

Release of Technical Standards 15.0000 Engineering Technology, General

JUNE 2, 2011

MDE – OFFICE OF CAREER AND TECHNICAL EDUCATION AND
MICHIGAN CENTER FOR CAREER AND TECHNICAL EDUCATION



Michigan Center for Career
and Technical Education



Agenda

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RELEASE OF NEW STANDARDS WEBINAR **15.0000 Engineering Technology, General**

RECORDED June 2, 2011

- Career and Technical Education in Michigan
- Review of Process to Develop Standards for Engineering
- Steps on how to access the revised standards
- Implementation timeline

On Behalf of MDE

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Project Team

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Michigan Department of Education

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- Supervisor Career Planning & Education Unit

Dr. Patricia Talbott

- Consultant for Engineering, Manufacturing & Industrial Technology

Jan Vogel

- Special Projects

MCCTE-FSU

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- Project Director

Tina Koepf

- Research Coordinator

Kim Ducat

- Project Coordinator

Career Technical Education in Michigan

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**Adoption of Career Clusters
2005**

Perkins IV Legislation (2006)

• Common standards - Common assessments - Program of Study

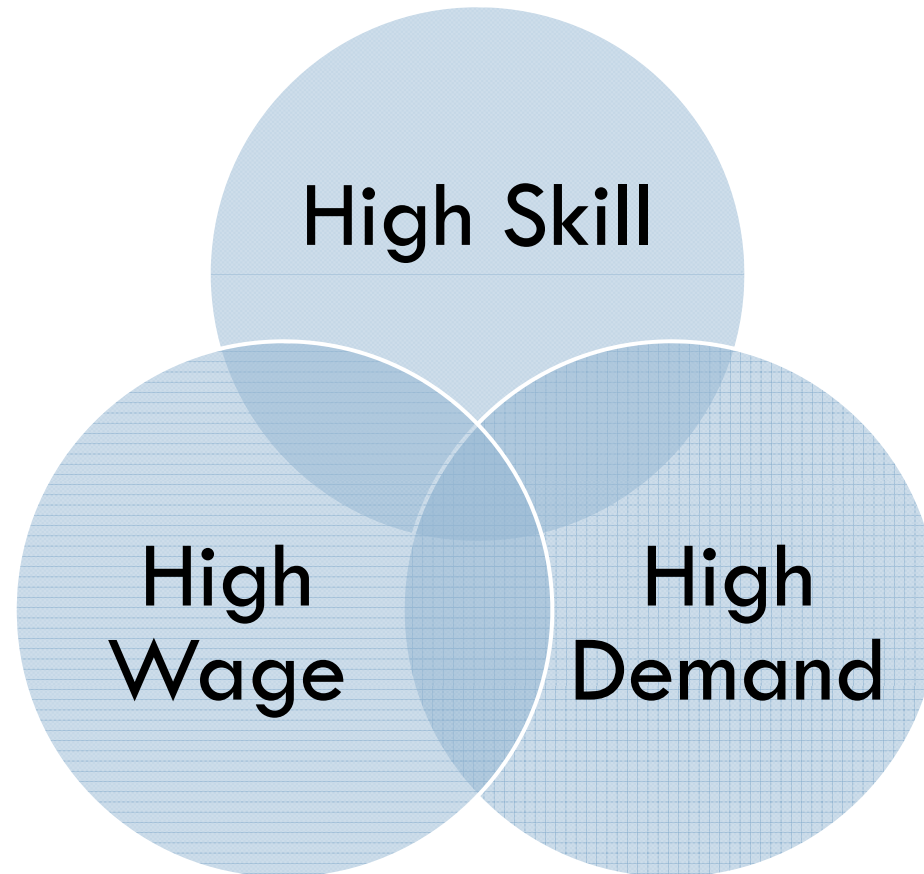
Standards Adoption (2007)

**Curriculum Delivery
(segmenting) (2008)**

**Academic Alignment (2008-
2009)**

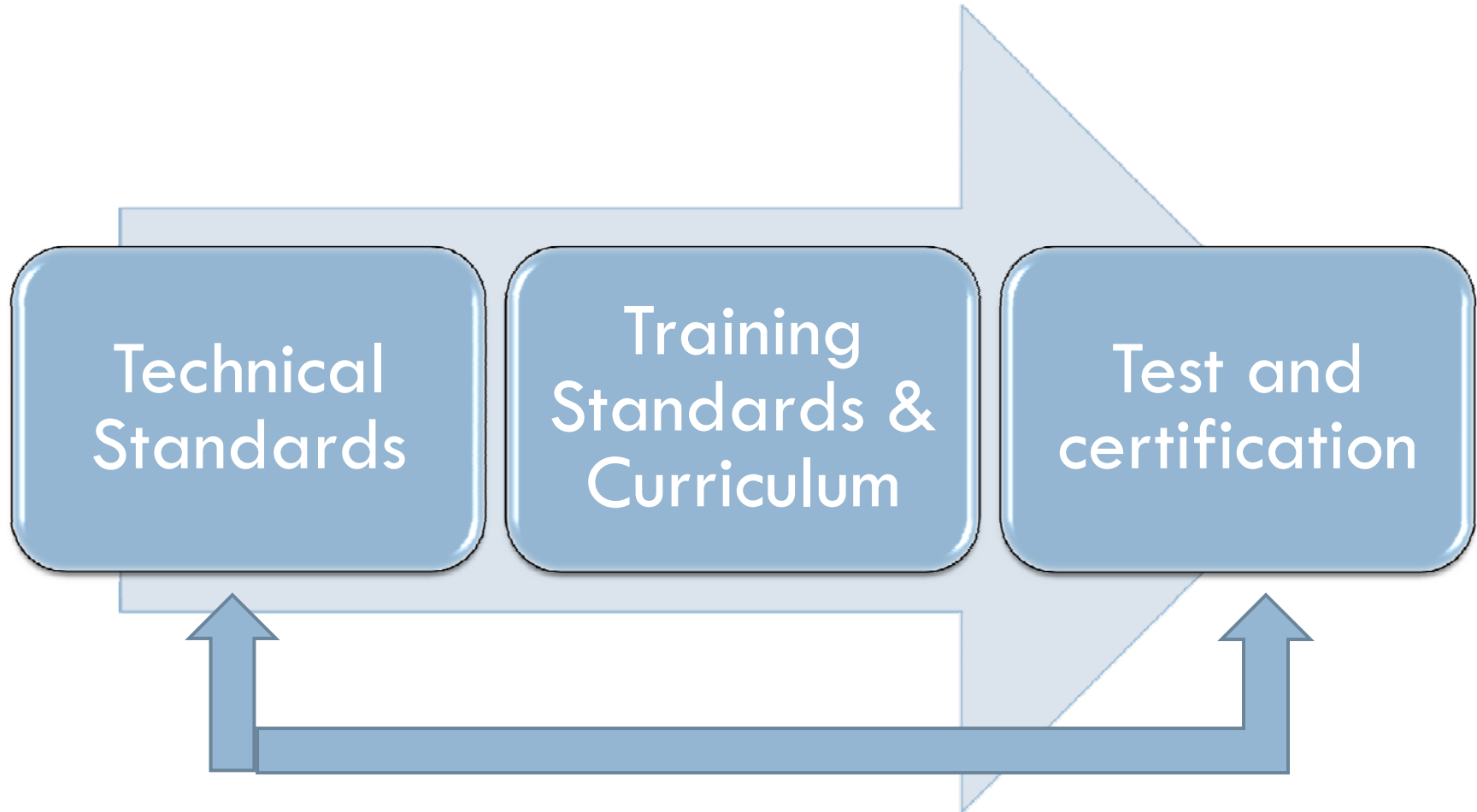
Perkins Legislation

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Perkins Legislation

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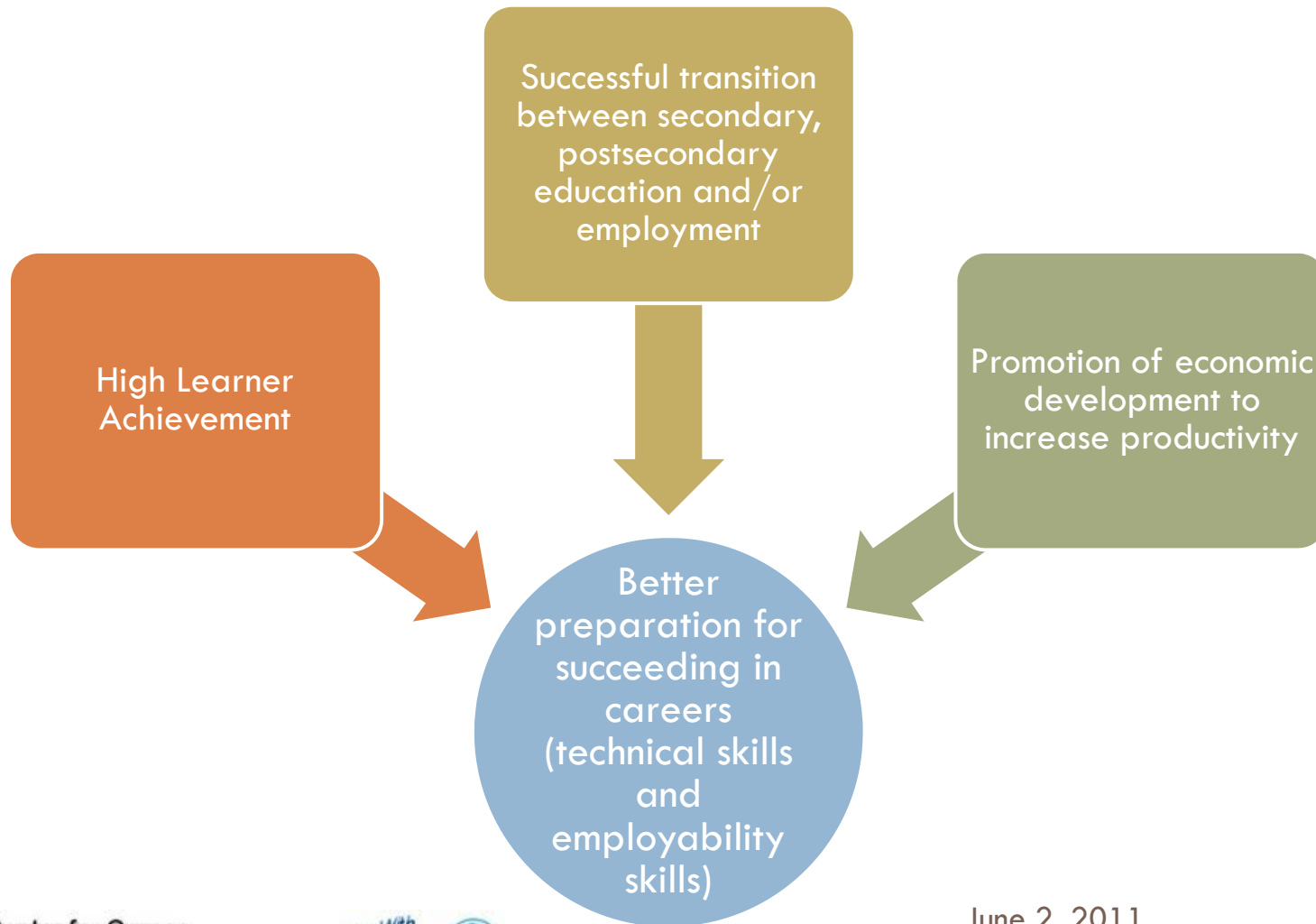


National Career Clusters

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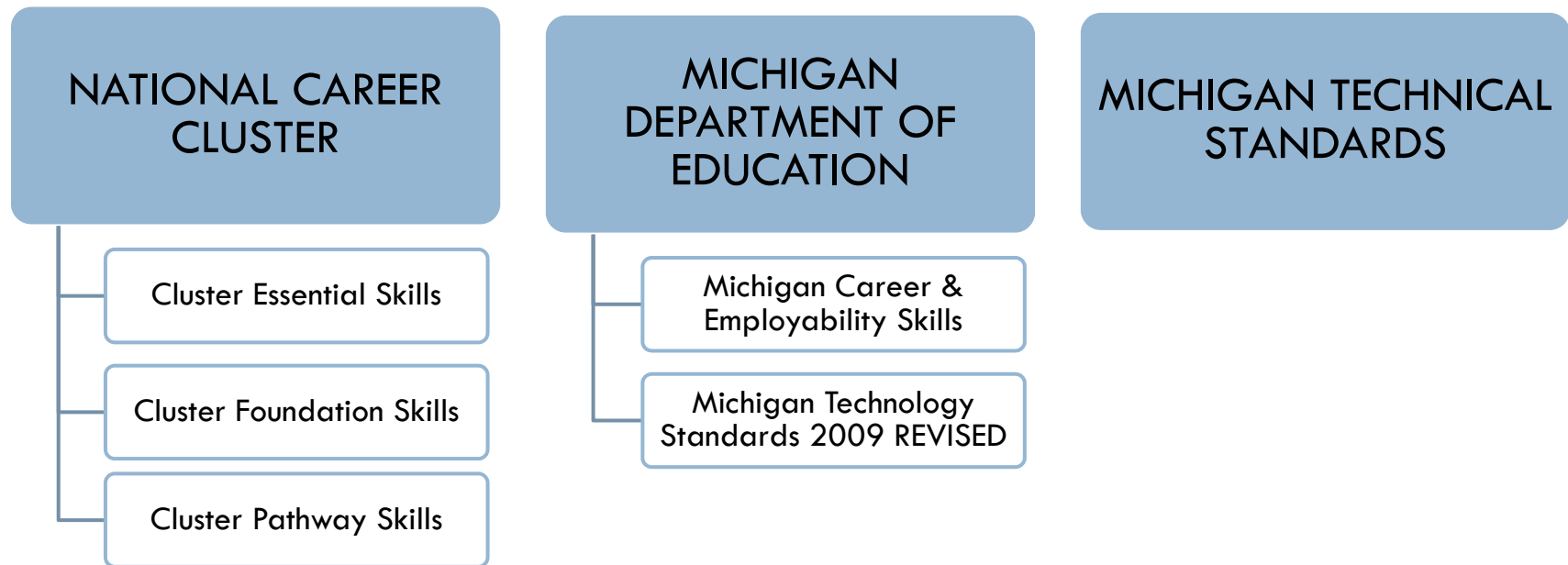


National Career Clusters



Sources of CTE Standards

10



New & Emerging

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Process to
finalize
standards
for
Engineering

Our Process

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Step 1

- Convene meeting of currently approved programs
- February 24, 2011
- Utica High School
- Jackson Area Career Center

Step 2

- Convene Second Meeting with School
- April 20, 2011
- Added Traverse Bay Area Skill Center - New & Emerging Academy

Step 3

- Segmenting
- May 19, 2011

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Step 1 – Engineering Meeting

Step 1--Engineering Meeting

February 24, 2011

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Convene current programs

- Jackson Area Career Center
- Utica Schools

Different Delivery Format

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Project Lead the Way

General Engineering

STEM Cluster

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Planning, managing, and providing scientific research and professional and technical services (e.g., physical science, social science, engineering) including laboratory and testing services, and research and development services.

Sample Career Specialties/Occupations	<p>Aerospace Engineer* Aeronautical Engineer* Agricultural Engineer* Agricultural Technician* Application Engineer* Architectural Engineer* Automotive Engineer* Biomedical Engineer* Biotechnology Engineer* Chemical Engineer* Civil Engineer* Communications Engineer* Computer Engineer* Computer Hardware Engineer* Computer Programmer* Computer Science Technician* Computer Software Engineer* Construction Engineer* Consultant* Development Engineer* Drafter* Electrical Engineer* Electrician* Electronics Technician* Energy Transmission Engineer* Environmental Engineer* Facilities Technician* Fire Protection Engineer* Geothermal Engineer* Hazardous Waste Engineer* Hazardous Waste Technician* Human Factors Engineer* Industrial Engineer* Industrial Engineering Technician* Licensing Engineer* Manufacturing Engineer* Manufacturing Technician* Manufacturing Processes Engineer* Marine Engineer* Materials Engineer* Materials Lab & Supply Technician* Mechanical Engineer* Metallurgic Engineer* Mining Engineer* Naval Engineer* Network Technician* Nuclear Engineer* Ocean Engineer* Operations Research Engineer* Packaging Engineer* Packaging Technician* Petroleum Engineer* Pharmaceutical Engineer* Plastics Engineer* Power Systems Engineer* Product Design Engineer* Project Engineer* Project manager* Prototype Engineer* Quality Engineer* Quality Technician* Radio/TV Broadcast Technician* Radiology Engineer* Researcher* Safety Engineer* Software Engineer* Sound Technician* Structural Engineer* Survey Technician* Systems Design Engineer* Technical Sales Manager* Technical Writer* Telecommunications Engineer* Textile Engineer* Transportation Engineer* Nuclear Engineer and Procurement Engineer</p>	<p>Analytical Chemist* Anthropologist* Applied mathematician* Archeologist* Astronomer* Astrophysicist* Atmospheric scientist* Biologist* Botanist* CAD operator* Cartographer* Chemist* Communications technologist* Conservation scientist* Cosmologist* Cryptographer* Crystallographer* Demographer* Dye chemist* Ecologist* Economist* Electronmicroscopist* Environmental scientist* Expert systems scientist* Geneticist* Geologist* Geophysicist* Geoscientist* Herpetologist* Hydrologist* Ichthyologist* Inorganic chemist* Laboratory Technician* Mammalogist* Marine scientist* Materials analyst* Materials scientist* Mathematician* Mathematics* Metallurgist* Meteorologist* Microbial Physiologist* Mycologist* Nanobiologist* Nuclear chemists* Nuclear technician* Numerical analyst* Nutritionist* Oceanographer* Organic chemist* Ornithologist* Paleontologist* Physicist* Polymer scientist* Programmer* Protein scientist* Protozoologist* Quality-control scientist* Radio chemist* Research chemist* Research Technician* Science Teacher* Lab Technician* Scientific visualization / graphics expert* Spectroscopist* Statistician* Technical writer* Technologist* Toxicologist* Zoologist*</p>
Pathways	Engineering and Technology	Science and Math
Cluster K&S	<p style="text-align: center;">Cluster Knowledge and Skills</p> <ul style="list-style-type: none"> ◆ Academic Foundations ◆ Communications ◆ Problem Solving and Critical Thinking ◆ Information Technology Applications ◆ Systems ◆ Safety, Health and Environment ◆ Leadership and Teamwork ◆ Ethics and Legal Responsibilities ◆ Employability and Career Development ◆ Technical Skills 	

STEM Cluster

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STEM--Engineering and Technology Pathway

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I	ACADEMIC FOUNDATIONS
A	Apply the concepts and processes using the guiding principles and standards of school mathematics to solve STEM problems.
B	Apply and use algebraic, geometric and trigonometric relationships, characteristics, and properties to solve problems.
C	Demonstrate the ability to select, apply, and convert systems of measurement to solve problems.
D	Demonstrate the ability to use Newton's Laws of Motion to analyze static and dynamic systems with and without the presence of external forces.
E	Explain relevant physical properties of materials used in engineering and technology.
F	Explain the relationships between scientific theory, scientific principles and laws, in technology, and engineering.
II	PROBLEM-SOLVING AND CRITICAL THINKING
A	Use mathematics, science, and technology concepts and processes to solve problems in projects involving design and/or production (e.g. medical, agricultural, biotechnological, energy and power, information and communication, transportation, manufacturing, and construction).
III	INFORMATION TECHNOLOGY APPLICATIONS
A	Select and use different forms of communications technology including word processing, spreadsheets, database, presentation software, email to communicate, and use of the internet to search for and display information.
IV	TECHNICAL SKILLS

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Step 2 – Second Meeting with Schools

Step 2—Schools Identify Standards

□ April 20, 2011

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Develop comprehensive list of standards to include various national standards

- NOCTI Pre-Engineering/Engineering Technology
- Skills USA Engineering Technology Blueprint
- Certified Manufacturing Technologist/Engineer (SME) (2010)
- Florida Engineering Technology
- Florida Introduction to Engineering Design
- Florida Foundations of Technology
- Vermont Engineering Technician

Four Major Knowledge Areas

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I	Engineering Design
II	Engineering Ethics
III	Engineering Graphical Communication
IV	Engineering Systems

4 Knowledge Areas; 16 Skill Areas; 106 Performance Elements

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I		Engineering Design
	A	Overview of Engineering
	B	Design Process/Problem Solving
	C	Project Planning
II		Engineering Ethics
	A	Demonstrate an understanding of the cultural, social, economic, and political consequences of engineering decisions
	B	Demonstrate an understanding of the effects of technology on the environment
	C	Demonstrate knowledge of constraints on global sustainability issues
III		Engineering Graphical Communication
	A	Create and assemble a prototype using CAD modeling software.
	B	Demonstrate an understanding of mathematics and dimensioning associated with CAD design software.
	C	Demonstrate an understanding of tolerances and their implications on an engineering design.
IV		Engineering Systems
	A	Discuss physical properties and characteristics of materials used in engineering systems
	B	Demonstrate an understanding of and be able to select and use transportation and logistical engineering technologies
	C	Demonstrate an understanding of and be able to select and use civil and construction engineering technologies
	D	Demonstrate an understanding of and be able to use electrical and electronic engineering technologies
	E	Demonstrate an understanding of and be able to use thermal dynamic principles
	F	Demonstrate an understanding of and be able to use mechanical engineering principles
	G	Demonstrate an understanding of common manufacturing, assembly and fabrication principles used in engineering

June 2, 2011

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Step 3 – Updated Standards Recommended by OCTE

15.0000—2010 CIP

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- **Engineering**
- **Title:** Engineering Technology, General
- **Definition:** A program that generally prepares individuals to apply basic engineering principles and technical skills in support of engineers engaged in a wide variety of projects. Includes instruction in various engineering support functions for research, production, and operations, and applications to specific engineering specialties.

Engineering Technical Standards

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Customized List to
address delivery
options

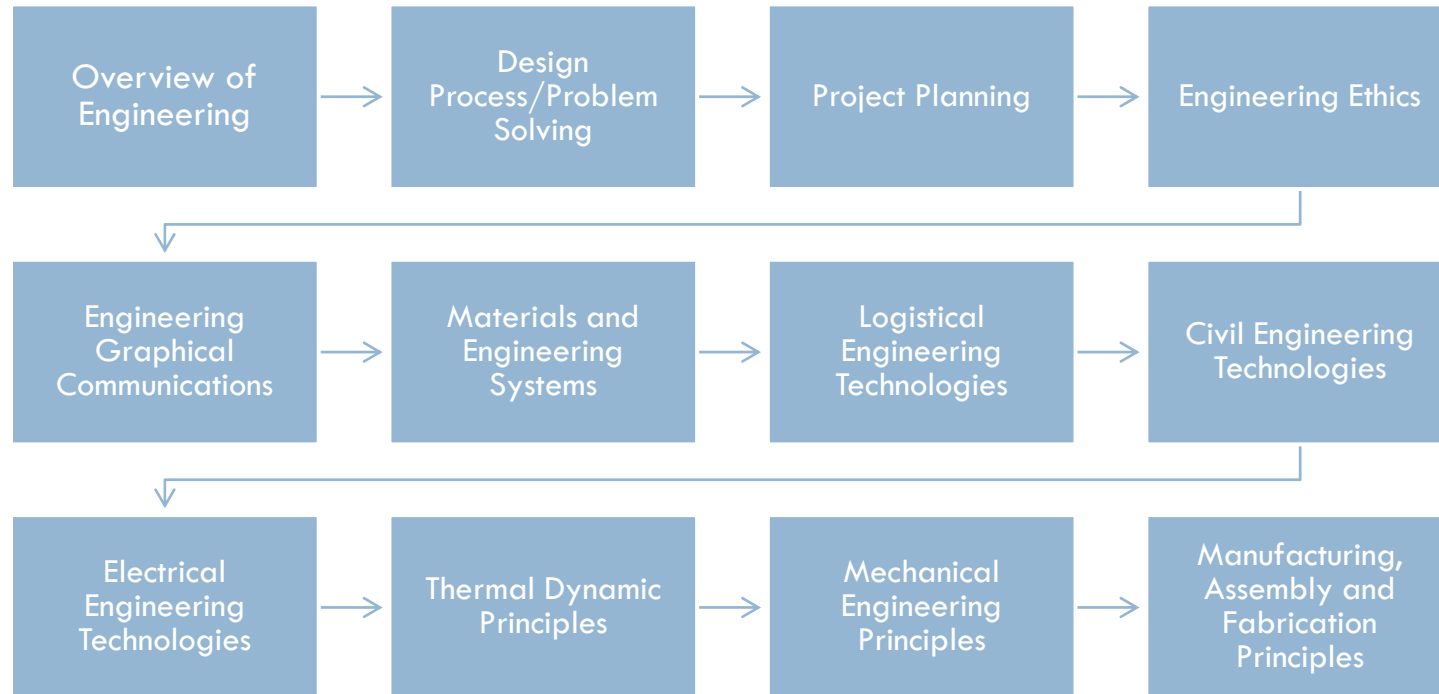
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Step 5 - Segmenting

Segmenting--Identify 12 Titles

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□ April 18, 2011



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Step 6 – Standards released to the field

STANDARDS RELEASED TO THE FIELD

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Home Schools MI Merit **Programs** Resources Help

Home

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Links

- [MCCTE-FSU](#)
- [States' Career Clusters](#)
- [OCTE Website](#)

Welcome to MCCTE Navigator

Welcome to the electronic curriculum system for Michigan's Career and Technical Education community (State/Regional/Local Administrators, and instructors). The system is called MI CTE Navigator and provides real-time access to Michigan's state approved CTE program curriculum which is necessary for educational decision-making, management and ultimately student achievement.

The web-based, online database is comprehensive, statewide, user-friendly, and instructor-driven and can be used for managing the technical standards, career cluster content, segments, resource content, and academic alignment results for all of Michigan's CTE program areas.

How to Use Navigator

Helpful Links

- [How Navigator Works](#)
- [Teachers - How to Upload and Retrieve Delivery Resources](#)

Tutorials

- [How to activate CTE teachers](#)
- [How to retrieve your password](#)
- [Overview of Navigator](#)

What's New

Wed, 01 Sep 2010 at 09:55 AM

ANNUAL UPDATE OF NAVIGATOR BEGINS September 15, 2010

In order to keep Navigator current for this school year, we require all users to be REACTIVATED annually. This reactivation process will begin with CEPD Administrators on September 15, 2010 and subsequently proceed to...

Upcoming Events

No events scheduled at this time.

State of Michigan

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Fax: 517.373.8776

General Contact

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Ferris State University
Bishop Hall, 1349 Cramer Circle
Big Rapids, MI 49307

Telephone: 888.591.2789
Fax: 231.591.2043

<http://navigator.mccte-fsu.org/>

June 2, 2011

STANDARDS RELEASED TO THE FIELD

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Steps to access webinar and gap analysis:

- Select "Program"
- Select "Career Cluster"

t **Programs** Users Reports

National Career Clusters

- Agriculture, Food, and Natural Resources
- Architecture & Construction
- Arts, A/V Technology & Communication
- Education & Training
- Finance
- Government and Public Administration
- Health Science
- Hospitality & Tourism
- Human Services
- Information Technology
- Law, Public Safety, Corrections & Security
- Management
- Manufacturing
- Marketing, Sales and Service
- Science, Technology, Engineering and Mathematics
- Transportation, Distribution & Logistics

<http://navigator.mccte-fsu.org/>

STANDARDS RELEASED TO THE FIELD

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Steps to access webinar and gap analysis:

- Select specific CTE program

Programs

14.1001 - Electrical, Electronics and Communications Engineering

14.3801 - Surveying Engineering

15.0000 - Engineering General (2011)

15.1306 - Mechanical Drafting and Mechanical Drafting CAD/CADD (2011)*

<http://navigator.mccte-fsu.org/>

STANDARDS RELEASED TO THE FIELD

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Steps to access webinar and gap analysis:

-Click on Links – “Program Links”



The screenshot shows the website for the Michigan Center for Career and Technical Education. The header includes the center's name and the Michigan Department of Education logo. A navigation menu contains links for Home, Schools, MI Merit, Programs, Resources, and Help. Below the menu, a breadcrumb trail reads: Home > Pathways > Engineering/Manufacturing and Industrial Technology > Architecture & Construction > Drafting & Design Technology. The main content area features a 'Login' section with fields for E-Mail and Password, and buttons for LOGIN and REGISTER. A 'Links' section is highlighted with a red bar, and the 'Program Links' option is highlighted in green. A blue dashed arrow points from the 'Program Links' option to the '15.0000 Engineering Technology, General' heading. Below this heading is a list of expandable sections: Technical Standards, Foundation Standards, Pathway Standards, and Career & Employability Standards.

Michigan Center for Career and Technical Education

A Partner With MICHIGAN Department of Education

Home Schools MI Merit Programs Resources Help

Home > Pathways > Engineering/Manufacturing and Industrial Technology > Architecture & Construction > Drafting & Design Technology

Login

E-Mail

Password

LOGIN REGISTER

Forgot your password?

15.0000 Engineering Technology, General

- [-] Technical Standards
- [-] Foundation Standards
- [-] Pathway Standards
- [-] Career & Employability Standards

Links

- Program Links
- States' Career Clusters
- OCTE Website

Gap Analysis Levels

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4=Exceeds criteria and/or able to teach task



3=Accomplishes task to criteria



2=Accomplishes task with help



1=Exposed to the task



N=Not Exposed to the Task

Sample plan of improvement

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PLAN OF IMPROVEMENT		
<i>Any performance element rated a "1" or "N" needs plan of improvement.</i>		
What needs to be done?	Who is going to do it?	When will it be done?
<i>Sample: Provide students exposure through job shadow</i>	<i>Teacher</i>	<i>Fall 2012</i>
<i>Sample: Evaluate current teaching material to expand opportunities for students</i>	<i>Teacher</i>	<i>Summer 2012</i>
<i>Sample: Expand Curriculum</i>	<i>Teacher</i>	<i>Summer 2012</i>

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Step 7 - Academic Alignment

To be done in Fall 2011

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Step 8 - Implementation

Next Steps

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March 2011 –
December 2012

- Complete Gap Analysis

Fall, 2011

- Academic Alignment with
State Panel

Fall 2012

- Implementation of the
standards

OCTE Process for New Programs

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- All other applications will be accepted through the New Program process beginning Fall 2011.

Thank You!!

If you have questions regarding this webinar contact:

- Michigan Center for Career and Technical Education

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Phone: 231-591-2789

- Dr. Patricia Talbott, State Consultant for Michigan Department of Education

Email: talbottp@michigan.gov

Phone: 517-335-0359



THANK YOU!

