applications. • Collect and display data. • Analyze root causes and develop an improvement plan. • Understand results. • Implement institutionalization/systematization.