

**Skilled and Technical Sciences Industrial Technology Education**

**Endorsement Guidelines**

**To Accompany Rule 24**

**(Adopted by the State Board  
of Education on \_\_/\_\_/\_\_)**

**Proposed REDLINE Skilled and Tech Sci Field—9.30.16  
(After Ad Hoc Meeting)**

**006.33 Skilled and Technical Sciences Industrial Technology Education**

**006.33A** Grade Levels: 6-12.

**006.33B** Endorsement Type: Field.

**006.33C** Persons with this endorsement may teach Skilled and Technical Sciences Industrial Technology Education and will be eligible for the Work-Based Learning Cooperative Education/Diversified Occupations endorsement.

**006.33D** Certification Endorsement Requirements: This endorsement **shall** require a minimum of 48 semester hours of coursework in skilled and technical sciences industrial technology education and professional education, including:

**006.33D1** A minimum of six (6) semester hours of professional education coursework to include content area methods, assessment, and facility design and management; and

**006.33D24** A minimum of six (6) semester hours in each of the following career fields areas: Architecture and Construction, Manufacturing, Energy and Engineering, Science, Technology, Engineering and Mathematics (STEM); and Transportation, Distribution and Logistics. The career field area courses will include career information, first aid, occupational and environmental safety, and will include meeting the requirements to qualify for an Occupational Safety and Health Administration (OSHA) 10 card; and

**006.33D32** A minimum of three (3) semester hours in the pedagogical content knowledge and principles/foundations of career and technical education; and

**006.33D43** A minimum of three (3) semester hours in the coordination and supervision of work-based learning, and

**006.33ED4** Work Experience: The endorsement is available only to those who have either (A) 1000 verified hours of volunteer, internship, or paid work experience relevant to the career field; or (B) at least 300 hours of supervised work experience relevant to the career field under the direction of the college or university recommending the endorsement.

**006.33FE** Endorsement Program Requirements: Nebraska teacher education institutions offering this endorsement program must have on file, within the institution, a plan which identifies the courses and the course completion requirements which the institution utilizes to grant credit toward completion of this endorsement.

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**THE FOLLOWING ARE RECOMMENDED GUIDELINES FOR  
INCLUSION AS PART OF THE INSTITUTION'S PLAN  
UNDER THIS ENDORSEMENT.**

Through the courses identified in its plan, the institution must provide candidates for this endorsement with opportunities to demonstrate the dispositions and competencies required by the following guidelines: ~~should prepare prospective teachers to:~~

**Pedagogical Content Knowledge**

Standard 1. Demonstrate professionalism with an emphasis in the following areas:

- Element 1. Professional growth, reflection, and evaluation.  
Candidates are aware of and reflect on their practice in light of research on teaching and learning, professional ethics, and resources available for professional learning; they continually evaluate the effects of their professional decisions and actions on students, families, and other professionals in the learning community, and actively seek out opportunities for ongoing professional development, especially by engagement in professional organizations, conferences, in-service workshops, and other professional opportunities.
- Element 2. Collaboration with families, colleagues, and community.  
Candidates engage in and reflect on a variety of experiences related to skilled and technical sciences that demonstrate understanding of and readiness for leadership, mentoring, collaboration, and community engagement and involvement.

Standard 2. Integrate the Nebraska Career Readiness Standards in all Skilled and Technical Sciences (STS) courses to include:

- Element 1. Apply appropriate academic and technical skills;
- Element 2. Communicate effectively and appropriately;
- Element 3. Contribute to employer and community success;
- Element 4. Make sense of problems and persevere in solving them;
- Element 5. Use critical thinking skills;
- Element 6. Demonstrate innovation and creativity;
- Element 7. Model ethical leadership and effective management;
- Element 8. Work productively in teams and demonstrate cultural competency;
- Element 9. Utilize technology;
- Element 10. Manage personal career development; and
- Element 11. Attend to personal and financial well-being.

**Content Knowledge**

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Standard 3. Demonstrate teaching and technical skills appropriate to successfully teach the study of skilled and technical sciences in the following specific career clusters:

Element 1. Architecture and Construction Knowledge and Skills in:

1a. Design and Pre-Construction and

1b. Construction;

Element 2. Energy and Engineering Knowledge and Skills in:

2a. Energy,

2b. Engineering, and

2c. Robotics;

Element 3. Manufacturing Knowledge and Skills in:

3a. Production,

3b. Maintenance, Installation, and Repair and

3c. Automation;

Element 4. Transportation, Distribution, and Logistics Knowledge and Skills in:

4a. Facility and Mobile Equipment Maintenance and

4b. Multi-modal Transportation.

**Principles of Career and Technical Education**

Standard 4. Demonstrate knowledge of curriculum and program design: Deliver a standards-based curriculum in Skilled and Technical Sciences through programs of study that incorporate classroom and laboratory instruction; experiential, project and work-based learning, and leadership and personal development through SkillsUSA.

Element 1. Develop programs of study that reflect the needs of the community and have been developed according to state requirements.

Element 2. Design courses in the program of study that are organized logically and sequentially from introductory to advanced levels.

Element 3. Align technical content with core academic content standards.

Standard 5. Apply knowledge of facilities and equipment planning: Design facilities and equipment plans that support the implementation of the program and curriculum by providing all students opportunities for the development and application of knowledge and skills.

Element 1. Develop facility plans that provide for the effective delivery of all programs of study offered.

Element 2. Demonstrate knowledge of existing local, state, and federal safety and health standards.

Element 3. Develop training and evaluation so students using the facility engage in a safe working environment.

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Element 4. Demonstrate the ability to maintain a clean and organized environment conducive to learning.

Element 5. Demonstrate knowledge of facility design that is accessible and accommodating to all students.

Element 6. Demonstrate the ability to organize storage space for both student and teacher materials, supplies, and equipment.

Element 7. Demonstrate the ability to maintain an inventory of equipment, tools, consumable items, and instructional technology and is able to develop a plan for new purchases and replacements.

Element 8. Maintain and use equipment, tools, and instructional technology according to current industry standards so that classroom instruction is delivered correctly and effectively.

Element 9. Plan for adequate quantities of tools, equipment, and consumable supplies to equip all students at all times.

Standard 6. Demonstrate knowledge of experiential, project and work-based learning: Enhance student learning through continuous experiential, project, and work-based learning experiences.

Element 1. Integrate work-based learning with the Skilled and Technical Sciences program for all students.

Element 2. Align work-based learning to Skilled and Technical Sciences curriculum standards.

Element 3. Assess work-based learning by measuring students' growth against a current and relevant set of career-based skills, knowledge, and competencies.

Element 4. Create student-planned, personalized work-based learning experiences.

Element 5. Engage students to maintain accurate work-based learning documentation to meet state and local requirements.

Element 6. Provide direct supervision and guidance for each student's work-based learning experience.

Element 7. Document work-based learning experiences between the student and adult supervisors.

Standard 7. Demonstrate knowledge of leadership and personal development: Engage student participation in intra-curricular and leadership and personal development experiences through SkillsUSA.

Element 1. Provide the opportunity for all students to be a member of SkillsUSA.

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Element 2. Engage students in meaningful leadership and personal development activities to build a progressive leadership and personal development plan related to Skilled and Technical Sciences.

Element 3. Provide leadership to ensure the SkillsUSA constitution and bylaws are up-to-date and approved by chapter members.

Element 4. Engage students in the planning and implementation of a program of work.

Element 5. Facilitate the conduct of regularly scheduled chapter meetings.

Element 6. Implement an awards recognition program planned and conducted by student members.

Element 7. Provide leadership to ensure the SkillsUSA chapter has a current budget, which provides the financial resources to support the program of work.

Standard 8. Demonstrate the knowledge of school and community partnerships: Engage school and community partners in developing and supporting a quality skilled and technical sciences program.

Element 1. Demonstrate knowledge of how to regularly inform key stakeholders regarding the goals, objectives, and accomplishments of the Skilled and Technical Sciences program.

Element 2. Demonstrate knowledge of how to initiate engagement of key stakeholders with the Skilled and Technical Sciences program.

Element 3. Demonstrate knowledge of how to recognize key stakeholders for their support of the Skilled and Technical Sciences program.

Element 4. Participate in key stakeholder activities.

Standard 9. Demonstrate knowledge of program marketing: Engage key stakeholders through involvement, recognition, and the sharing of information about all components of the program.

Element 1. Design and implement strategic marketing efforts with pieces implemented by the appropriate key stakeholders.

Element 2. Design and implement a recruitment and retention plan that yields steady or increasing student enrollment.

Element 3. Utilize relevant Skilled and Technical Sciences data for marketing and communication purposes.

Standard 10. Demonstrate knowledge of program planning and evaluation: Design and implement a system of needs assessment and evaluation for continual program development and improvement.

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Element 1. Collect and report relevant Skilled and Technical Sciences data to key stakeholders and other entities as determined by local and state requirements.

Element 2. Survey key stakeholders to determine their expectations and current assessment of program quality and the success of students.

Element 3. Provide leadership for a representative Skilled and Technical Sciences advisory committee, authorized by the local board of education, to meet regularly to advise program direction and development.

Element 4. Provide leadership for creation and implementation of a programmatic strategic plan that is based on performance data, key stakeholder surveys, and advisory committee input.

Element 5. Develop and implement a Skilled and Technical Sciences budget that provides the financial resources to support the current and planned needs of the program.

- ~~A. Describe a personal philosophy regarding industrial technology education based on current research findings, and the application of that philosophy in curriculum and instructional design, assessment, and professional development, including being able to:~~
- ~~1. Design programs based on a mission statement with stated goals and objectives which reflect the definition and intent of industrial technology education; and,~~
  - ~~2. Use an organized set of concepts, processes and systems that are technological when designing course outlines, instructional strategies, and evaluations of student work.~~
- ~~B. Demonstrate teaching and technical skills appropriate to successfully teach the study of industrial technology, including being able to:~~
- ~~1. Demonstrate knowledge and an understanding of the development of industrial technology, its effects on people, the environment and culture; and industry, its organization, personnel systems, techniques, resources and products; and their impact on society and culture;~~
  - ~~2. Use instruction content from the content organizers of:~~
    - ~~a. Architecture and Construction Career Cluster including the Design and Pre-Construction Pathway and Construction Pathway;~~
    - ~~b. Manufacturing Career Cluster including the Production Pathway and the Maintenance, Installation and Repair Pathway;~~
    - ~~c. Science, Technology, Engineering and Mathematics (STEM) Career Cluster including the Engineering and Technology Pathway;~~

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- ~~d. Transportation, Distribution and Logistics Career Cluster including the Facility and Mobile Equipment Maintenance Pathway.~~
- ~~3. Identify and incorporate safe and efficient use of contemporary technological tools, instruments, and machines into a program of study;~~
- ~~4. Incorporate insight, knowledge, and applications of technological concepts, processes and systems into a teaching program;~~
- ~~5. Use skills, creative abilities, positive self-concepts, and individual potential in teaching industrial technology;~~
- ~~6. Identify the use of contextual academics used in the industrial technology program;~~
- ~~7. Apply problem-solving and creative abilities involving human and material resources, processes, and technological systems;~~
- ~~8. Use activity-oriented laboratory instruction which reinforces abstract concepts through concrete experiences;~~
- ~~9. Apply current and emerging technologies to the design and production of activities for student use;~~
- ~~10. Incorporate employability skills into the program;~~
- ~~11. Design industrial technology education programs that advance student attitudes, knowledge, and skills regarding how industrial technological systems function;~~
- ~~12. Facilitate the ability of students to apply industrial technological knowledge and skills; and~~
- ~~13. Manage a work-based learning program which includes the supervision of students in the workplace.~~
- ~~C. Demonstrate the ability to develop, manage, and evaluate an industrial technology program in schools, including being able to:~~
  - ~~1. Demonstrate a philosophy and understanding of Career education;~~
  - ~~2. Design a strategic program plan that includes a mission statement, rationale for change, goals and objectives, action steps, and program evaluation strategies;~~
  - ~~3. Select content based on the goals and objectives appropriate to the specific industrial technology content organizers (Architecture and Construction; Manufacturing; Science, Technology, Engineering and Mathematics/STEM; and Transportation, Distribution and Logistics Clusters) or other clusters as applicable;~~
  - ~~4. Structure an educational environment in the classroom and laboratory to advance the instructional process including:
    - ~~a. Contextual academics~~~~



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- ~~b. Technical skills based on national standards~~
  - ~~c. Employability skills~~
  - ~~d. Safety training and daily practice~~
  - ~~5. Select appropriate instructional technologies to effectively teach all student populations;~~
  - ~~6. Demonstrate laboratory management (i.e., inventory, requisitioning equipment and materials, maintenance, and budgeting);~~
  - ~~7. Integrate career student organizations in the curriculum;~~
  - ~~8. Communicate and promote a learning environment that reflects the real world and provides tangible and intangible benefits for the student and the community;~~
  - ~~9. Organize and coordinate an external advisory committee; and,~~
  - ~~10. Use standards to evaluate and revise an industrial technology education program, including being able to identify standards for the program, establish a process for using the standards, and utilize findings for subsequent program revisions.~~
- ~~D. Demonstrate attitudes, knowledge, and skills needed for success as a teacher in Industrial Technology Education, including being able to:~~
- ~~1. Create, revise, analyze and implement curricula to prepare students for a dynamic and rapidly changing world. The Industrial Technology teacher prepares students:~~
    - ~~a. For exploration of careers in industrial technology;~~
    - ~~b. For their roles as consumers and citizens;~~
    - ~~c. For advanced education in industrial technology;~~
    - ~~d. For roles as employees, owners and managers of industrial technology businesses;~~
    - ~~e. To understand domestic industrial technology and how it is similar to and different from global industrial technology; and,~~
    - ~~f. To access and apply current industrial technologies;~~
  - ~~2. Organize classroom and laboratory experiences for the study of industrial technology;~~
  - ~~3. Manage technological activities in both an individual and group setting;~~
  - ~~4. Apply multi-cultural and global perspectives as they relate to the study of industrial technology;~~



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- ~~5.—Demonstrate an understanding of the role and function of industrial technology in the global society; and,~~
- ~~6.—Apply values and ethics as they relate to content issues in the study of industrial technology.~~
- ~~E.—Facilitate collaborative learning by having students work together in groups that may include students, teachers, business and industry leaders, and others.~~
- ~~F.—Demonstrate an understanding of and be able to apply industrial technology concepts, principles and processes in each of the following career clusters: Architecture and Construction; Manufacturing; Science, Technology, Engineering and Mathematics (STEM); and Transportation, Distribution and Logistics.~~
- ~~G.—Identify concepts and strategies needed for career exploration, development and growth in industrial technology areas.~~

**Skilled and Technical Sciences Ad Hoc Committee Members**

Friday, September 30, 2016 – 9:30 A.M.

Concordia Fallbrook, 570 Fallbrook Blvd., Lincoln, NE 68521

Members may fulfill more than one of the categories listed below (Generally 10-12 members)

Ad Hoc Committee Requirements	Possible Ad Hoc Committee Members
Ad Hoc Chair – Collaboratively determined by NDE Team Leader responsible for the endorsement area and the NDE designee with responsibilities for NCTE coordination.	Tony Glenn, NDE <a href="mailto:tony.glenn@nebraska.gov">tony.glenn@nebraska.gov</a>
Current Teachers— Currently endorsed and employed practitioners in approved or accredited public or private schools in the endorsement area at the grade levels under consideration.	1. Jason Novotny, Gretna High School <a href="mailto:jnovotny@gretnadragons.org">jnovotny@gretnadragons.org</a> 2. Nathan Smith, Cross Country High School <a href="mailto:nasmith@crosscounty.esu7.org">nasmith@crosscounty.esu7.org</a>
Faculty Members— Faculty members from a college of DOE who are teaching professional education courses or serve as the Certification Official at an approved educator preparation institution.	1. Eric Knoll, UNL <a href="mailto:eknoll2@unl.edu">eknoll2@unl.edu</a> 2. Greg Vander Weil, WSC <a href="mailto:grvande1@wsc.edu">grvande1@wsc.edu</a>
Specialists in the Content Area— Might include Arts and Sciences college faculty or persons drawn from professional practice in the endorsement area.	1. <del>Charmain Satree, NDE</del> <del><a href="mailto:csatree@gmail.com">csatree@gmail.com</a></del> (Not able to attend.)
Administrators— Administrative or supervisory personnel from approved or accredited public or private schools with responsibility for supervision, leadership, or personnel functions at the grade levels and/or in the content area.	1. Jim Musil, Omaha Public Schools <a href="mailto:jim.musil@ops.org">jim.musil@ops.org</a> 2. <del>Brandon Mowinkel, Milford Public</del> <del><a href="mailto:bmowinkel@milfordpublicschools.org">bmowinkel@milfordpublicschools.org</a></del> (Not able to attend.)

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<p><b>NCTE Representation— Representation from the NCTE Standing Committee to which the endorsement has been assigned.</b></p>	<p><b>1. Tom Wandzilak, UNL (also with Ag Ad Hoc) NCTE Standing Committee ‘B’ <a href="mailto:twandzilak1@unl.edu">twandzilak1@unl.edu</a></b></p>
<p><b>NDE Representative with responsibilities related to the endorsement area. (This person may also serve as the Ad Hoc Chair.)</b></p>	<p><b>1. N/A</b></p>
<p><b>Representatives of national/state specialty professional associations or professionals drawn from areas of employment related to the content area.</b></p>	<p><b>1. Jim Townsend, Kawasaki <a href="mailto:jtownsend@lcn.kmmfg.com">jtownsend@lcn.kmmfg.com</a> 2. Gregg Stahr, SkillsUSA State Supervisor <a href="mailto:Greg.stahr@nebraska.gov">Greg.stahr@nebraska.gov</a></b></p>
<p><b>Additional P-12 school practitioners or higher education faculty to equalize the representation between these two groups.</b></p>	<p><b>1. N/A</b></p>
<p><b>A NDE designee, who will be a non-voting member and serve as a consultant for the <i>ad hoc</i> committee.</b></p>	<p><b>Pat Madsen, NDE <a href="mailto:pat.madsen@nebrasla.gov">pat.madsen@nebrasla.gov</a></b></p>