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MINNESOTA PIPELINE PROJECT

PRIVATE INVESTMENT, PUBLIC EDUCATION LABOR AND INDUSTRY EXPERIENCE



**ADVANCED
MANUFACTURING**



AGRICULTURE



**HEALTH CARE
SERVICES**



**INFORMATION
TECHNOLOGY**



MINNESOTA DEPARTMENT OF
LABOR & INDUSTRY

**2015 PROGRESS REPORT
TO THE MINNESOTA LEGISLATURE**

EXECUTIVE SUMMARY

PIPELINE PROJECT 2015 LEGISLATIVE REPORT

The Minnesota Private Investment, Public Education, Labor and Industry Experience (PIPELINE) Project is a legislatively directed initiative managed by the Minnesota Department of Labor and Industry (DLI) in collaboration with the Department of Employment and Economic Development (DEED) and Minnesota State Colleges and Universities (MnSCU).

Minnesota Laws 2014, Chapter 312, Article 3, Sec. 21 calls for the state agencies to work with recognized industry experts, representative employers, higher education institutions, and labor representatives to define competency standards for occupations in:

- advanced manufacturing
- agriculture
- health care services
- information technology

DLI convened an Industry Council for each of the four industries and conducted three meetings between August and November 2014.

These meetings resulted in a greater shared understanding of industry workforce needs, the identification of occupations that could benefit from dual-training, and recommendations and ideas for next steps to support and expand dual-training in Minnesota. The Industry Councils continue to develop competency standards models for 15 identified occupations.

The outcomes for the PIPELINE initiative include establishing, verifying, and developing competency standards in at least one entry-level and two higher-skill level occupations for each industry and submitting a progress report and recommendations to the legislature by Jan. 15, 2015.

PIPELINE PROJECT FINDINGS

- There is high demand for employees in entry, mid- and advanced-level occupations in Advanced Manufacturing, Agriculture, Information Technology, and Health Care Services.
- Employers and industry representatives support competency-based workforce development and dual-training systems and they are engaged to further develop programs to help meet workforce needs.
- Employers and industry representatives recognize and value their role in identifying and validating competencies for identified occupations.
- Given sufficient resources, government has the ability to provide the infrastructure, tools, and assistance to help employers develop and manage dual-training programs.
- Education and organized labor can assist employers with early exposure, hiring, recruiting and related instruction for dual-training programs.
- It is essential to promote awareness about high-growth and high-demand industries and dual-training opportunities in these fields, especially to young people, people of color, women and veterans.
- Long-term and widespread employer engagement in dual-training systems requires an analysis of the costs and impact on productivity, revenue and employee tenure.

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RECOMMENDATIONS

1. Complete occupational competency standards for all occupations identified through the PIPELINE Project.

Fifteen occupations have been identified by the Industry Councils that could be developed through dual-training. DLI began to develop occupation specific competency standards models based on the competency models developed by the US DOL. Six PIPELINE occupation competency standards models for related instruction and on-the-job training are developed. Competency standards models will continue to be developed through June 2015 for the remaining identified occupations.

2. Build industry Competency Councils for each targeted industry to develop competency standards for additional occupations in each industry.

Industry Council representatives with broad industry knowledge have named subject matter experts to serve on Competency Councils to develop competencies that will be delivered through a combination of on-the-job training and related instruction. Each industry will have its own Competency Council and additional experts will be consulted as new occupations are identified.

3. Establish dual-training committees for a PIPELINE project identified occupation in each targeted industry.

Four potential dual-training pilot projects have been identified; one from each of the Industry Councils. DLI will facilitate the coordination of at least one new dual-training and/or apprenticeship programs during the next six months. Dual-training committees are needed to ensure successful implementation of each dual-training program and include ongoing participation by employers, employees and education providers.

4. Develop templates and implementation tools for new dual-training programs for all occupations identified through the PIPELINE project.

Templates and implementation tools based on the work of the PIPELINE project would include

how-to guides and checklists for the development of a successful dual-training programs: recruiting and hiring; related instruction; on-the-job training programs; mentoring; program governance and sustainability.

5. Create and execute a plan for dual-training outreach, exposure, and awareness.

The Industry Councils identified that outreach, early exposure and awareness about their industries and about dual-training opportunities is essential to build and expand dual-training in Minnesota. The PIPELINE Project recommends developing materials to market dual-training opportunities; identify and evaluate skills assessments and partner with key stakeholders including employers, labor and education to offer hands-on awareness events.

6. Align dual-training delivery system to other workforce initiatives.

The Industry Councils acknowledged and explored many current workforce initiatives in these targeted industries. It is imperative that the PIPELINE Project continue to learn about, collaborate and align with statewide workforce development projects designed to enhance Minnesota's skilled labor force.

7. Develop research and analysis tools to determine dual-training system costs and benefits.

The PIPELINE Project recommends additional research and analysis on the costs, return on investment and benefits of dual-training for employers, employees and the state.

8. Explore providing financial support to make dual-training programs viable and sustainable for employers and employees.

The Industry Councils recommended the state explore possible incentive funds or seed grants for employers and dual-training employees or apprentices to assist in off-setting the initial costs associated with beginning a dual-training or apprenticeship program.

INTRODUCTION

PIPELINE PROJECT 2015 LEGISLATIVE REPORT

During the 2014 session, the Minnesota legislature created the PIPELINE Project to explore an employment based workforce model centered on training employees through a system that has been successful in the United States and Europe for more than a century – apprenticeship.

By targeting four economic growth industry sectors with limited previous experience with Minnesota’s apprenticeship system, this initiative strives to explore workforce development solutions in areas of economic demand and potential growth. The industries include: Advanced Manufacturing, Agriculture, Health Care Services, and Information Technology (IT).

Several long-term systemic issues related to workforce development were the impetus behind the Minnesota PIPELINE legislation. These workforce realities continue to guide the management of the PIPELINE project: jobs in high-growth sectors increasingly require complex knowledge, skills and abilities of its employees; and Minnesota has well documented issues with high rates of youth unemployment and college graduate under-employment. Therefore, the long-term project goals of the PIPELINE Project include enhancing the number of skilled workers in Minnesota’s workforce through increasing dual-training and registered apprenticeship throughout Minnesota.

In developing the project plan, identifying participants and inventorying current workforce initiatives, DLI worked closely with staff members from a number of groups. Among them were the Minnesota Chamber of Commerce, Minnesota AFL-CIO, the Department of Employment of Economic Development and Minnesota Colleges and Universities. The chief legislative sponsors, Sen. Teri Bonoff and Rep. Kim Norton, were also very involved in the project planning and implementation. Sen. David Senjem and Sen. Carla Nelson also took part.

Additionally, Mayo Clinic, Hennepin Technical College and South Central College generously hosted Industry Council meetings.

The findings and recommendations in this report are developed directly from the information that was learned from the representatives of each industry during the 12 Industry Council meetings and multiple employer information gathering sessions.

PIPELINE PROJECT PURPOSE

The PIPELINE Project was developed to enhance the skilled workforce in Minnesota by being a catalyst for expanding the dual-training system with the voluntary participation from industry leaders. The legislation identifies several project outcomes:

- Establishment of competency standards for entry level and at least two additional higher skill levels in each industry.
- Verification of competency standards and skill levels and their transferability by representatives of each respective industry.
- Models of ways for Minnesota educational institutions to engage in providing education and training to meet the competency standards established.
- Participation from the identified industry sectors.
- By Jan. 15, 2015, report to the legislative committees with jurisdiction over jobs on the progress and success, including outcomes, of the initiatives in this section and recommendations on occupations.

INDUSTRY COUNCILS

The PIPELINE Project began by identifying and inviting industry representatives from employers, labor and education providers to participate in Industry Council discussions.

DLI convened 12 meetings, three for each of the Industry Councils in August, October and November 2014.

The Industry Councils have worked to:

- understand current and near-future workforce needs in each industry,
- explore existing workforce initiatives, better understand dual-training and apprenticeship programs in each industry,
- identify occupations in each industry that have the potential to be developed through dual-training or apprenticeship programs,
- begin to establish competency standard models for one entry-level and at least two higher-skill occupations in each industry, and
- gather recommendations from each Industry Council about how to implement dual-training in each industry.

During the first meeting, each Industry Council discussed the purposes of the PIPELINE Project, began to identify the needs of each industry and explored high-demand and hard-to-fill occupations.

Following these meetings, industry specific surveys were distributed to further clarify the occupations most easily supported by dual-training or apprenticeship, as well as validate industry-specific personal effectiveness competencies, academic competencies, workplace competencies, and industry-wide competencies.

During the second meeting, the Industry Council's identified three or four occupations to begin exploration of dual-training delivery models.

These competencies were based on current dual-training, education and apprenticeship programs developed by the U.S. Department of Labor and were presented by Industry Council members.

The final meetings of the Industry Councils identified recommendations for moving forward with competency standard development and potential next steps in dual-training delivery.



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DUAL-TRAINING AND REGISTERED APPRENTICESHIP

Registered apprenticeship is the most utilized dual-training system in the United States and in Minnesota.

The Minnesota Department of Labor and Industry is recognized by the U.S. Department of Labor as the state apprenticeship authority with the responsibility to develop, administer and oversee registered apprenticeship programs.

In December 2014, Minnesota had 310 apprentice sponsors and more than 8,800 active apprentices. Currently, approximately 80 percent of registered apprenticeships in Minnesota are in the construction trades.

Dual-training, including registered apprenticeship, has many advantages for employers and workers. These employment-based training models provide living wages and benefits for employees while they are learning new skills and advancing their careers.

An individual entering a dual-training program can be hired into the position as a dual-trainee or apprentice, then through on-the-job training and related instruction the employee can gain knowledge and skills needed to be an expert worker in their chosen occupation.

The core components of dual-training and registered apprenticeship are the same:

- employment,
- on-the-job training and mentorship, and
- related instruction.

The Industry Councils identified that the terms “dual-training” and “apprenticeship” have been interchanged and often confused.

Registered apprenticeship is a formal system of delivering dual-training. DLI approves apprenticeship program standards that include the program’s administrative rules, and the required related instruction and the detailed work-processes for on-the-job training for each occupation in the apprenticeship program.

The standards also include a progressive wage schedule so the apprentice earns more as their skills develop. DLI also approves registered apprenticeship agreements between employers and apprentices and issues nationally recognized credentials upon the successful completion of an apprenticeship program.

Dual training and registered apprenticeship programs can be developed in a variety of ways including:

- single employer with a customized training provider,
- multi-employer and labor joint programs,
- education driven with multi-employer participation,
- industry association with multi-employer participation.

Delivery options for dual-training and registered apprenticeship are also flexible and designed to meet employer’s needs:

- Time-based programs require a specified number of hours the dual-training employee or apprentice spends in on-the-job training and related classroom instruction.
- Competency based programs have assessments that must be passed to ensure mastery of specific skills.
- Hybrid programs require a combination of the time-based and competency-based approaches.

DUAL-TRAINING	REGISTERED APPRENTICESHIP
Dual-trainee is an employee of participating employer	Registered apprentice is employee of sponsoring employer
Work process – A description of on-the-job training	Work process – 2,000 hours each year or equivalent
Related technical instruction – A description of the coursework the dual-trainee will complete	Related technical instruction– 144 hours each year or equivalent
	Safety training – 50 hours each year
	Progressive wage schedule
	State issued completion certificate

COMPETENCY STANDARDS MODELS

The PIPELINE Project has developed competency standard models to help depict occupation specific dual-training competencies.

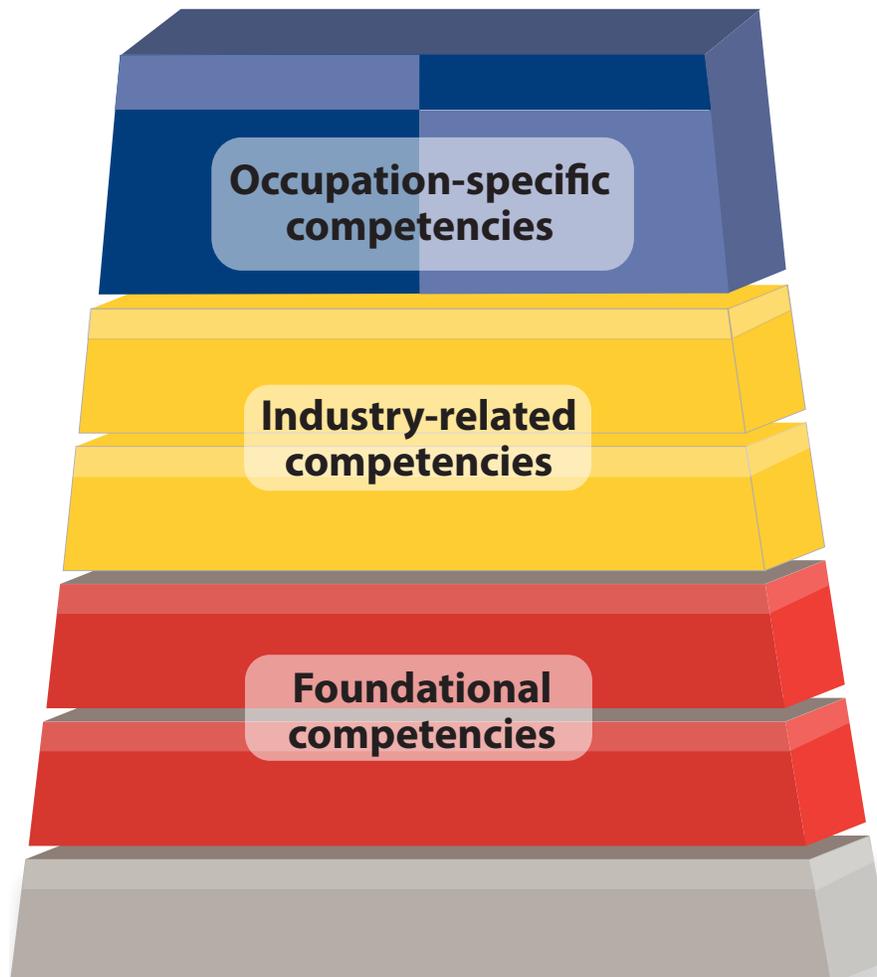
These models help to promote an understanding of the function of competency standards in general and to illustrate the knowledge, skills and abilities required for each specific occupation.

The PIPELINE competency standards models are modified versions of competency models developed by the U.S. Department of Labor.

These models are depicted as pyramids. The base of the competency pyramid includes the most general knowledge and skills. Greater specialization continues as the pyramid rises through industry, occupation and finally employer-specific knowledge skills and abilities are found at the top of the pyramid.

Models for the PIPELINE occupations were pulled from the Competency Model Clearinghouse for review, discussion and validation by Minnesota industry leaders (www.careeronestop.org/CompetencyModel).

Initial competency standards have been drafted for each identified occupation, but nine occupations require further analysis. All occupation competency standards models must be validated by industry subject matter experts. Competency standards for PIPELINE identified occupations can be found in the Appendix.



PIPELINE PROJECT FINDINGS	INDUSTRY COUNCIL IDEAS
<p>There is a high demand for employees in entry, mid and advanced level occupations in Advanced Manufacturing, Agriculture, Information Technology, and Health Care Services.</p>	<ul style="list-style-type: none"> • Create innovative recruiting tools and models; for example girl high school clubs, veterans’ programs, and prison-to-work programs that aim to recruit more diverse audiences into industry. • Develop a talent pipeline through dual-training programs by building an infrastructure for continuous improvement of the current workforce. • Identify opportunities for program variability based on industry sub-sectors and geographic differences in Minnesota. • Support and expand current innovative training programs throughout the state. • Establish tools to identify the transferability of skills from unrelated occupations. • Seek opportunities to develop career pathways that will support employees entering the profession and moving between occupations. • Focus recruitment on projects aiming to hire people of color, women, and veterans.
<p>Employers and industry representatives support competency-based workforce development systems, and they recognize and value their role in identifying and validating competencies for identified occupations.</p>	<ul style="list-style-type: none"> • Continue to develop occupational competency standards for the careers selected by each Industry Council. • Validate PIPELINE Project occupational competency standards with industry experts. • Identify means of analyzing and documenting transferable skills. • Lead the Minnesota effort in defining each selected occupation identified by the PIPELINE Industry Councils thus creating standardized language throughout the state. • Implement one to four new dual-training programs with newly established tools and occupational competency standards. • Implement new dual-training programs in partnership with Industry Councils.
<p>Given sufficient resources, government has the ability to provide the infrastructure, tools, and assistance to help employers develop and manage dual-training programs.</p>	<ul style="list-style-type: none"> • Build a system to track on-the-job-training (OJT) and related instruction progress. • Assist and support employers with the processes and structure related to establishing dual-training or apprenticeship. • Create dual-training templates and program design options to facilitate quick and easy implementation of new dual-training programs in each industry. • Develop a tool kit to include resources for establishing dual-training programs and training for employers, mentors, and educators.

PIPELINE PROJECT FINDINGS	INDUSTRY COUNCIL IDEAS
<p>(continued ...)</p>	<ul style="list-style-type: none"> • Establish seed funding to assist employers and dual-trainee employees or apprentices in participating in new dual-training and/or apprenticeship programs in each of the four industries. • Create incentives for employers and dual-training employees. • Target existing state and innovative funding streams to finance PIPELINE Project next steps.
<p>Education and organized labor can assist employers with early exposure, hiring, recruiting and related instruction for dual-training programs.</p>	<ul style="list-style-type: none"> • Science, Technology, Engineering and Math (STEM) preparation is aligned to workforce demand. • Support career courses being included in K-12 standards. • Ensure classrooms have relevant technology. • Develop programs to foster industry skills; exposure programs for faculty and initiatives to bring industry experts into classrooms. • Design programs to foster creativity and innovation. • Identify or develop aptitude assessments specific to each occupation. • Ensure prospective candidates are aware of high-level of commitment need to successfully complete dual-training.
<p>It is essential to promote awareness about high-growth and high-demand industries and dual-training opportunities in these fields, especially to young people, people of color, women and veterans.</p>	<ul style="list-style-type: none"> • Continue to provide education about dual-training and apprenticeship definitions, processes and benefits. • Outreach to increase awareness on specific industry and dual-training opportunities to all groups in Minnesota. • Develop programs to foster career exploration. • Create industry specific marketing material to promote PIPELINE occupations and dual-training “tool-kits” to support employers, dual-training employees or apprentices, and early exposure initiatives. • Develop a marketing plan to expose youth and adults to hands-on industry specific career exploration opportunities through summer camps, semester programs, cooperatives, internships, etc. • Create marketing and communication plan to disseminate dual-training information and templates to employers; the goal is to educate more employers on this workforce model.
<p>Long-term and widespread employer engagement in dual-training systems requires an ongoing analysis of the costs and impact on productivity, revenue and employee tenure.</p>	<ul style="list-style-type: none"> • Identify how dual-training programs will increase employee retention. • Identify how to measure the return on investment for employers engaged in dual-training programs. • Research and document the cost of dual-training versus other hiring and education methods within the industry.

ADVANCED MANUFACTURING OUTCOMES

ABOUT THE INDUSTRY

Minnesota had more than 307,200 manufacturing jobs statewide in 2013, which is 13 percent of all private-sector employment.

Manufacturing has the second-largest total payroll of any private-sector industry at \$18.3 billion annually, and manufacturing pays an average annual wage of \$59,565. That amount is 21 percent higher than the average wage in all other industries.

In addition, every manufacturing job also supports another 1.7 jobs in other segments of Minnesota's economy – or about 519,000 additional jobs – meaning in all, manufacturing accounts for about 826,000 jobs, or 31 percent of all jobs statewide.

Manufacturing also contributes \$43.7 billion to the state economy and accounts for 16 percent of Minnesota's gross domestic product. Minnesota companies sold nearly \$20 billion in manufactured products in foreign markets, and more than 8,600 companies had export sales in 2013.

ADVANCED MANUFACTURING INDUSTRY COUNCIL

Seventy-five people participated in the Advanced Manufacturing Industry Council meetings.

- 27 members of industry and industry associations
- 14 education representatives
- Seven labor and labor/education representatives
- 27 government, legislative and other representatives

Council membership includes employer representation from food, medical device, precision, and custom manufacturing sectors. Council members and additional representatives are listed in Appendix C.

The first Advanced Manufacturing Industry Council meeting was conducted Aug. 12, 2014, at the Department of Labor and Industry. The purpose of the PIPELINE Project and the vision for success were shared with the Council.

Industry Council member Kim Arrigoni, Board Officer at Haberman Machine, presented the business case for the advance manufacturing sector to begin investigating non-traditional workforce development options like dual-training or apprenticeship models as solutions to workforce shortages in their industry. Richard Wagner, President of

Advance Manufacturing is the PIPELINE industry that currently has the strongest apprenticeship infrastructure in the state, including 20 registered apprenticeship programs in manufacturing and 125 current manufacturing apprentices.

DLI has also partnered on a Customized Training Pilot Program (CTPP) in advanced manufacturing industry with DEED. The program tracks participant training and program completion in partnership with Alexandria Technical and Community College, Hennepin Technical College, Central Lakes College and Century College.

The CTPP program has 143 participants, 22 employers and includes 73 signed employer agreements. A full description is available in Appendix D.



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Dunwoody College of Technology, described the educational impact of dual-training and registered apprenticeship programs for employees, employers and the state. Using a facilitated process, the Council generated an inventory of abilities, knowledge and skills for high-demand advance manufacturing occupations; the occupations discussed at this meeting were used to generate a preliminary list of “apprenticeable” advance manufacturing occupations.

After the first Industry Council meeting, the list of high-demand occupations was cross-referenced with DEED labor-market data, MnSCU listening sessions results and Wanted Analytics data, a Web-supported database that provides current and past job openings in the state.

A survey was designed to identify the most “apprenticeable” advance manufacturing occupations. More than 100 industry representatives completed the survey selecting six of the most “apprenticeable” industry occupations. The survey also served to validate industry specific competencies related to personal effectiveness, academic, workplace, and industry-wide technical skills based on the PIPELINE Competency Standards Models adopted the U.S. DOL Competency Models.

ADVANCED MANUFACTURING OUTCOMES

South Central College hosted the second Advance Manufacturing Industry Council meeting on Oct. 13, 2014. Jan Doebbert, Vice-President of Academic Affairs and Bob Defries, Dean of Customized Training both of Alexandria Technical and Community College discussed its registered apprenticeship program; opportunities, challenges and lessons learned. Dr. Annette Parker, President of South Central College, presented on dual-training programs and models throughout the United States, and the current U.S. DOL grant awarded to South Central College focusing on expanding dual-training throughout Minnesota.

The Industry Council identified four occupations for a dual-training focus, including the development of competency standards.

The final Advance Manufacturing Industry Council meeting was hosted by DLI on Nov. 14, 2014. The Industry Council made recommendations to move forward with occupational competency standard development and potential next steps to increase dual-training delivery in advanced manufacturing.

Occupations identified by the Advanced Manufacturing Industry Council for PIPELINE competency modeling and dual-training planning are:

- **CNC Operator/machinist**
- **Maintenance and repair worker**
- **Mechatronics technician**
- **Metal fabricators – welders, cutters solderers, brazers**

ADVANCED MANUFACTURING RECOMMENDATIONS

Recommendations specific to the Advanced Manufacturing industry are categorized by area of need:

1. Early exposure

Industry Council members strongly support creating a marketing and branding campaign to highlight career opportunities in advanced manufacturing, and to promote dual-training options in this industry sector. They suggest providing youth and adults greater awareness of this industry by linking career awareness initiatives and self-awareness assessments related to an individual's interest and aptitude. Other efforts to increasing awareness and understanding of this industry include:

- developing more youth and adult advance manufacturing camps,
- creating opportunities for hands-on experience in advanced manufacturing occupation, and
- establishing mentoring programs linking industry experts with youth and/or adults interested in learning more about advanced manufacturing.

Council members believe that strong mentors both prior to employment and during dual-training will strengthen recruitment and career advancement in advanced manufacturing. This includes training mentors about K-20 pathways and how to mentor strong workplace skills.

Employers expressed a preference that programs be frontloaded with pre-employment training to ensure success as individuals enter the work setting. Many employers within the manufacturing industry currently use temp-to-hire or third party employment services to recruit and hire employees. Employees receive some general training through these employment services, followed by on-the-job training at the manufacturer.

The Industry Council suggests focusing outreach efforts to under-represented groups in this industry, such as people

ADVANCED MANUFACTURING OUTCOMES

of color, women and veterans. In addition, the Industry Council believes it is critical to educate parents, school counselors, and teachers about the opportunities available in this industry.

The Advanced Manufacturing industry has been and continues to be dedicated to early exposure initiatives aimed at highlighting occupational opportunities and pathways in this industry. The Industry Council encourages the PIPELINE Project to link and to partner with the other advanced manufacturing initiatives and projects throughout the state to maximize impact and effectiveness.

2. Hiring and recruiting

Council members said that employers generally try to hire experienced operators and machinists to ensure efficiency and quality. Dual-training could be an alternative means of developing a talent pipeline and building the infrastructure for continuous improvement of the current workforce. The Industry Council also suggested the idea of hiring individuals as interns first to determine the employee's commitment and interest in the specific occupation; then converting the employee to an apprentice at the end of a successful internship experience.

The Industry Council recommends a coordinated recruitment initiative for advanced manufacturing by region and statewide. For example, it is likely that there is untapped opportunity to recruit and hire individuals who do not self-identify their skills or interests as aligning with careers in advanced manufacturing. Skills from unrelated occupations or the military could be identified as transferable to the industry; resulting in effective recruiting strategies and streamlined training. The aim of cross-industry partnerships is to reach a diverse untapped group of potential advanced manufacturing application; veterans, women, high school youth, transferable, but unrelated skilled workers, individuals in corrections facilities, persons with disabilities, people of color, and low-income communities.

3. Skills and training

The breadth of knowledge and skill needs within advanced manufacturing is significant. Council members identified skill needs such as stamping, blue print reading, and running a lathe, or more general needs such as efficiency, quality assurance, and flexibility.

Additionally, a mix of skills is needed within each sub-sectors of the industry. For example, medical manufacturing requires machinists, injection molding operators, regulatory specialists, sterilizations technicians, etc. As the advanced manufacturing industry continues to automate, different levels of skill are needed such as machine operators with programming abilities and knowledge of electrical applications— a technician and an engineer in one person.

Continuous improvements skills are needed to ensure employers remain competitive in a world economy. The council suggested a multi-employer and/or multi-function supply chain work rotation might maximize employee development. Additionally, national skills standards groups may be a resource for competencies mapping in advanced manufacturing.

The Industry Council recognizes the various drivers and structures available for delivering on-the-job training and related instruction for dual-training programs. They continue to seek assistance with developing dual-training and apprenticeship standards, and setting up the dual-training system framework.

Industry Council members explored the types of infrastructure this industry needs to support dual-training. The development of a “tool kit” for associations and employers new to dual-training emerged as a Council recommendation. The tools needed in the tool kit include training for new mentors, templates for competency mapping and program development, templates for related instruction curriculum development, and train-the trainer programs for program sponsors, supervisors, mentors, and faculty.

ADVANCED MANUFACTURING OUTCOMES

4. Recommended next steps

- Validate occupational competency standards; identify means of analyzing and documenting transferable skills.
- Continue to provide education about dual-training and apprenticeship definitions, processes and benefits.
- Outreach to increase awareness on Advanced Manufacturing industry and dual-training opportunities throughout Minnesota.
- Assist and support employers with the processes and structure related to establishing dual-training or apprenticeship.
- Establish seed funding to assist employers and dual-trainee employees or apprentices in initiating new dual-training and/or apprenticeship programs in advance manufacturing.
- Create dual-training templates and program design options to facilitate quick and easy implementation of new dual-training programs in advance manufacturing throughout the state; ensuring that they are cross-functional and represent the industry as a whole.
- Implement one new dual-training program with newly established tools and occupational competency standards.
- Create industry specific marketing material to promote the advance manufacturing occupations and dual-training “tool-kits” to support employers, dual-training employees or apprentices, and early exposure initiatives.
- Lead the Minnesota effort in defining advanced manufacturing and defining each selected advance manufacturing occupation identified by this Industry Council thus creating standardized language throughout the state.
- Create innovative recruiting tools and models; for example girl high school clubs, veterans’ programs, and prison to work programs that aim to recruit more diverse audiences into this industry.
- Negotiate statewide agreements with MSSC, NIMS, PMMI, and AWS to ensure national credentialing standard are available to employers and employees throughout Minnesota.
- Identify opportunities for program variability based on industry sub-sectors and geographic differences in Minnesota.
- Perform a cost analysis of dual-training versus other methods of hiring and employee training and education.

AGRICULTURE OUTCOMES

ABOUT THE INDUSTRY

A 2010 study by the Minnesota Department of Agriculture estimated the total economic impact of agriculture in the state at \$23.3 billion and the agricultural economy has improved greatly since then. The same study shows the total employment impact to be 149,384 jobs, which includes direct employment of 98,006.

According to the 2012 Census of Agriculture, Minnesota is home to more than 74,500 farms covering just more than 26 million acres, which is nearly half of the state's total land area. The market value of agricultural products sold in 2012 climbed to \$21.3 billion, a 61 percent increase since 2007.

Minnesota ranks fourth in the United States for total market value of products sold, including fourth in the value of crops and seventh in the value of livestock products. Minnesota is

first in the number of turkeys, third in hogs and pigs, third in soybeans, third in grains and oilseeds, fourth in corn for grain, and seventh in milk from cows. It ranks in the top 15 in several other crop and livestock categories, including poultry and egg production, cattle and calves and vegetables.



AGRICULTURE

Agriculture has several national apprenticeship programs, yet no registered apprenticeship programs are active in Minnesota. Many of the positions within the industry are new, emerging or experiencing significant technological shifts.

AGRICULTURAL INDUSTRY COUNCIL

Fifty-two people participated in the Agriculture Industry Council meetings.

- 19 members of industry and industry associations
- Nine education representatives
- Four labor and labor/education representatives
- 20 government, legislative and other representatives

Council members and additional representatives are listed in Appendix F.

The first Agriculture Industry Council meeting was conducted Aug. 14, 2014 at the Department of Labor and Industry. The purpose of the PIPELINE Project and the vision for success were shared with the Council.

Industry Council member Dr. Brian Buhr, Dean of University of Minnesota's College of Food, Agriculture and Natural Resource Sciences (CFAN), framed the issues facing the agriculture industry in Minnesota, especially related to workforce shortages statewide.

Current competency standards training models used in the United States and Europe were outlined. Through a facilitated process, the Council generated an inventory of abilities, knowledge and skills for high demand agriculture occupations; the occupations discussed at this meeting were used to generate a preliminary list of "apprenticeable" agriculture occupations.

After the first Industry Council meeting, the list of high-demand occupations was cross-referenced with DEED labor-market data, MnSCU listening sessions results and Wanted Analytics data. A survey was designed to identify the most "apprenticeable" agriculture occupations. The survey also served to validate industry specific competencies related to personal effectiveness, academic, workplace, and industry-wide technical skills based on the PIPELINE Competency Standards Models adapted from the U.S. DOL Competency Models in other industries, as agriculture models had not been developed prior to the PIPELINE Project.

The Department of Labor and Industry hosted the second Agriculture Industry Council meeting on Oct. 3, 2014. The meeting was dedicated to discussion and selection of three agriculture PIPELINE occupations.

Industry Council members were asked to identify industry experts in each of the selected agriculture PIPELINE occupations.

The final Agriculture Industry Council Meeting was hosted by DLI on Nov. 12, 2014. The Industry Council identified recommendations for moving forward with occupational competency standard development and potential next steps to increase dual-training delivery in agriculture.

AGRICULTURE OUTCOMES

Occupations identified by the Agriculture Industry Council for PIPELINE competency modeling and dual-training planning are:

- **Agronomist**
- **Herd manager**
- **Skilled mechanic (agriculture)**

Full descriptions of these occupations are available in Appendix G.

AGRICULTURE RECOMMENDATIONS

Recommendations specific to the Agricultural industry are categorized by area of need:

1. Early exposure

While there are currently no registered apprenticeship programs in Minnesota, the agriculture Industry Council demonstrated a high level of interest and support for dual-training and apprenticeship. Agriculture is experiencing significant structural shifts in technology changes; resulting in emerging professions and potential opportunities to develop strong career pathways within the industry. Exposure and increased awareness to agriculture occupations is critical, especially for Minnesotans in suburban and urban locations who may have little understanding of this industry. Council members think it is important to promote greater awareness about “where Minnesota’s food comes from.” Hands-on experiences are important ways for individuals to assess their interest, aptitude, and suitability to professions within the industry. Council members believe that career exploration opportunities need to be directed at K-12 students, which requires providing training to support agriculture, food and natural resources instructors to begin this early career exploration process. Further, students need an early understanding of demand for strong Science, Technology, Engineering and Math (STEM) in agriculture as a foundation to career mobility within the industry.

2. Hiring and recruiting

The industry needs all levels of workers, including leaders, sales people, scientists, herd managers, financial workers, etc. A background or understanding of agriculture, including hands-on experience is beneficial in all of these occupations and more. Industry members anticipate a wave of retirements. This, compounded by industry growth, is resulting in significant concerns of workforce shortages.

Hiring is currently employer dependent. Industry Council members confirm that hiring is done at the entry-level with the expectation that trained employees will advance to manager roles. While current practices have a limited ability to meet the needs for some types of agriculture employees, it does not ensure the development of high-level managers and scientists. Industry Council members reinforce the importance of understanding the geographical recruitment and hiring needs and practices throughout the industry and state.

3. Skills and training

Agriculture is a multiple dimension industry. This sector has experienced significant technological shift in its operational practices. Employees need knowledge of power diesel, electrical circuits, plumbing, hydraulic systems, computer technology, reading technical specifications and instructions, metal fabrication, building construction, etc. Equipment that historically was manually controlled is now electronically controlled and wireless technology is common. Employees need a higher level of technological proficiency than in the past, but this does not lessen the need for manual skills. Technicians need to be highly skilled in a range of areas, including: manual mechanics, electronics, emerging technology, manufacturer specific technology, and have a commercial driver’s license. Animal

AGRICULTURE OUTCOMES

care professionals need these skills, as well as an understanding of nutrition, animal monitoring and care. Sub-sectors of the industry must also understand standards for organic farming, conservation and animal care.

The delivery of related instruction and on-the-job training are critical for this industry and must be reviewed regularly to ensure curriculum, equipment, and technology are relevant to the changing needs of the industry. Education must be flexible and reflect the seasonality of the agriculture industry. Production cycle creates periods of very high labor demand (i.e. hours of work) and periods of low labor demand. Many positions require long hours and/ or night shifts. Language and cultural skills, as well as people management skills are necessary and increasingly multi-lingual skills and cross-cultural experience is valued.

Industry council members suggest partnering with one or more of their strong industry associations as the appropriate means of developing dual-training, rather than employer-by employer. This industry prefers cross training initiatives with short and stackable credentials that could fit the flexibility needs of agriculture and train the trainer programs that assist employers with refining their on-the-job training techniques.

4. Recommended next steps

- Continue to develop occupational competency standards for the careers selected by the Industry Council.
- Launch new dual-training programs in partnership with an agriculture Industry Council.
- Develop a marketing plan to exposure youth and adults to hands-on agriculture career exploration opportunities through summer camps, semester programs, cooperatives, internships, etc.
- Identify feasibility having regional dual-training coordinators throughout the state.
- Align agriculture education and supports to meet the needs of the industry in Minnesota.
- Survey current recruitment strategies for selected PIPELINE occupations throughout the state.
- Create urban agriculture recruitment programs for youth and adults.
- Identify how dual-training programs will increase employee retention.
- Identify how to measure the return on investment for employer having dual-training programs.
- Develop a tool kit to include resources for establishing dual-training programs and training for employers, mentors, and educators.

HEALTH CARE SERVICES OUTCOMES

ABOUT THE INDUSTRY

With more than 445,000 jobs at more than 14,000 establishments, Health Care and Social Assistance is the largest employing industry in Minnesota. The state gained a total of about 114,000 net new jobs from 2003 to 2013, while health care and social assistance added almost 94,500 net new jobs; accounting for 83 percent of the net job growth.

Health care occupations are projected to gain more than 27,500 new jobs in the next ten years, but will also need new workers to fill nearly 34,500 replacement openings due to retirements or other existing workers leaving the labor force. According to DEED's Employment Outlook, the state of Minnesota will have 62,220 total openings in STEM Health Care occupations from 2012 to 2022.

There are several significant health care services initiatives in Minnesota aimed at serving the industry's workforce needs. Notable examples include: Blue Ribbon Commission on the University of Minnesota Medical School, Foreign Trained Immigrant Physicians Task Force, Legislative Healthcare Workforce Commission, Mental Health Workforce Development Plan, Itasca Project, and NGA Healthforce Workforce Policy Academy.

HEALTH CARE SERVICES INDUSTRY COUNCIL

Fifty-seven people participated in the Health Care Services Industry Council meetings.

- 19 members of industry and industry associations
- 11 education representatives
- six labor and labor/ education representatives
- 21 government, legislative and other representatives

Industry Council participants are listed in Appendix H.

The first Health Care Service Industry Council meeting was conducted Aug. 15, 2014, at the Department of Labor and Industry. The purpose of the PIPELINE Project and the vision for success were shared with the Council.

Industry Council members Bethany Krom, Assistant Dean at Mayo School of Health Sciences and Adam Sumala, Vice-President of Membership and Strategic Affiliations at Leading Age Minnesota (formerly Aging Service of

The industry has long fostered employer-education partnerships through clinical rotations, residencies and other forms of internships.

Minnesota has one registered apprenticeship program:

The Health Support Specialist registered apprenticeship program, which was developed by Leading Age Minnesota. The program currently has eight employer sponsors, including:

- Good Shepard Lutheran Home
- Good Shepard Lutheran Services
- Oak Hill Living Center
- Three Links Care Center
- Avera Morningside Heights
- Benedictine Health Systems
- Benedictine Living Community
- Caledonia Care and Rehab

There are currently 38 active Health Services Specialist apprentices in Minnesota, 16 apprentices have completed the program.

Minnesota) framed the PIPELINE project related to the Minnesota Healthcare Services sector. Through a facilitated process the Council generated an inventory of abilities, knowledge, and skills for high demand Health Care Services occupations; the occupations discussed at this meeting were used to generate a preliminary list of "apprenticeable" health care services occupations.

After the first Industry Council meeting, the list of high-demand occupations was cross-referenced with DEED labor-market data, MnSCU listening sessions results and Wanted Analytics data. A survey was designed to identify the most "apprenticeable" advance manufacturing occupations. Several Industry Council members reached out to PIPELINE Project staff members to discuss the uniqueness of the health care services industry. Some shared that this is a highly regulated and licensed non-profit industry, with often limited control of some of the legal, licensure and financial aspects of training and



HEALTH CARE SERVICES

HEALTH CARE SERVICES OUTCOMES

development of employees. The survey and Industry Council membership conversations also served to validate industry specific competencies related to personal effectiveness, academic, workplace, and industry-wide technical skills based on the PIPELINE Competency Standards Models adapted from the U.S. DOL Competency Models.

Mayo Health Systems in Rochester hosted the second Healthcare Services Industry Council meeting on Oct. 1, 2014. Industry Council member Sally Nadeau, Communications Manager at Leading Age Minnesota (formerly Aging Service of Minnesota), discussed its registered apprenticeship program; opportunities, challenges and lessons learned.

The Industry Council selected four occupations for a dual-training focus, including the development of competency standards. Industry Council members requested the PIPELINE Project support other important initiatives in the Health Care Services sector, especially related to nursing professionals.

The final Health Care Services Industry Council meeting was hosted by DLI on Nov. 7, 2014. The industry council identified recommendations for moving forward with occupational competency standard development and potential next steps to increase dual-training delivery in Health Care Services.

Occupations identified for the Health Care Services Council for PIPELINE competency modeling and dual training planning are:

- **Health information technician**
- **Health support specialist (current registered apprenticeship)**
- **Medical scribe**
- **Psychiatric technician/mental health technician**

Full descriptions of these occupations are available in Appendix I.

HEALTH CARE SERVICES OUTCOMES

HEALTH CARE SERVICES RECOMMENDATIONS

Recommendations specific to the Health Care Services industry are categorized by area of need:

1. Early exposure

Many students and youth are familiar with some professions within the healthcare industry – especially the idea of being a doctor or a nurse. However, enhanced career education and counseling is needed to provide awareness about the very broad range of occupations within the sector. Even some students that are interested are unaware of the nature of health care work and don't always have realistic expectations about the necessity of being academically prepared for a career in health care. Students who do not take sufficient science and math in high school must “play catch-up” in college prior to entering their chosen field of study. Industry council members want to expand many of the hands-on career exploration opportunities already available in Minnesota. Increasing outreach efforts to high school counselors, teachers and parents was also identified as essential to promoting lesser known health care professions.

2. Hiring and recruiting

Health care is in the midst of significant structural and technological changes. Council members indicate that the industry is also transitioning from a model of acute care to community care. Further, demographic shifts are causing changes in health care workforce demand. There is a need for more specialists in geriatric, hospice, palliative care, and chronic disease management care. A high proportion of some professions, especially nurses, are nearing retirement age.

The Industry Council shared that health care services demand varies by subsector within the industry and geographically across Minnesota. Long-term care services face workforce challenges as the pay structure is less than in acute care and other health care settings. Labor demand appears especially critical in rural areas. There is high turnover in direct care positions, including nursing assistants, and practical and professional nursing. As turnover occurs, the industry may lose prospective employees. Occupations exist in silos with little opportunity to move between and among professions.

Financial issues are a significant concern to this industry. Council members wanted to learn more about the return-on-investment of dual-training initiatives, particularly at a time when the industry is feeling pinched by continued cuts and pressure to reduce cost.

3. Skills and training

Health care services employees must have strong verbal and writing skills. Strong candidates are detail oriented with good critical thinking skills, as well as knowledgeable about biology and medicine. The role of technology is growing in all areas of health care services. Workers have to be more technologically proficient in providing care, documenting care and communicating with patients, members of the care team and other professionals. Employees are also expected to have a greater understanding of health care finance, including reimbursement practices.

The long-term partnership between education and health care addresses many of the skill needs of the profession, yet as the approach to care changes, new professions are emerging in mental health, in community care and to support industry technology. Industry Council members recognize the benefit of standardizing curriculum within health care occupations both at academic institutions and on-the-job-training sites. They believe Minnesota's health care education should be aligned with the highest national standards and be flexible in its delivery.

Health care services professionals have a rich history of mentorship through formalized relationships, such as residency and clinical placements. Leaders in health care services would like to expand training for preceptors and industry mentors. Then, build on this training model for occupations not traditionally linked to this form of training.

HEALTH CARE SERVICES OUTCOMES

4. Recommended next steps

- Complete the occupational competency standards and validate with industry experts.
- Implement dual-training program that supports emerging industry professions, changing care models and technology.
- Establish seed funding to assist employers and dual-trainee employees or apprentices in initiating new dual-training and/or apprenticeship programs in health care services.
- Research and document the cost of dual-training versus other hiring and education methods within the industry.
- Seek opportunities to develop career pathways that will support employees entering the profession and moving between occupations.
- Identify opportunities for program variability based on industry sub-sectors and geographic differences in Minnesota.
- Create marketing and communication plan disseminate to disseminate dual-training information and templates to employers; the goal is to educate more employers about this workforce model.
- Host follow-up Industry Council meeting to report about results and next steps for dual-training.
- Create dual-training templates and program design options to facilitate quick and easy implementation of new dual-training programs in healthcare services in emergent occupations.
- Recognize and acknowledge the healthcare services sector is unique due to its financial structure, licensure requirements and state/federal regulations.
- Recognize the need for health care services to have state or federal funds to further to develop and fund dual-training programs in throughout the industry.

INFORMATION TECHNOLOGY OUTCOMES

ABOUT THE INDUSTRY

The Information Technology (IT) field has grown in importance in the state of Minnesota, now accounting for more than 88,600 jobs, according to employment estimates from DEED.

The state continues to see steady job growth in IT, with both short- and long-term gains at software publishers; data processing, hosting and related services; and other information services, which includes Internet publishing, broadcasting and Web search portals.

Combined, these three industries increased more than 10 percent and now provide more than 19,000 jobs in the state. IT occupations are projected to gain more than

8,000 net new jobs through 2022 and will also provide 13,810 replacement openings for 22,140 total openings in the next decade.

There are currently no registered apprenticeships in Minnesota; however dual-training and apprenticeship are being explored by employers and related instruction providers.

Programs that combine formal education and on-the-job training such as internships are common in this industry.



INFORMATION TECHNOLOGY

INFORMATION TECHNOLOGY INDUSTRY COUNCIL

Sixty-five people participated in the Information Technology Industry Council meetings.

- 30 members of industry or industry associations' representatives
- 12 education representatives
- Four labor and labor/education representatives
- 19 government, legislative and other
-

Council members and additional representatives are listed in Appendix K.

The first Information Industry (IT) Council meeting was conducted on Aug. 15, 2014, at the Department of Labor and Industry. The purpose of the PIPELINE Project and the vision for success were shared with the Council.

Margaret Anderson Kelliher, President and Chief Executive Officer of Minnesota High Tech Association, framed the workforce challenges that face the Minnesota Information Technology sector. Through a facilitated process the Council generated an inventory of abilities, knowledge, and skills for high demand IT occupations; the occupations discussed at this meeting were used to generate a preliminary list of “apprenticeable” occupations.

After the first Industry Council meeting, the list of high-demand occupations was cross-referenced with DEED labor-market data, MnSCU listening sessions results and Wanted Analytics data. A survey was designed to identify

the most “apprenticeable” IT occupations. Several Industry Council members reached out to PIPELINE Project staff members to discuss the uniqueness of the IT industry. Specifically, the industry is project and consultative-based and serves as both an individual industry sector and a functional business area throughout organizations. The survey and Industry Council member conversations also served to validate industry specific competencies related to personal effectiveness, academic, workplace, and industry-wide technical skills based on the PIPELINE Competency Standards Models adapted from the U.S. DOL Competency Models.

Hennepin Technical College hosted the second Information Technology Industry Council meeting on Oct. 2, 2014. Industry Council member Brendan Nolan, Director of Business Development at Eagle Creek Software Services, discussed Eagle Creek Model of Addressing the IT Talent Supply Gap. The Industry Council selected four occupations for a dual-training focus, including the development of competency standards.

The final IT Industry Council meeting was hosted by DLI on Nov. 10, 2014. Industry Council member, Bruce Lindberg, Executive Director of Advanced IT Minnesota, discussed the new Fusion program, which pairs employer-endorsed students with employer partners to students, leading to workforce-ready employees upon graduation. This program is currently available at Metro State University and soon will be offered at Mankato State

INFORMATION TECHNOLOGY INDUSTRY

University. Industry Council member, Mark Hurburt, President of Prime Digital Academy (formerly Chief Strategy Officer at the Nerderly), outlined the newly established Prime Digital Academy's format of working directly with employers to re-engineer software development education to prioritize the capabilities newcomers needed to make immediate contributions. Their students learn modern technologies, real world methodology and relevant behavioral skills through hands-on, experiential learning. Finally, the Industry Council identified recommendations for moving forward with occupational competency standard development and potential next steps to increase dual-training delivery in Information Technology.

Occupations identified by the Information Technology Industry Council for PIPELINE competency modeling and dual training planning are:

- **Security analyst**
- **Web developer**
- **Software developer**
- **Service desk/front line support or computer user support specialist**

Full descriptions of these occupations are available in Appendix L.

INFORMATION TECHNOLOGY RECOMMENDATIONS

Recommendations specific to the Information Technology industry are categorized by area of need:

1. Early exposure

The Information Technology instruction is offered in the secondary education system, yet varies considerably between districts and individual schools. Schools are increasingly using technology tools in the classroom, but may not provide instruction about how the technology works or how to develop tools for the technology. Parts of the IT industry maybe hidden because information technology occupations are imbedded in all industries. The proliferation of computing devises and their popularity among youth is an opportunity to engage student curiosity in how devices work and how to build programs that can add to the function of a device. The IT industry does have excellent examples of programs that are engaging youth and students, including "Coder Dojo," computing camps and technology based "meet ups." Ensuring a broader range of students has access and sufficient information to foster interest in these experiences remains a pressing need.

Industry representatives call for earlier exposure for K-12 students to the industry. They believe it is especially important to create greater awareness for students in the 8th and 9th grade. This would both develop an understanding of the occupations and career paths within information technology and inform students about the need for an academic foundation to assist in being successful in IT. Council members believe that the opportunity to use the proliferation of cell phones, computers, games, and hand-held devices to create interest and exploration in how those devices work. Parents are recognized as essential in assisting young adult early career decisions. Therefore, parents need to be educated about the great career opportunities that are available in IT.

Employers expressed interest in creating opportunities and incentives for IT professionals to work with K-20 teachers and faculty to ensure the curriculum and technology taught in schools is relevant to industry needs. Industry council members discussed the improtance of career counselors in the K-20 system. They believe these supportive service positions will be able to assist youth and adults in making more informed career decisions by working with students to develop individual career plans. IT Industry Council participants recognize the value of supporting schools and helping to strengthen IT resources as well as offer co-op education opportunities.

INFORMATION TECHNOLOGY INDUSTRY

2. Hiring and recruiting

IT is a broad and diverse industry that by its nature rests at the forefront of technology changes, many of which also lead to significant structural changes within the industry. While it is forecasted the current move to cloud based systems and storage will greatly diminish the need for some professions, others will undoubtedly emerge from this shift. Industry council employers indicate that there is a significant skills shortage in a wide number of occupations, including extreme shortages in some areas such as coding and software engineering. Employers also note there is little standardization for titles and hiring criteria across and between occupations. Employers often seek candidates with a four-year degree for positions that require a two-year degree. In addition, employers often require at least one-year work experience. Council members said this practice is a “hedge” against hiring under-prepared employees. Employers actively recruit students/ potential employees who have engaged in “real” work, including those with internships, work experience in college IT service offices, and hobbyists with programming or network building experience. Employers continue to want to recruit, hire and retain the best and the brightest; leading to increased competition for IT talent.

3. Skills and training

Most information technology occupations require a strong science, technology, engineering and math (STEM) foundation. Employers seek workers with broad technical knowledge, as well as specific software skills. Employees must demonstrate nimbleness and an ability to learn new and emerging technologies quickly and to transfer knowledge from one project, language or technology to the next. Process thinking and project management skills are highly sought because IT workers often build or maintain substantial infrastructure.

In addition to technology skills, employees need to have business skills, such as understanding workflow, budget and finance, and organizational theory. Employers are especially in need of employees with knowledge about how different forms of technology work together.

Council members are highly supportive of project based learning opportunities and understand classroom experiences cannot fully develop students for the industry. They encourage connecting teachers and instructors with industry through work experience. They also support creating more credit for prior learning options and occupational standards based on competency mastery. Lastly, employers acknowledge that increasing the speed and responsiveness in modifying and developing curriculum was critical to meeting the workforce needs of this industry.

INFORMATION TECHNOLOGY INDUSTRY

4. Recommended next steps

- Continue to develop occupational competency standards for the careers selected by the Industry Council.
- Identify an Information Technology employer to initiate a dual-training program in one of the Industry Council's selected occupations.
- Support and expand current innovative information technology training programs throughout the state.
- Assist and support employers with the processes and structure related to establishing dual-training or apprenticeship.
- Establish seed funding to assist employers and dual-trainee employees or apprentices in initiating new dual-training and/or apprenticeship programs in information technology occupations.
- Create dual-training tool kits that serve as a “turn-key resource” with templates and program design options to facilitate quick and easy implementation of new dual-training programs in information technology.
- Engage teachers, faculty and information technology experts with in this sector to develop project based curriculum and on-the-job experiential opportunities.
- Lead the Minnesota effort to standardize the definition of each selected information technology occupation identified by this Industry Council.
- Provide information and training sessions for employers, educators, mentors and others.
- Catalog titles and hiring practices for occupations and determine if standardization is a reasonable goal.



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Minnesota PIPELINE Project

Private Investment, Public Education, Labor and Industry Experience

Progress Report to Legislature

January 2015

Appendices

- A. PIPELINE Legislation
- B. Summary and history of Apprenticeship in Minnesota
- C. Advanced Manufacturing Industry Council meetings
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- K. Information Technology Industry Council meetings
- L. PIPELINE Project Occupations and Competency Standard Models for Information Technology
- M. Training initiatives shared at Information Technology Industry Council meetings

Appendix A

PIPELINE Legislation

Laws 2014, Chapter 312, Article 3, Sec. 21

Minnesota PIPELINE Project



Sec. 21. **COMPETENCY STANDARDS: ADVANCED MANUFACTURING, HEALTH CARE SERVICES, INFORMATION TECHNOLOGY, AND AGRICULTURE.**

(a) The commissioner of labor and industry, in collaboration with the commissioner of employment and economic development, shall establish competency standards for programs in advanced manufacturing, health care services, information technology, and agriculture. This initiative shall be administered by the Department of Labor and Industry. In establishing the competency standards, the commissioner shall convene recognized industry experts, representative employers, higher education institutions, and representatives of labor to assist in defining credible competency standards acceptable to the advanced manufacturing, health care services, information technology, and agriculture industries.

(b) The outcomes expected from the initiatives in this section include:

(1) establishment of competency standards for entry level and at least two additional higher skill levels in each industry;

(2) verification of competency standards and skill levels and their transferability by representatives of each respective industry;

(3) models of ways for Minnesota educational institutions to engage in providing education and training to meet the competency standards established; and

(4) participation from the identified industry sectors.

(c) By January 15, 2015, the commissioner of labor and industry shall report to the legislative committees with jurisdiction over jobs on the progress and success, including outcomes, of the initiatives in this section and recommendations on occupations in which similar competency standards should be developed and implemented.

A link to the final law is here: <https://www.revisor.mn.gov/laws/?id=312&year=2014&type=O>

Appendix B

Summary and History of Apprenticeship in Minnesota



Page 5:
Apprentices fare
well in competition



Page 6:
Technical,
character skills

apprenticeship WORKS

Message from new director of DLI Apprenticeship Issue No. 10

By John Aiken

The new year is bringing some new faces to our agency's Apprenticeship unit. I was recently named Director of Labor Standards and Apprenticeship Division and wanted to extend my greetings. I am looking forward to working with you to ensure registered apprenticeship continues to promote and establish work-based careers for Minnesotans while helping employers develop a highly skilled workforce.

My career in public service began in the Consumer Services Division of the Minnesota Attorney General's Office back in 1999. I started as a phone analyst registering and responding to inquiries related to a wide range of consumer issues. During the course of my eight-year tenure in the Attorney General's office, I learned first-hand the positive impact state government can have on people's lives. I also quickly learned that while I could not solve all problems, I could be responsive to those I served.



John Aiken

I have carried out my philosophy of responsive government throughout my state government career, which now has spanned nearly 15 years and four state government agencies in two states. After leaving the Attorney General's office in 2007, I joined the Minnesota Secretary of State's office as the Communications Director. While there, I led the communications surrounding the Norm Coleman and Senator Al Franken recount. I then had an opportunity to move to Massachusetts where I joined the Commonwealth's Attorney General's office to serve as liaison between businesses and consumers and to directly assist homeowners facing foreclosure. When I returned to Minnesota, I eagerly accepted a

position with the Department of Labor and Industry to promote continuous improvement efforts to streamline state services to provide a better experience for the public we serve.

In each role, I emphasized a commitment to citizen assistance and engagement as well as to making government more responsive to the needs of those it serves. I am excited about the opportunity to continue that commitment to responsive government here at DLI.

*John Aiken can be contacted at
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Related story

Rick Martagon, longtime figure in trades and education, named state program administrator for apprenticeship. **Page 2**

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DLI names Apprenticeship Unit administrator

Rick Martagon is longtime trades, apprenticeship advocate

Rick Martagon is switching hats. Again.

In January 2015, the longtime construction trades and education advocate was named administrator of DLI's Apprenticeship Unit.

"The building and construction trades system has been a great model for training workforce. What I see now is that it's time to educate the rest of the world and show how the apprenticeship model and investment in workers continues to deliver and pay off," Martagon said.

Beginning in 2007, Martagon served as the training director for Bricklayers and Allied Craft Workers, Local No. 1. In 2010, he was named president of the Apprenticeship Coordinators Association of Minnesota (ACAM).

Martagon is passionate about



Rick Martagon

Veteran's Administration and Minnesota's registered training programs to better share the career prospects for veterans offered by the trades and apprenticeship programs.

The ACAM has not yet named a new president, yet Martagon said he feels like he's leaving the group in good hands and is proud of the accomplishments that occurred under his leadership.

One of his first steps as ACAM president was to increase

apprenticeship and education and is excited about his new role. A Navy veteran, Martagon said he hopes to improve communication between the

communication between the local and community-based organizations and the apprenticeship programs.

Other accomplishments include the production of an educational movie titled "Apprenticeship: Building Your Career", and launching "Construct Tomorrow" which, in its first year, shared hands-on trades career experiences with more than 2,200 high school students.

"The trades are back in the schools. We are finally being invited to offer information and training opportunities to students who are bright and motivated but might not be interested in college."

It is Martagon's goal to continue to spread this message about current registered apprenticeship opportunities and educate the emerging workforce.

DLI experts available for speaking engagements

DLI staff members regularly speak to community, industry and school groups about issues that affect employees, employers and other DLI stakeholders.

As part of its outreach efforts to stakeholders, DLI's speakers bureau can provide interested parties with a knowledgeable speaker in an array of topics.

- Apprenticeship programs and opportunities
- Construction codes and licensing
- Occupational safety and health topics or free consultation assistance
- Wage and hour requirements
- Workers' compensation coverage, reporting and claims issues
- Workers' compensation dispute resolution
- Workers' compensation ombudsman services



Experts from DLI are available to speak to community, industry and school groups about issues that affect employees, employers and other DLI stakeholders.

For more details or to place a request for a speaker, visit www.dli.mn.gov/Speakers.asp.

Grants strive to bring women to apprenticeship

As part of the Women's Economic Security Act (WESA), the legislature made \$250,000 available to qualifying nonprofits to help promote, assist and support women entering apprenticeship programs in non-traditional occupations.

These grants are one part of a larger effort to close the gender pay gap and increase income for working women.

In October 2014, DLI released a request for proposal seeking nonprofit groups to provide innovative projects for outreach, education, training, placement and mentoring services to women. The intent of the



proposals was to help women secure sponsorships in a registered apprenticeship program and succeed as an apprentice.

After the proposal review process, four groups were chosen to provide programming including:

- The Construction Careers Foundation
- The Association of Women Contractors
- Wisconsin Regional Training Partnership/Big Step (through the Minnesota AFL-CIO)
- Summit Academy, OIC

Historically, many of the registered apprenticeship programs found it difficult to attract and retain women apprentices. Currently, women make up less than 7 percent of registered apprentices in Minnesota.

Apprentices continue holiday display tradition

Project lets Local 633 Cement Finishers practice all of their skills

Each year, the cement finisher apprentices at the Local 633 Training Center in New Brighton, Minn., practice their skills to design, construct and demolish an expansive holiday display.

Their work begins each November as the apprentices start to design the display. Once the plans are in place, forms are built, concrete is poured and then finished.

The apprentices use many of the cement finishing skills on the large project including staining, stamping and texturing the concrete. Some of the more labor-intensive portions of the project include a working fountain, large chair for Santa, a Christmas tree, a gingerbread cement finisher, ice fishing display and candy cane sidewalks.

The display was completed in late November and featured at the Cement Finishers Union meeting Christmas party. After one week, the display was demolished to make room at the center for more training projects.

The project was overseen by instructors Dave Schutta, Pete Dubay and coordinator Tom Reger.

Learn more about the center and its apprenticeship program at www.local633.org/apprenticeship.html.



Above, pictured is a portion of the large holiday display created by Local 633 cement finisher apprentices. After a week, the display was demolished so the apprentices could continue working at the training center.

At right, a chair made for Santa, out of cement, is included in the display.



Online slideshow

View more images of the holiday display at <http://go.usa.gov/ekAd>

**Apprenticeship
performance measurements
October, November and December 2014**

	Oct.	Nov.	Dec.
Sponsor information			
Active sponsors	310	310	310
New sponsors	0	0	0
New occupations	0	0	0
Apprentice information			
Total apprentices	9,017	9,221	9,176
Females	602	613	615
Minorities	1,634	1,701	1,702
Veterans	333	350	345
New apprentices	356	336	209
Graduations	99	48	52
Services to sponsors and apprentices			
Service calls	294	171	83
Information calls	141	105	72
Compliance reviews	3	2	3
Supervisory visits	11	2	2
VA visits	0	0	0
New standards	0	0	1
Revised standards	1	1	3
Community outreach visits	33	14	30
Technical assistance visits to sponsors	8	2	4
Prospective sponsor visits	1	1	0

Mentoring important for successful apprenticeship

Ratio of journeyworkers to apprentices helps ensure enough face-to-face time



Mentoring has been, and continues to be, an important part of the apprenticeship model. The mentor process continues to change and now courses are offered to journeyworkers about how to mentor, model and teach apprentices.

Mentoring is a key factor for apprentices to learn their trades.

A well-trained, responsible journeyworker who mentors an apprentice models the skills required to perform a portion of a larger job and gradually engages the apprentice in more demanding and technical tasks. Direct supervision of apprentices on the job site also helps keep everyone safe.

Journeyworker ratios

Each registered apprenticeship program identifies a ratio of the number of journeyworkers needed to oversee apprentices. A ratio exists to ensure continuous supervision and allows apprentices to learn skills from many journeyworkers. Apprentices who have the opportunity to observe and assist multiple journeyworkers obtain a well-rounded experience from which to launch their career in the skilled crafts.

Mentorship continues to evolve and many programs now offer courses to journeyworkers about how to mentor, model and teach apprentices. Hands-on learning like that used in the apprenticeship model continues to be one of the best values and most effective learning techniques in education.

Learn more about apprenticeship and journeyworker ratios at www.dli.mn.gov/APPR/Ratios.asp.

Program helps dislocated workers thrive

Marcia Tyner worked as a certified nursing assistant for a medical provider for more than seven years before the company abruptly closed.

After losing her job, she found it difficult securing full-time work and eventually lost her apartment and moved in with her grandmother. She knew she needed more training to obtain a better job, so she attended an information session at Goodwill-Easter Seals to learn more about its Medical Office Training Program.

What happened next changed Tyner's career path.

"I looked at the information about a construction career — the wages and types of jobs and I was hooked. I knew I liked physical labor and I was in good shape, so it seemed like fate," she said.

Goodwill-Easter Seals is a DLI Labor Education Advancement Program (LEAP) grant recipient. Their 12-week construction preparation program provides an



Marcia Tyner, a longtime certified nursing assistant, changed careers and is now working in construction. A Goodwill-Easter Seals program helped her with the transition.

introduction to construction concepts and fundamentals, construction math, measuring, blueprint reading, fabrication, framing, sheathing and finishing skills. Participants also receive OSHA 10 and lead abatement worker certifications and employment readiness instruction. The goal of the program is to help people get the skills they need to

enter apprenticeship training. Tyner is now an apprentice in the Construction Craft Laborer apprenticeship program.

Goodwill-Easter Seals recently expanded their program through a partnership with St. Paul and Urban Homeworks to build Section 3 homes. In addition, St. Paul College awards 33 continuing education credits to all of their construction graduates.

"It was an amazing experience," Tyner said about the program and staff.

Tyner, hoping to inspire other women to follow her path, said she approaches all the women she meets and asks them, "Hey, what do you do for a living? Let me tell you about my career."

More information about the training program from Goodwill-Easter Seals is at www.goodwilleasterseals.org/site/PageServer?pagename=serv_emp_st_construction.

Apprentices earn accolades at Chicago competition

Apprentices from Roofers, Local No. 96, participated in the annual Midwest Roofing Competition on Oct. 4, 2014, in Chicago.

Second-year apprentices competed in the categories of insulation application, proper tape exposure and a game of "Roofer's Jeopardy." Third- and fourth-year apprentices demonstrated skill in roofing math, crane signaling, setting rolls for a four-ply roof and application of inside and outside corners.

Winners were awarded plaques and tools. Mark Conroy, apprenticeship coordinator for Local No. 96, said it was a very tough competition through all phases and the apprentices showed dedication in learning their craft as well as strong work ethic. "The quality of work executed by these competitions reflects well on the quality of training received from our apprenticeship program," Conroy said.



Front, left to right: Matt Oehrlein, roof tech, second place, phase 3 and 4; Mitch Clark, Palmer West Construction, first place, phase 2. **Back row:** Mark Conroy, apprenticeship coordinator; Guy Bahnemann, Berwald Roofing; Jamie Metcalf, range-cornice, tied for fourth place, phase 2; and Vance Anderson, business agent.

Apprentices find careers, new futures in Bemidji

Wells Academy instructors teach technical, character skills

At Wells Academy, they are emphasizing that simply learning technical skills isn't enough to create a well-rounded employee. They are also teaching apprentices about developing themselves.

Andy Wells, owner of Wells Technology in Bemidji, Minn., says that he created and integrated Wells Academy into his business to develop skilled employees for the area workforce and help a young Native American population struggling to find better jobs with minimal skills or experience in the manufacturing industry.

“We look upon apprentice training as an investment in both a future workforce and in social enterprise by helping those most in need,” Wells said.

The academy was approved by the Minnesota Department of Labor and Industry as a registered apprentice program in 2006 and has since trained 25 apprentices.

Apprentices receive theory and practical hands-on training in CNC operating, programming and Swiss-type machining. They also spend time developing character traits like honesty, respect and other personal qualities during the 12-month program. Wells says that technical skills needed for modern production machines are significant but emphasized that personal skills are also important for developing trusted and productive employees.

Wells shared the success story of an academy graduate who was released from prison, joined the apprenticeship program, completed



Apprentices at Wells Academy in Bemidji, Minn., are taught both technical and character skills. Apprentices receive theory and practical hands-on training in CNC operating, programming and Swiss-type machining. In addition, they spend time developing personal skills.

both basic and advanced training and then a two-year business-college program. He then began working as an instructor at Wells Academy and is now in office management doing bidding and estimating. Wells says that with the right training and support, you can help develop self-supporting skilled workers while instilling in them the value of work.

The training offered at Wells Academy will prepare apprentices for careers in many areas including:

- machine operators
- technicians

- programmers
- inspection staff
- quality managers
- foremen and supervisors
- managers of production
- bidders
- marketing staff
- entrepreneurs

More information

Read more about Wells Academy at www.wellstech.com/html/academy/wells-academy-info.html.

Building Minnesota's Workforce through Dual-Training and Registered Apprenticeship



EMPLOYER BENEFITS

- Workers with all the skills, knowledge and abilities for their occupation
- Worker retention
- Nationally recognized transferable credential
- Mentorship, knowledge transfer and succession planning strategy
- Helps identifying gaps in incumbent worker training
- Addresses generational and cultural differences
- Increases safety awareness reducing insurance costs
- Creates a culture of learning
- Prepares employees for new technology and new innovations

REGISTERED APPRENTICE BENEFITS

- Hands-on learning
- Income as you learn
- Training and skill development directly related to occupation
- Transferable and nationally recognized credential

FUNDING SOURCES

- G.I. Bill for veterans
- Dislocated Worker Fund
- Workforce Investment Act -
- Trade adjustment insurance
- Grant programs



The Department of Labor and Industry (DLI) Apprenticeship Division promotes, develops, certifies and monitors quality registered apprenticeship training programs in Minnesota workplaces.



MORE INFORMATION

Registered Apprenticeship:
www.dli.mn.gov/Appr.asp

Skilled Manufacturing
Customized Training Pilot
Project:
www.dli.mn.gov/APPR/customized_training.asp

Minnesota PIPELINE Project:
www.dli.mn.gov/pipeline.asp



Why apprenticeship?

What Employers are saying about why they have a
Registered Apprenticeship Program:

*“To expand our training base and
to ensure that we as a company are training our employees correctly.”*

*“We have a high level of confidence in registered apprenticeship because it is a successful
way to get the most qualified individuals. We believe this is due in part to the structure and
demands of apprenticeship.”*

*“We feel more comfortable in knowing that the journeyworker
is fully trained and competent in their occupation.”*

*“We use apprenticeship because we can control the time that the apprentice is in the
program. If they are going well they can finish early
and if they are having some issues we can
hold them in the apprenticeship until they are proficient.”*

*“Apprenticeship gives the plant a structured training system for high-skill jobs. It also
provides employee recognition when completing the program.”*

*“Training employees for their needs and specific
to the equipment at our company.”*

Apprenticeship Information and FAQs

History

In 1937, the National Apprenticeship Act (also known as the Fitzgerald Act) was passed by Congress. This act read, in part: "To enable the United States Department of Labor to formulate and promote the furtherance of labor standards necessary to safeguard the welfare of apprentices and to cooperate with the States in the promotion of such standards." Registered Apprenticeship programs in Minnesota represent more than 315 different occupations.

This law was a major step forward in protecting apprentices from workplace injuries. The act established a national advisory committee to draft regulations and establish minimum safety standards for apprenticeship programs. It was eventually amended to permit the United States Department of Labor to issue regulations protecting health, safety and general welfare of apprentices. This emphasis on safety continues in today's apprenticeship programs and industry-specific safety training standards now exist for all apprenticeship programs in Minnesota.

Frequently asked questions about apprenticeship and on-the-job training (OJT) programs

What is apprenticeship?

Apprenticeship is a formal system of employee training that combines on-the-job training with related technical instruction. It is designed to produce craft-workers who are fully competent in all aspects of an occupation, including: knowledge, skill and proficiency on the job. With apprenticeship training, there is a written contract between the apprentice and the sponsor, approved by and registered with the state of Minnesota, that specifies the length of the training, school hours, an outline of the skills of the trade to be learned and the wages the apprentice will receive.

Minnesota's apprenticeship program allows employers to design their own apprenticeship program that provides apprentices with specific skills, training and job-related instruction tailored to the company's needs.

When did Minnesota's apprenticeship program begin? How many apprentices have participated in a registered program?

The federal government recognized the need for states to have trained and skilled workers and subsequently approved the Minnesota Apprenticeship Program submitted in 1939. Upon approval by the Federal Bureau of Apprenticeship, the state of Minnesota conducted its first Apprenticeship Advisory Council (now Apprenticeship Board) meeting Sept. 18, 1939, chaired by Dr. C.A. Prosser of the Dunwoody Institute.

Since that time, more than 110,000 apprentices have been registered in Minnesota and thousands of large and small businesses have trained them to meet the needs of the company as well as to provide highly skilled, high-wage jobs for the apprentices.

Is there a shortage of skilled workers in Minnesota?

In all skilled occupations, employers are becoming greatly concerned about the shortage of job candidates with the necessary skills and abilities.

-more-

How many occupations have apprentice training programs?

There are roughly 105 occupations training in excess of 10,500 apprentices. See the Apprenticeship Training Program Memo for a list of Minnesota occupations.

What types of companies have apprenticeship programs?

A variety of types and sizes of companies have apprenticeship programs. Construction, manufacturing, transportation and the printing trades benefit greatly from apprenticeship programs. In fact, without a continuous flow of apprentices becoming skilled journey workers, quality industrial standards would be severely affected. Recently, apprenticeship programs have been developed for child care development specialist, administrative support services, accounting clerk, hazardous waste technician, low-voltage system installer, experimental machinist and refuse derived fuel processor positions, to name a few.

With few exceptions, any business that requires highly skilled employees -- from a small two-person business to the largest corporations -- can benefit from apprenticeship.

What are the requirements for entry into the apprenticeship program?

A high school diploma or G.E.D. is required for apprentice applicants. Math, science and industrial technical courses are especially helpful in being considered for an apprenticeship.

More information

Contact the Department of Labor and Industry's Apprenticeship unit through any of the following methods:

- fax a letter on your company letterhead to (651) 284-5740 requesting information to assist you in preparing for a visit from an apprenticeship training field representative;
- call (651) 284-5090 or 1-800-DIAL-DLI (1-800-342-5354) and request more information;
- write to the Apprenticeship unit, Minnesota Department of Labor and Industry, 443 Lafayette Road N., St. Paul, MN 55155;
- send an email message to dli.apprenticeship@state.mn.us; or
- visit these related websites at www.constructioncareers.org or www.iseek.org

Appendix C

Advanced Manufacturing Industry Council Meetings

Minnesota PIPELINE Project

Advanced Manufacturing Industry Council

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Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Advanced Manufacturing Industry Council

Meeting I

August 12, 2014

9:30 – 12:30

AGENDA

Welcome & Introductions
PIPELINE Project Overview

Jessica Looman
Assistant Commissioner
Department of Labor and Industry

PIPELINE Project Vision

Senator Terri Bonoff

**Business Case for the PIPELINE
Project**

Kim Arrigoni
Board Officer
Haberman Machine

**Educational Impact of the PIPELINE
Project**

Richard Wagner
President
Dunwoody College of Technology

BREAK at approximately 10:20

Competency Standards Framework

Jessica Looman
Assistant Commissioner
Department of Labor and Industry

**Abilities, Knowledge and Skills
Activity**

Cristine Leavitt
Continuous Improvement Consultant
Department of Administration

LUNCH at approximately 11:50

Next Steps & Closing

Cristine Leavitt
Continuous Improvement Consultant
Department of Administration



Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Advanced Manufacturing Industry Council

Meeting 2

October 13, 2014

9:30 – 11:30 (optional lunch at 11:30)

AGENDA

Welcome & Introductions

Jessica Looman

Department of Labor and Industry

Senator Terri Bonoff

Minnesota State Senate

Representative Kim Norton

Minnesota House of Representatives

Marsha Danielson

Dean of Global Outreach & Strategic Partnerships

South Central College

MN PIPELINE Project Status

Heather McGannon

MN PIPELINE Project Manager

Department of Labor and Industry

Overview of Dual-Training System in Minnesota and United States

Bob Defries

Dean, Customized Training

Alexandria Technical & Community College

Alexandria Technical and Community College Registered Apprenticeship Program

Advanced Manufacturing Dual-Training Model in the U.S.

Dr. Annette Parker

President

South Central College

Selection of Advanced Manufacturing Occupations

Discuss and Identify Advanced Manufacturing Workforce Efforts

Next Steps & Closing



Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Advanced Manufacturing Industry Council

Meeting 3

November 14, 2014

9:00 – 11:00

AGENDA

Welcome & Introductions

Jessica Looman

Assistant Commissioner
Department of Labor and Industry

Senator Terri Bonoff

Minnesota State Senate

Representative Kim Norton

Minnesota House of Representatives

MN PIPELINE Project Status

Heather McGannon

MN PIPELINE Project Manager
Department of Labor and Industry

Recommendations on areas of focus for Advanced Manufacturing

Identify MN PIPELINE next steps
and/or projects to support
Advanced Manufacturing dual-
training in Minnesota.

Next Steps & Closing

Appendix D

PIPELINE Project Occupations and Competency Standard Models for Advanced Manufacturing

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

MN PIPELINE PROJECT

Advanced Manufacturing Industry Council

List of Identified Advanced Manufacturing Occupations:

- 1. CNC Operator/Machinist**
- 2. Welders, Cutters, Solderers & Brazers**
- 3. Maintenance & Repair Workers**
- 4. Mechatronics**

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

PIPELINE PROJECT
Advanced Manufacturing Industry Council

Advanced Manufacturing Industry Council Selected Occupations and Descriptions

Below are the 4 occupations and Descriptions the Advanced Manufacturing Industry Council selected to begin investigating dual-training models and implementation in Minnesota.

CNC Operator - Milling and Turning

Source: www.onetcodeconnector.org

CNC operator machinists oversee the CNC machines that shape parts from metal or plastic. They must interpret blueprints, manuals and other work instructions. They also study sample parts to determine dimensions of finished work pieces and CNC equipment setup requirements. They then set the machine and load it with the correct cutting tools. CNC operator machinists inspect work pieces throughout a production run. In addition, machinists measure and mark dimensions and reference points on material or work pieces as a guide for subsequent machining.

CNC operator machinists additionally clean and perform basic preventative maintenance functions on machines, tooling and parts. They must work safely to prevent on-the-job injuries, which includes wearing personal protective equipment such as safety glasses. They also inspect cutting tools for sharpness and usability. These professionals additionally detect malfunctions using precision measuring instruments such as micrometers, dial calipers, depth gages, indicators and scales. They have to communicate with supervisors, engineers, production control employees and other personnel for assignments, and to resolve machining or quality issues as well.

Other Duties include:

- Calculate dimensions or tolerances, using instruments such as micrometers or vernier calipers.
- Machine parts to specifications, using machine tools, such as lathes, milling machines, shapers, or grinders.
- Set up, adjust, or operate basic or specialized machine tools used to perform precision machining operations.
- Align and secure holding fixtures, cutting tools, attachments, accessories, or materials onto machines.
- Measure, examine, or test completed units to check for defects and ensure conformance to specifications, using precision instruments, such as micrometers.
- Monitor the feed and speed of machines during the machining process.
- Maintain machine tools in proper operational condition.

- Study sample parts, blueprints, drawings, or engineering information to determine methods or sequences of operations needed to fabricate products.
- Operate equipment to verify operational efficiency.
- Check work pieces to ensure that they are properly lubricated or cooled.

Welders, Cutters, Solderers, and Brazers

Source: www.onetcodeconnector.org

Use hand-welding or flame-cutting equipment to weld or join metal components or to fill holes, indentations, or seams of fabricated metal products. Welders, Cutters, Solderers, and Brazers cut or join metal parts by applying intense heat to metal. Welding is one of the most dependable means of joining metal parts and is used in the building of bridges, buildings, ships, automobiles, pipelines, storage tanks, electronic equipment, and many more.

Other Duties include:

- Examine work pieces for defects and measure work pieces with straightedges or templates to ensure conformance with specifications.
- Chip or grind off excess weld, slag, or spatter, using hand scrapers or power chippers, portable grinders, or arc-cutting equipment.
- Remove rough spots from work pieces, using portable grinders, hand files, or scrapers
- Prepare all material surfaces to be welded, ensuring that there is no loose or thick scale, slag, rust, moisture, grease, or other foreign matter.
- Develop templates and models for welding projects, using mathematical calculations based on blueprint information.
- Guide and direct flames or electrodes on or across work pieces to straighten, bend, melt, or build up metal.
- Cut, contour, and bevel metal plates and structural shapes to dimensions as specified by blueprints, layouts, work orders, and templates, using powered saws, hand shears, or chipping knives.
- Repair products by dismantling, straightening, reshaping, and reassembling parts, using cutting torches, straightening presses, and hand tools.
- Fill holes, and increase the size of metal parts.
- Check grooves, angles, or gap allowances, using micrometers, calipers, and precision measuring instruments.
- Operate metal shaping, straightening, and bending machines, such as brakes and shears.
- Hammer out bulges or bends in metal work pieces.
- Dismantle metal assemblies or cut scrap metal, using thermal-cutting equipment such as flame-cutting torches or plasma-arc equipment.
- Estimate materials needed for production and manufacturing and maintain required stocks of materials.
- Join parts such as beams and steel reinforcing rods in buildings, bridges, and highways, bolting and riveting as necessary.
- Gouge metals, using the air-arc gouging process.
- Mix and apply protective coatings to products.
- Operate brazing and soldering equipment.

Maintenance and Repair Worker

Source: www.onetcodeconnector.org

Perform work involving the skills of two or more maintenance or craft occupations to keep machines, mechanical equipment, or the structure of an establishment in repair. Duties may involve pipe fitting; boiler making; insulating; welding; machining; carpentry; repairing electrical or mechanical equipment; installing, aligning, and balancing new equipment; and repairing buildings, floors, or stairs.

Other Duties include:

- Inspect, operate, or test machinery or equipment to diagnose machine malfunctions.
- Dismantle machines, equipment, or devices to access and remove defective parts, using hoists, cranes, hand tools, or power tools.
- Perform routine maintenance, such as inspecting drives, motors, or belts, checking fluid levels, replacing filters, or doing other preventive maintenance actions.
- Diagnose mechanical problems and determine how to correct them, checking blueprints, repair manuals, or parts catalogs, as necessary.
- Repair machines, equipment, or structures, using tools such as hammers, hoists, saws, drills, wrenches, or equipment such as precision measuring instruments or electrical or electronic testing devices.
- Maintain or repair specialized equipment or machinery located in cafeterias, laundries, hospitals, stores, offices, or factories.
- Assemble, install, or repair wiring, electrical or electronic components, pipe systems, plumbing, machinery, or equipment.
- Clean or lubricate shafts, bearings, gears, or other parts of machinery.
- Adjust functional parts of devices or control instruments, using hand tools, levels, plumb bobs, or straightedges.
- Order parts, supplies, or equipment from catalogs or suppliers.

Mechatronics

Source: www.onetcodeconnector.org

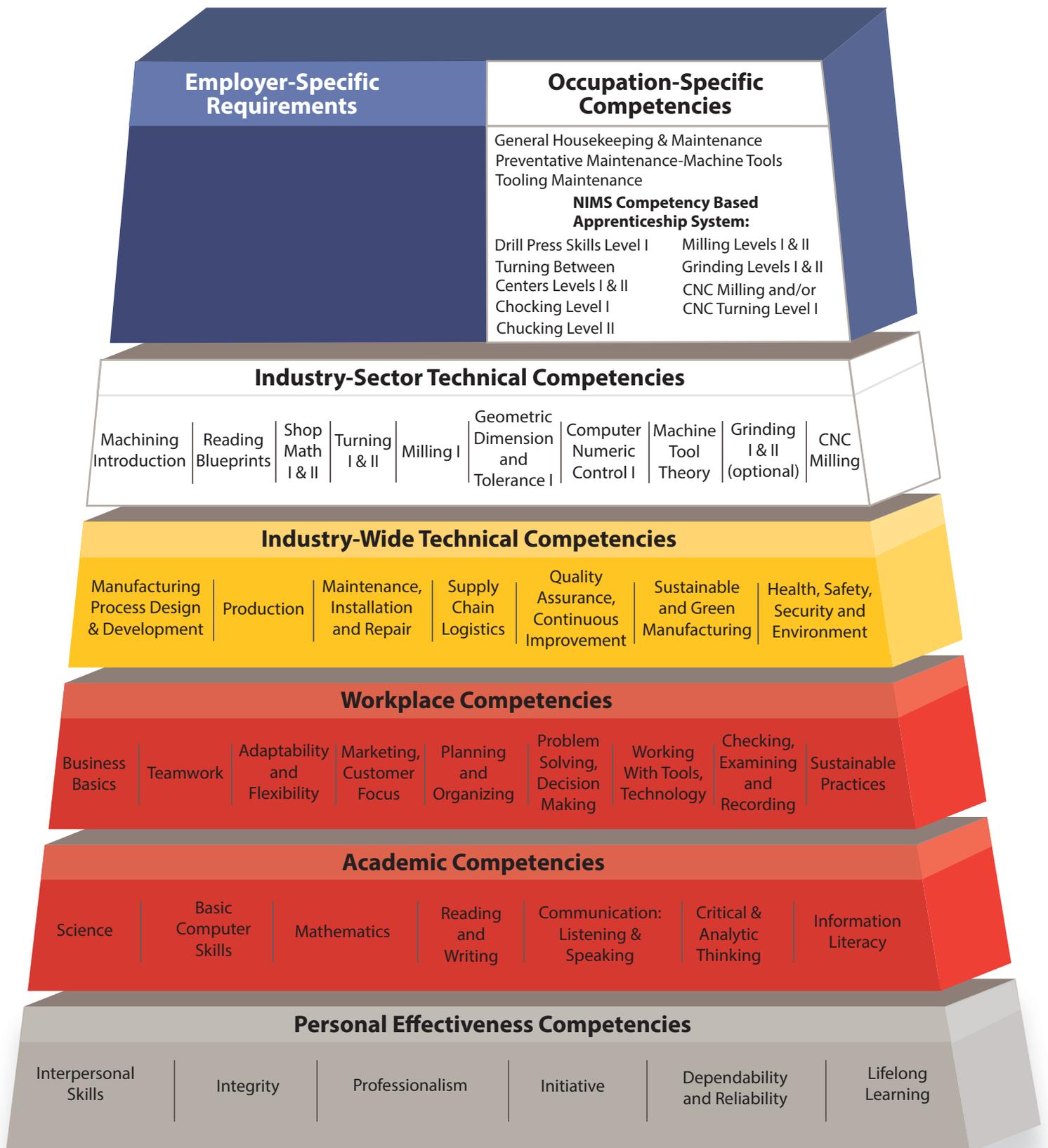
Research, design, develop, or test automation, intelligent systems, smart devices, or industrial systems control. Mechatronic engineers work with the electronic instrumentation and computer control systems which nearly all machinery relies on for efficient and reliable operation. Mechatronic Engineers work with automatic systems monitor process plants for leaks and faults, and keep the plants operating all the year round. Mechatronic engineers build and design these systems and need expertise in computing and electronics, core mechanical engineering knowledge, and the ability to bring these together to make working systems which meet the safety and reliability levels required.

Mechatronic engineers also have roles in project engineering, reliability engineering and power engineering where their cross-disciplinary knowledge gives them an edge on mechanical or electrical engineers. Mechatronic engineers can work with electrical and mechanical systems together and solve problems that cross discipline boundaries. Their strength in IT, computer hardware and networking as well as software also helps them to be very versatile problem solvers. Writing and testing software for specialized computer systems and micro-controllers forms a major part of the work of mechatronics.

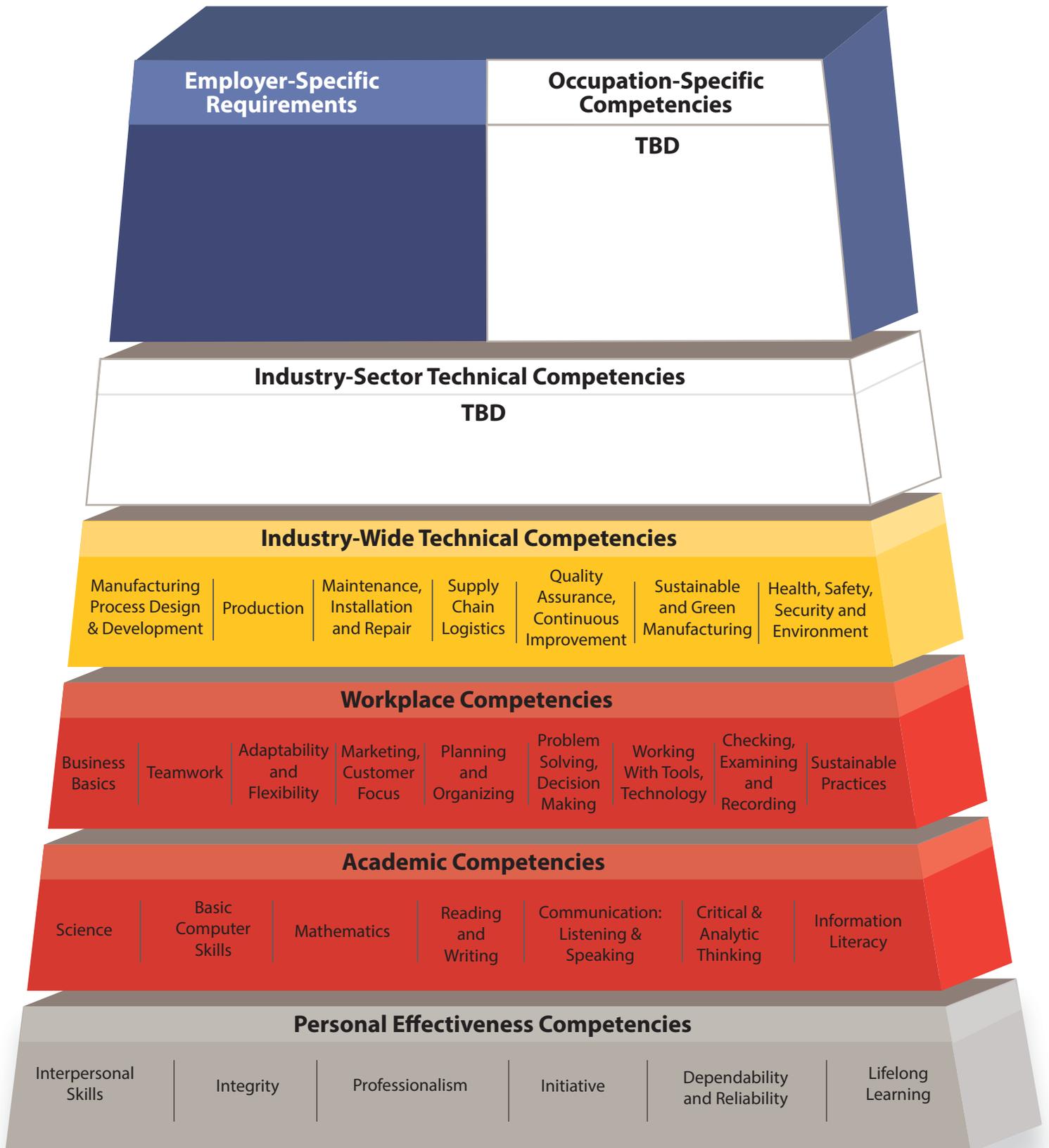
Other Duties include:

- Design engineering systems for the automation of industrial tasks.
- Create mechanical design documents for parts, assemblies, or finished products.
- Maintain technical project files.
- Implement or test design solutions.
- Create mechanical models and tolerance analyses to simulate mechatronic design concepts.
- Conduct studies to determine the feasibility, costs, or performance benefits of new mechatronic equipment.
- Publish engineering reports documenting design details or qualification test results.
- Research, select, or apply sensors, communication technologies, or control devices for motion control, position sensing, pressure sensing, or electronic communication.
- Identify and select materials appropriate for mechatronic system designs.
- Apply mechatronic or automated solutions to the transfer of materials, components, or finished goods.

PIPELINE Project - Competency Model for Advanced Manufacturing - Occupation: Machinist Apprentice -



PIPELINE Project - Competency Model for Advanced Manufacturing Occupation: Welders, Cutters, Solderers, and Brazers -

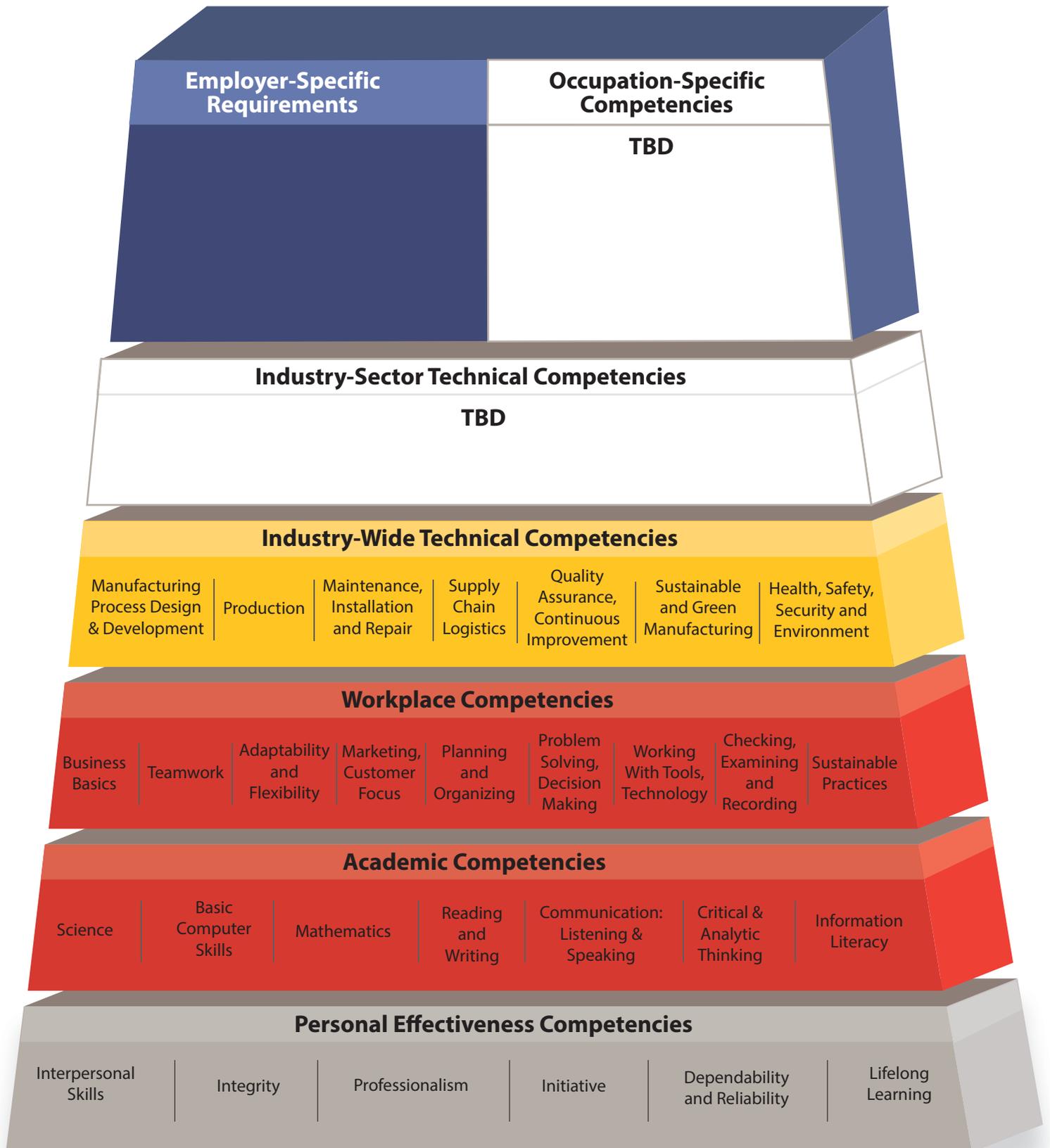


Based on: Advanced Manufacturing Competency Model Employment and Training Administration, United States Department of Labor, April 2010. -

PIPELINE Project

Competency Model for Advanced Manufacturing

Occupation: Maintenance and Repair Worker -

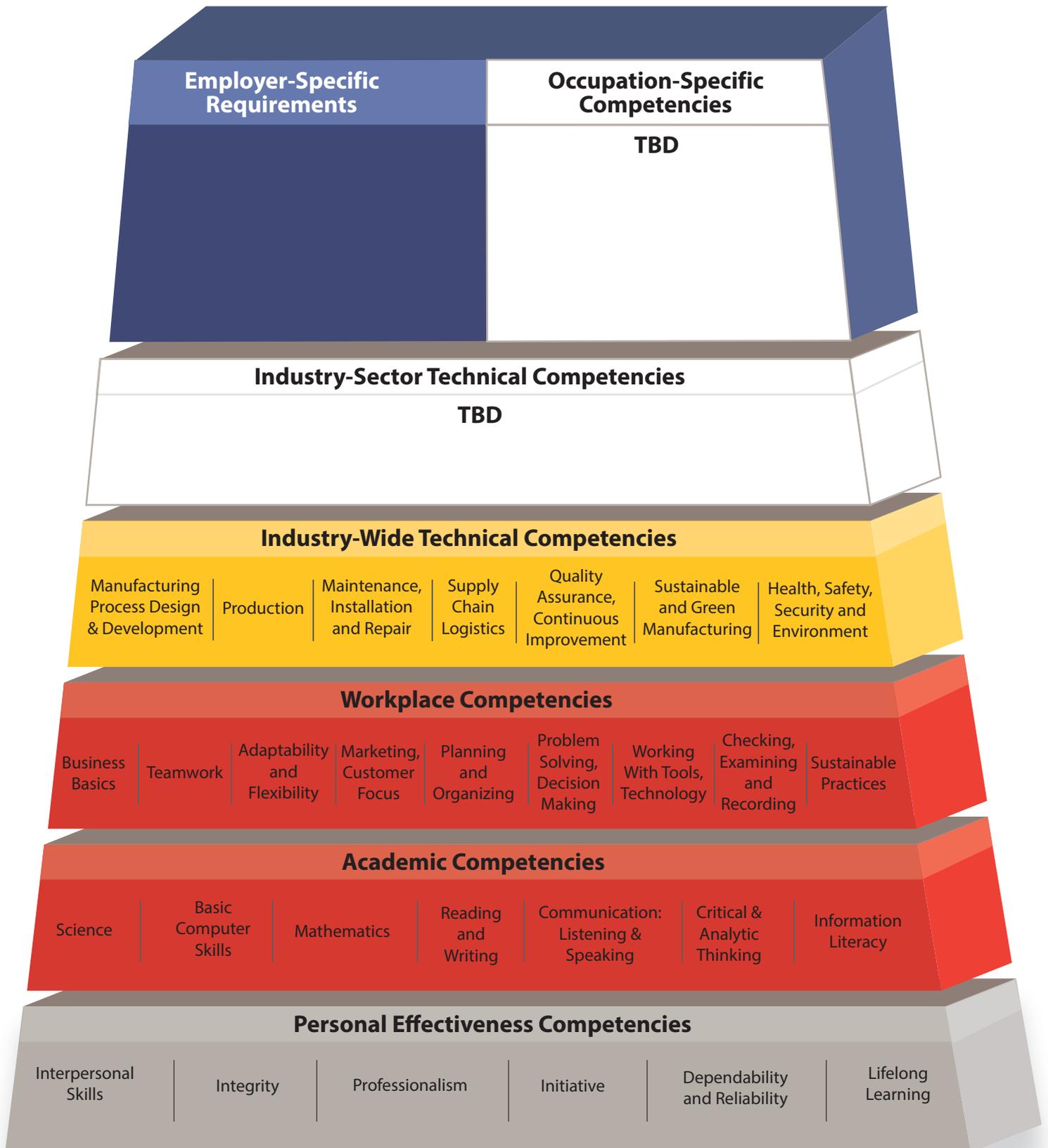


Based on: Advanced Manufacturing Competency Model Employment and Training Administration, United States Department of Labor, April 2010. -

PIPELINE Project

Competency Model for Advanced Manufacturing

Occupation: Mechatronics -



Based on: Advanced Manufacturing Competency Model Employment and Training Administration, United States Department of Labor, April 2010. -

Appendix E

Minnesota Dual- Training Programs in Advanced Manufacturing

REGISTERED APPRENTICESHIP PROGRAMS

MANUFACTURING



October 1, 2014

Program Sponsor	Year Program Began	Graduated Apprentices	Current Apprentices	Apprenticeable Occupation(s)	Related Training Provider
American Crystal Sugar - #4108	2001	3	4	Electronic control technician, maintenance electrician and electrician	American Crystal Sugar training staff
Boise Cascade- #3867	1992	49	0	Instrumentation technicians, maintenance millwrights, maintenance electricians, maintenance pipefitters	Rainy River Technical College
Buhler Inc. Apprenticeship Academy - #4284	2013	0	16	Machine maintenance and repair	Dunwoody Buhler Academy
CHS Mankato - #4237	2010	0	1	Maintenance Electrician	In house Century College – online SC tech MKTO – classroom
Eaton Corporation - #3092	2006	15	1	Tool & Die makers, Machine maintenance, Machinist	National Institute of Metalworking Skills (NIMS)/ Tooling University/ Hennepin Tech
EJ Ajax - #3888	2001	25	8	Machine operator, production sheet metal worker, punch press operator, maintenance mechanic	Hennepin Tech/ NIMS
Federal Mogul - #4140	2002	74	13	Lab Technician, tool maker, control technician, gage room technician, maintenance mechanic, maintenance electricians	South East Technical College
Haberman Machine - #4262	2012	1	19	NIMS Certified CNC Operator-Milling	NIMS
McNeilus Steel- #4213	2009	2	0	Machine setter, steel handler	Training on site from McNeilus training staff
Mackay Envelope - #2532	1999	34	3	Machine adjusters, paper cutter, platen-press operator	Tooling University

Program Sponsor	Year Program Began	Graduated Apprentices	Current Apprentices	Apprenticeable Occupation(s)	Related Training Provider
Massman Automation Design, LLC- #4272	2012	0	1	Machinist	Alexandria Tech/National Institute of Metal Working
Medtronic - #4250	2011	2	0	Tool & Die makers	NIMS
New Page Corp - #3893	1998	33	11	Electrical instrumentation electrician, mechanical Reliability Specialists	Training on site from staff
Profab, Inc. - #4271	2012	0	9	Machinist	Alexandria Tech/National Institute of Metal Working
Rock Tenn- #2338 & #4083	1999	54	7	Predictive maintenance inspector, maintenance machinist, industrial truck mechanic, millwright and instrument control technicians	Dunwoody/ St. Paul Technical College
Schuneman Equip Company Farm Equip Dealer - #4287	2014	0	1	Diesel Technician	Web based online coursework from John Deere national curriculum
Toro Company- #3970 & #3852	2000	154	12	Die cast maintenance, tool & die, millwright, prototype machinist, CNC machinist, maintenance technicians, tool inspector	Hennepin Tech
United Taconite - #4214	2008	30	18	Maintenance millwrights, electrical/electronic technicians, Automotive Mechanic	Curriculum from Virginia Tech/Instruction given at workplace
Valley Custom Mold- #3017	1992	7	1	Mold Maker	Online coursework
Wells Academy - #4199	2006	8	3	CNC Operator – Set up Tech, CNC Programmer – Swiss Machining	In-house classes

Bühler Inc.

Apprenticeship Academy

Industrial Specialist for Machine and Process Technology

Start a
successful
future today.

Customer Service
Engineer



Bühler is a specialist and technology partner for plant, equipment, and services for processing basic foods and for manufacturing advanced materials. The company is a global market leader in the supply of flour production plants, pasta and chocolate production lines, animal feed manufacturing installations, and aluminum die casting systems. Bühler Group operates in over 140 countries with the North American headquarters located in Plymouth, MN.

Customer Service Engineer Profile

Customer Service Engineers are primarily responsible for the repair, installation, inspection and modification of machinery at customer sites.

Responsibilities

- Repair, install, troubleshoot, inspect and modify Bühler and other manufacturers' equipment both at customer sites and at Bühler locations
- Assess customer's maintenance and spare part needs
- Understand and follow Bühler procedures in order to timely and accurately follow through on customer needs
- Provide customer training
- Assist customers with process improvements
- Provide input for improvements in equipment and processes
- Promote Bühler Customer Service and help customers plan future service



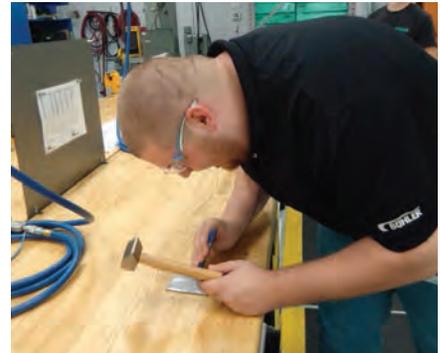
Build a successful professional future as a Customer Service Engineer with Bühler.

The Bühler Apprenticeship Academy offers an apprenticeship for the next generation of Customer Service Engineers. The apprenticeship is a formalized 3-year dual training program that combines structured on-the-job training and related technical instruction. Our apprenticeship connects learning directly to the world of work. Apprentices are paid as full time employees of Bühler Inc. for the entire length of the program and receive benefits. This 3-year program is divided into modules with classes at Dunwoody College of Technology, Minneapolis, and the Bühler Apprenticeship Workshop in Plymouth, MN. All training classes, tools, books, computer and uniforms are paid for by Bühler (contingent upon successful completion and employment commitment). Upon completion of the program the apprentices receive their journeyworker card from the Minnesota Department of Labor and Industry.



Bühler Inc. Apprenticeship Academy

Industrial Specialist for Machine and Process Technology



Apprenticeship Training Content

First Year

- Manufacturing Processes & Materials
- Blueprint Reading, Production Drawings
- Geometric Dimensioning & Tolerancing
- Math for Machining Technology
- Statics & Strength of Material
- Communication

Second Year

- Electrics, Fundamental Theory
- Electrics, Applications
- Understanding of Schematics
- Electrical Application II
- Math for Computers
- Electronic Devices Lab
- Introduction to PLC's

Third Year

- Product Design
- Quality, Lean Systems Theory
- Business Fundamentals
- Operations Management
- Introduction to Management & Supervision
- On-the-Job Training

Applying for the Apprenticeship Academy

To apply go to www.buhlerusa.iapplicants.com and complete the questionnaire. Candidates will then be invited to an Open House at Bühler Inc. to receive more information. Bühler uses several assessments to evaluate and select appropriate candidates for the Bühler Apprenticeship Program. New apprentices are chosen in March and start at Bühler in August of each year. Applicants must be 18 years of age and have a high school diploma or GED by the start of the program.

Additional Information

Visit the career page of www.buhlergroup.com for additional information.

Questions? Contact:

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www.buhlergroup.com



Alexandria Technical & Community College

Standards for Machinist Apprentice

Developed by

Alexandria Technical & Community College

ATCC Registered Apprenticeship: Program Overview

The National Institute for Metalworking Skills, Inc. (NIMS) approach is time-base apprenticeship in a competency-based training program. These standards of apprenticeship represent a way of conducting and delivering apprenticeship training in the nation's metalworking industry.

The competency-based apprenticeship training approach provides the opportunity for the apprentice and employer sponsor to move through the system at a modified pace. By benchmarking the achievement through the core competencies of the NIMS program, the apprentice will be able to build a portfolio of skills and credentials validating the acquired skilled levels. This will provide a return on investment for the apprentice in training and employer sponsor through better on-the-job performance along with a "Certificate of Completion of Training" for the apprentice from the apprenticeship unit of the Minnesota Department of Labor & Industry. With this program, the apprentice will be able to validate the levels of achievement that is recognized throughout the industry as well as obtaining college credits. These standards of apprenticeship were developed in accordance with the standards recommended by the Minnesota Department of Labor Apprentice Unit as a basis for Alexandria Technical & Community College to work towards a NIMS competency based apprenticeship program. The skill standards used in the core competencies required are industry written and validated. The assessments used to measure the attainment of the competencies are developed from the skill standards and are industry designed and validated.

Recognizing the need and advantage of having a highly skilled and efficient machinist, the Alexandria Technical & Community College along with participating employer sponsors will work to together under direction of Director of Apprenticeships and Apprenticeship Committee to provide the related instruction and on the job training to insure the success of the machinist apprenticeship program.

To insure the program is meeting the need to fulfill the above there will be an Apprenticeship Committee consisting of Director of Apprenticeships along with two staff Alexandria Technical & Community College, three former or present employer sponsors, and three people employed in the machining field. The committee will be updated quarterly on the progress of participating apprentices, sponsors, and related instruction by the Director of Apprenticeships.

Contact Information: Rich Davy
Sr. Field Representative, MN Department of Labor and Industry
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SKILLED MANUFACTURING CUSTOMIZED TRAINING PROGRAM

New program now available through Jan. 15, 2015



Minnesota's new Skilled Manufacturing Customized Training Program is designed to create skilled workers for current and projected manufacturing openings and to meet the needs of Minnesota employers that have customized training programs.

ACADEMIC INSTRUCTION AND JOB-RELATED LEARNING

The Minnesota Legislature passed funding for this program in 2013. The legislation directs the Minnesota Department of Labor and Industry (DLI) to collaborate with **Alexandria Community and Technical College, Central Lakes College, Century College** and **Hennepin Technical College** to develop a program for manufacturing industries that integrates academic instruction and job-related learning in the workplace. State funding for this program ends Jan. 15, 2015.

The program is employee-centered. A student would take some classes at the school and get training at the manufacturer's worksite. The employer pays wages to the participant (new employee), who is hired to produce work and learn. This program is designed to provide:

- training for a variety of workers in a high-demand industry, such as dislocated workers, secondary and postsecondary school participants, individuals with disabilities, retired or disabled veterans, etc.;
- employment for workers during training and unsubsidized employment upon program completion; and
- employers in high-tech manufacturing industries with skilled employees.



The State of Minnesota seeks manufacturing employers and participants for a new training program that combines employment, economic development and workforce development to grow business and improve productivity in Minnesota's manufacturing industry.



TECHNICAL COLLEGES

Alexandria Technical and Community College

www.alextech.edu
Alexandria, Minnesota

Central Lakes College

www.clcmn.edu
Brainerd, Minnesota

Century College

www.century.edu
White Bear Lake, Minnesota

Hennepin Technical College

www.hennepintech.edu
Brooklyn Park

CONTACT INFO

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Rich Davy, DLI representative

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Appendix F

Agriculture Industry Council Meetings

Minnesota PIPELINE Project

Agriculture Council List

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Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Agricultural Industry Council

Meeting I

August 14, 2014

1:30 – 4:30

AGENDA

Welcome & Introductions

Jessica Looman

Assistant Commissioner

Department of Labor and Industry

PIPELINE Project Vision & Overview

Senator Terri Bonoff

Dave Kornecki

Minnesota State Senate

Framing the Issue for the Industry

Dr. Brian Buhr

Dean

U of M College of Food, Agriculture
and natural Resolved Sciences (CFAN)

BREAK at approximately 2:45

**Examples of Current Competency
Standards Training Models
U.S. and Europe**

Jessica Looman

Assistant Commissioner

Department of Labor and Industry

**Occupations and Competencies
Activity**

Cristine Leavitt

Continuous Improvement Consultant

Department of Administration

Next Steps & Closing

Cristine Leavitt

Continuous Improvement Consultant

Department of Administration

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Agriculture Industry Council

Meeting 2

October 3, 2014

9:00– 11:30 (optional lunch at 11:30)

AGENDA

Welcome & Introductions

Jessica Looman

Assistant Commissioner
Department of Labor and Industry

Senator Terri Bonoff

Minnesota State Senate

Representative Kim Norton

Minnesota House of Representatives

MN PIPELINE Project Status

Heather McGannon

MN PIPELINE Project Manager
Department of Labor and Industry

Overview of Dual-Training System in United States

Jessica Looman

Assistant Commissioner
Department of Labor and Industry

BREAK at approximately 10:00

Selection of Agriculture Occupations and Identification of Experts

Dual- Training System in Minnesota Discussion

Next Steps & Closing

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Agriculture Industry Council

Meeting 3

November 12, 2014

9:00 – 11:00

AGENDA

Welcome & Introductions

Jessica Looman

Assistant Commissioner
Department of Labor and Industry

Senator Terri Bonoff

Minnesota State Senate

Representative Kim Norton

Minnesota House of Representatives

MN PIPELINE Project Status

Heather McGannon

MN PIPELINE Project Manager
Department of Labor and Industry

Update on Competency Work for Selected Agriculture Occupations

Recommendations on
implementing dual-training on 4
selected occupations

Identify MN PIPELINE next steps
and/or projects to support dual-
training for Agriculture industry in
Minnesota.

Next Steps & Closing

Appendix G

PIPELINE Project Occupations and Competency Standard Models for Agriculture

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

MN PIPELINE PROJECT
Agriculture Industry Council

List of Selected Agriculture Occupations:

- 1. Skilled Mechanic (Agriculture)**
- 2. Agronomist**
- 3. Herd Manager**

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

PIPELINE PROJECT
Agriculture Industry Council

Agriculture Council Selected Occupations and Descriptions

Below are the 3 occupations and Descriptions the Agriculture Industry Council selected to begin investigating dual-training models and implementation in Minnesota.

Skilled Mechanic (Agriculture) * Apprenticiable occupation

Source: www.bls.gov and www.maizisandmiller.com

Agriculture equipment mechanics have the experience, training and skills to maintain and repair many different types of agricultural equipment including tractors, combines and a wide range of other machinery. They also know how to diagnose and troubleshoot the large engines in this equipment and the electrical, transmission and hydraulic systems that make it work. Agriculture equipment tills the soil, plants the seeds, applies agrichemicals to facilitate yields and harvests a wide range of crops that enrich our lives. Skilled agriculture equipment mechanics keep this equipment working safely and efficiently year after year. Most agriculture equipment mechanic positions require some travel working on equipment out in the field.

Types of Agricultural Machinery

Soil Cultivation:

Cultivator, Cultipacker, Chisel plow, Harrow, Spike harrow, Drag harrow, Disk harrow, Plough, Power tiller /Rotary tiller / Rototiller, Spading machine, Subsoiler, Two-wheel tractor, Stone Picker

Planting:

Broadcast seeder, Planter (farm implement), Plastic mulch layer, Potato planter, Seed drill, Air seeder, Precision drill, Transplanter, Rice transplanter

Harvesting / Post-Harvest:

Beet harvester, Bean harvester, Cane Harvester, Carrot Puller, Chaser bin, Combine harvester, Conveyor belt, Corn harvester, Cotton picker, Fanning mill, Farm truck, Forage harvester, Gleaner Gravity wagon, Haul out Transporter, Potato digger, Potato harvester, Rice huller, Sickle, Swather

Loading:

Backhoe, Front end loader, Skid-steer loader

Agronomist

Source: <http://education-portal.com> and www.jobsdescriptions.org

Agronomists have varied duties that require them to think critically to solve problems. First and foremost, agronomists experiment and plan studies to improve crop yields. They study a farm's crop production in order to discern the best ways to plant, harvest, and cultivate the plants, regardless of the climate. It is also important for agronomists to develop methods to control weeds and pests to keep crops disease-free.

They use technological processes for sowing crops and the growing of the seedlings of vegetables, fruits, grape vines, etc...They determine ways of cultivating crops on different plots of land, having in consideration the conditions of soil. They make decisions about the plowing, sowing and plant protection, select and procure the seeds, fertilizers and other materials required for plant growth, schedule the plowing and sowing. They manage the exploitation of land resources, prepare laboratory tests for agricultural land and organization of the ground, and determine the fertilization process. They prepare the production plan for the crop plants, record the operative documents, and ensure the coordination with the production of animals

In professional work, the agronomist develop plans for irrigation, draining and soil enrichment, investigate and develop methods to obtain quality products.

They also perform environmental studies to control pests and parasitic plants and to protect soil and water. They study and apply scientific methods to obtain various valuable crops, both qualitatively and quantitatively. They develop and supervise environmental projects, industrial buildings, etc...They also:

- Design and coordinate the necessary testing equipment and agricultural machinery
- Develop plans and projects on cultivation of agricultural areas
- Prepare reports and present scientific papers in his field of specialty
- Determine the technological processes for the planting of crops, etc
- Manage and modify the agro-technical processes and work processes in the plant cultivation
- Determine ways of cultivating crops on different plots of land, as per the ground conditions
- Make decisions on plowing and sowing

Herd Manager - **Bison Herd Manager Apprenticeship occupation*

Source: www.onetonline.org

Herd Managers are responsible for overall management of the dairy herd including milking, herd health and breeding. Coordinate and share duties and responsibilities with the assistant herd manager. Make decisions pertaining to day-to-day operation, such as when an animal needs to be bred, treated, culled, etc.; also which animals are candidates for embryo transfer program. Decide when veterinarian or service personnel need to be called; decide when a tank of milk must be dumped. Discuss herd nutrition issues with feed manager. They also:

- Collect and record data on cows, heifers and bulls
- Observe all livestock for signs of illness or distress (several times daily)

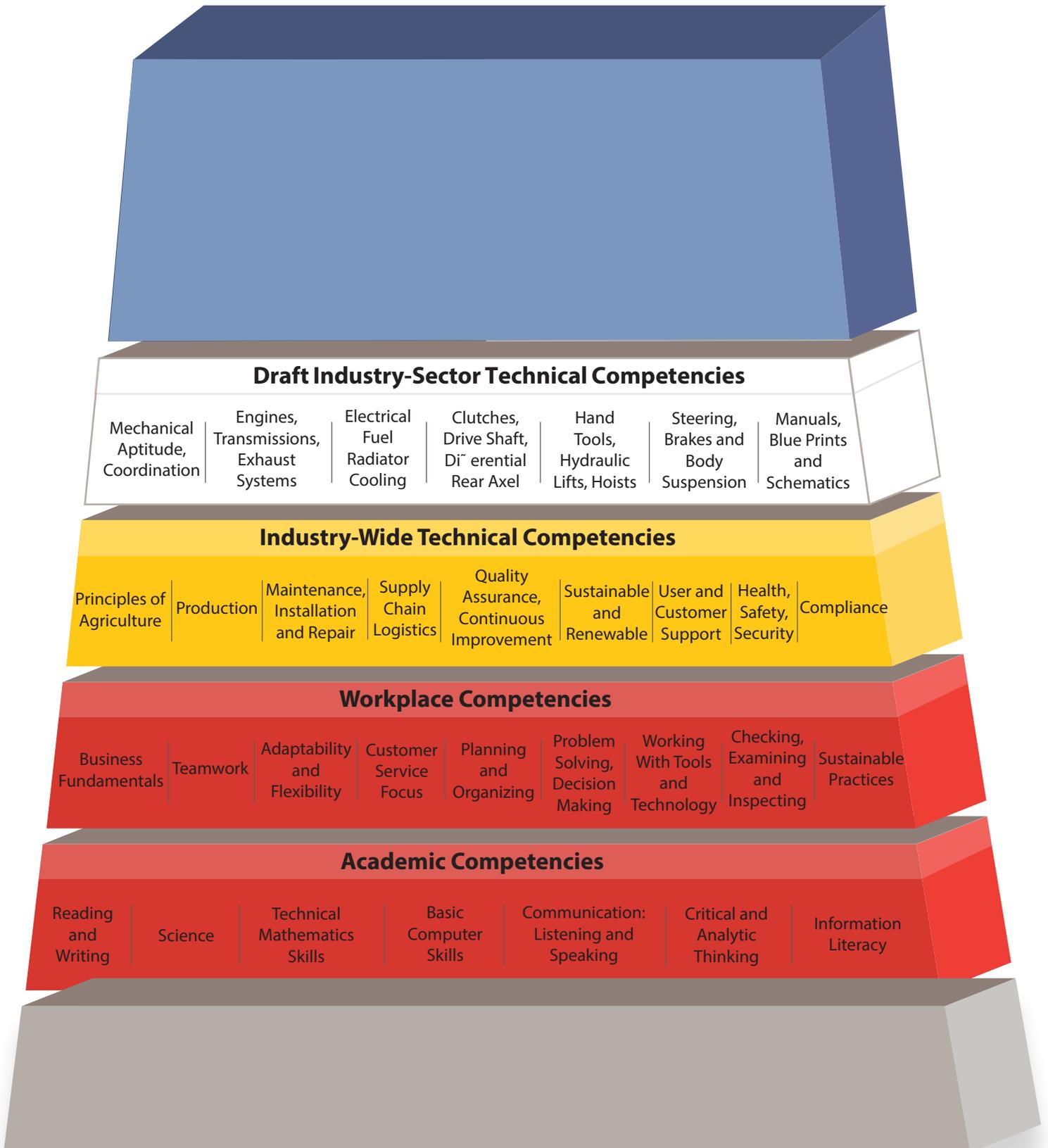
- Monitor and adjust environment for cow comfort; schedule bedding
- Monitor maternity area and assist with difficult births
- Monitor and assist with care of fresh cows and newborn calves
- Manage grouping of cows, heifers and bulls in pens
- Keep all animals visibly identified
- Move cows from far-off dry pen to close-up dry pen weekly
- Recommend culling decisions
- Communicate management decisions with owners and managers

Herd Health Management

- Observe cows, heifers and bulls for health problems
- Treat and care for sick animals; record treatments in cow health records
- Schedule and assist with pregnancy checks or other veterinary visits
- Dry off cows weekly
- Maintain mastitis and dry cow treatment programs
- Maintain herd vaccination program
- Maintain and administer hoof trimming program

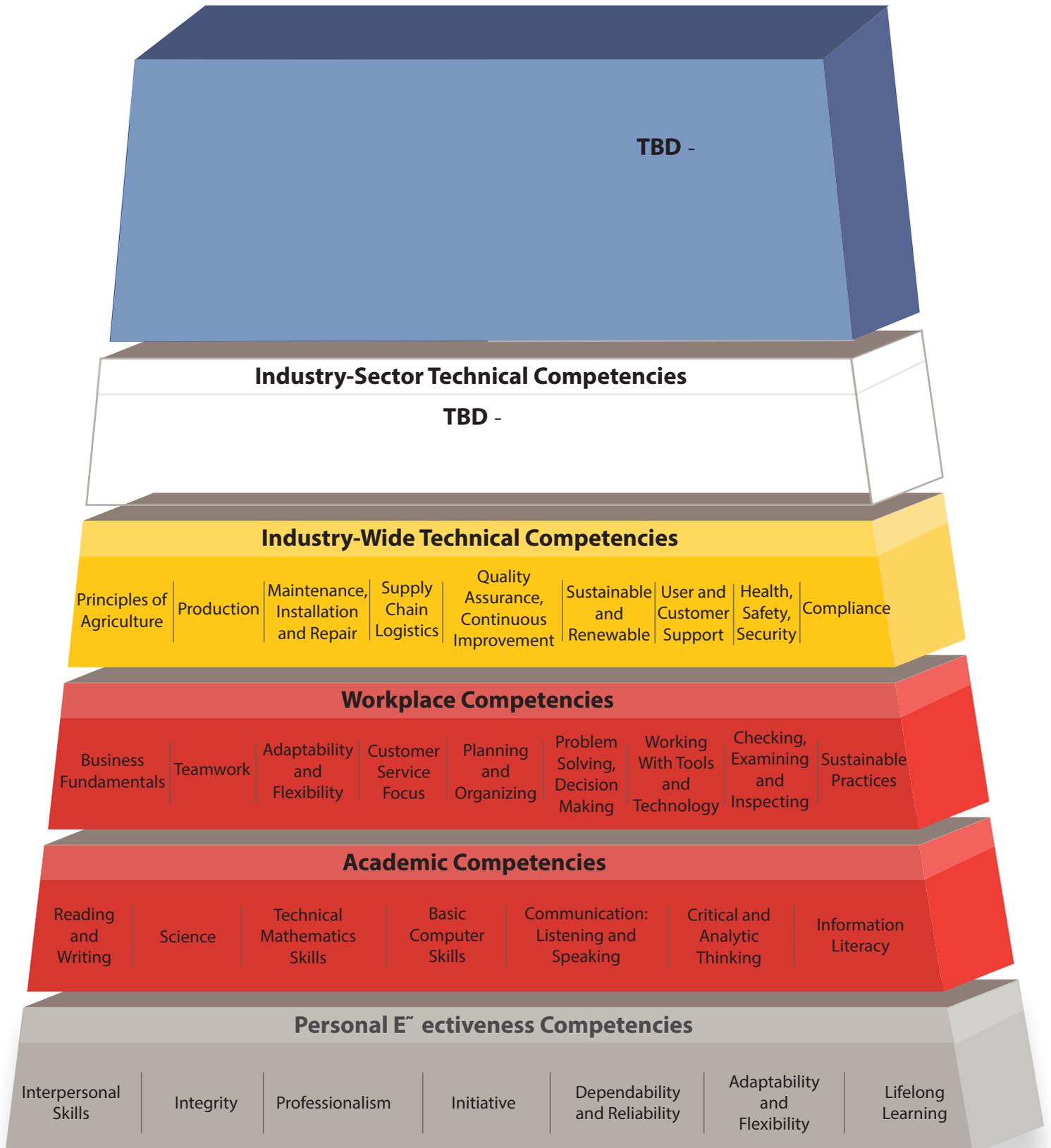
PIPELINE Project

Competency Model for Agricultural Occupation: Mechanic, Industrial Truck -



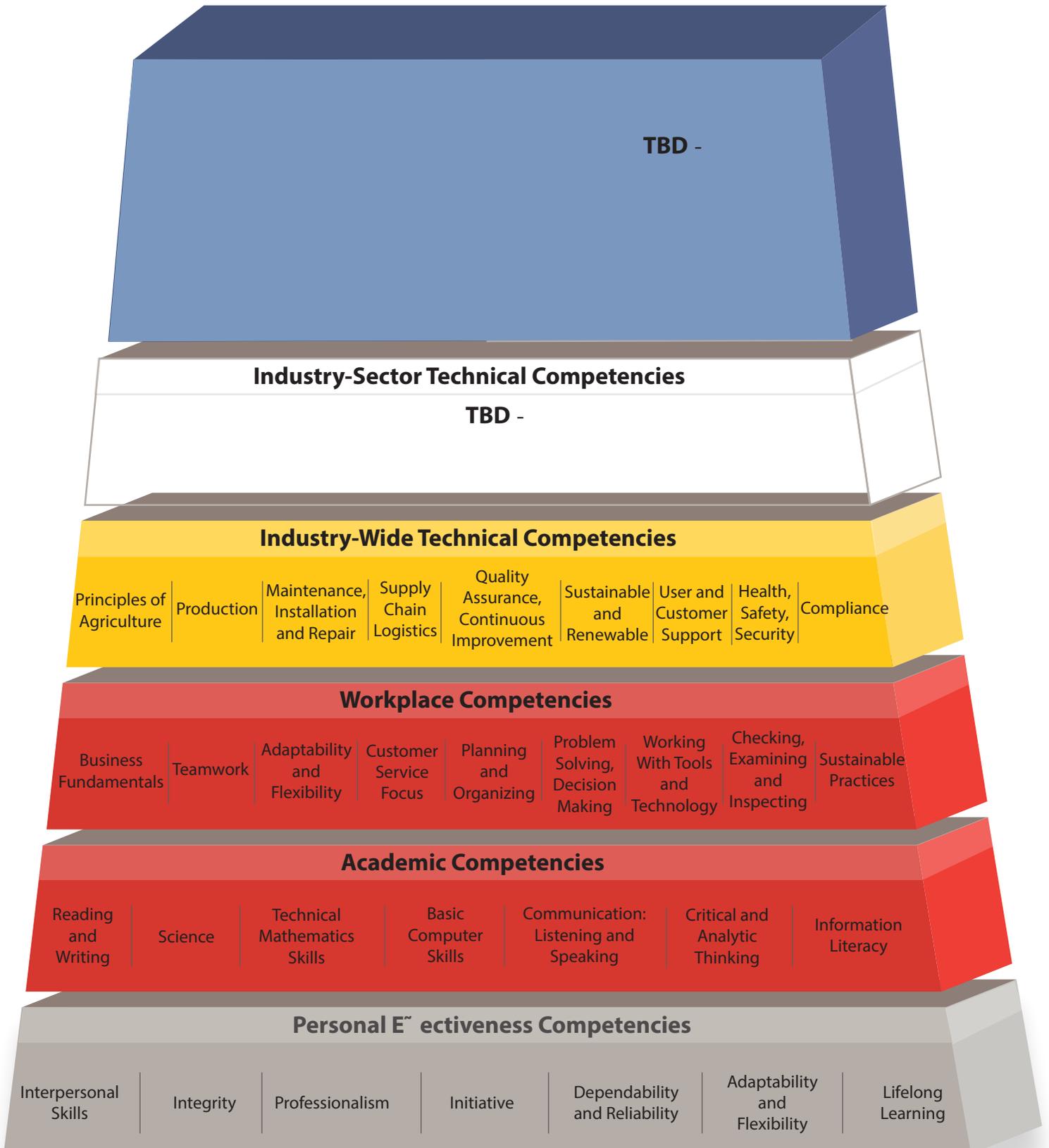
Based on: Truck Mechanics and Diesel Engine Specialists: Competency Model Employment and Training Administration, United States Department of Labor

PIPELINE Project - Competency Model for Agricultural Occupation: Agronomist -



Based on: Agricultural Industry Council input and feedback and modifications from the USDOL competency model

PIPELINE Project - Competency Model for Agriculture - Occupation: Herd Manager -



Based on: Competency Model for Employment and Training Administration, United States Department of Labor

Appendix H

Health Care Services Industry Council Meetings

Minnesota PIPELINE Project

Health Care Services Council List

Employer

Deb Barnes

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Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Health Care Industry Council

Meeting 1

August 15, 2014

9:30 – 12:00

AGENDA

Welcome & Introductions

Jessica Looman

Assistant Commissioner

Department of Labor and Industry

PIPELINE Project Vision & Overview

Senator Terri Bonoff

Dave Kornecki

Minnesota State Senate

**Framing the Project in Health Care
Services**

Bethany Krom

Mayo School of Health Sciences

**Framing the Project in Health Care
Services**

Adam Suomala

Aging Services of Minnesota

BREAK at approximately 10:30

**Occupations and Competencies
Activity**

Cristine Leavitt

Continuous Improvement Consultant

Department of Administration

**LUNCH at approximately 11:15
Next Steps & Closing**

Cristine Leavitt

Continuous Improvement Consultant

Department of Administration



Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Health Care Services Industry Council

Meeting 2

October 1, 2014

9:30 – 11:30 (optional lunch at 11:30)

AGENDA

Welcome & Introductions

Jessica Looman

Assistant Commissioner
Department of Labor and Industry

Senator Terri Bonoff

Minnesota State Senate

Representative Kim Norton

Minnesota House of Representatives

Bethany Krom

Mayo School of Health Sciences

MN PIPELINE Project Status

Heather McGannon

Department of Labor and Industry

Overview of Dual- Training System in United States

Jessica Looman

Assistant Commissioner
Department of Labor and Industry

BREAK at approximately 10:30

Selection of Health Care Services Occupations and Identification of Industry Experts

Cristine Leavitt

Continuous Improvement Consultant
Department of Administration

Dual-Training System in Minnesota Discussion

Cristine Leavitt

Continuous Improvement Consultant
Department of Administration

Next Steps & Closing

Heather McGannon

Department of Labor and Industry



Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Health Care Services Industry Council

Meeting 3

November 7, 2014

9:00 – 11:00

AGENDA

Welcome & Introductions

Jessica Looman

Assistant Commissioner

Department of Labor and Industry

Senator Terri Bonoff

Minnesota State Senate

Representative Kim Norton

Minnesota House of Representatives

MN PIPELINE Project Status

Heather McGannon

MN PIPELINE Project Manager

Department of Labor and Industry

**Update on competency work for
selected health care services
occupations**

**Recommendations on
implementing dual-training on 4
selected occupations**

**Recommendations on MN PIPELINE
next steps and projects to support
dual-training in health care services
in Minnesota.**

Closing & Thank you

Appendix I

PIPELINE Project Occupations and Competency Standard Models for Health Care Services

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

MN PIPELINE PROJECT
Health Care Services Industry Council

List of Selected Health Care Services Occupations:

- 1. Health Information Technician**
- 2. Psychiatric/Mental Health Technician**
- 3. Health Support Specialist**
- 4. Medical Scribe - Special Projects**

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

PIPELINE PROJECT
Health Care Services Industry Council

Health Care Services Industry Council Selected Occupations and Descriptions

Below are the 4 occupations and descriptions the Health Care Services Industry Council selected to begin investigating dual-training models and implementation in Minnesota.

Health Information Technician

Source: www.onetcodeconnector.org

Compile, process, and maintain medical records of hospital and clinic patients in a manner consistent with medical, administrative, ethical, legal, and regulatory requirements of the health care system. Process, maintain, compile, and report patient information for health requirements and standards in a manner consistent with the healthcare industry's numerical coding system.

Other duties include:

- Protect the security of medical records to ensure that confidentiality is maintained.
- Review records for completeness, accuracy, and compliance with regulations.
- Retrieve patient medical records for physicians, technicians, or other medical personnel.
- Assign the patient to diagnosis-related groups (DRGs), using appropriate computer software.
- Process patient admission or discharge documents.
- Transcribe medical reports.
- Resolve or clarify codes or diagnoses with conflicting, missing, or unclear information by consulting with doctors or others or by participating in the coding team's regular meetings.
- Enter data, such as demographic characteristics, history and extent of disease, diagnostic procedures, or treatment into computer.
- Identify, compile, abstract, and code patient data, using standard classification systems.
- Release information to persons or agencies according to regulations.

Psychiatric Technician/Mental Health Technician

Source: www.onetcodeconnector.org

Care for individuals with mental or emotional conditions or disabilities, following the instructions of physicians or other health practitioners. Monitor patients' physical and emotional well-being and report to medical staff. May participate in rehabilitation and treatment programs, help with personal hygiene, and administer oral or injectable medications.

Other duties include:

- Take and record measures of patients' physical condition, using devices such as thermometers or blood pressure gauges.
- Monitor patients' physical and emotional well-being and report unusual behavior or physical ailments to medical staff.
- Provide nursing, psychiatric, or personal care to mentally ill, emotionally disturbed, or mentally retarded patients.
- Observe and influence patients' behavior, communicating and interacting with them and teaching, counseling, or befriending them.
- Collaborate with or assist doctors, psychologists, or rehabilitation therapists in working with mentally ill, emotionally disturbed or developmentally disabled patients to treat, rehabilitate, and return patients to the community.
- Encourage patients to develop work skills and to participate in social, recreational, or other therapeutic activities that enhance interpersonal skills or develop social relationships.
- Restrain violent, potentially violent, or suicidal patients by verbal or physical means as required.
- Train or instruct new employees on procedures to follow with psychiatric patients.
- Develop or teach strategies to promote client wellness and independence.
- Administer oral medications or hypodermic injections, following physician's prescriptions and hospital procedures.

Health Support Specialist * Apprenticable occupation

Source: www.healthsupportspecialist.org

All Household Staff are members of a self-directed, cross-trained work team assigned to a household of sixteen residents on a permanent basis. Their purpose is to plan and coordinate resident care creating a HOME and strengthening COMMUNITY while incorporating PersonFirst Values to establish a sense of belonging, usefulness and purpose in daily life. All staff are trained in housekeeping, laundry, dietary, social and activities services that directly affect the resident's environment. In addition, non-licensed staff is trained as nursing assistants. Services are provided for adult and geriatric residents in accordance with federal and state standards, guidelines, and regulations that govern the organization.

Activities include:

- Identifies, plans and incorporates resident's daily pleasures and interests into household life based upon recommendations from families and friends.
- Plan, observes and participates in the household/facility activity calendar.
- Incorporates children, plants, and pets into regular household life.
- Provides assistance to access activities and programs in/outside of the home.
- Provides 1:1 interaction with residents based upon preferences.
- Encourages residents to achieve highest level of practical functioning based upon their interests and abilities.
- Provides adaptations for desired activities such as magnifying glass, headphones and large print books.
- Performs a variety of miscellaneous tasks as requested such as shopping, running errands, assisting with correspondence, reading to the resident and distributing mail.

Medical Scribe - Special Projects

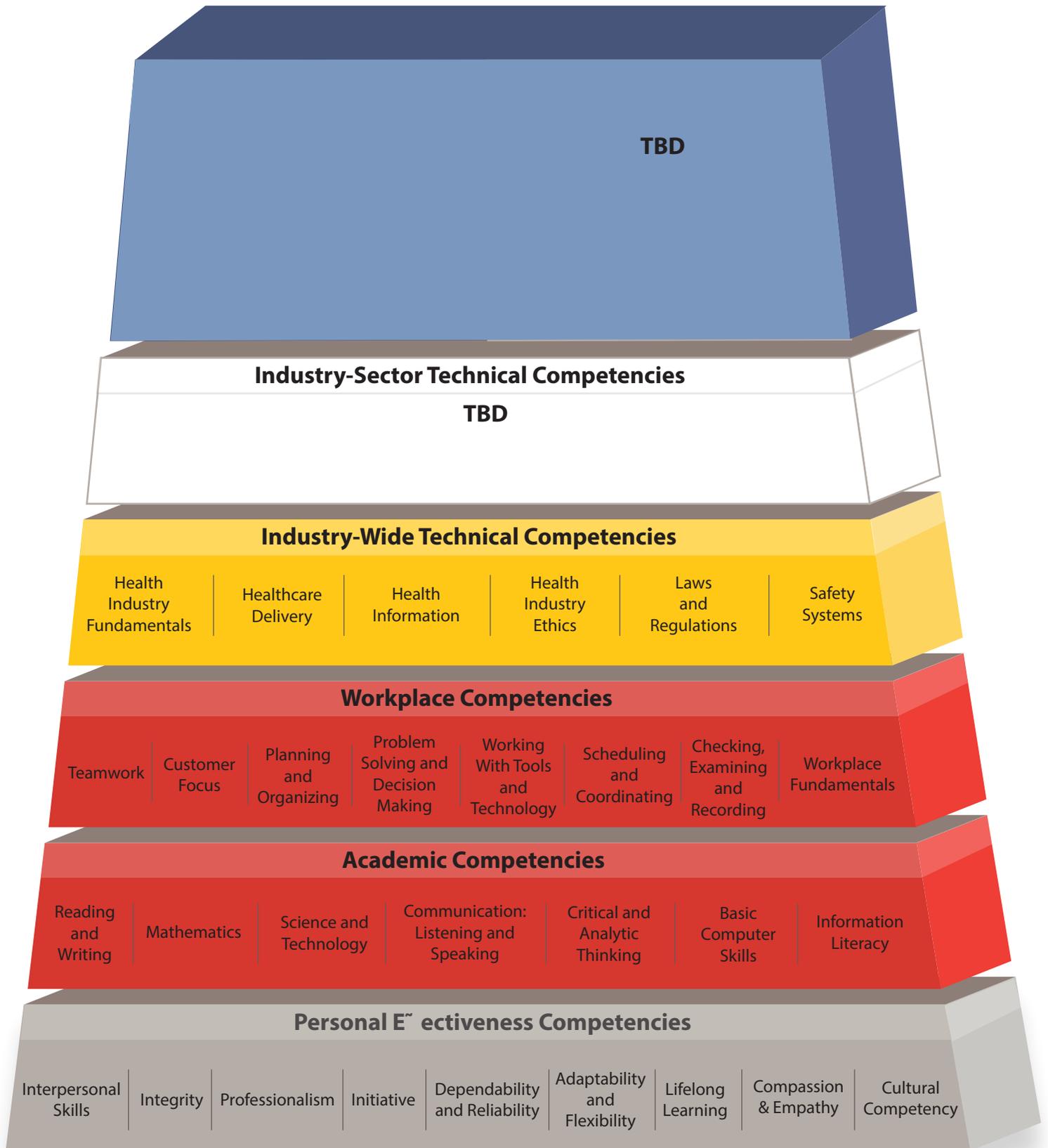
Source: www.onetcodeconnector.org

Transcribe medical reports recorded by physicians and other healthcare practitioners using various electronic devices, covering office visits, emergency room visits, diagnostic imaging studies, operations, chart reviews, and final summaries. Transcribe dictated reports and translate abbreviations into fully understandable form. Edit as necessary and return reports in either printed or electronic form for review and signature, or correction.

Other duties include:

- Take dictation using shorthand, a stenotype machine, or headsets and transcribing machines.
- Return dictated reports in printed or electronic form for physician's review, signature, and corrections and for inclusion in patients' medical records.
- Review and edit transcribed reports or dictated material for spelling, grammar, clarity, consistency, and proper medical terminology.
- Transcribe dictation for a variety of medical reports, such as patient histories, physical examinations, emergency room visits, operations, chart reviews, consultation, or discharge summaries.
- Distinguish between homonyms and recognize inconsistencies and mistakes in medical terms, referring to dictionaries, drug references, and other sources on anatomy, physiology, and medicine.
- Translate medical jargon and abbreviations into their expanded forms to ensure the accuracy of patient and health care facility records.
- Produce medical reports, correspondence, records, patient-care information, statistics, medical research, and administrative material.
- Identify mistakes in reports and check with doctors to obtain the correct information.
- Perform data entry and data retrieval services, providing data for inclusion in medical records and for transmission to physicians.
- Set up and maintain medical files and databases, including records such as x-ray, lab, and procedure reports, medical histories, diagnostic workups, admission and discharge summaries, and clinical resumes.

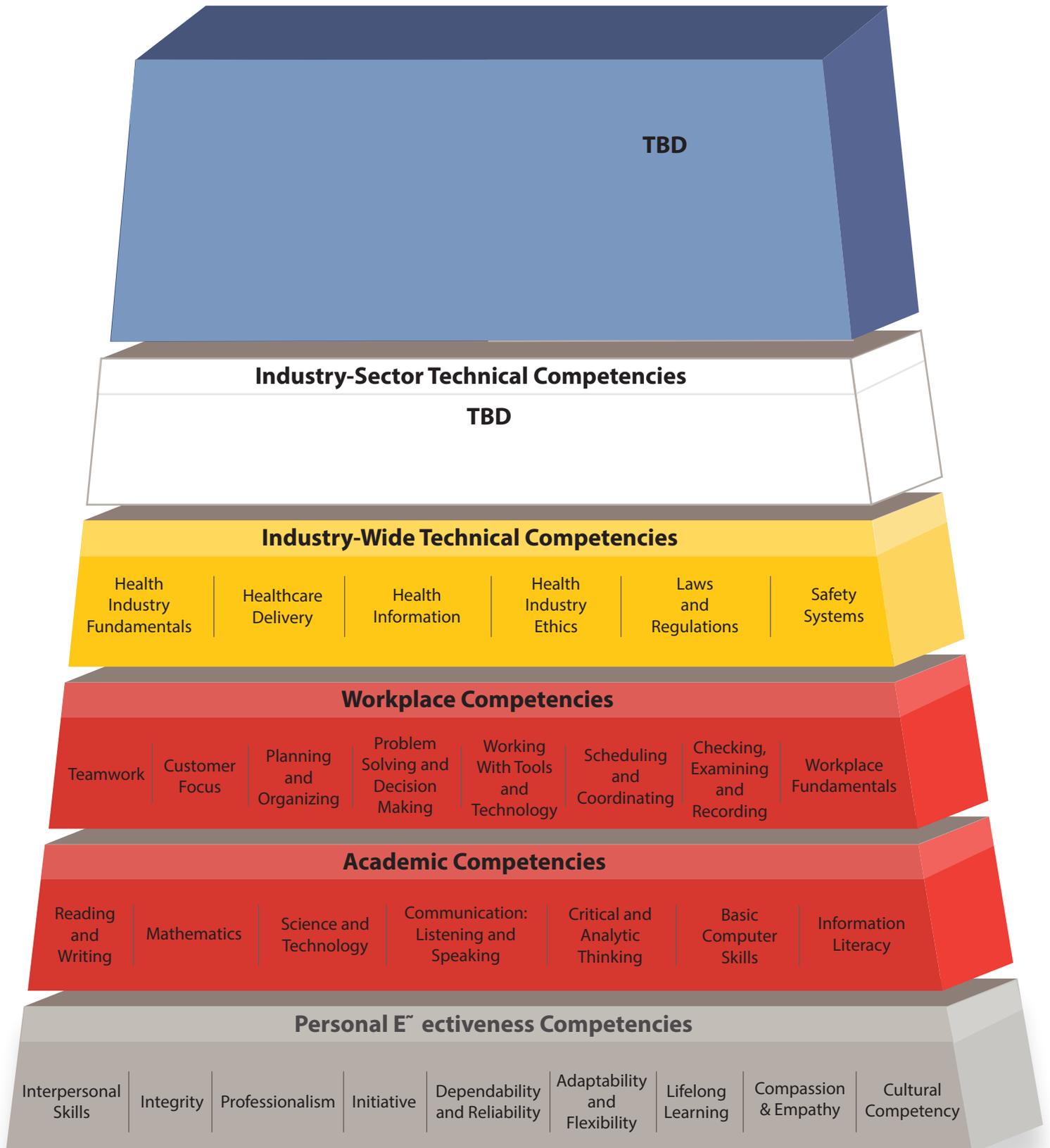
PIPELINE Project
Competency Model for Health Care Services
Occupation: Health Information Technician -



PIPELINE Project

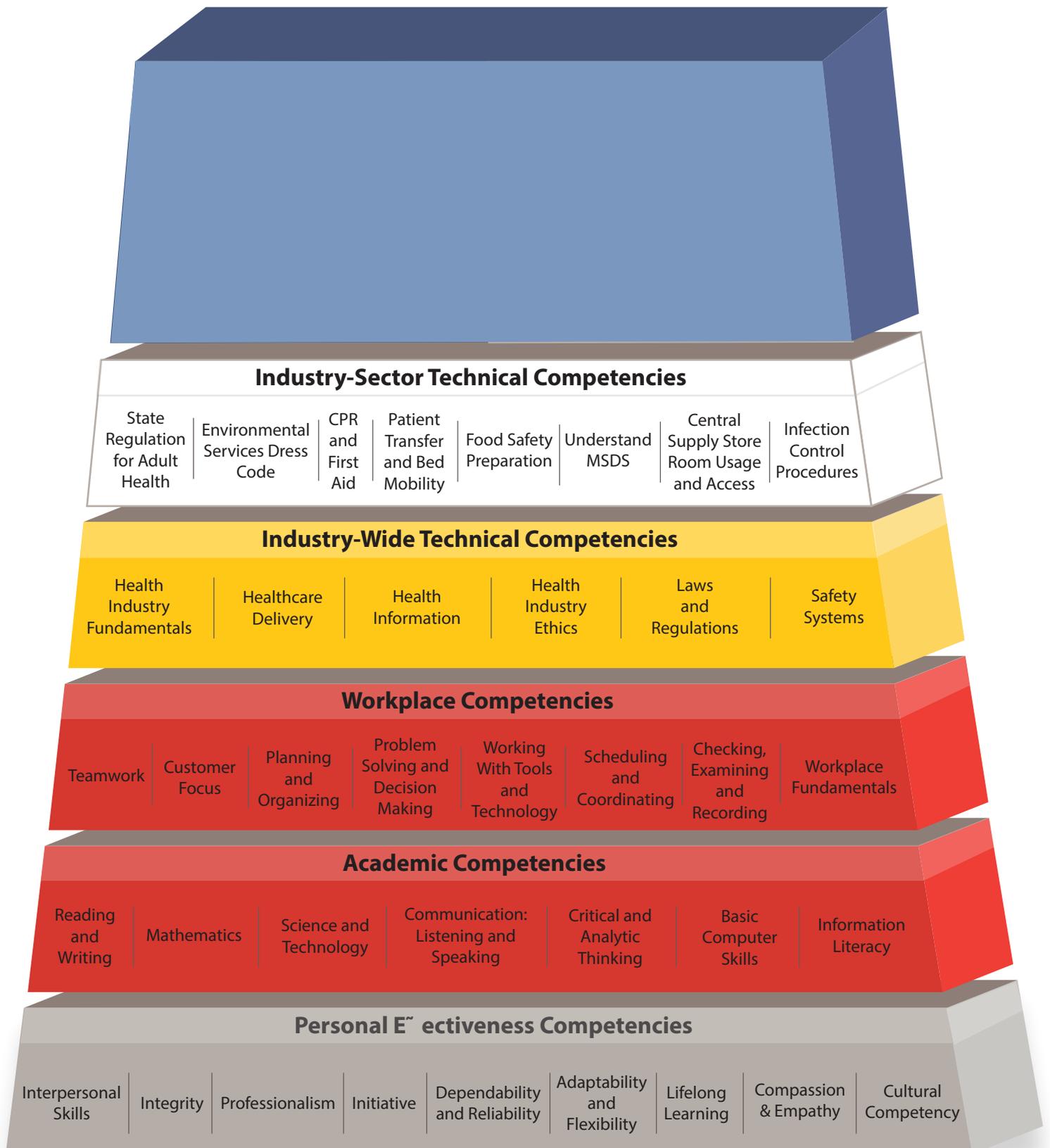
Competency Model for Health Care Services

Occupation: Medical Scribes -



Based on: Health: Allied Health Competency Model Employment and Training Administration, United States Department of Labor, December 2011. -

PIPELINE Project - Competency Model Health Care Services Occupation: Health Support Specialist -

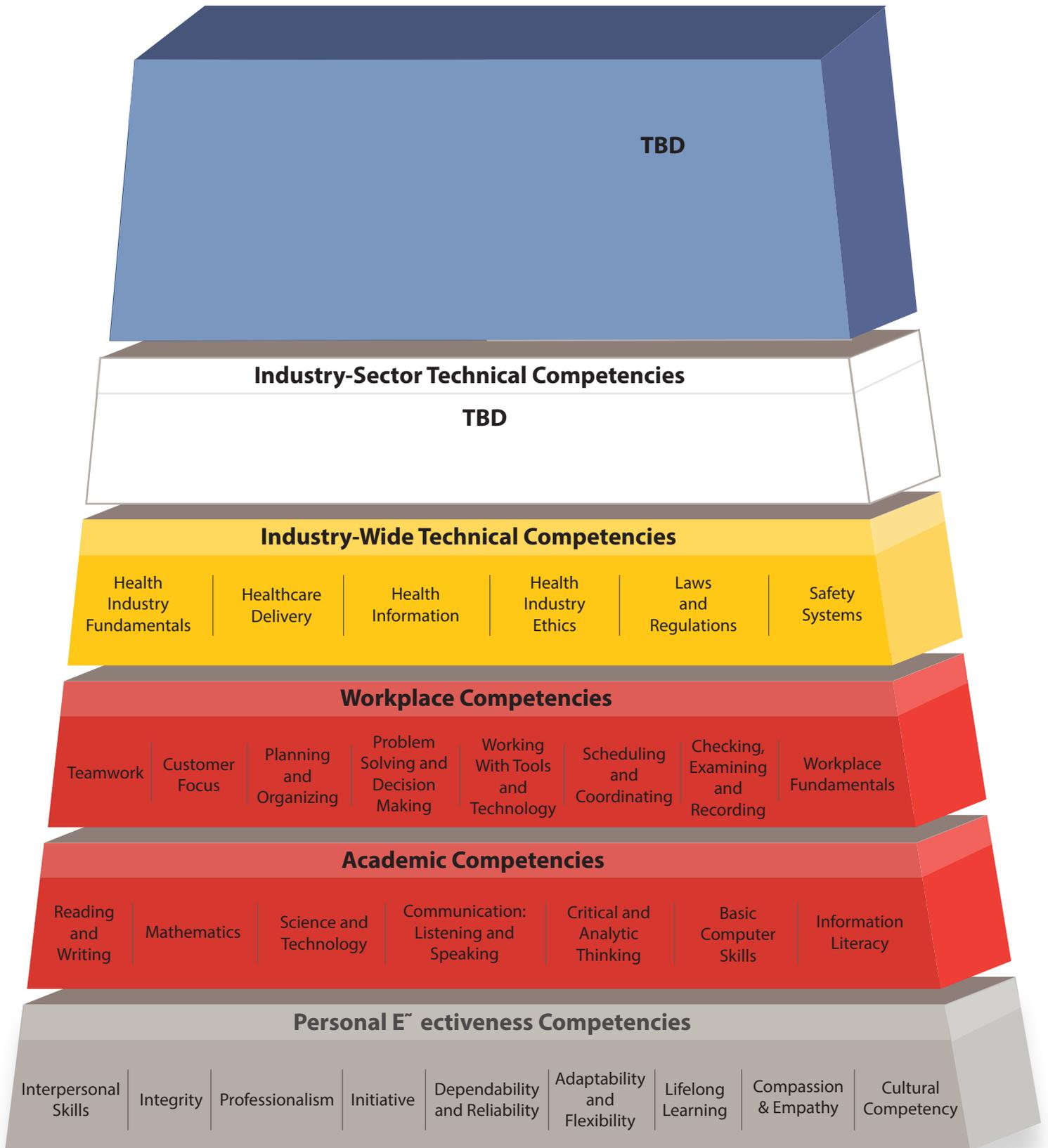


Based on: Health: Allied Health Competency Model Employment and Training Administration, United States Department of Labor, December 2011. -

PIPELINE Project

Competency Model for Health Care Services -

Occupation: Psychiatric Technician/Mental Health Technician -



Based on: Health: Allied Health Competency Model Employment and Training Administration, United States Department of Labor, December 2011. -

Appendix J

Minnesota Dual-Training Programs in Health Care Services



Your path to a more rewarding future!



**Health Support
SPECIALIST**

A new era in older adult services has arrived and with it has evolved a new type of professional caregiver – the **Health Support Specialist (HSS)**. Your opportunity to be part of these exciting changes is now here. As part of this new generation of Health Support Specialists, you can:

- *Earn while you learn*
- *Take classes online*
- *Qualify for a scholarship*
- *Receive a Registered Apprenticeship Health Support Specialist certificate for 145 hours from a Minnesota State College*



If you are experienced in an adult care setting, you know the rewards. You are part of an important mission to care for individuals who have earned the respect that comes with age and the right to grow older with dignity. You, too, deserve to grow in your career as the models for care centers evolve. Organizations pioneering these changes recognize their staff members are on the front lines of these changes and they have provided the path for you to become a certified Health Support Specialist. Much of what you already know and the training you've already completed may be recognized toward your new certification.

If you are new to the field of aging services, you have made a wise choice. You are part of a cutting edge of change that offers you more opportunities than ever before. Care centers are removing the limits of compartmentalized roles that have stood in the way of reaching each staff member's fullest potential. Health Support Specialist apprenticeship programs are redefining and transforming these roles for the benefit of dedicated caregivers and the older adults they serve. You have been drawn to the field of older adult services at a truly exciting time!

Research has shown that new career frameworks like Minnesota's Health Support Specialist are the key to creating a team-based, person-directed environment where everyone can thrive. As you expand your skills, you will expand your satisfaction with your career and your value to your organization. Employers are developing new job descriptions and wage schedules to meet this new wave of employees. Will you be part of this landmark change?

Eligibility

Being selected for the Health Support Specialist program can be your career ladder to a more rewarding future. To be eligible, you must have the support of your employer, be at least 18 years old, have a high school diploma or GED and a Certified Nursing Assistant Certificate. Further minimum qualifications for enrollment are established by each employer and by the program sponsor, Aging Services of Minnesota.

On-the-Job Learning

HSS apprentices blend online learning with practice in their job setting. Experienced caregivers can receive credit for their skills and previous training while they learn new skills. Apprentices complete 2,500 hours of on-the-job training.

Mentoring

HSS apprentices work and learn under the direction of experienced, certified mentors whose goal is to help each apprentice succeed.

Professional Development

HSS is offered through a series of seven online college courses, each designed in partnership with several of Minnesota's leading provider organizations, and taught by Minnesota State Colleges and University (MnSCU) system faculty.

Wage Progression

HSS apprentices are provided the opportunity to "earn while they learn" based on a progressive pay scale that increases as skills increase. Each participating organization establishes a unique pay scale for their employees moving towards HSS certification.



Health Support SPECIALIST

HSS Curriculum

Career Skills, Culture & Diversity, Health Promotion	Assessment & Orientation		
	Health Support Specialist in Meaningful Activities 1 credit		
	Health Support Specialist in Physiological Care – 1 credit		
	Health Support Specialist in Memory Care – 1 credit	Health Support Specialist in Psychosocial Care – 1 credit	
	Health Support Specialist in Culinary Care – 1 credit	Health Support Specialist in Environmental Services - 1 credit	
	CNA pre-requisite is required.	145 hours of online classroom training, 9 credits plus 2,500 hours of on-the-job training.	Participants may not be required to duplicate any existing certifications.

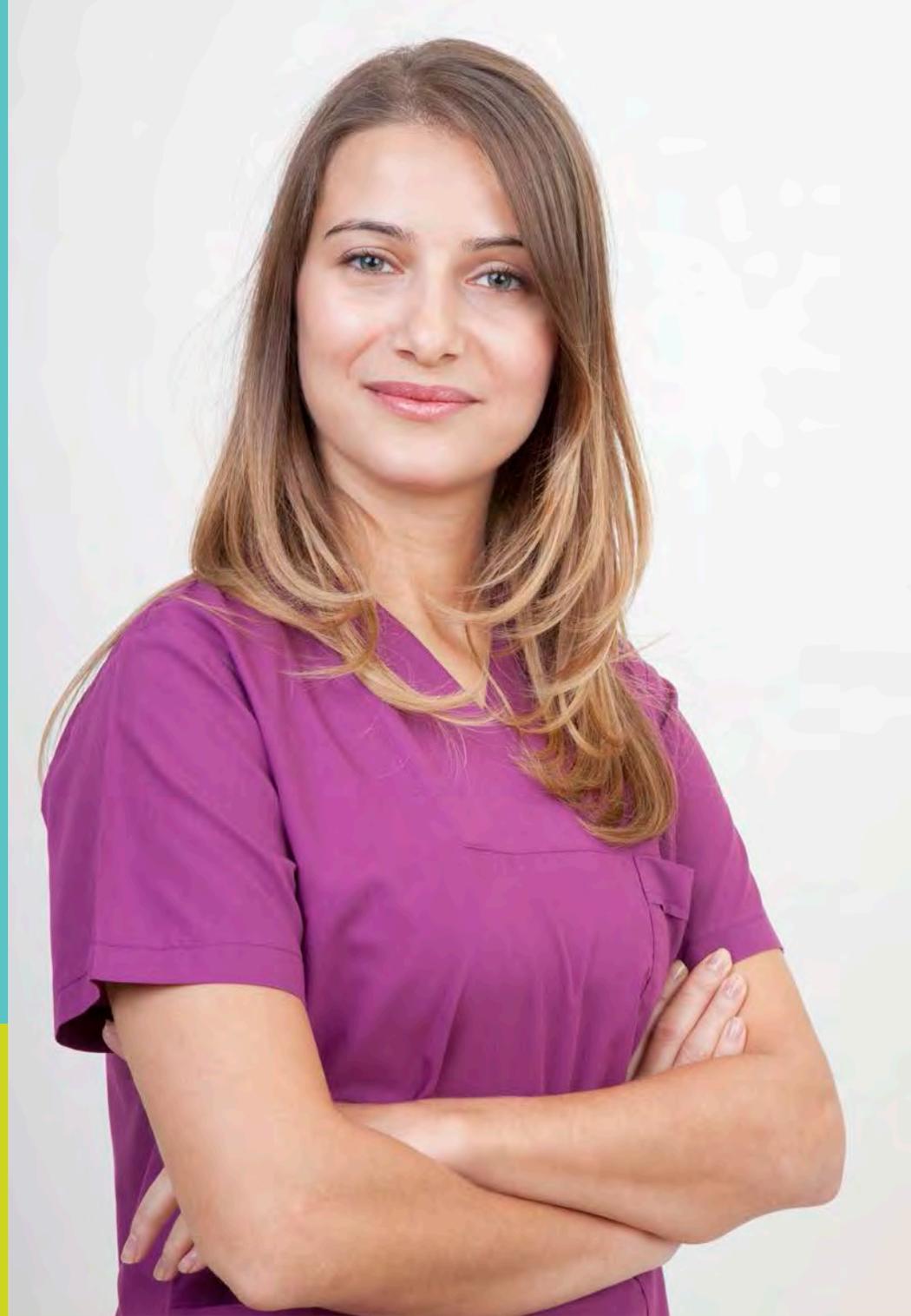
Cost and Scholarships

Fees to complete the seven HHS courses are approximately \$190 per credit hour, a total of about \$1,710. For participating organizations, this program has been designed to be entirely reimbursable through the Minnesota Nursing Facility Employee Scholarship Program, which is administered through the Minnesota Department of Human Services.

Support

HSS was developed through, and has the full support of, Minnesota's largest older adult services association, Aging Services of Minnesota. Lifelong learning opportunities and resources for caregivers are a hallmark of this highly respected organization.

Health Support Specialist was developed in part through an innovation grant from HealthForce Minnesota – a Center of Excellence within the Minnesota State Colleges and Universities System. The Center is a collaborative partnership of educators, healthcare providers and the community, working to increase the number and expand the diversity of healthcare workers; integrate health science education practice and research; and build capacity for both education partners and the provider community to enhance care and services for all Minnesotans.



For further information, visit:

www.healthsupportspecialist.org

Aging Services of Minnesota
2550 University Avenue West, Suite 350 South
St. Paul, MN 55114-1900
651.645.4545 • Fax: 651.645.0002
www.agingservicesmn.org

Appendix K

Information Technology Industry Council Meetings

Minnesota PIPELINE Project

Information Technology Council List

Employer

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Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Information Technology Industry Council

Meeting I

August 18, 2014

9:30 – 12:30

AGENDA

Welcome & Introductions

Jessica Looman

Assistant Commissioner

Department of Labor and Industry

PIPELINE Project Vision & Overview

Senator Terri Bonoff

Dave Kornecki

Minnesota State Senate

**Framing the Project in Information
Technology**

Margaret Anderson Kelliher

Minnesota High Tech Association

BREAK at approximately 10:30

**Occupations and Competencies
Activity**

Cristine Leavitt

Continuous Improvement Consultant

Department of Administration

LUNCH at approximately 11:45

Next Steps & Closing

Cristine Leavitt

Continuous Improvement Consultant

Department of Administration

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

I.T. Industry Council

Meeting 2

October 2, 2014

9:30 – 11:30 (optional lunch at 11:30)

AGENDA

Welcome & Introductions

Jessica Looman

Department of Labor and Industry

Senator Terri Bonoff

Minnesota State Senate

Representative Kim Norton

Minnesota House of Representatives

Dr. Ryan Brovold

Hennepin Technical College

MN PIPELINE Project Status

Heather McGannon

MN PIPELINE Project Manager
Department of Labor and Industry

Overview of Dual-Training System in United States

The Eagle Creek Model: Addressing the IT Talent Supply Gap

Brendan Nolan

Director of Business Development
Eagle Creek Software Services

Selection of I.T. Occupations and Identification of Experts

Dual-Training System in Minnesota Discussion

Next Steps & Closing

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

Information Technology Industry Council

Meeting 3

November 10, 2014

9:00 – 11:00

AGENDA

Welcome & Introductions

Jessica Looman

Assistant Commissioner
Department of Labor and Industry

Senator Terri Bonoff

Minnesota State Senate

Representative Kim Norton

Minnesota House of Representatives

MN PIPELINE Project Status

Heather McGannon

MN PIPELINE Project Manager
Department of Labor and Industry

Update on competency work for
selected IT occupations

Recommendations on
implementing dual-training on 4
selected occupations

Identify MN PIPELINE next steps
and/or projects to support IT dual-
training in Minnesota.

Next Steps & Closing

Appendix L

PIPELINE Project Occupations and Competency Standard Models for Information Technology

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

MN PIPELINE PROJECT
Information Technology Industry Council

List of Selected Information Technology Occupations:

- 1. Security Analyst**
- 2. Web Developer**
- 3. Software Developer**
- 4. Service Desk/Front Line Support or
Computer User Support Specialist**

Minnesota PIPELINE Project

Private Investment, Public Education, Labor & Industry Experience

PIPELINE PROJECT
Information Technology Industry Council

Industry Council Selected Occupations and Descriptions

Below are the 4 occupations and Descriptions the IT Industry Council selected to begin investigating dual-training models and implementation in Minnesota.

Security Analyst

Source: www.infosecinstitute.com

A security analyst is responsible for maintaining the security and integrity of data. The security analyst has to have knowledge of every aspect of information security within the company. Their main job is to analyze the security measures of a company and determine how effective they are. They are responsible for implementing any training required including instructing staff on proper security measures both in the office and online. The security analyst must work with business administrators as well as IT professionals in communicating flaws in security systems. They recommend changes that will improve every aspect of company security. The security analyst is also responsible for creating documentation to help the company in case there are any breaches. They plan, implement, upgrade, or monitor security measures for the protection of computer networks and information. May ensure appropriate security controls are in place that will safeguard digital files and vital electronic infrastructure. Security Analysts respond to computer security breaches and viruses. Other tasks include:

- Encrypt data transmissions and erect firewalls to conceal confidential information as it is being transmitted and to keep out tainted digital transfers.
- Develop plans to safeguard computer files against accidental or unauthorized modification, destruction, or disclosure and to meet emergency data processing needs.
- Review violations of computer security procedures and discuss procedures with violators to ensure violations are not repeated.
- Monitor use of data files and regulate access to safeguard information in computer files.
- Monitor current reports of computer viruses to determine when to update virus protection systems.
- Modify computer security files to incorporate new software, correct errors, or change individual access status.
- Perform risk assessments and execute tests of data processing system to ensure functioning of data processing activities and security measures.
- Confer with users to discuss issues such as computer data access needs, security violations, and programming changes.
- Train users and promote security awareness to ensure system security and to improve server and network efficiency.
- Coordinate implementation of computer system plan with establishment personnel and outside vendors.

Web Developer

Source: www.infosecinstitute.com

A web developer is a software designer or engineer who is involved in the development and design of web and/or network applications. They work in a variety of organizations of any size, and some work as independent freelancers. This career is a very rewarding one which offers many attractive benefits including job satisfaction, job security and excellent pay and benefits.

Web developers are typically responsible for IT duties involved in web development and programming, as well as coding. Their role is very critical, as they are the driving force behind the success of an application. The creation of a web application usually involves one or more developers.

They design, create, and modify Web sites. Analyze user needs to implement Web site content, graphics, performance, and capacity. Web developers integrate Web sites with other computer applications. Web developers convert written, graphic, audio, and video components to compatible Web formats by using software designed to facilitate the creation of Web and multimedia content.

Other tasks include:

- Design, build, or maintain web sites, using authoring or scripting languages, content creation tools, management tools, and digital media.
- Perform or direct web site updates.
- Write, design, or edit web page content, or direct others producing content.
- Confer with management or development teams to prioritize needs, resolve conflicts, develop content criteria, or choose solutions.
- Back up files from web sites to local directories for instant recovery in case of problems.
- Identify problems uncovered by testing or customer feedback, and correct problems or refer problems to appropriate personnel for correction.
- Evaluate code to ensure that it is valid, is properly structured, meets industry standards and is compatible with browsers, devices, or operating systems.
- Maintain understanding of current web technologies or programming practices through continuing education, reading, or participation in professional conferences, workshops, or groups.
- Analyze user needs to determine technical requirements.
- Develop or validate test routines and schedules to ensure that test cases mimic external interfaces and address all browser and device types.

Software Developers

Source: www.infosecinstitute.com

A software developer is somebody who designs and develops software for computer based systems. They do so by using knowledge of computer science and mathematics. This knowledge is used to create, analyze, test, and improve computer software. The skills and tasks performed by people who work in this field are in constant motion as a result of the fact that computer technology is currently a field where rapid development is taking place. Specialization is often necessary in the job, with new fields of specialization appearing quite rapidly. Software developers may work on various different types of programs such as games, operating systems, business applications, and network software. During the job, they will analyze how software is used, determine what needs need to be met by the software, use flowcharts and diagrams to describe how the software works, and create algorithms for resolving issues. They might transform these algorithms into computer language, but this is typically the work of computer programmers. They develop, create, and modify general computer applications software or specialized utility programs. Analyze user needs and develop software solutions. Design software or customize software for client use with the aim of optimizing operational efficiency. May analyze and design databases within an application area, working individually or coordinating database development as part of a team. Software Developers supervise computer programmers.

Other tasks include:

- Modify existing software to correct errors, allow it to adapt to new hardware, or to improve its performance.
- Develop and direct software system testing and validation procedures, programming, and documentation.
- Confer with systems analysts, engineers, programmers and others to design system and to obtain information on project limitations and capabilities, performance requirements and interfaces.
- Analyze user needs and software requirements to determine feasibility of design within time and cost constraints.
- Design, develop and modify software systems, using scientific analysis and mathematical models to predict and measure outcome and consequences of design.
- Store, retrieve, and manipulate data for analysis of system capabilities and requirements.
- Consult with customers about software system design and maintenance.
- Supervise the work of programmers, technologists and technicians and other engineering and scientific personnel.
- Coordinate software system installation and monitor equipment functioning to ensure specifications are met.
- Obtain and evaluate information on factors such as reporting formats required, costs, and security needs to determine hardware configuration.

Service Desk/Front Line Support or Computer User Support Specialist

Source: www.onetonline.org

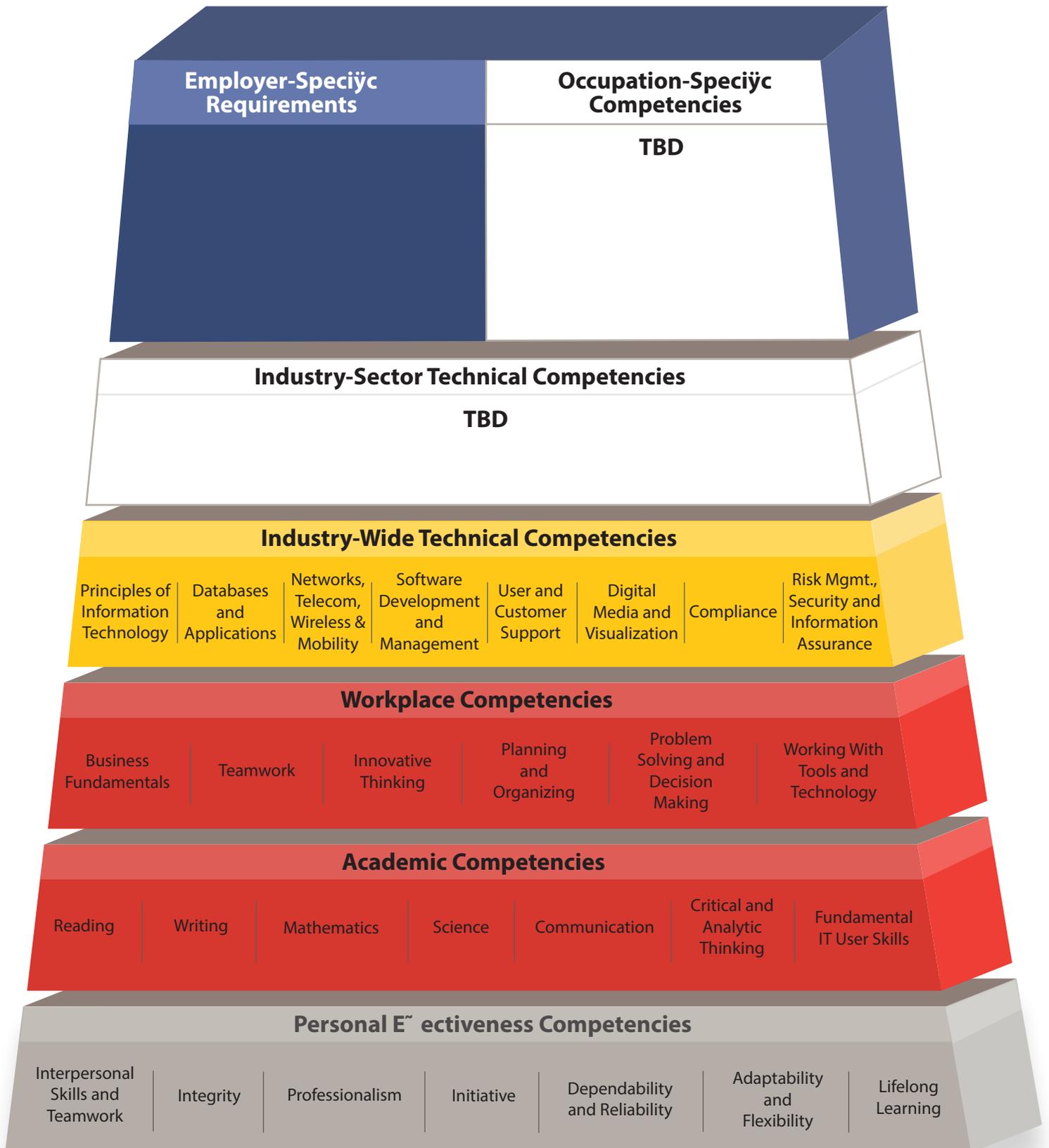
The role of the Service Desk Specialist is to assist customers who are experiencing any procedural or operating difficulty with the use of IT applications, products or services. Complex and/or high priority problems are elevated to specialized support groups for resolution when needed, but the technician is responsible to ensure that an effective solution is provided to the user. Provide technical assistance to computer users. They answer questions or resolve computer problems for clients in person, or via telephone or electronically. Computer Support Specialists provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems.

Other tasks include:

- Oversee the daily performance of computer systems.
- Answer user inquiries regarding computer software or hardware operation to resolve problems.
- Enter commands and observe system functioning to verify correct operations and detect errors.
- Set up equipment for employee use, performing or ensuring proper installation of cables, operating systems, or appropriate software.
- Install and perform minor repairs to hardware, software, or peripheral equipment, following design or installation specifications.
- Maintain records of daily data communication transactions, problems and remedial actions taken, or installation activities.
- Read technical manuals, confer with users, or conduct computer diagnostics to investigate and resolve problems or to provide technical assistance and support.
- Refer major hardware or software problems or defective products to vendors or technicians for service.
- Develop training materials and procedures, or train users in the proper use of hardware or software.
- Confer with staff, users, and management to establish requirements for new systems or modifications

PIPELINE Project

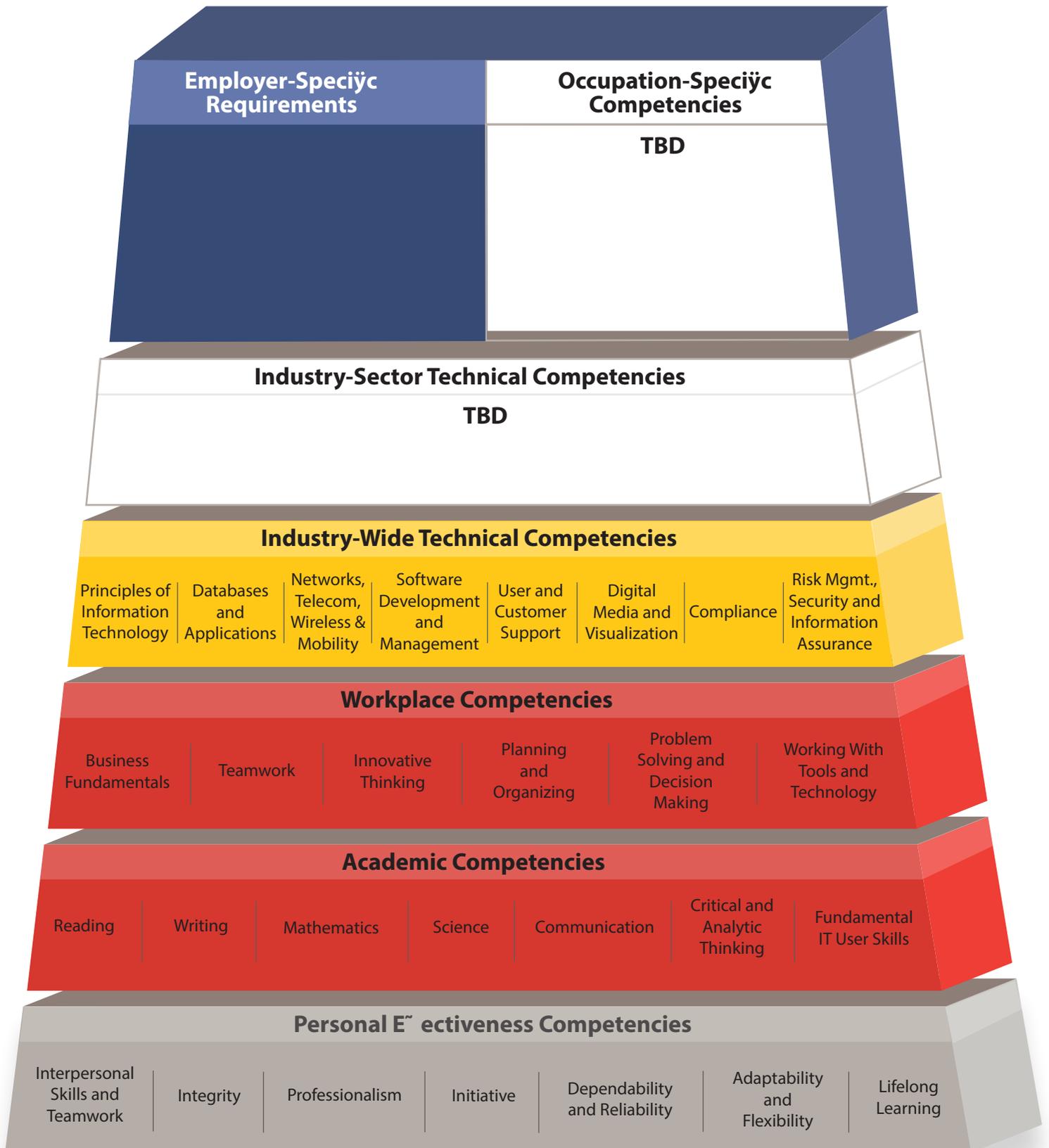
Competency Model for Information Technology - Occupation: Security Analyst -



Based on: Information Technology Competency Model Employment and Training Administration, United States Department of Labor, September 2012.

PIPELINE Project

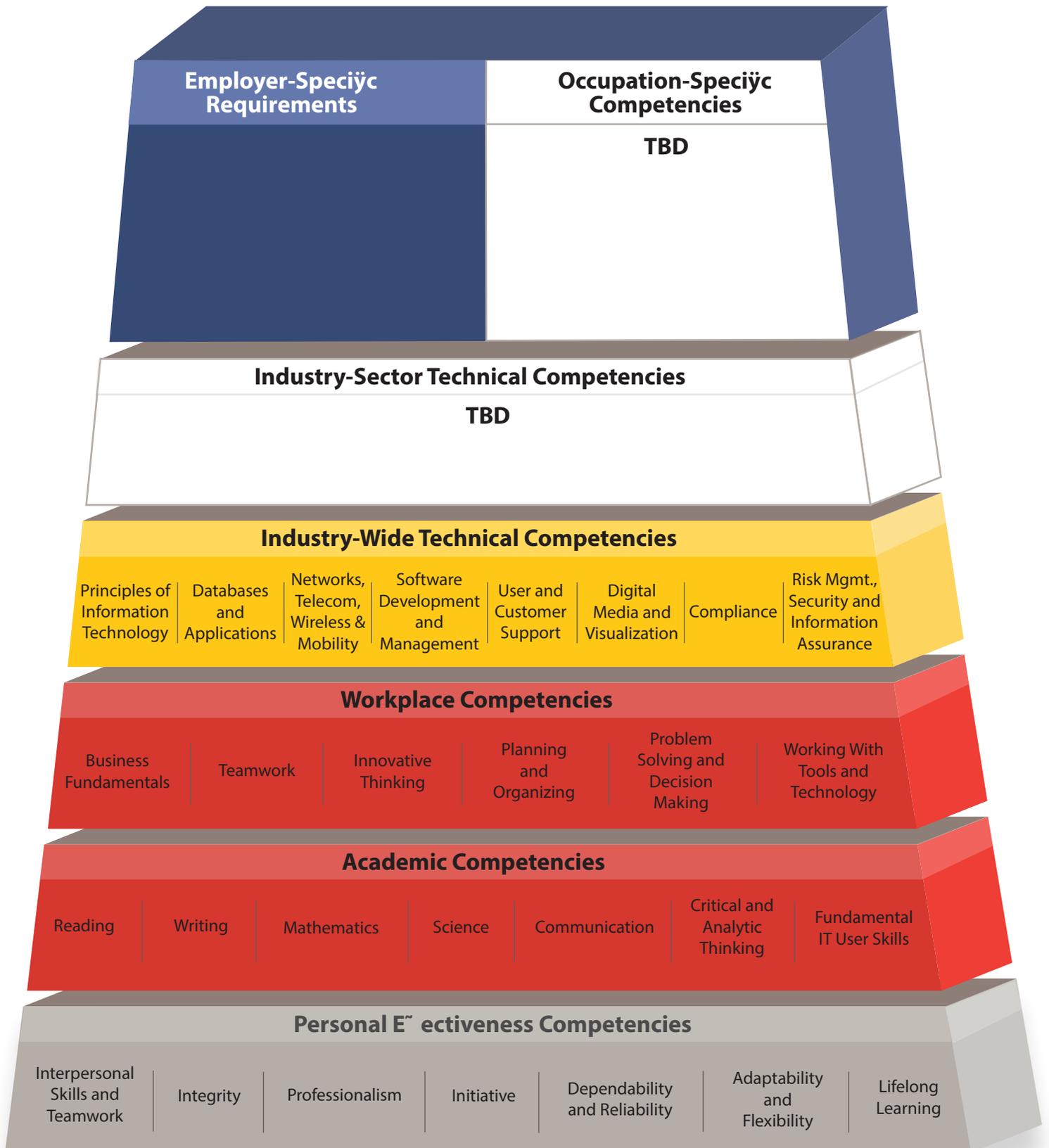
Competency Model for Information Technology - Occupation: Web Developer -



Based on: Information Technology Competency Model Employment and Training Administration, United States Department of Labor, September 2012.

PIPELINE Project

Competency Model for Information Technology - Occupation: Software Developer -

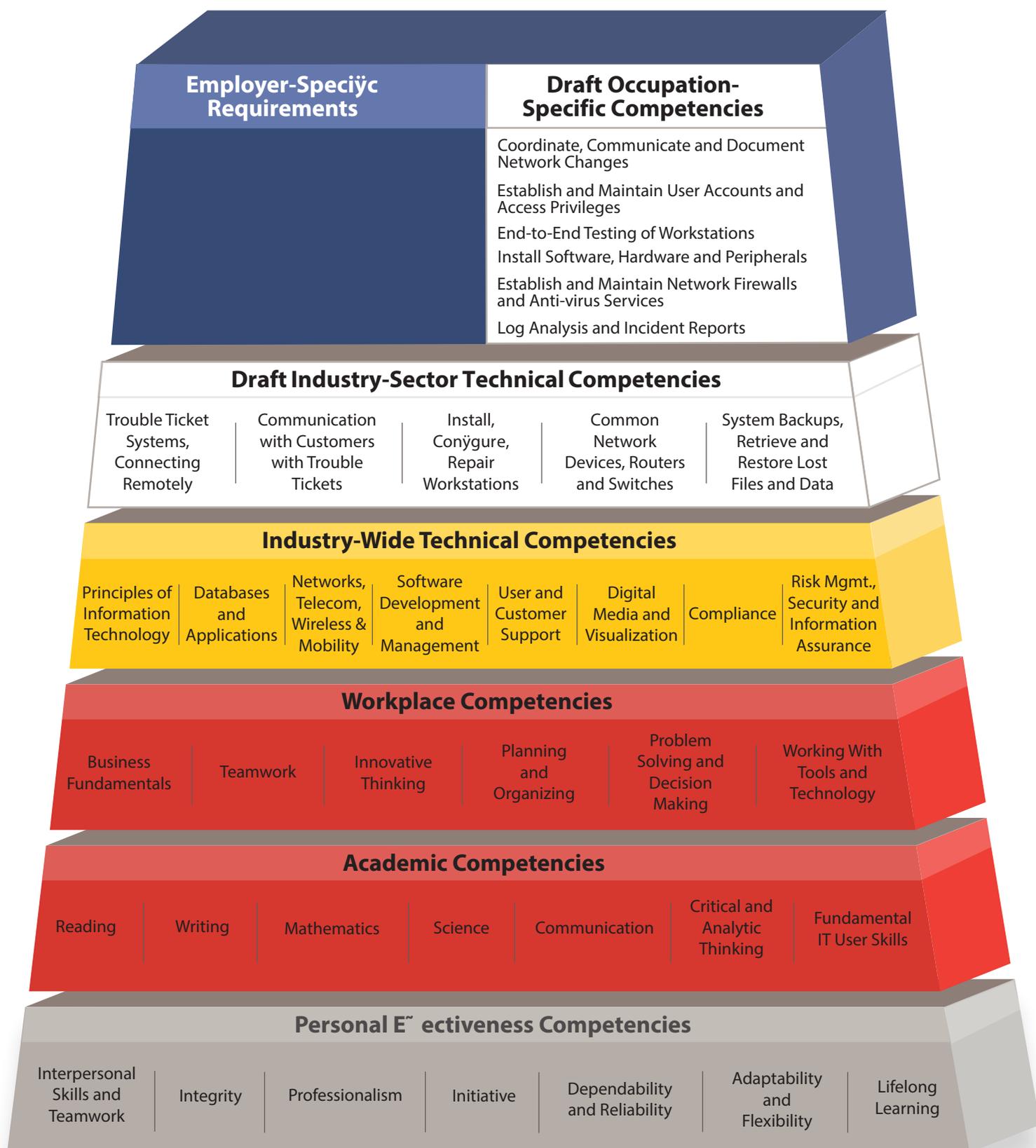


Based on: Information Technology Competency Model Employment and Training Administration, United States Department of Labor, September 2012.

PIPELINE Project

Competency Model for Information Technology

Occupation: Service Desk/Front Line Support or Computer User Support Specialist -



Based on: Information Technology Competency Model Employment and Training Administration, United States Department of Labor, September 2012. -

Appendix M

Training Initiatives Shared at Information Technology Industry Council Meetings



Are you having a difficult time finding skilled app and web development talent?

Introducing a groundbreaking solution designed for you.

Fusion: Employer Engaged Education

Advance IT Minnesota, Minnesota State University, Mankato, and Metropolitan State University have teamed up to create Fusion, an innovative program that will provide corporations, startups and government organizations with skilled application and web development talent.

Fusion pairs employer-endorsed students with partners like you to provide talent-in-training while students are in school, leading to workforce-ready employees upon graduation.

The Fusion program will benefit employers, students, universities and the Minnesota economy by bridging a critical gap between business needs and student learning, with a focus on developing cutting-edge tools and technologies.

Direct benefits of becoming one of the first Fusion employer partners include:

- Employer partners hand-select students from local universities to fill their entry-level tech talent shortage – today as interns, tomorrow as full-time, skilled employees.
- HR functions are administered by the university allowing employer partners to focus on their core competencies.
- Designed jointly by employers and academic leaders, this groundbreaking program will improve the tech talent landscape in Minnesota – and therefore raise your competitive edge in the industry.

You spoke, we listened, and now we need you to participate. Only 60 internship slots are available – contact us to reserve your spot(s) as soon as possible. If you would like to be one of the first companies to build and participate in this groundbreaking program, please contact us:

Bruce Lindberg, Executive Director
Advance IT Minnesota
bruce.lindberg@metrostate.edu
612-659-7228

Jennifer Hauschildt
jenniferhauschildt@me.com
651-270-9353



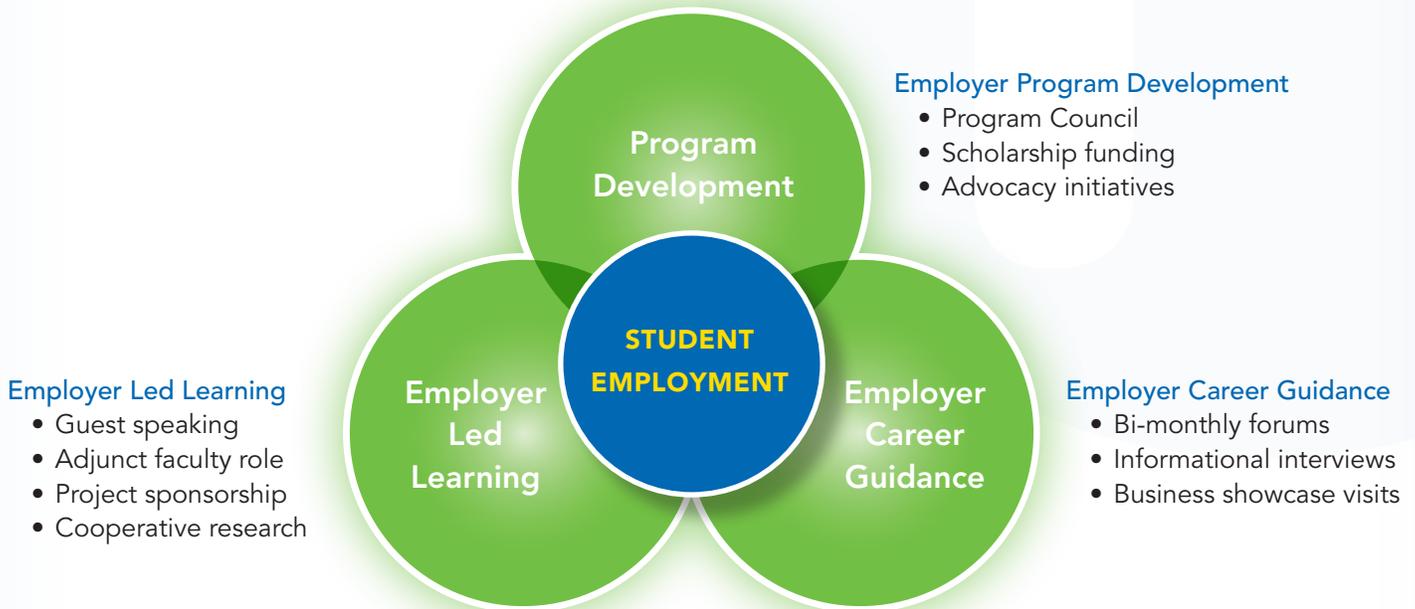
FUSION
EMPLOYER ENGAGED EDUCATION

www.advanceitmn.org/fusion

Fusion Engagement Opportunities

Employer partners are directly involved in shaping Fusion, giving technology companies a voice in preparing their future workforce. From selecting and training students, to weighing in on curriculum, to even having the opportunity to serve as guest speakers and instructors, employers

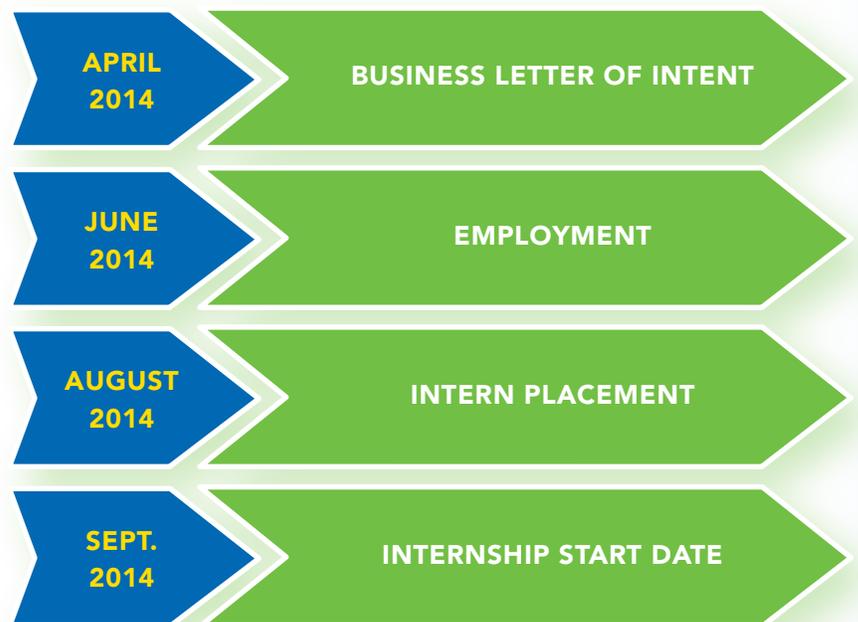
are a vital partner. This innovative approach will ensure that students receive training on relevant skills that match companies' rapidly changing technology needs. While employer engagement is centered on student employment, there are many other opportunities to be involved with the Fusion program as well, including:



Fusion Program Timeline

Join the forward-thinking high-profile employer supporters who helped shape the program to date:

- Blue Earth Interactive
- Diginer
- MOJO Minnesota
- The Nerderly
- Project Skyway
- Yugma





FUSION Application and Web Development Program

A bachelor's degree for students with a passion to work in the creative and dynamic world of app and web development

A proven pathway to rewarding employment

The FUSION program unites relevant, high quality university education with applied experience through an "IT Residency" to provide a dynamic career pathway for individuals who have a passion for the field of application and Web development. Designed for individuals who have earned two-year degrees in related programs or who have completed equivalent university-level course work, the program leads to a bachelor's degree and a proven pathway to full time employment¹. In addition, the program includes an innovative, paid IT Residency, which transforms the last two years of college from added debt to positive cash flow!

Student benefits

Why enroll in the FUSION program?

- The program follows a proven pathway to full time employment in the field;
- The program curriculum is tailored to the real-world competencies of developers and will give you an edge in career progression;
- You will have opportunities to network with employers and entrepreneurs in the rapidly evolving and creative workspace of application and Web development;
- You will earn as you learn; generating positive cash flow while completing your degree.

¹ Based on the nearly universal employment success of over 250 students who have worked in a similar part-time employment situation with Maverick Software Consulting over the past seven years.

Is the FUSION program right for you?

First and foremost, employer partners and program faculty are looking for individuals who are highly motivated and interested in the increasingly creative and dynamic field of application and Web development. If you can answer “yes” to the following questions, FUSION may be for you.

- Have you already developed your own apps and/or websites?
- Have you participated in extracurricular, volunteer work, or projects with others to create technology solutions?
- Did you find your previous programming and web development coursework to be engaging and did you challenge yourself to go beyond minimum expectations?
- Are you seriously interested in pursuing a career in the field?

What you will learn

The FUSION program blends technical competencies with essential workplace skills that are in high demand by employers. The academic program is designed to provide flexibility for students who may have varying levels of prior technical coursework and allows for electives tailored to your work and career interests.

The IT Residency

The IT Residency is an experiential learning component that includes a nontechnical skills preparation seminar and 18-24 months of work experience with one of program’s employer partners. You will work up to 20 hours per week during semesters and up to 40 hours per week during breaks and the summer. All residents start at \$13.50 per hour, and may progress up to \$18 per hour at the discretion of the employer, although increases are not guaranteed. You must meet minimum standards for employment and interview for positions with the companies you find most interesting.

How to learn more

Attend an upcoming student information session (to register email Sharon.hanson@metrostate.edu and indicate which session you’d like to attend).

TIME & DATE

4:30 PM Wednesday, August 27

PLACE

1380 Energy Park Place (EPP), Suite 104
Energy Lane, St Paul (Midway campus)

TIME & DATE

12 noon, Friday, August 29

PLACE

Ecolab, L302 (Library)
700 Maria Ave, St Paul (St Paul campus)

IT Residency and Program Admissions

The FUSION Application and Web Development program consists of two integrated components:

1. An **IT Residency and Preparation** (8 credits) that provides students with between 1200 and 2000 hours of paid experience working with one or more employer partners over three to four semesters of the program and a professional skills preparation seminar;
2. A **two-year upper division academic program** offered at Metropolitan State University

The "FUSION IT Residency" component serves as a cornerstone for employer engagement, the application of skills and knowledge gained in program courses, and overall student career success. Participation in the residency requires endorsement or "pre-screening" from a FUSION employer through an application process managed by Advance IT Minnesota.

Students who do not secure an employer endorsement may still apply for the academic program, but should be aware that the program was designed with concurrent employment in mind, and the probability of seamless post-program employment is significantly diminished without participation in the residency component. You may re-apply for the Residency component after six months if you have addressed employer recommendations to strengthen your candidacy.

How to apply for the FUSION IT Residency

The employer endorsement process embraces the participation of a diverse range of students, and favoring individuals with a passion for the field. At a minimum, applicants must meet the following criteria:

1. Evidence of extra-curricular involvement with application and/or web development, this could be volunteer projects, competitions, paid work, personal projects, etc.
2. A two-year degree in a related field (see below), OR at least 60 credits completed at a university, either of which includes the following courses completed with at least a "B" grade:
 - a. Fundamentals of programming
 - b. Object-oriented programming
 - c. Two semesters of a programming language beyond BASIC
 - d. At least one course related to Web development that includes HTML
3. Commitment to work part-time (20 hours per week maximum) with a designated employer partner, with the option for additional hours during breaks and the summer session. (Note: If you are already employed in a related position, you may use your current position to fulfill the six-credit experiential learning component.)

Applicant Admission Steps

1. Complete the program application and questionnaire
2. Update or create an online profile using one of the suggested tools (see application)
3. Sign a letter of commitment by the designated date in the offer letter.

B.A.S. in Application Development Major: Course Checklist

Degree Program Summary of Credits Needed	Range
Minnesota Transfer Curriculum (GenEd)	34-54
Metro State Upper Division Liberal Studies	8
Program Courses	58-78
Totals	120

Note: Total credits vary based on prior lower-division credits or associate degree composition. There are eight Transfer Curriculum courses (MATH) included in program credit requirements.

Course Color Codes: Foundation course Required Course Program Elective Upper Division Elective

Notes: Filled colors in credit columns indicate courses that fulfill column requirement
 Numbers entered in credit columns indicate required credits for those columns
 A single course may not count in more than one column

Lower or Upper	Metrostate Course Number	Transfer Equivalent Course Number	Name	Foundation courses	Additional Required Courses	Program Electives	Upper Division Electives
Program Credits Needed (minimum of 58)				18	20	8	12
LD	MATH 115		College Algebra (applies to transfer curriculum)	4			
LD	MATH 215		Discrete Math (applies to transfer curriculum)	4			
LD	ICS 140		Programming Fundamentals	3			
LD	ICS 141		Programming with Objects	3			
LD	ICS 311		Database Systems and Programming		4		
LD	ICS 225		Web Design and Implementation	4			
LD	ICS 265		Programming in C				
LD	ICS 266		Programming in C++				
LD	ICS 268		Programming in Visual Basic				
LD	CFS 264		Computer and Operating System Fundamentals II				
LD	CFS 262		Computer and Operating System Fundamentals I				
UD	ICS 349		Internship Preparation		2		
UD	ICS 350I		IT Residency		6		
UD	ICS 362		Computer Organization and Architecture				
UD	ICS 365		Comparative Programming Languages				
UD	ICS 370		Design and Implementation I		4		
UD	ICS 382		Application Security				
UD	ICS 425 or 325		Client/Server Architecture		4		
UD	ICS 462		Operating Systems				
UD	ICS 470		Software Engineering				
UD	Pending		Enterprise Integration Architecture				
UD	ICS 342		Mobile Application Development				
UD	ICS 440		Parallel and Distributed Algorithms				

Employer Endorsement Process

1. Advance IT Minnesota reviews application and questionnaire for minimum qualifications and notifies applicant if his/her application has been submitted to employers.
2. Three employer partners review each application and other evidence artifacts. Based on a structured survey, reviewers will rate applicants on work readiness dimensions and assign an overall recommendation level.
Acceptance is based on cumulative ratings and recommendations from three reviewers. Applicants will receive an anonymous summary of reviewer ratings and comments for career development purposes.
3. Students are notified of decision, and must commit to admission within one-week of notification. If not endorsed, applicants may re-apply after addressing concerns indicated by reviewers.

IT Residency Placement (Hiring Process)

Once endorsed, students become eligible to participate in a Residency Placement Event, which will take place near the beginning of each semester including summer session (three times per year). These events allow both employers and students to participate in multiple interviews at single location over a defined time frame. Students and employers then submit their ranked choices based on the perceived match of career interests, skills and other factors with the available positions. The placement coordinator will then work with employers to maximize the number of compatible placements. If a student is not placed through this process, he or she will be eligible for the next event, and will receive feedback on any potential issues that may have impacted employer hiring decisions. A limited number of alternative positions may be available to provide experience until the next placement event.

Academic Program Admissions

Students should apply to the program through established admission processes at Metropolitan State University. Application to the university may be pursued during or after application to the IT Residency program. Your employer endorsement results will be forwarded to university representatives once completed.

Prime Academy: Software Development

Our Program at a Glance

Prime prepares our students to join the industry as entry-level software engineers through a program centered around a 12 week immersive classroom experience. We'll use modern technologies like HTML / CSS, Javascript, jQuery, AngularJS and Node.js to give you foundational knowledge in software engineering you'll be apply in any technical environment. Your experience with Prime will look like this:

- **Preload**

Students come to Prime from different backgrounds and varying levels of technical experience. Preloading is our way of ensuring everyone shows up to the first day in class ready to speak the same language and successfully learn together. You'll warm up for your classroom experience over 6 weeks, learning online on your schedule and checking in weekly with the instructor who'll lead your cohort when you arrive at school.

- **Boot**

Your first six weeks at Prime is coding bootcamp. As you begin your in-person classroom experience, you'll dive headfirst into fundamental software engineering concepts. You'll learn from instructors, mentors and each other as you apply concepts from lectures in hands-on challenges. The days are long, but the skills you learn in Boot are foundational to your new career.

- **Build**

You learn by doing, that's why the second six weeks of the in-person classroom experience is focused on project work. You'll learn how to be part of a software development team, practicing behaviors and techniques you'll use every day as a working engineer. You'll have the chance to work on projects of your own design as well as helping real world startups build prototypes to prove their concepts.

- **Launch**

After 18 weeks, your classroom experience concludes. Students may seek entry-level positions immediately, but many will apply to positions in Prime's LAUNCH apprenticeship network to get exposure to other technologies first. Developed with employers specifically for our graduates, these apprenticeships provide a way to earn some real world experience and make some money while you're at it.

Learn by Doing

Prime's curriculum is engineered from top to bottom to prepare you for the software engineering workplace through exposure to pragmatic best practices and real world work. Our assignments are abstracted from work done by entry level programmers in our hiring network, and the projects in the second half of the program are tackling the real technology needs of startups in our community. You'll leave the program with a portfolio of work, not just a collection of homework exercises.

Learn Through Apprenticeship

The hardest part of launching a new career is getting your foot in the door. Prime Digital Academy's partnerships with dozens of local tech employers connect you with hiring managers at the industry's best workplaces. Our network of apprenticeship positions, designed specifically with Prime graduates in mind provides three or more months of paid, on the job experience to get your resume started. Placement in these programs must be earned, but we've worked with the network to ensure that you're learning everything you need to know to hit the ground running in your first gig as a software engineer.

What You'll Learn

We're constantly updating our curriculum to respond to the evolution of technology and the feedback from our hiring network. We start with fundamental programming methodologies and design patterns like MVC and object-oriented programming, but we quickly bring theory into practice with a focus on toolsets, authentic workplace context and behavioral skills.

<http://primeacademy.io/>
(952) 222-8108

hello@primeacademy.io

Prime Digital Academy
9401 James Ave S, Suite 152
Bloomington, MN 55431



Eagle Creek is the industry leader in US Onshoring, successfully operating technology centers from North and South Dakota for the last eight years. From CRM, to Java or .NET, to Business Intelligence; superior in capabilities to offshore, more reasonable than on site, while enabling knowledge retention and reliable governance. We are successfully delivering the most sophisticated projects to the world.

Founded in 1999, Eagle Creek Software Services provides consulting & technical expertise to the Enterprise. We focus on CRM, Information Management (BI) and Applications Development, helping our clients to increase quality and efficiencies while managing price and risk in software development, deployment, & support.

We're uniquely positioned by combining on site expertise with our U.S. Onshoring delivery platforms. This model utilizes on shore but offsite, technology center based resources, in a model that we developed in collaboration with the state governments of North & South Dakota. Through this approach, we are able to achieve consistency and sustainability in the provisioning of technical & consulting capabilities to our clients.

With over 15 years in business and over 4,000,000 hours of experience, Eagle Creek has expertise in a multitude of industries. From Hospitality to Manufacturing, we have the know-how to implement, upgrade or maintain your technology stack. But if you're in need of a company with a special understanding, a deep industry expertise, we have that also. For example, Healthcare, Insurance, Financial Services, Communications, Technology, and Life Sciences are just some of the areas we excel in.

We're committed to delivering a technology value proposition that positively impacts our customer and to helping you sustain your front office technology investments. Simply stated, you want the highest quality of services, at the most affordable price, where risk is continuously assessed and mitigated. With all of our years of experience we only know one way to achieve this, and that's through US Onshoring. Nine years ago, when everyone was building offshore facilities, we were investing in onshoring. Today, we are the innovation leader supporting over 40 different technologies, applications and platforms. CRM, Application Development, BI - Salesforce, Oracle, Marketo, Birst, Cognos, Informatica, Java, .Net and Drupal - depth of expertise and breadth of experience.

We're Eagle Creek - the innovative leader in U.S. outsourcing.

<http://www.eaglecrk.com/company/aboutus/>

Eagle Creek Software
Address: 10050 Crosstown Circle #650
Eden Prairie, MN 55344
Phone: (877) 258-5997

INFORMATION TECHNOLOGY CONSULTANT ACADEMY MODEL

*Providing individual skills to meet the workforce needs
of Eagle Creek Software Services.*



**Undergraduate
Certificate**
12 credit hours

Internship

**Interview for
Employment**

Employees of Eagle Creek
may have the opportunity
to pursue a sponsored
Graduate Degree

Master of Business Administration
(Customized IT specialization for Eagle Creek)

Customized Graduate Degree
offered collaboratively by
USD and DSU

FOR MORE INFORMATION

Visit www.usd.edu/cde/it.cfm or contact:

University of South Dakota
Division of Continuing & Distance Education
800-233-7937
605-677-6240
cde@usd.edu

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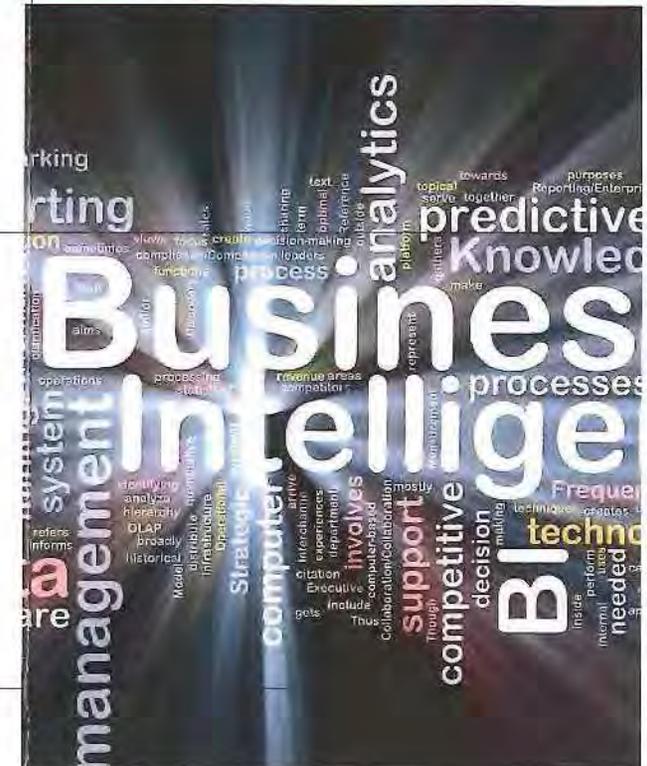


UNIVERSITY OF
SOUTH DAKOTA

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or email disabilityservices@usd.edu. USD/1M/\$.64pc

INFORMATION TECHNOLOGY CONSULTANT ACADEMY



Train and prepare for a career
in Information Technology Consulting
with Eagle Creek Software Services.



UNIVERSITY OF
SOUTH DAKOTA

PROGRAM DESCRIPTION

The University of South Dakota has partnered with Eagle Creek Software Services to develop an innovative learning experience that prepares individuals for the workforce needs of and potential employment with Eagle Creek. Eagle Creek is a consulting company that helps maximize clients software investments to improve efficiencies and quality while managing price and risk.

The Information Technology Consultant Academy uniquely integrates four undergraduate courses with an internship, which will provide participants a unique credential entering an IT-related profession.

ABOUT EAGLE CREEK SOFTWARE SERVICES

Eagle Creek was founded in 1999 and provides consulting and technical expertise to the enterprise, enabling IT professionals to increase quality and efficiency while managing risk and price. Eagle Creek is the largest systems integration company in North America dedicated to Oracle, CRM, BI and Application Development. By use of their revolutionary "Dakota Model," Eagle Creek has successfully served more than 300 Fortune 1500 organizations across 15 industries.

ADMISSION REQUIREMENTS

USD Admission Requirements:

1. Completed Application
2. Statement of Purpose
3. Official high school transcript or GED
4. ACT or SAT scores (not required if applicant is over the age of 24)
5. Official transcripts from all institutions of higher learning

Eagle Creek Admission Requirements:

- Applicants must have a baccalaureate degree or be degree-seeking and within two years of graduating with a baccalaureate degree.
- Resumé
- Completion of CSC 150 or an equivalent course is required. Completion of CSC 250 or an equivalent course or demonstration of competence in the content area is required.
- A minimum cumulative GPA of 2.7 in Computer Science courses and a minimum overall GPA of 2.5.

Apply today at: www.usd.edu/cde/it.cfm

REQUIRED COURSES*

COURSE TITLE	ROTATION
Project Management for Business Consulting (3 cr.)	Every Fall
Software Engineering for IT Consulting (3 cr.)	Every Fall, Every Spring
Database Management Systems (3 cr.)	Every Spring
Advanced Software Engineering for IT Consulting (3 cr.)	Every Fall, Every Spring

*All courses are offered at USD, Vermillion and/or Online

PROGRAM LOGISTICS

Application
Students will make application to the Academy.



Completion of the Undergraduate Certificate Program*
Students will complete the required courses and gain in-depth knowledge and skill in the professional areas of:
Software Engineering for IT Consulting,
Advanced Software Engineering for IT Consulting, Database Management Systems and Project Management for Business Consulting.
**Free tuition for qualifying students.*



Paid Internship**
Students who successfully complete the undergraduate courses are eligible to apply to a paid internship.



Interview for Employment**
Students who successfully complete the internship will qualify for a final interview, which may lead to employment with Eagle Creek.

** Internship and employment depend on performance and credentials; they are not guaranteed.

