

BUILDING A MANUFACTURING TALENT PIPELINE

*A Toolkit for Educators on How to Embed Industry
Certifications to Improve Outcomes in Technical Education*





Manufacturers cannot win the race to compete in the global marketplace without the talent they need. Yet skill shortages continue to impact all stages of manufacturing – from skilled production to engineering. The challenge will only grow as the demographics of our workforce drive “boomer” retirements. Never before have the stakes been so high.

The good news is that manufacturers value skills certifications, and are partnering with community and technical colleges across the country to build a skilled workforce for our nation’s manufacturers. Manufacturers are collaborating with schools that are creating innovative, accelerated learning models that equip workers with the skills employers want and need.

The opportunity now is to bring these innovations to scale. We need many more high schools, community and technical colleges, and universities to jump on board in support of manufacturing education. To reclaim the mantle of leadership

in technical education and to address the skills gap, the U.S. must transform its education system to create a clear path to successful and lucrative manufacturing careers.

If you are interested in being responsive to the needs of manufacturers in your community or already have a history of providing education and training programs to manufacturing partners, this toolkit is for you. It builds off nearly ten years of experience in working with educational institutions across the country to rethink and repackage manufacturing education.

The heart of this toolkit is a system of industry certifications – designed by and for industry and endorsed by the National Association of Manufacturers. They represent the skill standards educators can use to design programs of study aligned with manufacturers’ needs.

We invite you to join the hundreds of educational providers across the county using industry certifications as validation for their programs of study. This toolkit provides the basics on how you can begin.

Sincerely,

Jennifer McNelly
President
The Manufacturing Institute

TOOLKIT FOR EDUCATORS ON IMPLEMENTING CERTIFICATIONS

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WHY A TOOLKIT?

The process and tools explained in the following pages provide a road map for manufacturing companies traveling the path to workforce certification. Up until now, this work has been done by a small number of individuals who have each evolved their own techniques and tools. This manual brings together their best practices so that others who do this work can benefit.

74% OF MANUFACTURERS REPORT THAT THE SKILLS GAP HAS NEGATIVELY IMPACTED THEIR COMPANY'S ABILITY TO EXPAND OPERATIONS.

69% OF MANUFACTURERS EXPECT THE SHORTAGE IN SKILLED PRODUCTION WORKERS TO WORSEN.

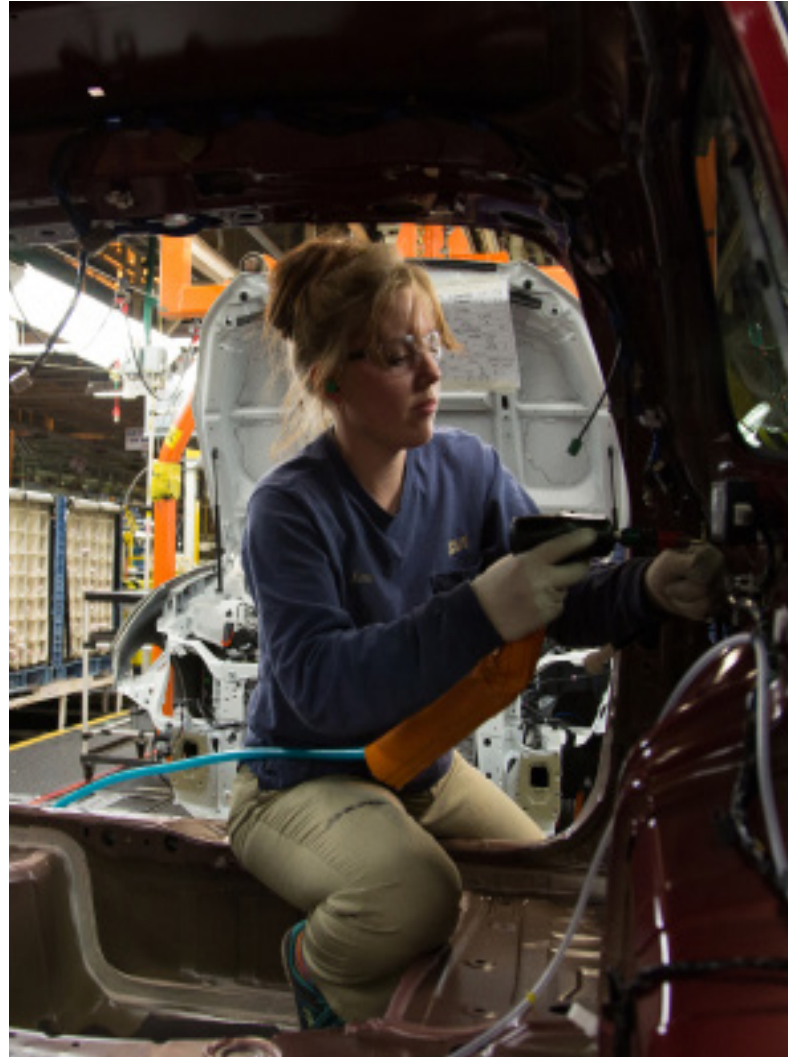
Deloitte Consulting LLP and The Manufacturing Institute, *The Boiling Point? Skills Gap in U.S. Manufacturing, 2011*

CREDENTIALS IN THE MARKETPLACE

The marketplace is flooded with various degrees, certificates, diplomas, certifications, licenses, and badges offered by a wide variety of educational institutions and credentialing organizations. One reason for the growth of these credentials is the great risk, to employers and job seekers alike, when a new hire turns out to be a poor fit. For companies, this can mean losing out after spending hundreds of hours of recruiting, onboarding, and training. For individuals, a mismatch between their knowledge, skills, and abilities and available jobs can be catastrophic.

Employers are seeking the best possible talent. They are increasingly relying on credentials as screening tools for the knowledge, skills, and abilities needed to do the job. Young people and adults gravitate to credentials to provide documentation and evidence of marketable skills to secure employment and advance in their careers.

Yet, because of the variety of credentials in the marketplace, customers—both employers and students—are often confused. Many terms sound the same, but can mean very different things. Three different terms are particularly important: credential, certificate, and certification.



“Credential” is the broadest of the terms, referring to a wide variety of tools for reflecting competence. “Certificate” is typically used as a term to refer to a shorter-term program of study at an educational institution. “Certification” is primarily the term used by industry to validate skills.

Industry certifications have gained importance in the marketplace because companies cannot find individuals with the knowledge and skills they need and they are constantly faced with turnover and, lost productivity. Here are a few of the challenges:

Teaching vs. Learning: Although education and training programs provide students knowledge and skills, employers are uncertain whether students have mastered the content and can actually perform what was taught.

Validating skills and abilities: Experienced workers indicate they have the skills for the position but an employer is not sure if they can do what their company requires.

Industry certifications can solve these challenges. They are unique in that they are not tied to a single educational institution; they are not awarded by a school but rather by a third party that maintains the assessments and oversees their administration and use. An industry-endorsed certification validates the individual’s knowledge and skills as compared to industry standards. It takes the guesswork out of the hiring process and provides an objective assessment of the skills needed to do a specific job.

TIP: The health care industry provides a good example of the value of certifications. Regardless of which nursing school you attend, in order to become a registered nurse you have to pass the National Council Licensure Examination for Registered Nurses. Everyone understands what that means; it is viewed as a validation of the individual’s knowledge and skills. In the same way, manufacturing certifications validate worker skills and take some of the risk out of hiring decisions for employers.

Credential* Refers to an attestation of qualification or competence issued to an individual by a third party (such as an educational institution or an industry or occupational certifying organization) with the relevant authority or assumed competence to issue such a credential.

Examples of credentials include:

- Educational Diplomas and Certificates (typically for one academic year or less of study);
- Educational Degrees, such as an Associate’s (2-year) or Bachelor’s (4-year) degree;
- Registered Apprenticeship Certificate;
- Occupational Licenses (typically, but not always, awarded by state government agencies); and
- Industry-recognized or professional certifications.

Certificate** A curriculum in which courses are taken that directly relate to a particular occupational area. A certificate program is usually half the time from start to completion as an associate degree. Pell grants cannot be applied toward certificate programs.

Certification** An industry-recognized credential that has been approved by business and industry leaders to possess the necessary rigor, technical and academic standards.

*As defined by the Department of Labor, Employment and Training Administration, Training and Employment Guidance Letter No. 15-10, December, 2010

**As defined by the American Association of Community Colleges (AACC), 21st Century Initiative, Glossary of Terms, 2013

Skills Certification System Overview

SKILLS CERTIFICATION SYSTEM

The Manufacturing Institute launched the Skills Certification System to redefine manufacturing education to industry standards and address the skills gap challenge in this country. The system was developed by manufacturers, for manufacturers, to help them create a pipeline of workers with high-demand skills.

The Skills Certification System links education and work through manufacturing-related industry certifications. Students earn not only an education certificate or degree, but also industry-validated, nationally portable transportable certifications with real value in the marketplace.

The curriculum in each program of study is aligned with the requirements of the industry certifications, ensuring graduates have the knowledge and skills required for jobs in today's manufacturing economy. Ideally, certification assessments or testing is embedded in the actual course requirements, and not "optional," so students can document that they have mastered the skills required to do the job, and can present that

documentation to employers.

The visual below illustrates the Skills Certification System—stackable industry certifications that serve to link content mastered in educational programs of study with real jobs. The foundation is grounded in basic academic and workplace skills, such as critical thinking, following instructions and reading for information, as measured by the National Career Readiness Certificate (NCRC). From there, workers gain core technical skills, including safety, quality, and maintenance, as assessed by the Manufacturing Skill Standards Council (MSSC) Certified Production Technician. Finally, workers are certified in specialized, occupationally specific skills, such as welding, machining and logistics, as measured by a number of industry-based certification sponsors.

Generic educational pathways (left column) and career pathways (right column) in manufacturing are aligned through "stackable" industry-based certifications (middle column). While nationally portable, certifications are typically embedded in curricula based on regional employment needs.

WHY CERTIFICATIONS?

Skills certifications are becoming the "new currency" in the marketplace. Employers are seeking clear ways of determining what workers know and are able to do on the job. Workers are seeking alternatives or add-ons to degrees to demonstrate marketable competencies. Educational systems are looking for efficient ways to provide seamless, effective delivery of programs from high school through four-year institutions. Industry certifications are a win-win-win proposition.

Certifications provide an objective way for:

- Students to validate the talent they can bring to the job;
- Educational providers to establish the value of their product; and
- Employers to have a level of certainty about the skill level of an individual before hiring them.

While third-party certification can be awarded after testing, totally apart from the education process itself, embedding certifications within education pathways benefits the student, the educational provider, and the employer.

The Skills Certification System is applied STEM. It puts a heightened focus on critical science, technology, and critical thinking skills.

Embedding industry-based certifications in manufacturing-related programs of study will help ensure colleges and universities are graduating technicians and technologists with the skills manufacturers need.

Value. The Manufacturing Institute has been collecting documentation on the value of certifications over the past ten years. Some of the major observations on value include:

Benefits for Students

- Documents knowledge and skills gained through education or life experiences
- Offers a competitive advantage when looking for work or career advancement
- Increases career opportunities and earning potential
- Enhances transferable skills across industries within manufacturing or other sectors

Benefits for Educators

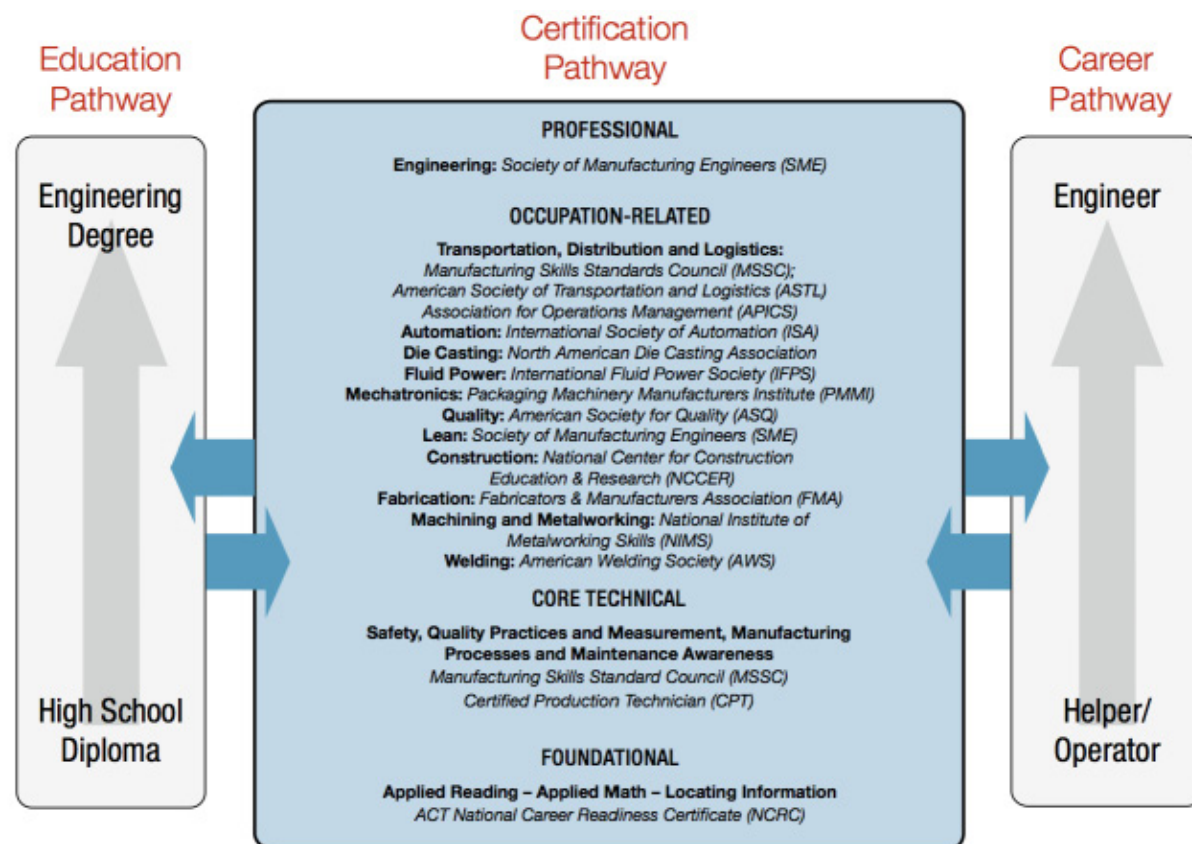
- Outlines critical foundation and workplace skills employers are demanding
- Identifies technical skill sets employers require, particularly in high growth occupations
- Provides clear guidance for updating/aligning curricula with industry requirements
- Standardizes learning outcomes across similar programs nationally

Benefits for Educational Systems

- Enhances efficiencies of the education and workforce delivery systems
- Supports sector-based strategies, linking closer to an economic development agenda
- Increases acceptance of credits for articulation across programs and institutions
- Promotes student completion

Benefits for Employers and Communities

- Access to a skilled workforce they can further develop through on-the-job training
- Ability to focus during the hiring process on the candidate "fit" within the company
- Reduced training costs and turnover, enhanced workplace safety, and increased productivity
- Improved quality of the workforce and workforce expertise in a community or region



CERTIFICATION MODELS

One of the major lessons learned over the past few years about establishing certification systems in communities and states is that there is no “one size fits all.” Each college, community and state is unique. Having said that, several generic models have emerged that provide a good overview of how the Skills Certification System can be embedded at different levels and for different student populations. A few examples include:

- High School to Community College
- For-Credit Community College Programs
- Community College to Four-Year
- Non-Credit to Credit
- Accelerated Model
- Apprenticeship

High School to Community College: Alamo Community College San Antonio, TX

The Alamo Community Colleges model builds on the success of its nationally recognized Advanced Technology and Manufacturing Academy.



High-school juniors and seniors region-wide spend 2½ hours each day at Alamo campuses completing an industry-driven curriculum to develop work ready skills in manufacturing. The dual-credit program, which is at no personal cost to students or parents, allows participating students to graduate high school with 27-35 credit hours, the equivalent of a college occupational diploma or one-year certificate in Manufacturing Technology. Students can also earn their National Career Readiness Certificate (NCRC) and the Certified Production Technician Certification from the Manufacturing Skills Standards Council (MSSC). The program serves at-risk, minority students from low income families and enrolls approximately 60 students a year.

Certification Leads to Toyota Job Opportunity

Class: ATMA Senior Graduate 2012
Internship 2010-2011: Toyota Motor Manufacturing, TX
College Certificates: Marketable Skills Award; OSHA Safety Card; Level 1 – Certificate
Certifications: NCRC, MSSC Safety, Quality Practices & Measurement, Manufacturing Processes & Production.



Embedding Certifications into For-Credit College Programs of Study: Lorain County Community College Cleveland, Ohio

While the manufacturing base in the Cleveland area has declined significantly in recent years, employers are still in need of skilled workers to fill vacancies and replace retiring workers.



As part of the industry certification initiative at Lorain, college leadership launched a significant curriculum review process and aligned curriculum with numerous industry certification requirements. Targeted occupations include: Mechanical Design, Machining, Quality Assurance, Welding, and Automation (Systems Specialist).

To spur employer engagement, the Manufacturing Advocacy & Growth Network (MAGNET), an employer-led organization that also serves as the Northern Ohio Manufacturing Extension Partnership, facilitated numerous employer meetings to validate the certification pathways and discuss embedded skills, including both applied STEM and critical “soft” skills.

Based on input from employer partners in the region, LCCC now embeds a number of certifications into its for-credit course offerings, including the National Career Readiness Certificate in TECN 11, a technical problem solving course.

Community College to Four-Year: Ivy Tech Community College and Indiana State University Indiana

Ivy Tech has been using the Manufacturing Skill Standards Council (MSSC) Certified Production Technician (CPT) since 2006 in Workforce Development. In 2007 the college embedded the CPT certification within the Advanced Manufacturing degree at ten regional Ivy Tech campuses. That created the opportunity to provide a crosswalk from training to academic credit and increase regional adoption of CPT assessments.

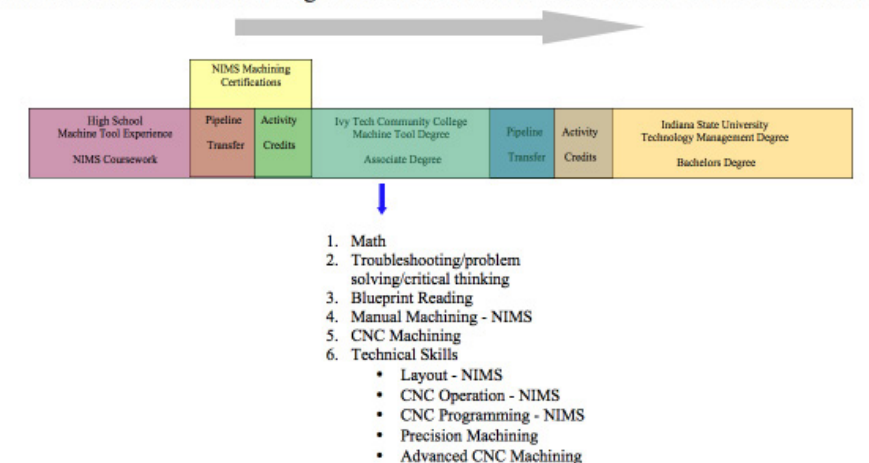


Current articulation agreements with Indiana State University include the Advanced Manufacturing degree into ISU Advanced Manufacturing Management or ISU Technology Management and build in credit earned for MSSC as a critical component.

Indiana leads the nation with the number of manufacturing related, industry-based certifications offered through its statewide community college system.

A model is shown below.

Indiana Advanced Manufacturing Educational Collaboration Machine Tool Career Lattice Model



Non-Credit to Credit: Career Technical Education in the State of Florida

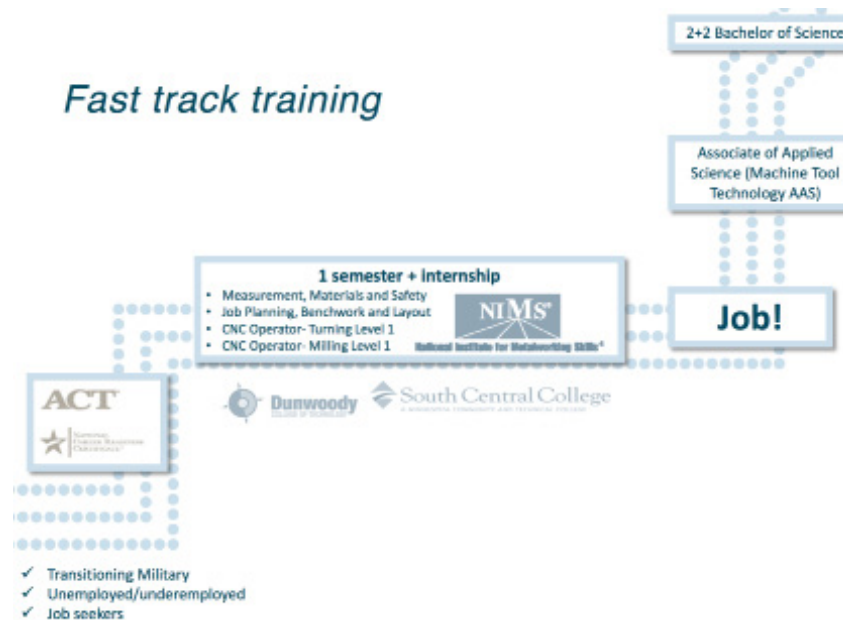
In 2007 the Florida Legislature passed the Career and Professional Education Act (CAPE). The purpose of the act was to provide a statewide planning partnership between the business and education communities in order to attract, expand, and retain targeted, high-value industry and to sustain a strong, knowledge-based economy. While originally focused on industry certification attainment by secondary students, the 2013 legislature expanded to include industry certification attainment by postsecondary students. Gold Standard Industry Certification Articulation Agreements ensure students receive college credit for successfully earning a nationally recognized industry certification. Receiving the MSSC Production Technician Certification is currently valued at 6 credits toward an Electronics Engineering AS/AAS Degree; 9 credits toward a Manufacturing Technology degree; and 15 credits towards an Engineering Technology degree.

Right Skills Now Accelerated Training: A Collaboration of the President's Jobs Council, The Manufacturing Institute, Dunwoody College of Technology and South Central College

Right Skills Now is an acceleration of the Skills Certification System, which includes nationally portable, industry-recognized certifications that are combined with for-credit education programs. These education pathways are directly aligned to career pathways in manufacturing, so students progressing through the programs earn college credit towards a degree, a national certification with labor market value, and the hands-on technical experience to be successful on the job. In the current Right Skills Now Program, students earn a National Career Readiness Certificate (NCRC) and four certifications from the National Institute for Metalworking Skills (NIMS). The program is 24 weeks long and broken down into 18 weeks of classes and hands-on lab work, followed by a paid internship. Credits earned can be applied toward an AAS Degree in Machine Tool Technology.



A model is shown below:



Certifications and Apprenticeship: National Institute for Metalworking Skills

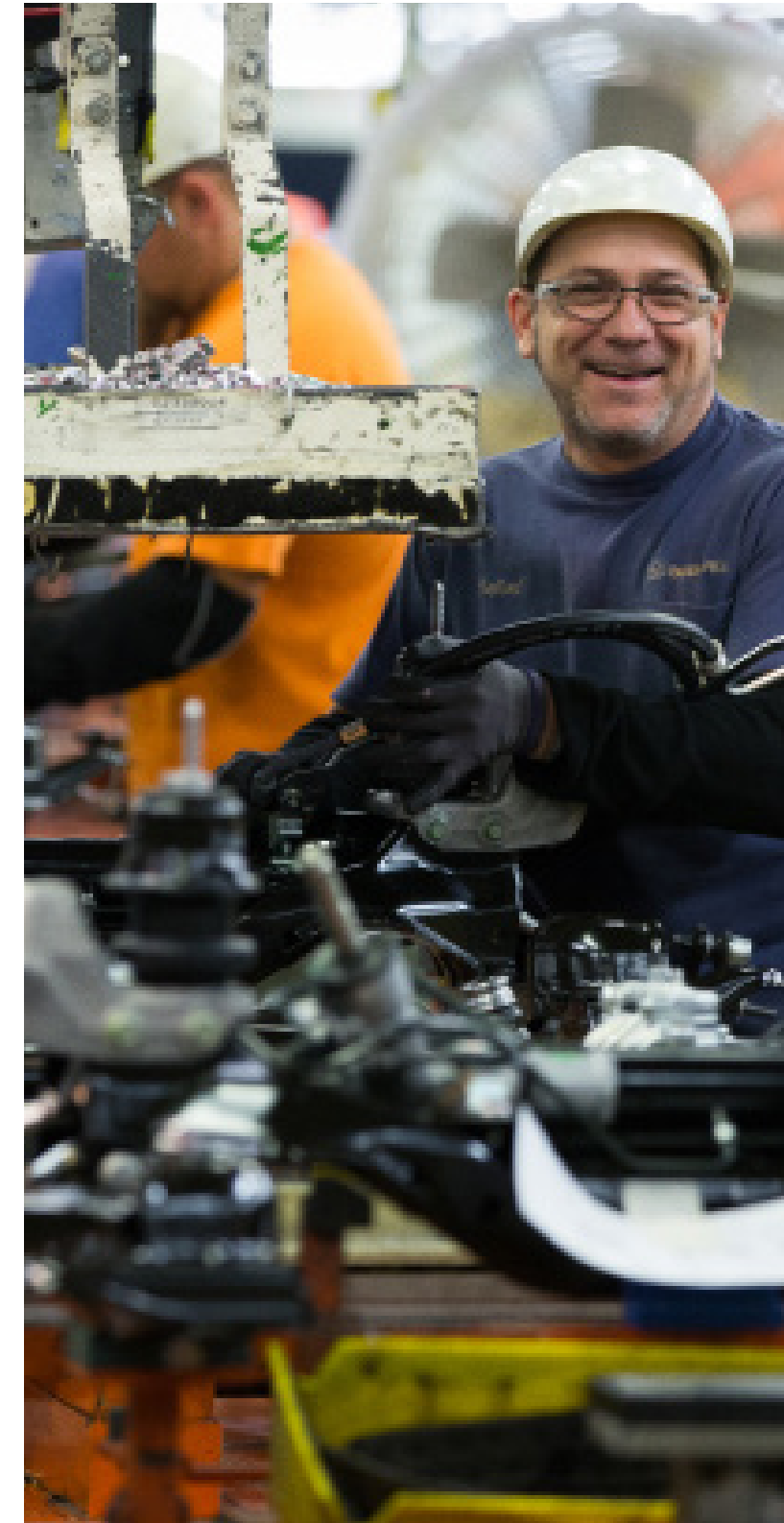
The National Institute for Metalworking Skills (NIMS) Competency-Based Apprenticeship System brings national standards and third party objective assessments to the nation's metalworking industry. To become a NIMS Certified Machinist, Toolmaker, CNC Setup Programmer or a Certified Journey Worker in any NIMS occupation, the apprentice must earn NIMS credentials in demonstrating satisfactory performance in a required number of competencies. The system integrates the NIMS national metalworking standards and credentialing assessments, combining the traditional on-the-job learning of apprenticeship with the use of NIMS assessments as performance measures. Using attained competencies in lieu of a rigid set of hours, the project builds on the 24 sets of NIMS standards and credentials and enables employers to apply the NIMS credential as milestones within their apprenticeship training. Employers are able to customize training to meet their own needs while maintaining the national integrity of apprenticeship training.



Lessons Learned

- Every college, every community, and every state is at a different level of readiness to implement skills certification.
- There is no "one size fits all" model – design a model that fits within the unique framework of your college/community vision and faculty orientation.
- You already have many of the pieces in place!
- Other colleges and communities have many tools to share, so there is no need to worry about "starting from scratch."
- Communication is key! Keep all your partners engaged on a regular basis and celebrate success through human interest stories.
- Skills certification is not a stand-alone effort or special "program" – it needs to be woven into the fabric of the college.

Moving Systemic Reform across 12 States to Implement Nationally Portable, Industry-Recognized Credentials in Advanced Manufacturing



KEY STEPS TO LAUNCHING SKILLS CERTIFICATION

Implementing the Skills Certification System is a multi-step process that may take many months or even several years. Based on the experience of early adopters, the four major “buckets” and ten steps below provide a guide or map to successful implementation.

While not purely linear, the steps as listed do build on each other. Some steps may be done by other partners in the community.

PLANNING AND RESEARCH

1. Identify State/Regional Economic Demands and LMI: Use state and regional economic data to guide decision making. Identify potential growth industries, projected worker demand, high-demand occupations and cross-cutting skill requirements.
2. Launch Planning/Create an Asset Map: Take stock of all the resources and expertise already available in your community to support skills certification. See the Asset Map Template in the Resources section of this Toolkit.

DESIGN AND DEVELOPMENT

3. Engage Industry Leaders/Build Demand: It is critical to build employer demand while producing a supply of certified workers. Use marketing tools and deploy employer champions who stress the return on value for using certifications as part of their hiring process. Business and trade associations can play an important role here.
4. Recruit Community Support/Build Program Model: Based on state and/or regional economic data, determine which high-growth industries and which high-demand occupations to target for certification efforts. Often high-demand occupations will support numerous projected high-growth industries. Identify the career pathways/programs of study that support those high-demand occupations.

IMPLEMENTATION AND SYSTEM BUILDING

5. Align Programs to Certification Requirements: Faculty objectively audit/analyze existing curriculum against the needs of regional manufacturers and the requirements of targeted industry certifications. Faculty identify gaps in curricula and develop new instructional modules to fill gaps and determine where in the sequence of instruction the various certification exams should be given. See an example of a curriculum crosswalk in the Resource section of this Toolkit.

6. Build Systems to Support Your Model: Identify all possible systems that might feed potential students into career pathway pipelines. Consider WIA, Adult Basic Education, Continuing Education, returning military, displaced workers, etc. Also consider partners that can help open doors for job placements, such as Manufacturing Associations, professional trade organizations, and the Manufacturing Extension Partnership (MEP). Provide an in-depth orientation to key stakeholders at the college and community level so “buy-in” begins early. Build in mechanisms for ongoing engagement, such as regular faculty sessions to share progress and operational meetings with community stakeholders to review progress.

7. Design Career Pathways and Articulation Agreements: Based on targeted high-demand occupations, develop career pathways that connect progressive levels of education, training, support services and credentials in a way that optimizes the progress and success of individuals with varying levels of abilities and needs. Collaborate across secondary, two-year and four-year institutions, and develop the articulation agreements necessary to maximize transfer of credit. Aggressively build applied STEM skills into all career technical curricula. See an example of a career pathway visual in the Resource section of this Toolkit.

8. Incorporate Real-World Learning Experiences: Work closely with employer partners to incorporate as many real-world experiences as possible into your program design. Include job shadowing, internships, co-op, and pre-apprenticeship opportunities for students, and externships for teachers.

POLICY AND SUSTAINABILITY

9. Drive a Policy Agenda: Identify “big picture” policy barriers that are impeding progress. Develop a policy agenda for driving needed policy interventions. Leverage local successes to promote regional and statewide change.
10. Sustain the Certification System/Track ROI: Identify key performance indicators to serve as benchmarks for measuring progress. Collect data on a regular basis to assess actual vs. plan progress. Work with employers to help them develop a plan for tracking key metrics, such as employee turnover and productivity, so they can measure the impact of certified workers to their bottom line outputs. Develop a comprehensive plan for sustaining the certification effort beyond any grant funding that may have launched it.

FREQUENTLY ASKED QUESTIONS

My students are already able to get jobs, often before they even complete the program. Why do I need to add certifications?

Students who go to work without having completed your program have no marketable credential. When programs have embedded industry certifications, students can earn them as they work through the curriculum and gain the necessary skills. Students often complete a National Career Readiness Certification (NCRC) before they begin technical instruction, because it provides a good baseline measure of their applied academic skills. Certain technical certifications, like AWS and NIMS, can be earned throughout a semester. Then, if students do go to work, they have the benefit of a transferable certification with real value in the marketplace.

Employers are not asking for industry certifications, so why should we add them?

The experience of The Manufacturing Institute working with thousands of employers over many years suggests that the

answer is straightforward: Many manufacturers simply do not know about industry certifications and the value they can add to the bottom line. Building a supply of certified workers needs to go hand-in-hand with building a group of employers who want and value them. Students need to know that their additional investments of time and energy in earning industry certification will pay off. Employers who learn about the value of certifications and see a return on that value will begin to prefer job applicants with documented skills. Manufacturing associations and trade organizations can help build the demand side.

What difference can certifications really make?

Recent surveys conducted by The Manufacturing Institute showed that the lack of skilled employees to fill available jobs is creating significant costs for companies:

- 65% of companies report a >5% increase in production down time
- 65% of companies report a >5% increase in production cycle time
- 70% of companies report a >5% increase in overtime
- Over 90% of companies that use industry-recognized certifications believe they make a difference in validating the skills of their employees.

Companies see positive impacts on: training costs, employee retention, employee engagement, workplace safety and personnel decision-making. This kind of documentation demonstrates that industry certifications are making a difference.

When should certification tests be taken?

Don't think of certification as an “end of course” assessment. Industry certifications test should be taken as soon as the student has mastered the knowledge and skills necessary to pass the exam. That might be four weeks into the semester.

What is tested on industry certification exams?

Some are purely knowledge-based exams, and so are computerized (or paper and pencil upon request). Others are performance-based and require the student to demonstrate a skill to a certain level of proficiency or tolerance. Others are a combination of the two. Certification sponsors vary in their specific requirements. The best source of information on certification requirements is each sponsor's website. Links to all the NAM-endorsed certification sponsors are included on the following pages of this toolkit.



Who pays?

This is a very important question. There are three answers: the student, government, and employers. In some cases colleges have aligned programs of study with industry certification requirements, but do not take the next step and actually get students to take the certification exam—it is considered optional and the student typically pays out of pocket. Experience has shown that this is ineffective. Many colleges are now taking advantage of state and federal dollars—or foundation grants—to cover certification costs. While that strategy helps to establish value in the short term, it is not sustainable in the long term. Some colleges are building the costs of industry certifications into the student fee structure as part of their longer term strategy. Employers are sometimes willing to cover the cost for certifying existing workers so they can keep their skills current.

Does an individual need to take or pass a program of study or curriculum to sit for an industry certification?

No. Industry certifications are not tied to a particular curriculum or educational program. They test and validate the competencies employers need in the workplace. For that reason, some individuals can pass an industry certification based on their work or life experience and need no additional training. Military veterans are a good example.

Where do students take the exams?

It varies, but in all cases the exams must be administered by a trained, third-party evaluator. For some certifications, like the MSSC Certified Production Technician (CPT), which are purely knowledge-based, the test is administered at an authorized MSSC testing center. The college can apply to be such a center, by getting its computer lab approved and a test proctor trained, or there may already be a testing facility in the community. For other certifications, which are performance-based, testing needs to be conducted in an appropriate facility on specialized equipment. In most cases, the instructor who trained the student cannot also test the student. Some certification sponsors train manufacturers in the community to serve as evaluators on performance-based exams.

How can I learn more about how to work with employers regarding industry certifications?

The Manufacturing Institute has developed a Toolkit for Educators 2.0 that will provide a deeper dive into the process, including specific steps and extensive tools.



The Skills Certification System currently includes 15 certification sponsors that provide industry standards and assessments, spanning the entire occupational pathway from entry-level workers to engineers. Outlined below is a snapshot of each partner. Each industry sponsor's website contains extensive information about standards, certifications, assessments, and costs.

Academic and Core Technical Skills

At the foundation of the skills system is the ACT National Career Readiness Certificate (NCRC). The NCRC is an industry-recognized, portable credential that demonstrates achievement and a certain level of applied academic and employability skills for workplace success. Individuals may earn the NCRC by taking three WorkKeys® assessments: Applied Mathematics, Reading for Information, and Locating Information.

For more information, please contact Terry Ausman at terry.ausman@act.org



Manufacturing Skill Standards Council (MSSC) assessment and certification system is focused on the core technical knowledge and skills needed by front-line production workers. MSSC offers the Certified Production Technician (CPT), which consists of four modules: Safety; Quality Practices and Measurement; Manufacturing Processes and Production; and Maintenance Awareness. MSSC is accredited by the American National Standards Institute (ANSI) under ISO Standard 17024.

Manufacturing Skill Standards Council (MSSC) Certified Logistics Technician Certification (CLT) is the industry-recognized national certification for the core technical skills of front-line workers (entry level through first line of supervision) involved in the handling and distribution of materials throughout the supply chain and logistics industry.

For more information, please contact Neil Reddy at reddyn@msscusa.org



The Manufacturing Skills Institute offers the Manufacturing Technician 1 (MT1) certification, developed to meet the growing employment demands of the manufacturing industry. The MT1 certification addresses the core industry-wide skills standards required for skilled production occupations in all sectors of manufacturing. The core competency areas certified are: (1) Math and Measurement, (2) Spatial Reasoning and Manufacturing Technology, and (3) Business Acumen and Quality.

For more information, please contact Katherine DeRosear at kderosear@manufacturingskillsinstitute.org.



Occupation-Specific Skills

American Society for Quality (ASQ) is the worldwide leader in providing credentials to the global quality community. The Society currently offers 16 different certifications including Quality Technician, Quality Inspector, and Quality Engineer. More than 170,000 certifications have been issued to dedicated professionals worldwide.

For more information, please contact Sally Harthun at sharthun@asq.org



American Society of Transportation and Logistics (AST&L) facilitates education and certification in the fields of transportation, logistics, and supply chain management. It provides globally-recognized credentials such as the Professional Designation in Logistics and Supply Chain Management (PLS) and the Certified in Transportation and Logistics (CTL) designation.

For more information, please contact Laurie Denham at ldenham@astl.org

Certification Partners



Association for Operations Management (APICS) is the global leader and premier source of the body of knowledge in supply chain and operations management. The APICS Certified in Production and Inventory Management (CPIM) and APICS Certified Supply Chain Professional (CSCP) designations are recognized globally for setting the standard of professional excellence in the industry.

For more information, please contact Lisa Sallstrom at lsallstrom@apics.org



American Welding Society (AWS) is the nation's premier entity for welding certification and has a robust collection of certification documents on its website. A few suggested links include the standards for the Certified Welders and the Body of Knowledge for the Certified Welding Inspector, 2 critical positions for many manufacturers.

For more information, please contact Monica Pfarr at mpfarr@aws.org



Fabricators & Manufacturers Association, International (FMA) Precision Sheet Metal Operator Certification (PSMO) is the metal fabricating industry's only comprehensive exam designed to assess a candidate's knowledge of fundamental precision sheet metal operations. Fabrication processes covered in the exam include shearing, sawing, press brake, and more.

For more information, please contact Cindy Day at cindyd@fmanet.org



International Fluid Power Society (IFPS) is the only organization that provides comprehensive technical certification in the fluid power and motion control industry. Numerous certifications are currently offered, such as Fluid Power Certified Technician and Fluid Power Electronic Controls.

For more information, please contact Donna Pollander at dpollander@ifps.org



International Society of Automation (ISA) is a global nonprofit organization setting the standard for automation by helping over 30,000 worldwide members solve difficult technical problems. ISA's Certified Control Systems Technician (CCST) and Certified Automation Professional (CAP) certifications are key elements of the Skills Certification System.

For more information, please contact Dalton Wilson at dwilson@isa.org



National Center for Construction Education and Research (NCCER) is recognized as one of the premier workforce development organizations for the construction and maintenance industry. The NCCER training and certification system offers more than 80 different assessments in over 60 different craft areas.

For more information, please call (386) 518-6500.



National Institute for Metalworking Skills (NIMS) is the only ANSI-accredited developer of precision manufacturing skill standards and competency assessments in the nation. NIMS has developed skill standards in 24 operational areas covering the breadth of metalworking operations, with 52 distinct skills certifications. NIMS certifications cover a range of machining specialties, including CNC programming and operation.

For more information, please contact Jim Wall at JimWall@nims-skills.org



North American Die Casting Association (NADCA) requires candidates to pass the specified examinations and fulfill the minimum apprenticeship period to become certified. The Certification Program has several levels ranging from Die Casting Technician to Master of Die Casting Technology.

For more information, please contact Melisa Ryzner at mryzner@diecasting.org



PMMI members manufacture packaging and packaging-related converting machinery. The PMMI Mechatronics Certificate Program and the PMMI Certified Trainer Program are among the most popular.

For more information, please contact Stephan Girard at sgirard@pmmi.org



Society for Manufacturing Engineers (SME) partners with three organizations to offer Lean Certification: the Association for Manufacturing Excellence (AME), The Shingo Prize for Operational Excellence, and the American Society for Quality (ASQ). The certification aligns these leading organizations to a single standard for the industry.

Society of Manufacturing Engineers (SME) offers the Certified Manufacturing Technologist, which focuses on the fundamentals of manufacturing and is acquired through a baccalaureate program or a combination of four years academic and work experience. The Certified Manufacturing Engineer is focused on applied and advanced manufacturing knowledge and may be acquired through a combination of eight years of work experience and a manufacturing or engineering degree.

For more information, please contact Pam Hurt at phurt@sme.org

SKILLS CERTIFICATION SYSTEM: ASSET MAP

An Asset Map is a tool to help you take stock of the programs, resources, and organizations that may support rollout of the Skills Certification System. The scope of the Asset Map can cover an individual community, a region or an entire state.

What programs of study specific to manufacturing already exist at you community college or other colleges in your region/state? The programs of study can be grouped into categories by high-demand occupations.

What types of programs currently serve as education pathways for manufacturing? They include: high school career academies; secondary vocational and technical education programs; internship or externship programs; apprenticeship programs; 2+2 programs between high schools and community colleges; and programs at four-year universities. Other resources to include: Skills USA; First Robotics; Project Lead the Way; Jobs for America's Graduates; Job Corps, etc.

What state initiatives currently support either the manufacturing sector or skills certification? These might include gubernatorial initiatives in manufacturing, education, or workforce development; sector or cluster projects around manufacturing; or legislative programs/ directives that require industry-recognized credentials or technical diplomas.

What are the manufacturing organizations or associations in the state? Include: State Manufacturing Association; Regional Manufacturing Associations; and Manufacturing Extension Partnership (MEP). How does your college currently interact with these groups?

Do you have connections with: MI's Dream It. Do It. campaign or other statewide marketing initiatives on careers in manufacturing? Are there career camps for students or teachers?

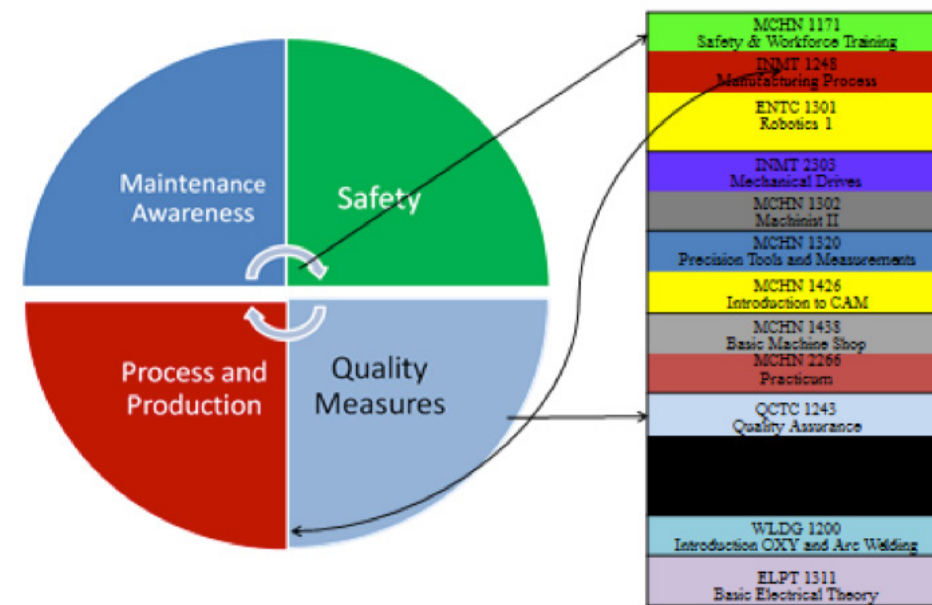
What other government programs might already be aligned to support skills certification? State and Local Workforce Investment Boards: do they have specific initiatives or goals around manufacturing or skills certification? Economic development organizations: are they targeting manufacturing as an industry in their strategic plans?

What other groups might be focused on the same topics and be willing to leverage resources? If there are major foundations active in the state, are their programs related to the goals of this project? There are also a number of government programs that provide money for education and job training. How many of those funds go toward manufacturing education or careers?

What are universities doing to support the manufacturing industry or community colleges? Do they offer entrepreneurship programs, business incubators, technology transfer initiatives, focused community college partnerships and articulation programs?

Investing the time to do an asset map pays off in the long run. It will allow you to identify and leverage important community and state resources, and also help to create a network of organizations and programs to support deployment of a manufacturing skills certification system.

Alamo Academy MSSC Credit Course Integration

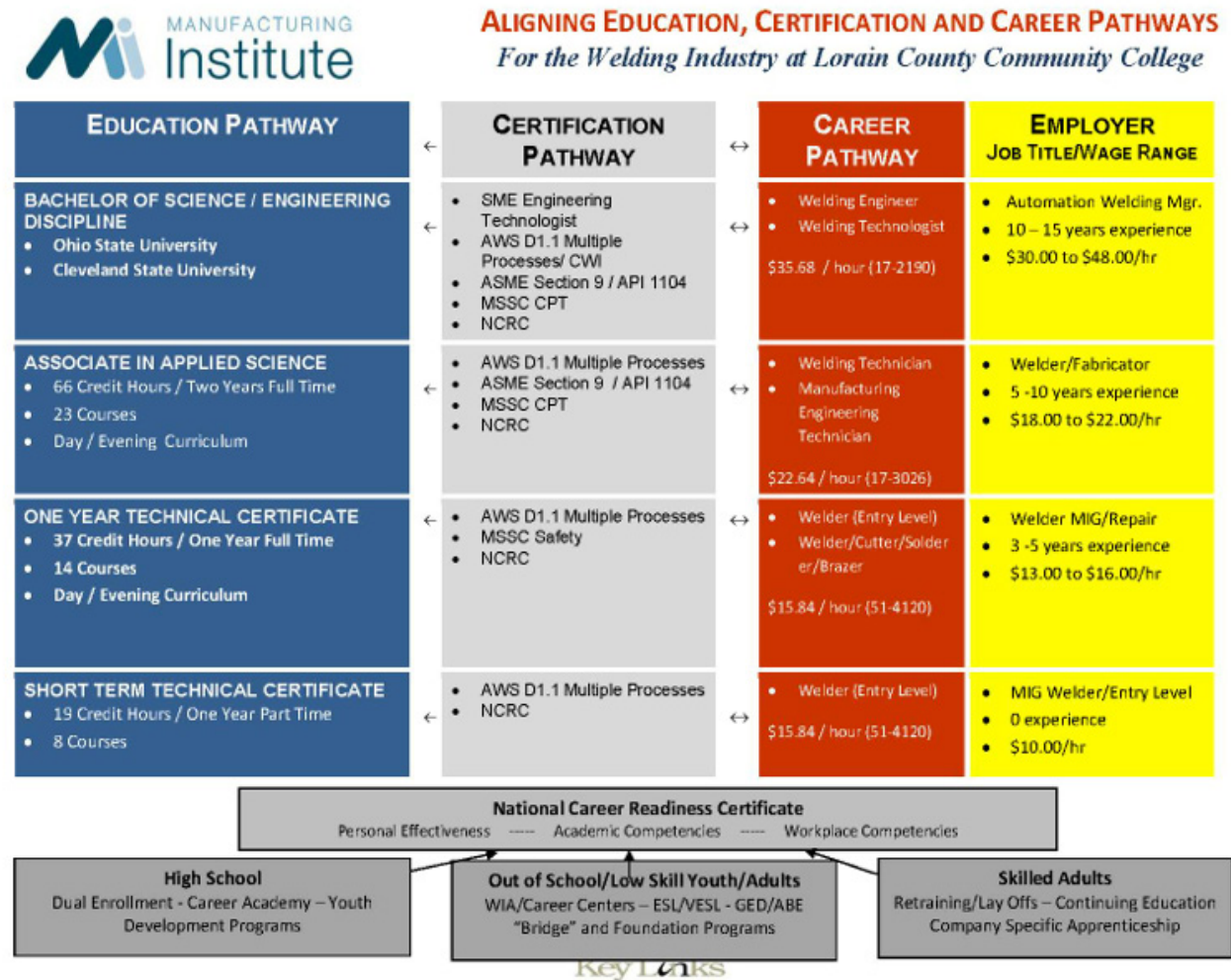


Manufacturing Operations Technician	Production Tool Operator / Maintenance Assistant (Academy)	CNC Manufacturing Technician
ECON 1301		ECON 1301
ENGL 1301		ENGL 1301
PHYS 1305	General Education, not covered specifically in the Academy	PHYS 1305
SPCH 1321		SPCH 1321
ITSC 1301		ITSC 1301
MATH 1333		MATH 1333
ELPT 1419		ELPT 1319
ENTC 1301	ENTC 1301	ENTC 1301
INMT 2303	INMT 2303	
WLDG 1313	MCHN 1302	MCHN 1302
MCHN 1320	MCHN 1320	MCHN 1320
MCHN 1438	MCHN 1438	MCHN 1438
MCHN 2266	MCHN 2266	MCHN 2266
	MCHN 1426	MCHN 1426
QCTC 1243	QCTC 1243	
RBTC 2447		RBTC 2447
WLDG 1428	WLDG 1200	MCHN 1330
WLDG 2439		MCHN 2403
ELPT 1420	INMT 1248	MCHN 2431
ELPT 1441		MCHN 2434
ELPT 2419		MCHN 2435
ELMT 1305		MCHN 2438
	24 of 31 SCh Crosswalk	
	19 of 31 Crosswalk	

This visual represents the alignment of the education, certification, and occupational pathways. The left column includes the courses required for the degree, the gray column shows the certifications aligned with the courses, and the red column includes common job titles and salary ranges at the national level. The information in the yellow column was gathered through the employer engagement seminars and represents feedback and comments from the employers based on their own knowledge and experience.

Advanced Manufacturing Competency Model

The Skills Certification System is grounded in the Advanced Manufacturing Competency Model. The model, built by manufacturers, for manufacturers, and in partnership with the Department of Labor, serves as a roadmap of the skills needed by workers entering and then advancing in careers across the manufacturing economy.



Occupation-Related: High-demand occupations are matched with critical industry certifications in such areas as machining, welding, fabrication, automation, fluid power, mechatronics, transportation/distribution, and logistics. At the top of the model are managerial and specialty occupations, including engineering.

Core Technical: Core technical skills that impact the bottom line include: safety, quality and measurement, maintenance installation and repair, production, and sustainable manufacturing.

Foundational: Basic skills that cut across all sectors in manufacturing include:

- >> **Workplace competencies:** Do workers use critical thinking skills, work in teams, and have problem solving skills?
- >> **Basic applied skills in reading, writing, math, and locating information:** Can workers communicate effectively, follow key instructions, and read manuals?
- >> **Personal effectiveness:** Will prospective employees show up on time, be dependable, and demonstrate initiative?

The Advanced Manufacturing Competency Model was developed because manufacturers recognized the need to agree on a common understanding of the entry- and technician-level skills required to be competitive in the global marketplace.

The framework does not replace or duplicate existing skill standards, but rather represents the core skills needed across the board for high-performance workers in today's advanced manufacturing environment.

To view manufacturing competencies, visit: www.careeronestop.org/competencymodel

There are numerous organizations in your own backyard that may provide you with additional resources as you pursue the use of certifications. So what's next? While each of these organizations varies by state and region, they will provide you with excellent guidance and leadership to ensure the development of a qualified talent pipeline.

Certification Partners

The Manufacturing Institute is working with manufacturing certification organizations that are the world market leaders in skills certification programs. This collaborative effort resulted in an organization of the certification programs, and the credentials they offer, into a system of "stackable credentials" that can be awarded in post-secondary education.

Visit: <http://www.themanufacturinginstitute.org/Skills-Certification/Certifications/NAM-Endorsed-Certifications.aspx>

Manufacturing Extension Partnership

Manufacturing Extension Partnership (MEP) works with small and mid-sized U.S. manufacturers. The nationwide network has a location in every state, and provides a variety of services to businesses. MEP also works with partners at the state and federal levels on programs that benefit and promote manufacturers.

Visit: <http://www.nist.gov/mep/find-your-local-center.cfm>

The M-List

The Manufacturing Institute's M-List recognizes high schools, community colleges, technical schools, and universities that are teaching manufacturing students to industry standards. Specifically, these schools offer students the opportunity to earn NAM-Endorsed Manufacturing Skills Certifications as a standard part of their manufacturing education programs.

Visit: <http://www.themanufacturinginstitute.org/Skills-Certification/M-List/M-List.aspx>

The Manufacturing Institute

The Manufacturing Institute is the authority on the attraction, qualification and development of world-class manufacturing talent. The Manufacturing Institute offers a variety of resources including research, promotional materials, webinar series, and expertise to support educators in their quest to align curriculum to industry-based certifications.

Visit: www.themanufacturinginstitute.org

Workforce Investment Boards

Workforce Investment Boards (WIBs) are present in every community in the nation. The WIBs' main role is to direct federal, state and local funding to workforce development programs. WIBs conduct and publish research on these programs and the needs of their regional economy and oversee One-Stop Career Centers.

Visit: <http://www.servicelocator.org/wibcontacts/>

This toolkit is a working document and will be updated periodically. To suggest changes or updates, please email AJ Jorgenson at ajjorgenson@nam.org.

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