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# Awarding Credit for Industry Certifications and Developing Innovative Articulation Agreements

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A Brief on Best Practices

## WHO THIS BRIEF IS FOR

This Brief is designed for education and workforce leaders who are ready to take their work with industry certification to the next level – valuing certifications for credit and negotiating articulation agreements that support students in earning that credit.

If you are just beginning to explore the world of industry certifications, you may want to review two additional documents before you read this one:

- Building a Manufacturing Talent Pipeline: An Introduction to Skill Certification
- Developing Skilled Workers/A How-To Guide for Educators: A Toolkit for Educators and Workforce Professional on Manufacturing Certification

Both can be found at:

[www.themanufacturinginstitute.org](http://www.themanufacturinginstitute.org)

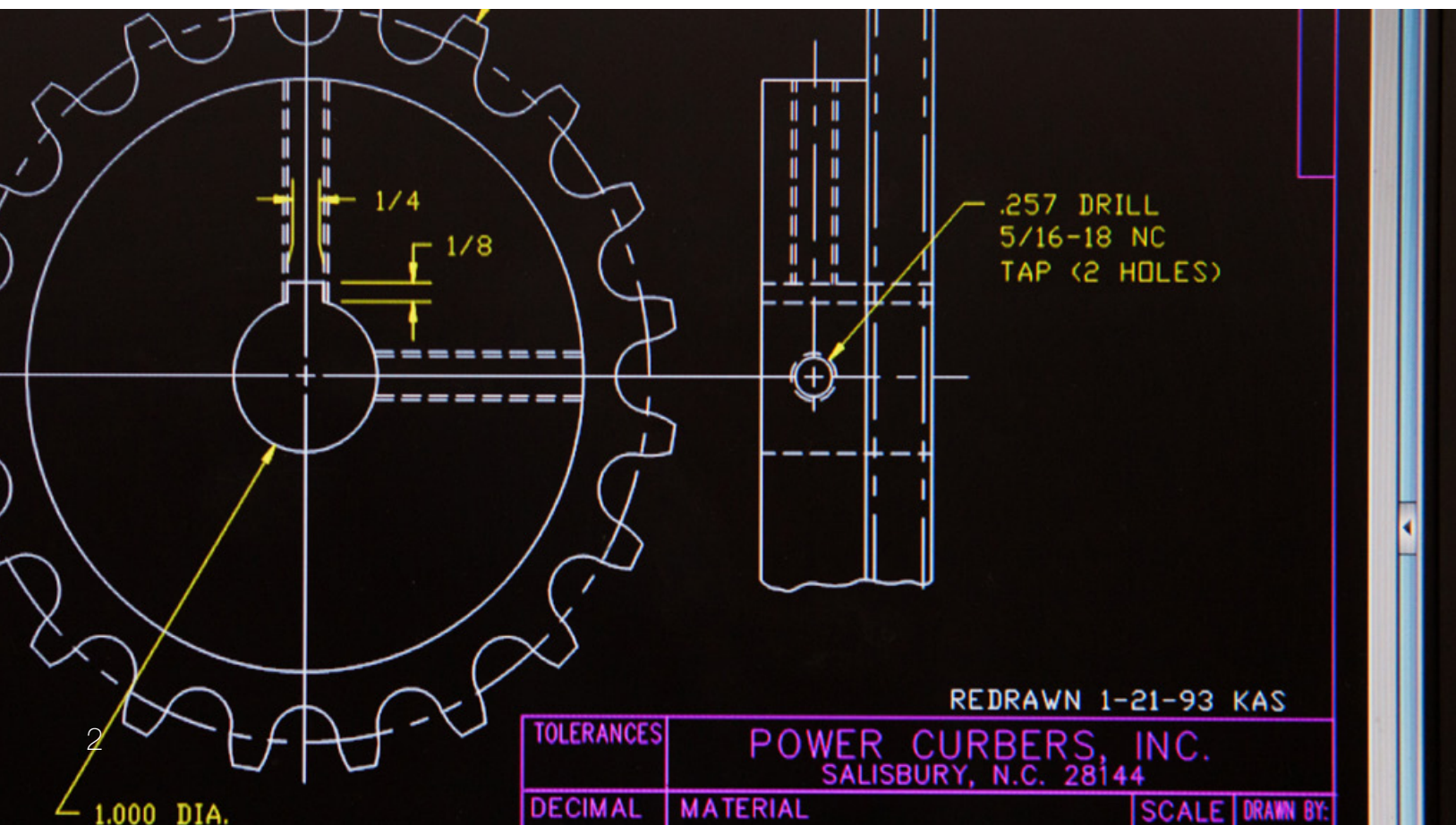
## ACKNOWLEDGEMENTS

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**Melanie Stover,**  
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**Audrey Theis, Ph.D.,**  
Key Links



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## EXECUTIVE SUMMARY

This brief focuses on awarding credit by community colleges for industry certifications and developing innovative articulation agreements in support of students earning that credit. As a result of the increased “pain” related to the skills gap, manufacturers across the country are calling for new models and different approaches to manufacturing education and training.

The brief focuses specifically on the industry certifications sponsored by the Manufacturing Skill Standards Council (MSSC) and the National Institute for Metalworking Skills (NIMS). Both play a critical role in the preparation of skilled workers for the modern manufacturing workplace, with MSSC focusing on critical cross-cutting skills such as safety and quality, while NIMS offers industry certifications in the specific occupational areas related to machining.

MSSC has identified three partner colleges that have established for-credit and dual credit programs for MSSC courses. Ivy Tech Community College, Indiana; Harper College, Illinois; and Alamo Colleges, Texas offer exemplary programs that are helping students earn credentials and degrees, supporting employers close the skills gap and enabling colleges to boost enrollments. Also included in the brief are three exemplary examples of articulation agreements statewide in Florida, at Ivy Tech in Indiana, and Alamo Academies in Texas, which are enabling the awarding of credit for MSSC certifications.

NIMS has identified three partner colleges that have developed innovative practices for awarding credit for NIMS certifications: Community College of Baltimore, Maryland; Ivy Tech Community College, Indiana; and Kirkwood Community College, Iowa. While each college has developed a different model to the process of awarding credit for NIMS certification, they all offer keen insight about how to ensure students earn credit for the knowledge and skills they have demonstrated through third-party validation.

NIMS also provided examples of articulation agreements for each of these three best practice examples. Again, each college has taken a slightly different approach based on college and state requirements, yet they all offer keen insight into the various methodologies that can be used as a mean to the end, i.e., the award of credit. The NIMS Articulation Template is also included, which provides a checklist to serve as a guide in the facilitation and development of articulation agreement.

Articulation agreements are critical to bridging the certification pathways into academic pathways. They help to ensure that learners can take coursework that is job-relevant while also maintaining the ability to earn academic certificates and degrees. This helps more diverse students to enter into academia, reduces the need for students to duplicate learning, and fosters transfer.

MSSC and NIMS have provided invaluable models, templates, and best practices. We urge institutions across the country to duplicate these examples, in production and machining programs, and across the spectrum of programs that need to work together to fill the skills gap nationally for manufacturing.

## THE SKILLS GAP PAIN

Faced with a growing skills gap, manufacturers are becoming increasingly aware that open positions are costing them money and impacting their ability to compete in the global marketplace. The talent shortage is affecting the ability of manufacturers to implement new technologies, develop new products, and provide quality customer service.

As a result of the increased “pain” related to the skills gap, manufacturers across the country are calling for new models and different approaches to manufacturing education and training. They need the right workers with the right skills – NOW!

## WHAT IS BEING DONE?

Innovative high schools and colleges across the country are aggressively addressing the needs of their manufacturing customers and pockets of excellence have begun to emerge. This brief highlights a “short-list” of states and/or institutions that are responding to the skills gap challenge by developing effective and innovative articulation agreements based on industry certification.

The brief focuses specifically on the industry certifications sponsored by the Manufacturing Skill Standards Council (MSSC) and the National Institute for Metalworking Skills (NIMS). Both play a critical role in the preparation of skilled workers for the modern manufacturing workplace, with MSSC focusing on critical cross-cutting skills such as safety and quality, while NIMS offers industry certifications in the specific occupational areas related to machining.

### TALENT SHORTAGE SIGNIFICANTLY IMPACTS MANUFACTURERS

The skills gap negatively influences operations, company growth and the bottom line in a variety of ways.

**82%** of executives believe the skills gap will impact their ability to meet customer demand

Executives also agree it will impact their ability to:

**78%** implement new technologies and increase productivity

**69%** provide effective customer service

**62%** innovate and develop new products

**48%** expand internationally

Source: 2014 Manufacturing Institute and Deloitte Skills Gap Study

The 2014 Manufacturing Skills and Training Study by Accenture found that **skill shortages are costing manufacturers up to 11% of net earnings**. Manufacturers report:

- 12% increase in overtime
- 8% increase in cycle time
- 10% increase in downtime

As reported by Accenture, the severe shortage of manufacturing skills in the United States has the potential to impede the trend of steady growth manufacturing in this country.

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## WHY ARTICULATION MATTERS

In an era of declining resources and diminishing investments in education, it is a social imperative that we improve the efficiency of our education system. The changing nature of the student population—with a substantial increase in the number of returning older students, the need to balance work and school, and variable attendance patterns—all require enhanced attention to the policies around transfer and articulation.

While declining revenues are a major challenge, renewed requirements for increased accountability, improved outcomes, and greater collaboration create an environment that supports the integration of industry certifications into post-secondary curriculum nationally. In addition, major federal education policy, including Carl Perkins and the new Workforce Innovation and Opportunity Act (WIOA), is driving an agenda towards third-party certifications as independent verification of competence for work.

Industry-based credentials embedded in manufacturing programs of study can serve as a powerful hook to attract students, win support from employers, and promote articulation and linkages across educational institutions.

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## WHY CERTIFICATIONS ADD VALUE

The promising practices outlined in this brief are based on three fundamental assumptions about the value of industry certifications:

- Embedding industry-based certifications in education pathways provides third-party validation of skills and minimizes hiring risk for employers;
- Aligning education and training to nationally portable, industry-driven certifications developed by employers increases placement and wage gains for students; and
- Embedding industry-based certifications in education pathways increases the acceptance of credits for articulation across programs and institutions, enhancing efficiencies of the educational delivery system and promoting student completion.

Both MSSC and NIMS embrace the value of industry certifications to employers, individuals and systems. The outstanding work that each has done to facilitate partnerships with educational providers on behalf of the country's manufacturers is discussed in the following pages.

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## MANUFACTURING SKILL STANDARDS COUNCIL (MSSC)

The Manufacturing Skill Standards Council (MSSC), a 501(c)3 non-profit, is an industry-led, training, assessment and certification system focused on the core skills and knowledge needed by the nation's front-line production and material handling workers. The nationwide MSSC System is based on industry-defined and federally-endorsed national standards for front-line industrial training.

As the leading certifying body for the nation's front-line manufacturing production and supply chain logistics workers, MSSC's two certification programs allow students and workers to document their knowledge. MSSC is the only certification organization in the industry accredited by ANSI under ISO 17024 and provides employers with a pipeline of individuals with the core competencies of highly skilled "industrial athletes of the future." MSSC has two certification programs: Certified Production Technician (CPT) and Certified Logistics Technician (CLT). For additional information, see: [www.msscusa.org](http://www.msscusa.org).

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### Best Practices: MSSC Courses for Credit

More and more community and technical colleges across the country are learning the value of integrating MSSC into their for-credit catalogs and

degree programs. While non-credit courses provide excellent opportunity for dislocated worker, rapid response and other fast track adult education, for-credit options open up new possibilities for students, colleges and employers. The best of the best have not only for-credit options at two-year colleges but also have dual credit arrangements with local and regional high schools systems that allow students to begin their certification in high school and complete at the college.

The benefits of offering MSSC courses and certifications in a for-credit program include:

- Lower administration costs
- Greater sustainability
- Less reliance on grant funding
- Greater attraction for students and parents
- Better opportunity for students to earn ANSI-accredited, industry-recognized credential AND credit toward a college degree

### THREE EXAMPLES

MSSC has identified three partner colleges that have established for-credit and dual credit programs



for MSSC courses. Ivy Tech Community College, Indiana; Harper College, Illinois; and Alamo Colleges, Texas offer exemplary programs that are helping students earn credentials and degrees, supporting employers close the skills gap and enabling colleges to boost enrollments.

### **Ivy Tech Community College**

The Advanced Manufacturing (ADMF) AAS degree program at Ivy Tech CC provides students with the opportunity to earn MSSC's Certified Production Technician (CPT) and Certified Logistics Technician (CLT) certifications in their first year of study. Students can earn, or transfer in, up to six hours of credit for the full-CPT and two hours for CLT. Students choose between two areas of emphasis (Manufacturing Design and Manufacturing Operations). Manufacturing employs more people in Indiana than any other industry, making graduates with this degree highly employable.

Appendix A provides a two-page flyer that outlines the Advanced Manufacturing AAS degree offered at Ivy Tech through the School of Applied Science and Engineering Technology. It offers an overview of the Manufacturing Design and Manufacturing Operations areas of emphasis, and all the courses associated with the degree program.

### **Harper College**

Harper College recently introduced a Manufacturing Technology AAS degree program designed to prepare students for employment in an advanced manufacturing environment. Harper has modularized its degree program into certificates that utilize college-issued and nationally-portable industry credentials earned one semester at a time. The program is flexible and allows students to move seamlessly between education and employment.

Students begin the degree with the solid foundation of the full CPT certification, a Tech Math course and a required internship. Next they select a field of specialization (Mechatronics, Precision Machining, Metal Fabrication or Supply Chain Management/Logistics), and must obtain an internship in that field. Then they continue to stack college and industry credentials in their specialization. Students who have earned enough stackable certificates in their chosen field may complete their AAS degree by completing 15-20 hours of general education courses.

Appendix B shows a visual of the Manufacturing Technology AAS degree, illustrating how students earn 11 credits by completing four MSSC courses towards a 16 credit Manufacturing Production Certificate prior to enrolling in one of four specializations.

### **Alamo Colleges**

Alamo Colleges has developed an Advanced Technology and Manufacturing Academy that uses the Certified Production Technician Safety and Quality modules as a foundation in a dual credit program. The program begins as early as the junior year in high school and articulates into two AAS degree programs at the college (Manufacturing Operations Technician or CNC Manufacturing Technician). This highly successful program is an educational partnership among Alamo Colleges, secondary schools, local business and industry, the San Antonio Manufacturers Association, regional Workforce Investment Boards and area economic development offices. Students have the opportunity to participate in paid internships with area employers including AT&T, Boeing, Lockheed Martin, Pratt & Whitney, and Toyota.

Appendix C includes two visuals. The first provides an overview of the Alamo Academy Program, with an outline of all courses included in year one (junior) and year two (senior). The second is an overview of the AAS degrees into which the Academy program feeds, including the course outlines for both the Alamo Manufacturing Operations Technician and the CNC Manufacturing Technician AAS degrees.





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## Best Practices: MSSC Articulation Agreements

An important component of all the best practice models discussed above is the articulation agreements that made the awarding of credit for MSSC a reality. To get a better understanding of the extent to which articulation agreements are being used across the country as a vehicle for awarding credit for MSSC-related course work, MSSC recently surveyed 52 schools (15 secondary and 37 post-secondary).

The survey covered the use of the Certified Production Technician (CPT) and Certified Logistics Technician (CLT) programs for credit and the implementation of articulation agreements between secondary and post-secondary institutions. Overall findings suggested that, while many schools offer credit for the MSSC certifications, articulation agreements are not widely used. A summary of the findings includes:

- 73% of secondary students enrolled in MSSC programs earn CTE credits toward graduation
- 53% of secondary programs surveyed have dual enrollment with area community or technical colleges, but only 40% earn college credit for the credentials

- 56% of post-secondary programs surveyed offer credit for MSSC certifications
- Only 16% have articulation agreements with area high schools
- Credits offered range from 6 to 15 hours for full CPT certification or 1.5 to 3.75 hours per certificate for CPT and CLT

The conclusions drawn suggest that best examples of articulation come from schools where there are statewide agreements in place either at the state department of education or through a community college system. Those states also have the most widespread usage of MSSC at the secondary level, suggesting that allowing students to earn industry certifications and college credit while in high school encourages education systems as well as students to pursue these opportunities.

Many students earn college credit through dual credit or dual enrollment programs rather than strict articulation agreements, but the end result is the same. Finally, many survey respondents who do not currently use articulation agreements or dual credit expressed interest in learning more about it.

## **EXAMPLES OF MSSC ARTICULATION AGREEMENTS**

Summaries of three innovative examples of Articulation Agreements involving MSSC certifications are provided below. More in-depth information is provided in the appendices as referenced.

### **Florida Statewide MSSC Articulation Agreement: Polk State Community College Summary**

The State of Florida has a Gold Standard Career Pathways Statewide Articulation Agreement for Industry Certification which includes the CPT certification. There are three AAS/AS degree programs that accept CPT for credit: Electronics Engineering Technology (6 hours), Manufacturing Technology (9 hours) and Engineering Technology (15 hours). This statewide agreement does not preclude the award of additional credits by any Florida college through local agreements. See Appendix D for details.

### **Ivy Tech Community College MSSC Articulation Agreement Summary**

Students can earn up to six hours of college credit for the Manufacturing Skill Standards Council (MSSC) Certified Production Technician (CPT) credentials. Degree and college certificate programs that incorporate CPT include Advanced Automation and Robotics Technology, Aviation Manufacturing, Manufacturing Operations, Mechatronics, and Advanced Manufacturing. Many of these degree programs may further articulate to a Bachelor's or even Master's level degree at various state universities. See Appendix E for details.

### **Alamo Academies MSSC Articulation Agreement Summary**

The Alamo program uses Manufacturing Skill Standards Council (MSSC) Certified Production Technician (CPT) credentials which are integrated into both for-credit and non-credit courses for participating high school and community college students. The Academies provide a college pathway for high school juniors and seniors to attain industry and academic certificates that lead to high-wage jobs or to further higher education while addressing critical workforce industry needs. Alamo has developed one of the most successful models in the U.S. in integrating the courses and industry-recognized credentials offered by the national MSSC into their academic, for-credit curriculum and articulating that credit into college degree programs. See Appendix F for details.

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## NATIONAL INSTITUTE OF METALWORKING SKILLS (NIMS)

Formed in 1995 by the metalworking trade associations to develop and maintain a globally competitive workforce, NIMS sets skills standards for the industry, certifies individual skills against the standards and accredits training programs that meet NIMS quality requirements. NIMS operates under rigorous and highly disciplined processes as the only developer of American National Standards for the nation's metalworking industry accredited by the American National Standards Institute (ANSI).

NIMS has developed skills standards in 24 operational areas covering the breadth of metalworking operations including metalforming and machining. The standards range from entry (Level I) to a master level (Level III). All NIMS standards are industry-written and industry-validated, and are subject to regular, periodic reviews under the procedures accredited and audited by ANSI.

NIMS certifies individual skills against the national standards. The NIMS credentialing program requires that the candidate meet both performance and theory requirements. Both the performance and knowledge examinations are industry-designed and industry-piloted. There are 52 distinct NIMS skill certifications.

Industry uses the credentials to recruit, hire, place and promote individual workers. Training programs use the credentials as performance measures of attainment, often incorporating the credentials as completion requirements. The credentials are often the basis for articulation among training programs. For more information see: [www.nims-skills.org](http://www.nims-skills.org)

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### Best Practice: Articulating Credit for NIMS Certifications

NIMS has identified three partner colleges that have developed innovative practices for awarding credit for NIMS certifications: Community College of Baltimore, Maryland; Ivy Tech Community College, Indiana; and Kirkwood Community College, Iowa. A brief overview of each is offered below, and more detailed descriptions are available in the appendix.

#### Community College of Baltimore County: Strategy for Life-Long Career Pathways

In 2013, the Community College of Baltimore County (CCBC) worked with the State of Maryland to develop a new, innovative approach to better support individuals who were continuing their education throughout their career pathways. With the increased support and use of NIMS certifications in industry training programs, CCBC determined the best approach was to provide credit for individual certifications based on current college courses. Through collaborative efforts, CCBC aligned NIMS certifications throughout a portfolio of manufacturing training programs. This strategy allowed CCBC to ultimately award credit hours to those individuals who earned NIMS certifications previously.

Appendix G provides a one-page overview of the approach and process used to create the articulation agreements needed to support the award of credit for NIMS certification. The document also highlights benefits for education, industry and the individual, as well as lessons learned and a point of contact for more information.

## **Ivy Tech Community College of Indiana: From Secondary to Post-Secondary, Approach to Providing Credit for Industry Certifications**

Ivy Tech Community College of Indiana started a certification crosswalk process in 2008 to provide credit for individuals holding industry certifications. Since the launch of this project eight years prior, this practice has been incorporated into policy and has positioned Ivy Tech to offer articulation agreements across campuses and with other postsecondary institutions. The curriculum committee aligns certifications with courses in the programs to provide credit and embeds the certifications into curriculum. The process works with multiple formats of courses, including those in partnership with industry and non-credit.

Appendix H provides a one-page overview of Ivy Tech's process of creating cross-walks and utilizing its curriculum committee to create the articulation agreements in support the award of credit for industry certifications. The document also the multiple benefits of their strategy, as well as lessons learned and a point of contact for more information.

## **Kirkwood Community College: From Accelerated Training to Credit**

Several years ago, Kirkwood Community College launched an accelerated training model called Right Skills Now to support local industry demand. Right Skills Now is a 16-week program designed to prepare students for entry-level CNC Operator jobs. Upon completion of the program and achievement of four NIMS certifications, students enter into internships with local employers. A key requirement for the Right Skills Now model is to offer credit for hours in the accelerated model. Kirkwood Community College offers the Right Skills Now program in its non-credit training models and worked swiftly to develop a seamless articulation agreement.

Appendix I details the process by which Kirkwood established the fast-track training program in non-credit and successfully articulated it with the for-credit associate degree. The document also highlights strategic benefits, as well as lessons learned and a point of contact for more information.

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## **Best Practice: NIMS Articulation Agreements**

Each of colleges identified in the best practice section above has negotiated an articulation agreement to facilitate the award of credit for NIMS certification. While each college has taken a slightly different approach based on the college and state requirements, they all offer keen insight into the various methodologies that can be used as a mean to the end, i.e., the award of credit.

### **Community College of Baltimore County (CCB):**

In this case, the articulation agreement is between CCB and the State Department of Maryland. The agreement facilitates the enrollment of students from the (secondary) Maryland Manufacturing Engineering Technology (MET) Career and Technology Education (CTE) Program of Study into the Community College of Baltimore County. It outlines what the local school system, student, community college and the State Department of Education must do in support of the agreement. See Appendix J for a copy of the signed articulation agreement.

**Ivy Tech Community College of Indiana:** The articulation agreement in Indiana takes the form of a training and certification crosswalk between various NIMS certifications and the corresponding courses for which they will receive credit. For example, a student who has earned a NIMS Metal Milling Skills Certification I will receive credit for MTTC 103 Milling Processes I. Details on this cross walk can be found at [www.ivytech.edu/prior-learning](http://www.ivytech.edu/prior-learning). See Appendix K for a sample crosswalk.



**Kirkwood Community College:** Kirkwood has prepared a comprehensive set of documents in support of articulation for its accelerated program model. Included in the package are the college policy statements, a crosswalk to support non-credit to credit conversion, a form requesting credit for an industry certification, and a sample portfolio worksheet. See Appendix L for the complete Kirkwood articulation package.

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### **Best Practice: NIMS Articulation Agreement Template**

Recently, the NIMS team conducted research and analysis of NIMS educational partner programs and agreements. Based on this analysis and the identification of best practices, NIMS designed a checklist to serve as a guide in the facilitation and development of articulation agreement.

The intent of the agreement is always to provide a student with a certain amount of articulated credit in a specific program based on NIMS credentials within an education program. The checklist is intended to serve as a resource for institutions considering a new articulation agreement.

It is highly recommended that institutions perform additional research when developing an articulation agreement to align with their curriculum. Once the agreement is established, a final review of the agreement annually is encouraged to reflect curriculum and/or NIMS certification changes. See Appendix M for a copy of the NIMS Articulation Template.

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## Conclusion

College credit and attainment of degrees remain important goals within the system of career and technical education. This remains true even as we see growth in alternative approaches to competency-based education, including earn-and-learn models, short-term training, online education, and many other flexible approaches designed to meet the needs of modern learners of all ages. Education and career pathways are increasingly modular, and that presents challenges to the traditional paradigm of time-based education and sequential completion of academic degrees.

A common metric of standards and competencies, as reflected in industry-based certifications, can serve as a bridge that connects manufacturing-related programs of study across educational levels and institutions.

**Jennifer McNelly, President  
The Manufacturing Institute**

The Manufacturing Skills Certification System is an important means for manufacturers to define the competencies needed for their workforce, measured by completion of certifications set by industry. Working toward a goal of 500,000 industry certifications in the United States through 2016, The Manufacturing Institute has spearheaded an aggressive agenda to grow the number and quality of career and technical institutions that align programs to these certifications. Today there are more than 180 community colleges, technical schools, and high school programs that meet the standards for the M-List for manufacturing excellence.

Articulation agreements are critical to bridging the certification pathways into academic pathways. They help to ensure that learners can take coursework that is job-relevant while also maintaining the ability to earn academic certificates and degrees. This helps more diverse students to enter into academia, reduces the need for students to duplicate learning, and fosters transfer.

MSSC and NIMS have provided invaluable models, templates, and best practices. We urge institutions across the country to duplicate these examples, in production and machining programs, and across the spectrum of programs that need to work together to fill the skills gap nationally for manufacturing.

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## Appendixes

Manufacturing Skill Standards Council (MSSC)  
Documents

Best Practice Case Studies

- A. Ivy Tech – School of Applied Science and Engineering Technology, Advanced Manufacturing Overview
- B. Harper College – Manufacturing Technology AAS Degree Overview
- C. Alamo Colleges – Advanced Technology and Manufacturing Academy

Articulation Agreements

- D. Florida Statewide MSSC Articulation Agreement: Polk State Community College Summary
- E. Ivy Tech Community College MSSC Articulation Agreement Summary
- F. Alamo Academies MSSC Articulation Agreement Summary

National Institute of Metalforming Skills (NIMS)  
Documents

Best Practice Case Studies

- G. Community College of Baltimore County: Strategy to Support Life-Long Career Pathways
- H. Ivy Tech Community College of Indiana: From Secondary to Post-Secondary, Approach to Providing Credit for Industry Certifications
- I. Kirkwood Community College: From Accelerated Training to Credit

Articulation Agreements

- J. Community College of Baltimore County Articulation Agreement with the Maryland Department of Education
- K. Ivy Tech Community College of Indiana Sample Articulation Crosswalk
- L. Kirkwood Community College Articulation Package
- M. NIMS Articulation Agreement Template

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# **Awarding Credit for Industry Certifications and Developing Innovative Articulation Agreements**

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A Brief on Best Practices



# Best Practices: MSSC Courses For-Credit



More and more community and technical colleges across the country are learning the value of integrating MSSC Courses into their for-credit catalogs and degree programs. While non-credit courses provide excellent opportunity for dislocated worker, rapid response and other fast track adult education, for-credit options open up new possibilities for students, colleges and employers. The best of the best have not only for-credit options at two-year colleges but also have dual credit arrangements with local and regional high schools systems that allow students to begin their certification in high school and complete at the college.

The benefits of offering MSSC Courses and Certifications in a for-credit program include:

- Lower administration costs
- Greater sustainability
- Less reliance on grant funding
- More attractive to students and parents
- Better opportunity for students to earn ANSI-accredited, industry-recognized credential AND credit toward a college degree

## Three Examples

MSSC has identified three partners who have established for-credit and dual credit programs for MSSC Courses. Ivy Tech Community College, Indiana; Harper College, Illinois; and Alamo Colleges, Texas offer exemplary programs that are helping students earn credentials and degrees, employers close the skills gap and boosting their own enrollment. Program descriptions are attached.

### Ivy Tech Community College

The Advanced Manufacturing (ADMF) AAS degree program at Ivy Tech CC provides students with the opportunity to MSSC's CPT and CLT certifications in their first year of study. Students can earn, or transfer in, up to six hours of credit for the full-CPT and two hours for CLT. Students choose between two areas of emphasis (Manufacturing Design and Manufacturing Operations). Manufacturing employs more people in Indiana than any other industry, making graduates with this degree highly employable.

### Harper College

Harper College recently introduced the Manufacturing Technology AAS degree program which is designed to prepare students for employment in an advanced manufacturing environment. Harper has modularized their degree program into certificates that utilize college-issued and nationally-portable industry credentials earned one semester at a time. The program is flexible and allows students to move seamlessly between education and employment.

Students begin the degree with the solid foundation of the full-CPT certification, a Tech Math course and a required internship. Then they select a field of specialization (Mechatronics, Precision Machining, Metal Fabrication or Supply Chain Management/Logistics), and must obtain an internship in that field. Then, they continue to stack college and industry credentials in their specialization. Students who have earned enough stackable certificates in their chosen field may complete their AAS degree by completing 15-20 hours of general education courses.

### Alamo Colleges

Alamo Colleges through its academies has developed an Advanced Technology and Manufacturing Academy that uses CPT Safety and Quality as a foundation in a dual credit program that begins as early as the junior year in high school and articulates into two AAS degree programs at the college (Manufacturing Operations Technician or CNC Manufacturing Technician). This highly successful program is an educational partnership between Alamo Colleges, secondary schools, local business and industry, the San Antonio Manufacturers Association, regional Workforce Investment Boards and area economic development offices. Students have the opportunity to participate in paid internships with area employers including AT&T, Boeing, Lockheed Martin, Pratt & Whitney and Toyota.

See attachments for detailed examples of each degree program. If you have more questions or would like to know more about offering MSSC Courses for-credit, please contact us at [info@msscusa.org](mailto:info@msscusa.org).

# ADVANCED MANUFACTURING

SOUTHWEST



## CAREERS IN THIS FIELD

*CAD/CAM Specialist*

*CNC Operator/Programmer*

*Commercial and Industrial Designer*

*Electromechanical Technician*

*Industrial Machinery Mechanic*

*Manufacturing Engineer Technician*

*Mechatronics Technician • Production Supervisor*

*Quality Technician • Robotics Technician*

Manufacturing employs more people than any other industry in the state of Indiana. This means there's a high demand for educated and skilled advanced manufacturing technicians. The nationally recognized and portable MSSC Certified Production Technician (CPT) certification is available to all students in the Advanced Manufacturing program, with successful completion of all four (4) of the MSSC Certified Production Technician certification exams.

## AREAS OF EMPHASIS

### MANUFACTURING DESIGN

This emphasis prepares students to enter a variety of fields including CNC operations or programming, CAD/CAM specialties or commercial and industrial design. These students combine artistic talents with the latest technology for increased productivity in manufacturing settings.

### MANUFACTURING OPERATIONS

With an emphasis in manufacturing operations, students will have an understanding of all factors affecting manufacturing, including global impact, environmental concerns, continuous process improvement, quality operations and lean manufacturing. As a quality technician or production supervisor, these students will ensure that the production processes and methods are followed correctly and improved often.

## ASSOCIATE OF APPLIED SCIENCE (AAS) DEGREE

Two-year Associate of Applied Science degree programs prepare students for careers, career changes and career advancement. AAS programs may also prepare students for transfer to four-year institutions. The program content, which is approximately 30 percent general education, provides depth and breadth in conceptual and professional/technical skills. Professional/technical courses equip students with the skills to obtain employment and to advance in the workforce.



# ADVANCED MANUFACTURING

SOUTHWEST

## ASSOCIATE OF APPLIED SCIENCE

64-65 Credit Hours

### FIRST YEAR

#### First Semester

ADMF 101	Key Principles of Advanced Manufacturing
ADMF 102	Technology in Advanced Manufacturing
ADMF 103	Graphic Communications for Manufacturing
ADMF 113	Electrical & Electronic Principles for Manufacturing
IVYT 1XX	Life Skills Elective
MATH 136	Intermediate Algebra

#### Second Semester

ADMF 115	Materials & Processing for Manufacturing
ADMF 116	Automation & Robotics for Manufacturing I
ADMF 201	Lean Manufacturing
Elective*	Advanced Manufacturing Elective
MATH 137	Trigonometry with Analytic Geometry

### SECOND YEAR

#### First Semester

ADMF 206	Automation & Robotics in Manufacturing II
ADMF 211	Quality Systems in Manufacturing
Elective*	Advanced Manufacturing Elective
COMM 101	Fundamentals of Public Speaking
PHYS 101	Physics I

#### Second Semester

ADMF 216	Projects in Advanced Manufacturing
ADMF 280	Manufacturing COOP/Internship
Elective*	Advanced Manufacturing Elective
Elective*	Advanced Manufacturing Elective
ENGL 111	English Composition
Elective	Humanities/Social Sciences

### \*Advanced Manufacturing Course Electives/Areas of Emphasis

#### Manufacturing Design

DESN 103	CAD Fundamentals
DESN 104	Mechanical Graphics
DESN 206	Mechanical and Electrical Equipment
DESN 214	Kinematics of Machinery
DESN 217	Design Process and Applications
DESN 220	Advanced CAD
MTTC 208	CNC Programming I
MTTC 209	CNC Programming II
MTTC 210	Interactive CNC
MTTC 211	Advanced Programming Techniques
MTTC 220	CAD/CAM I
MTTC 221	CAD/CAM II

#### Manufacturing Operations

ADMF 106	Supervision and Teams at Work
ADMF 109	Green Manufacturing Operations
ADMF 118	World Class Manufacturing
ADMF 119	Logistics in Manufacturing
ADMF 220	Work Cycle Analysis
ADMF 225	ISO Certification in Manufacturing

#### Production Technologies

ADMF 112	Mechatronics I
ADMF 122	Mechatronics II
ADMF 202	Mechatronics III
ADMF 205	Sensors in Manufacturing
ADMF 222	Mechatronics IV
EECT 112	Digital Fundamentals
EECT 122	Digital Applications
IMTC 107	Preventive Maintenance
IMTC 122	Electrical Wiring Fundamentals
INDT 103	Motor and Motor Controls
INDT 104	Fluid Power Basics
INDT 201	Fluid Power Systems
INDT 203	Machine Maintenance/Installation
INDT 204	Electrical Circuits
INDT 205	Programmable Controllers I
INDT 206	Programmable Controllers II

**Program Advisor:** Dennis Liechty  
**Phone:** (812) 429-1476  
**Email:** [dliechty1@ivytech.edu](mailto:dliechty1@ivytech.edu)

To learn more about employment and salary information for careers in this field, visit the U.S. Department of Labor's Bureau of Labor Statistics website at [bls.gov](http://bls.gov) and the official career site of the State of Indiana, [indianacareerconnect.com](http://indianacareerconnect.com).

Ivy Tech Community College is accredited by North Central Association of Colleges and Schools.





## Manufacturing Technology AAS

The Manufacturing Technology program is designed to prepare students for the modern manufacturing environment. This program will prepare students for employment with companies that have implemented team oriented design, production, quality, and maintenance systems within the manufacturing environment. American manufacturers are becoming increasingly dependent upon the use of high-tech equipment that involves multiple, integrated systems. It is critical that these companies be able to recruit and employ individuals who know how to operate, troubleshoot, and maintain this high-tech equipment. The program requires the student to select one of three fields of specialization – Mechatronics, Precision Machining, and Metal Fabrication.

### Step 1: Manufacturing Production Certificate

This 16-hour certificate is designed to build the core competencies of manufacturing production to prepare students for internships and entry level positions in manufacturing. Students who successfully pass all four assessments will be recognized as Certified Production Technicians by the Manufacturing Skill Standards Council (MSSC).

MFT 102	Intro to Manu & Safety (MSSC)	4	MFT 115	Intro to Manufacturing Maint (MSSC)	2
MFT 105	Quality and Measurement (MSSC)	2	MFT 100	Tech Math	3
MFT 110	Manufacturing Processes (MSSC)	3	MFT 120	Manufacturing Internship	2

### Step 2: Select a field of specialization

Mechatronics	Precision Machining	Metal Fabrication	Supply Chain Mgt/Logistics
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### Step 3: Obtain an internship related to field of specialization.

### Step 4: Complete one or more certificates in the specialization field.

<b>Electrical Maintenance Certificate</b> 10-hour certificate  ELT 110 Intro to Electronics 4 ELT 142 Electrical Wiring 2 ELT 215 Indus Controls 4	<b>Computer Numerical Control Oper I</b> 15-hour certificate  MFT 105 Machine Process I 4 MFT 123 Intro CNC Machining 3 MFT 125 Turning – Conv to CNC 3 MNT 120 Machine Process II 3 MNT 111 Prints & Schematics 2	<b>Basic Welding</b> 16-hour certificate  MNT 111 Prints & Schematics 2 WLD 110 Basic Welding 3 WLD 210 Advanced Welding 3 WLD 211 Welding III 4 WLD 212 Welding IV 4	<b>Inventory/Production Control</b> 12-hour certificate  SCM 101 Supply Chain Mgt 3 SCM 120 Production Control 3 SCM 122 Inventory Control 3 SCM 226 Material Planning 3
<b>Industrial Electronics Certificate</b> 6 additional hours ELT 120 Intro Ind Elec Maint 2 ELT 140 PLCs 2 ELT 143 Adv Electrical 2	<b>Computer Numerical Control Oper II</b> 11 additional hours MFT 128 Milling – Conv to CNC 3 MFT 130 Machining Blueprints 1 MFT 201 Advanced CNC 5 MFT 265 Properties of Materials 2	<b>Welding Fabrication Certificate</b> 13 additional hours WLD 225 Welding Blueprints 2 WLD 240 Cutting Processes 3 WLD 245 Fabrication I 4 WLD 250 Fabrication II 4	<b>Purchasing Certificate</b> 6 additional hours SCM 125 Purchasing 3 SCM 259 Adv Purchasing 3
<b>Mechatronics/Automation Cert</b> 10 additional hours ELT 135 Optics & Sensors 2 ELT 144 AC and DC Motors 2 ELT 145 Variable Freq Drive 2 ELT 161 Industrial Controls 4			<b>Physical Distribution Certificate</b> 6 additional hours SCM 121 Physical Dist 3 SCM 256 Just-in-Time/Lean 3

### Step 5: Complete AAS Degree

Approved Electives 3	Approved Electives 3	ENG101 Composition 3	Approved Electives 5
ENG101 Composition 3	ENG101 Composition 3	ENG103 or SPE101 3	ENG101 Composition 3
ENG103 or SPE101 3	ENG103 or SPE101 3	Science, Humanities, Soc Sci 9	ENG103 or SPE101 3
Science, Humanities, Soc Sci 9	Science, Humanities, Soc Sci 9		Science, Humanities, Soc Sci 9



## Advanced Technology and Manufacturing Academy

### 1st Year

First Year total of Program of Studies:  
6 courses and total of 19 credit hours

### 2nd Year

Second Year total of Program of Studies:  
5 courses and total of 15 credit hours.

#### Fall Semester

	Credit
<b>MCHN 1302 Print Reading for Machining Trade</b> <i>A review of applied math models and a study of different blueprints, with emphasis on machine blueprints and the application of each.</i>	3
<b>MCHN 1320 Precision Tools and Measurements</b> <i>An introduction to the modern science of dimensional metrology.</i>	3
<b>MCHN 1270 MSSC</b> <i>Manufacturing Skill Standards Council Certified Production Technician Safety and Quality Modules.</i>	2

**Fall Semester Total**     **8**

#### Spring Semester

	Credit
<b>INMT 1319 Manufacturing Processes</b> <i>Exploration of a variety of methods used in manufacturing.</i>	3
<b>MCHN 1438 Basic Machine Shop</b> <i>An introduction course that assists the student in understanding the machinist occupation in industry.</i>	4

**Spring Semester Total**     **7**

#### Summer

	Credit
<b>MCHN 2486 Internship- Machine Tool Technology/Machinist</b> <i>Practical, general workplace training supported by an individualized learning plan developed by the employer, college, and student.</i>	4

**Summer Total**     **4**  
**Year 1:Program Total**     **19**

#### Fall Semester

	Credit
<b>INMT 2303 Pumps, Compressors and Mechanical Drives</b> <i>A study of the theory and operations of various types of pumps and compressors.</i>	3
<b>ELPT 1319 Fundamentals of Electrical I</b> <i>Basic theory and practice of electrical circuits.</i>	3
<b>QCTC 1243 Quality Assurance</b> <i>Principles and application designed to introduce quality assurance.</i>	2

**Fall Semester Total**     **8**

#### Spring Semester

	Credit
<b>MCHN 1426 Introduction to Computer-Aided Manufacturing (CAM)</b> <i>A study of Computer Assisted Manufacturing (CAM) systems. Software is used to develop applications for manufacturing.</i>	4
<b>ENTC 1305 Robotics</b> <i>An introduction to Robots/ Automation.</i>	3

**Spring Semester Total**     **7**

**Year 2:Program Total**     **15**

**Level 1 Certificate of Completion  
Manufacturing Skills Trade Helper**

**Level 1 Certificate of Completion  
Tool Operator/Maintenance Assistant**

**Two Year Program of Studies: 11 courses and total of 34 credit hours.**

***Excellence Through Teamwork, Training and Integrity***



# Advanced Technology and Manufacturing Academy

Level 1 Certificate  
Manufacturing Skills Trade Helper

Level 1 Certificate of Completion  
Tool Operator/Maintenance Assistant

Associate of Applied Sciences  
Manufacturing Operations Technician

Associate of Applied Sciences  
CNC Manufacturing Technician

Semester 1	Credit
<b>MCHN 1438 - Basic Machine Shop I</b>	4
<b>MCHN 1320 - Precision Tools and Measurement</b>	3
MATH 1333 - Contemporary Mathematics II <i>OR</i> <i>Select a course from: AAS Natural Sciences or Mathematics core</i>	3
<b>INMT 2303 - Pumps, Compressors and Mechanical Drives</b>	3
ITSC 1301 - Introduction to Computers <i>OR</i>	3
COSC 1301 - Introduction to Computing	3
1st Semester Total	16
<b>Semester 2</b>	<b>Credit</b>
ENGL 1301 - Composition I <i>OR</i> <i>Select a course from: AAS Communications core</i>	3
<b>ELPT 1319 - Fundamentals of Electrical I</b>	3
ELMT 1305 - Basic Fluid Power	3
PHYS 1305 - Introductory Physics I Lecture <i>OR</i> <i>Select a course from: AAS Computation core</i>	3
<b>RBTC 1305 - Robotic Fundamentals</b>	3
2nd Semester Total	15
<b>Semester 3</b>	<b>Credit</b>
RBTC 2447 - Computer Integrated Manufacturing	4
WLDG 2439 - Advanced Oxy-Fuel Welding and Cutting	4
ELPT 1420 - Fundamentals of Electrical II	4
ECON 1301 - Introduction to Economics <i>OR</i> <i>Select a course from: AAS Social or Behavioral Sciences core</i>	3
3rd Semester Total	15
<b>Semester 4</b>	<b>Credit</b>
<b>MCHN 1302 - Print Reading For Machining Trade</b>	3
ELPT 2419 - Programmable Logic Controllers I	4
ELPT 1441 - Motor Control	4
MUSI 1306 - Music Appreciation <i>OR</i> <i>Select a course from: AAS Humanities or Fine Arts core</i>	3
<b>MCHN 2266 - Practicum (or Field Experience)</b> <b>- Machine Tool Technology/Machinist</b>	4
4th Semester Total	16
Program Total	62

DC/ATMA: 23

Total Hours AAS: 62

Hours Needed Post DC/ATMA: 39

General Academics: 18  
Specific Hours: 21

Semester 1	Credit
<b>MCHN 1302 - Print Reading For Machining Trade</b>	3
<b>MCHN 1438 - Basic Machine Shop I</b>	4
MATH 1333 - Contemporary Mathematics II ( <i>Math for Liberal Arts Majors II</i> ) <i>OR Select on course from: AAS Natural Sciences or Mathematics core</i>	3
ITSC 1301 - Introduction to Computers <i>OR</i>	3
COSC 1301 - Introduction to Computing	3
<b>MCHN 1320 - Precision Tools and Measurement</b>	3
1st Semester Totals	16
<b>Semester 2</b>	<b>Credit</b>
ENGL 1301 - Composition I <i>OR</i> <i>Select on course from: AAS Communications core</i>	3
MCHN 2403 - Fundamentals of Computer Numerical Controlled (CNC) Machine Controls	4
<b>QCTC 1243 - Quality Assurance</b>	2
PHYS 1305 - Introductory Physics I Lecture <i>OR</i> <i>Select one course from: AAS Computation core</i>	3
<b>MCHN 1426 - Introduction to Computer-Aided Manufacturing (CAM)</b>	4
2nd Semester Totals	16
<b>Semester 3</b>	<b>Credit</b>
ECON 1301 - Introduction to Economics <i>OR</i> <i>Select a course from: AAS Social or Behavioral Sciences core</i>	3
MCHN 2431 - Operation of CNC Turning Centers	4
MCHN 2434 - Operation of CNC Machining Centers	4
MCHN 1330 - Statistical Process Control for Machinist	3
MUSI 1306 - Music Appreciation <i>OR</i> <i>Select a course from: AAS Humanities or Fine Arts core</i>	3
3rd Semester Totals	17
<b>Semester 4</b>	<b>Credit</b>
MCHN 2435 - Advanced CNC Machining	4
RBTC 2447 - Computer Integrated Manufacturing	4
<b>RBTC 1305 - Robotic Fundamentals</b>	3
<b>MCHN 2266 - Practicum (or Field Experience)</b> <b>- Machine Tool Technology/Machinist</b>	4
4th Semester Totals	13
Program Total	62

DC/ATMA: 23

Total Hours AAS: 62

Hours Needed Post DC/ATMA: 39

General Academics: 18  
Specific Hours: 21

*Excellence Through Teamwork, Training and Integrity*

## Florida Department of Education

### Statewide Articulation Agreement Industry Certification to AAS/AS Degree Program

<b>AAS/AS Degree Name:</b>	Electronics Engineering Technology		
<b>CIP Number(s):</b>	<b>AAS:</b> 0615030301*	<b>AS:</b>	1615030301*
<b>Industry Certification:</b>	MSSC Certified Production Technician	<b>Code:</b>	MSSCN001
<b>College Credit:</b>	This Gold Standard Career Pathways Statewide Articulation Agreement guarantees the minimum award of course credits or a block of credit toward the above AAS/AS program is <u>6</u> hours of credit. This agreement does not preclude the awarding of additional credits by any college through local agreements.		
<b>Validation Mechanism:</b>			
To be eligible for articulation, the student must show evidence of their Certified Production Technician certification and it must have been issued within three (3) years prior to their enrollment in the program.			
<b>Rationale/Justification:</b>			
The Certified Production Technician certification represents industry acknowledgement of technical skill attainment of competencies in the Electronics Engineering Technology program.			
<b>Applicability:</b>			
State college administrators (statewide) were consulted and agreed that the " <b><u>Certified Production Technician</u></b> " shall articulate <b><u>six (6)</u></b> college credit hours to the AAS/AS Degree in <b><u>Electronics Engineering Technology</u></b> .			
Articulated credit awarded under this agreement may only be applied to the above AAS/AS Degree and the following College Completion Certificate (CCC) programs: Basic Electronics Technician (0615030310), Electronics Technician (0615030309), Laser and Photonics Technician (0615030411), and Robotics and Simulation Technician (0615040514).			
<b>Date Presented to ACC</b>	<b>ACC Recommendation</b>	<b>Date Submitted to SBE</b>	<b>SBE Status</b>
<b>10/28/2009</b>	<b>Approved</b>	<b>3/26/2010</b>	<b>Approved</b>

\* Certain programs may not have an AS/AAS degree available.

**Florida Department of Education**  
**Statewide Articulation Agreement**  
**Industry Certification to AAS/AS Degree Program**

<b>AAS/AS Degree Name:</b>	Engineering Technology			
<b>CIP Number(s):</b>	<b>AAS:</b>	0615000001*	<b>AS:</b>	1615000001*
<b>Industry Certification:</b>	MSSC Certified Production Technician		<b>Code:</b>	MSSCN001
<b>College Credit:</b>	This Gold Standard Career Pathways Statewide Articulation Agreement guarantees the minimum award of course credits or a block of credit toward the above AAS/AS program is <u>15</u> hours of credit. This agreement does not preclude the awarding of additional credits by any college through local agreements.			
<b>Validation Mechanism:</b>				
To be eligible for articulation, the student must show evidence of their Certified Production Technician certification and it must have been issued within three (3) years prior to their enrollment in the program.				
<b>Rationale/Justification:</b>				
The Certified Production Technician certification represents industry acknowledgement of technical skill attainment of competencies in the Engineering Technology program.				
<b>Applicability:</b>				
State college administrators (statewide) were consulted and agreed that the " <b><u>Certified Production Technician</u></b> " shall articulate <b><u>fifteen (15)</u></b> college credit hours to the AAS/AS Degree in <b><u>Engineering Technology</u></b> .				
Articulated credit awarded under this agreement may only be applied to the above AAS/AS Degree and the following College Credit Certificate (CCC) programs: Computer-Aided Design and Drafting (0615130304); Computerized Woodworking (0615080501); and CNC Machinist (0648051002).				
<b>Date Presented to ACC</b>	<b>ACC Recommendation</b>	<b>Date Submitted to SBE</b>	<b>SBE Status</b>	
<b>10/28/2009</b>	<b>Approved</b>	<b>3/26/2010</b>	<b>Approved</b>	

\* Certain programs may not have an AS/AAS degree available.



## Florida Department of Education

### Statewide Articulation Agreement Industry Certification to AAS/AS Degree Program

<b>AAS/AS Degree Name:</b>	Manufacturing Technology			
<b>CIP Number(s):</b>	<b>AAS:</b>	0615061307*	<b>AS:</b>	1615061307*
<b>Industry Certification:</b>	MSSC Certified Production Technician		<b>Code:</b>	MSSCN001
<b>College Credit:</b>	This Gold Standard Career Pathways Statewide Articulation Agreement guarantees the minimum award of course credits or a block of credit toward the above AAS/AS program is <u>9</u> hours of credit. This agreement does not preclude the awarding of additional credits by any college through local agreements.			
<b>Validation Mechanism:</b>				
To be eligible for articulation, the student must show evidence of their MSSC Certified Production Technician certification and it must have been issued within three (3) years prior to their enrollment in the program.				
<b>Rationale/Justification:</b>				
The MSSC Certified Production Technician certification represents industry acknowledgement of technical skill attainment of competencies in the Manufacturing Technology program.				
<b>Applicability:</b>				
State college administrators (statewide) were consulted and agreed that the " <b><u>MSSC Certified Production Technician</u></b> " shall articulate <b><u>nine (9)</u></b> college credit hours to the AAS/AS Degree in <b><u>Manufacturing Technology</u></b> .				
Articulated credit awarded under this agreement may only be applied to the above AAS/AS Degree.				
<b>Date Presented to ACC</b>	<b>ACC Recommendation</b>	<b>Date Submitted to SBE</b>	<b>SBE Status</b>	
10/28/2009	Approved	3/26/2010	Approved	

\* Certain programs may not have an AS/AAS degree associates.



## Use of Articulation Agreements within MSSC Community

MSSC surveyed 52 schools regarding their use of the Certified Production Technician (CPT) and Certified Logistics Technician (CLT) programs for credit and the implementation of articulation agreements between secondary and post-secondary institutions. Overall findings suggest that while many schools offer credit for the certifications, articulation agreements are not widely used.

### **RESULTS**

#### Classification

Total Respondents	52
Secondary	15
Post-secondary	37

#### Secondary Practices

- 73% of secondary students enrolled in MSSC programs earn CTE credits toward graduation
- 53% have dual enrollment with area community or technical colleges, but only 40% earn college credit for the credentials

#### Post-Secondary

- 56% offer credit for MSSC certifications
- Only 16% have articulation agreements with area high schools
- Credits offered range from 6 to 15 hours for full CPT certification or 1.5 to 3.75 hours per certificate for CPT and CLT

### **CONCLUSIONS**

The best examples of articulation come from schools where there are statewide agreements in place either at the state department of education or through a community college system. Those states also have the most widespread usage of MSSC at the secondary level suggesting that allowing students to earn industry certifications and college credit while in high school encourages education systems as well as students to pursue these opportunities.

Many students earn college credit through dual credit or dual enrollment programs rather than strict articulation agreements, but the end result is the same.

Finally, many survey respondents who do not currently use articulation agreements or dual credit expressed interest in learning more about it.

Attachments: Florida Statewide Articulation, Ivy Tech Community College Kokomo Region, Alamo Academies, 3 sample FL State Articulation Agreements, MSSC For-Credit Best Practices (includes sample integration of CPT and/or CLT into degree programs for Ivy Tech, Alamo and Harper College, the first two of which also participate in dual credit programs with area secondary schools).

## **Florida Statewide MSSC Articulation Agreement: Polk State Community College**

### **STATEWIDE ARTICULATION AGREEMENT**

The State of Florida has the **Gold Standard Career Pathways Statewide Articulation Agreement** for Industry Certification which includes the Manufacturing Skill Standards Council's (MSSC) Certified Production Technician (CPT) certification. There are three AAS/AS degree programs that accept CPT for credit: Electronics Engineering Technology (6 hours), Manufacturing Technology (9 hours) and Engineering Technology (15 hours). This statewide agreement does not preclude the awarding of additional credits by any Florida college through local agreements.

### **BACKGROUND AND RATIONALE**

The AAS/AS Degree Core courses are aligned with the national MSSC CPT Industry certification which represents industry acknowledgement of technical skill attainment of competencies in the three technology degree programs. State college administrators (statewide) were consulted and agreed upon the credit hours to be awarded within their respective degree programs. Current articulation agreements have been in place since 2010.

Students enrolled in the degree program complete core courses which prepare them to take the four MSSC CPT certification assessments: Safety, Quality Practices & Measurement, Processes & Production and Maintenance Awareness. Students who have earned the certifications through secondary or other adult education programs may articulate these credits for up to 15 hours of college credit toward the degree.

Depending on which degree program a student pursues, articulated credit awarded under this agreement may be applied to the AAS/AS Degree and the following College Credit Certificate (CCC) programs: Computer-Aided Design and Drafting, Computerized Woodworking, CNC Machinist, Basic Electronics Technician, Electronics Technician, Laser and Photonics Technician, and Robotics and Simulation Technician.

### **ELIGIBILITY**

To be eligible for articulation, the student must show evidence of their Certified Production Technician certification, and it must have been issued within three (3) years prior to their enrollment in the program.

### **USAGE**

Polk State Community College offers the AAS/AS for Engineering Technology and provides 15 hours of credit for CPT certification. Currently, a total of 105 students with the MSSC CPT certification have submitted for articulation with Polk State Community College through the Gold Standard Career Pathways Statewide Articulation Agreement. About 25% of these students are currently enrolled in at least one engineering technology class with more entering the pipeline.

There are 34 secondary and 34 post-secondary MSSC programs in the state. As of September 2015, 2,889 secondary and 8,274 post-secondary students have participated in MSSC programs and earned at least one credential.

## **Ivy Tech Community College MSSC Articulation Agreement Summary**

### **ARTICULATION AGREEMENT**

Students may earn up to six hours of college credit for the Manufacturing Skill Standards Council (MSSC) Certified Production Technician (CPT) credentials. Degree and college certificate programs that incorporate CPT include Advanced Automation and Robotics Technology, Aviation Manufacturing, Manufacturing Operations, Mechatronics and Advanced Manufacturing. Many of these degree programs may further articulate to a Bachelor's or even Master's level degree at various state universities.

### **BACKGROUND AND RATIONALE**

Ivy Tech is one of the first college systems in the country to offer credit for MSSC certifications. In 2014, the Ivy Tech Kokomo Region received a federal Youth CareerConnect grant from the U.S. Departments of Labor and Education. The program is designed to expand career education and job training programs for students and prepare them for good-paying, high-demand jobs in advanced manufacturing. The grants funds cover the cost of education from the junior year of high school through completion of an associate degree. The program includes field trips to area plants including General Motors and Grissom Air Reserve Base's metal technology machine shop.

### **ELIGIBILITY**

The program is available to juniors and seniors in high school. Students are informed about the program at the end of their sophomore year in high school and typically earn CPT Safety and Quality Practices & Measurement their junior year and CPT Process & Production and Maintenance Awareness the fall semester of their senior year. In the spring of their senior year students who have earned their full-CPT certification are eligible for internships with area employers.

### **USAGE**

Currently 46 students have completed the first year of the program and are continuing into their second year as high school seniors. Leaders of Ivy Tech's Integrated Technology Education Program in the Kokomo Region are working with incoming juniors who are eligible to start in the fall. There are 10 participating high schools and three career centers which represent about 20 additional high schools.

There are 88 secondary and 28 post-secondary MSSC programs in the state. As of September 2015, 1,572 secondary and 13,300 post-secondary students have participated in MSSC programs and earned at least one credential.

## **Alamo Academies MSSC Articulation Agreement Summary**

### **ARTICULATION AGREEMENT**

The Alamo program uses Manufacturing Skill Standards Council (MSSC) Certified Production Technician (CPT) credentials which are integrated into both for-credit and non-credit courses for participating high school and community college students. The Academies provide a college pathway for high school juniors and seniors to attain industry and academic certificates that lead to high-wage jobs or to further higher education while addressing critical workforce industry needs. Alamo has developed one of the most successful models in the U.S. in integrating the courses and industry-recognized credentials offered by the national MSSC into their academic, for-credit curriculum and articulating that credit into college degree programs.

### **BACKGROUND AND RATIONALE**

During the two-year Alamo Academies Program in San Antonio, Texas, high school students earn 30 college credits at no personal cost allowing them to receive credits toward a college degree and high school diploma. Academies students are also eligible to be paid almost \$3,000 through an industry internship and may earn AAS, Bachelor of Arts (BA) or Master of Arts (MA) Degrees at no cost through industry tuition reimbursement or scholarships.

### **ELIGIBILITY**

The program is universal so the only eligibility criteria is for students to be in good standing, be college ready, and desire to participate in target occupational pathways. Important to note: All high school students participating in the junior internship must first secure a CPT Safety Credential. All high school students participating in senior year internship must also secure a CPT Quality Practices & Measurement Credential.

### **USAGE**

As part of this community-wide collaborative, school districts provide the books and transportation for high schoolers, and the two-year Alamo Colleges provide MSSC-authorized Instructors and MSSC-authorized Assessment Centers. Since inception in 2001, over 1,100 graduates received training in high-wage demand occupations during their junior and senior high school years. The Alamo Academies has a 14 year proven track record of graduates earning a tuition free one year Level I Certificate of Completion (almost 1/2 way toward an AAS) and industry-recognized credentials, depending on the Academy. Success rates are impressive: 42% of graduates receive jobs and the remaining 58% go on to higher education.

There are 14 secondary and 35 post-secondary MSSC programs in the state. As of September 2015, 120 secondary and 4,461 post-secondary students have participated in MSSC programs and earned at least one credential.

# From Industry to Degrees

*Community College of Baltimore County Develops Strategy to Support Life-Long Career Pathways*



## Overview & Process

In 2013, the Community College of Baltimore County (CCBC) worked with the State of Maryland to develop a new, innovative approach to better support individuals who were continuing their education throughout their career pathways. With the increased support and use of NIMS certifications in industry training programs, CCBC determined the best approach was to provide credit for individual certifications based on current college courses.

To develop a successful and sustainable articulation agreement, CCBC formed an advisory committee of internal leadership and local industry representatives. Through collaborative efforts, CCBC aligned NIMS certifications throughout a portfolio of manufacturing training programs. This strategy allowed CCBC to ultimately award credit hours to those individuals who earned NIMS certifications previously. By providing streamlined on and off ramps between education and industry through the articulation agreement, individuals were able to accelerate their continued education by earning further certifications and degrees, and completing their registered apprenticeship programs.

## Contact Information

William Werneke  
Manufacturing Technology Coordinator  
Community College of Baltimore County  
[wwerneke@ccbcmd.edu](mailto:wwerneke@ccbcmd.edu)

## Benefits

### For Education:

- Industry certifications serve as the best validation mechanism. Students who hold a NIMS certification have already proven that they have learned the basic skills and acquired the essential knowledge for a certain skill set.

### For Industry:

- For employers offering an apprenticeship or other training program, providing the employee with credit for prior learning accelerates the training process.
- If an employer is subsidizing tuition, providing credit for prior learning decreases the overall investment required.

### For the Individual:

- Credit for prior learning – No requirement to retake classes for knowledge and skills already developed.
- Acceleration of training – Allows an individual easy re-entry to continue training to further enhance their skill set.

## Lessons Learned

- **Form a strong team** – Gather a committee of internal and external leaders to support the implementation and management of the articulation agreement, including representatives from local companies.
- **Build industry support** – Make a specific ask from local industry representatives regarding your need for subject matter expertise.
- **Seek other best practices** – Connect with other organizations who have set up an articulation agreement to learn from them, to apply their lessons learned and reflect a consistent format.

# From Secondary to Post-Secondary

*Ivy Tech Community College of Indiana Approach to Providing Credit for Industry Certifications*



## Overview & Process

Ivy Tech Community College of Indiana started a certification crosswalk process in 2008 to provide credit for individuals holding industry certifications. The Ivy Tech Community College of Indiana team incorporated the review into their curriculum committee meetings. The curriculum committees work with different programs across campuses of Ivy Tech Community College of Indiana, and representatives who lead the committees include regional academic officers. Overseeing all curriculum committees is a statewide chair.

The curriculum committee aligns certifications with courses in the programs to provide credit and embeds the certifications into curriculum. The process works with multiple formats of courses, including those in partnership with industry and non-credit. Since the launch of this project 8 years prior, this practice has been incorporated into policy and has positioned Ivy Tech to offer articulation agreements across campuses and with other postsecondary institutions.

## Benefits

- Provides credit for prior coursework, allowing individuals to continue to work and learn.
- Encourages individuals to pursue industry certifications, as a means to validate prior learning.
- Creates a streamlined career pathway, with multiple on and off ramps.
- Inclusion of a performance component in the NIMS certifications supports real-life application
- Allows outreach and provides opportunities to non-traditional students, including veterans

## Lessons Learned

- **Time** – When the process is new, time is key to building a successful and sustainable articulation agreement structure, whether between credit and non-credit or other avenues. Schedule to allow for proper planning.
- **Support** – Critical to the development of an articulation agreement is support from stakeholders. Buy-in may take time.

## Contact Information

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Ivy Tech Community College of Indiana  
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Lillian M. Lowery, Ed.D.  
State Superintendent of Schools

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**ARTICULATION AGREEMENT  
COMMUNITY COLLEGE OF BALTIMORE COUNTY  
AND THE  
MARYLAND STATE DEPARTMENT OF EDUCATION  
ON BEHALF OF LOCAL SCHOOL SYSTEMS\***

*August 2013 – August 2015*

Maryland State Department of Education (MSDE) and the Community College of Baltimore County (CCBC) enter into this articulation agreement in order to facilitate the enrollment of students from the Maryland Manufacturing Engineering Technology (MET) Career and Technology Education (CTE) Program of Study into the Community College of Baltimore County.

Subject to terms of this agreement, a student who successfully completes either the Machining Operations Pathway, CNC Programming and Operations Pathway, or the Machining / CNC Programming and Operations Pathway in the Manufacturing Engineering and Technology Program of Study which includes: *Principles of Competitive Manufacturing (2 credits)* as well as *Machining Operations (2 credits)* or *CNC Programming and Operations (2 credits)* will be granted advanced credit at the Community College of Baltimore County for the following courses:

Program of Study Course Title:	CCBC Course Code:	CCBC Course Title:	Number of Credits:
Principles of Competitive Manufacturing – <i>Measurement, Materials &amp; Safety</i>	CAMM 111	Manufacturing Processes I	4 Credits
Principles of Competitive Manufacturing – <i>Job Planning, Benchwork &amp; Layout</i>	CAMM 112	Manufacturing Processes II	4 Credits
Machining Operations – <i>Manual Milling</i>	CAMM 161	Manual Mill Operations I	3 Credits
Machining Operations – <i>Turning Operations Between Centers or Turning with Chucking</i>	CAMM 152	Manual Lathe Operations	3 Credits
CNC Programming and Operations – <i>CNC Turning Operations and CNC Turning: Programming and Operations</i>	CAMM 253	CNC Lathe Operations	3 Credits

**Maryland Public Schools: #1 in the Nation Five Years in a Row**



CNC Programming and Operations – <i>CNC Milling Operations and CNC Milling: Programming and Operations</i>	CAMM 252	CNC Milling Operations	3 Credits
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The Community College of Baltimore County accepts Advanced Placement examination scores of three or better to fulfill General Education requirements.

**The terms of this agreement are as follows:**

**Maryland Local School Systems will:**

- Offer the Maryland MET CTE program of study as stated in the program proposal;
- Communicate details of this agreement to principals, parents, teaching staff, guidance personnel and students; and
- Identify an MET contact person at the local school system’s central office who will communicate with CCBC regarding this agreement.

**Students will:**

- Complete the entire MET Machining Operations Pathway, CNC Programming and Operations Pathway or the Machining / CNC Programming and Operations Pathway in the Maryland MET CTE program of study by taking all required courses;
- Take and pass the National Institute of Metalworking Skills (NIMS) exam for each certification area as appropriate;
- Earn a B grade in all Maryland MET CTE program of study courses, and maintain an overall B grade average;
- Receive a high school diploma;
- Meet the admission dates and procedures that apply to all new students at the Community College of Baltimore County;
- Provide a letter of recommendation from his/her lead MET Program instructor;
- Apply within five years of high school graduation to be accepted; and
- Provide a copy of their official NIMS certification.

**The Community College of Baltimore County will:**

- Communicate details of this agreement to admissions staff, chairs of academic departments and faculty;
- Award the appropriate number of academic and technical credits upon completion of the student’s requirement as specified in this agreement upon appropriate review of the student’s transcript and standing at the college or university (no more than twelve credits may be earned);
- Ensure credits are recorded on the student’s transcript; and
- Provide MSDE with the number of students matriculating from the Maryland CTE Program of Study as well as the number of credits awarded to the students.

**Maryland State Department of Education will:**

- Communicate details of this agreement with local school systems;
- Provide CCBC with a list of approved Maryland MET CTE Programs of Study; and
- Update the approved list biannually.

The Community College of Baltimore County (CCBC) will arrange meetings with students on the Maryland MET Program school campuses to provide information and assistance in matriculating at CCBC. The Admissions Office of CCBC will supply MSDE with promotional literature that will be used to assist students with the transfer process.

***For the Community College of  
Baltimore County:***

***For Maryland State Department of  
Education:***

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Doug Kendzierski,  
Campus Director

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Katharine M. Oliver,  
Assistant State Superintendent  
Division of Career and College Readiness

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Michael Netzer,  
Campus Dean

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Mark McColloch,  
Chief Academic Officer

# From Accelerated Training to Credit

*Kirkwood Community College Develops Articulation Agreement for Fast-track Training to 2-Year Program*



## Overview & Process

Several years ago, Kirkwood Community College launched an accelerated training model called Right Skills Now to support local industry demand. Right Skills Now is a 16-week program designed to prepare students for entry-level CNC Operator jobs. Upon completion of the program and achievement of four NIMS certifications, students enter into internships with local employers.

A key requirement for the Right Skills Now model is to offer credit for hours in the accelerated model. Kirkwood Community College offers the Right Skills Now program in their non-credit training models and worked swiftly to develop a seamless articulation agreement. The first step in the process was to ensure that the curriculum was mirrored, to support a smooth transition for students from the non-credit to credit degree program. The next step in the process was to translate credit hours into contact hours. Finally, the articulation agreement development team identified equipment and resources offered in each program to guarantee similarity between the two programs.

Instructors in both non-credit and credit training programs are required to hold NIMS certifications to ensure a quality measure between both programs.

## Benefits

- **Recruitment Tool** – With the articulation agreement, the Right Skills Now program serves as an excellent recruitment avenue for students to enter into the two-year associates degree program.
- **Streamlines Continued Education** – The Kirkwood team spent substantial time on the articulation agreement to remove any potential barriers as individuals transition from the non-credit training program to a for-credit program.

## Lessons Learned

- **State Requirements** – The team learned that the states may have varying requirements to successfully build out an articulation agreement.
- **First Time** – Prepare for the unknown and allot additional planning time.
- **Organizational Requirements** – Different education institutions have different variations in requirements for articulation

## Contact Information

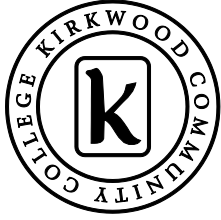
Andy Livin  
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**TRAINING AND CERTIFICATION CROSSWALK - MAY 2015**

<http://www.ivytech.edu/prior-learning>

**\*\*All certifications or licenses must be current and valid. Training must be documented with ACE transcript**

Students with certifications in the following areas	Will receive credit for the following courses
<b>MACHINE TOOL TECHNOLOGY</b>	
NIMS Measurement, Materials & Safety Certification and NIMS Job Planning, Benchwork, and Layout Certification	MTTC 101 Introduction to Machining
NIMS Turning Operations with Chucking Skills Certification or NIMS Turning Operations: Turning Between Centers Certification	MTTC 102 Turning Processes I
NIMS Manual Milling Skills I Certification	MTTC 103 Milling Processes I
NIMS Grinding Skills I Certification	MTTC 105 Abrasive Processes I
NIMS CNC Milling: Operations Certification and NIMS CNC Turning: Operations Certification	MTTC 107 CNC Operations
CNC Milling: Programming Setup & Operations Certification and CNC Turning: Programming Setup & Operations Certification	MTTC 242 CNC Machining



To obtain credit for Kirkwood Continuing Education coursework, the student must submit the following to the program coordinator:

1. Application for Alternative Credit
2. Proof of non-credit course completion

To obtain credit for industry recognized, third-party portable certificate, credential or licensure, the state or national examination must have been successfully completed no more than two years from the date of submission of the Application for Alternative Credit form. The student must submit the following to the program coordinator:

1. Application for Alternative Credit
2. Industry Recognized, Third-Party Portable Certificate, Credential or Licensure form
3. Copy of certificate or license

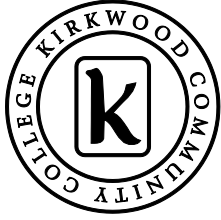
To obtain credit for work experience or experiential learning, the student must submit the following to the program coordinator:

1. Application for Alternative Credit
2. Portfolio to include but not limited to:
  - a. Tangible examples of competencies or a completed Portfolio Worksheet
  - b. A current resume
  - c. A job description that clearly defines duties and a letter from the employer verifying that the student has met the competencies of the course(s) requested.

If approved, one half of the tuition per credit for each Application for Alternative Credit (except for Kirkwood Continuing Education), will be added to the student's bill for the current term. All forms, attachments and documentation will be submitted to the Records Evaluator for billing, processing and archival.

Alternative credit will be denoted on the student's transcript as exam credit. The credit will not apply to the grade point average calculation. If the student transfers to another institution, credits earned through this policy are subject to the receiving institution's transfer credit policies and procedures. It is not guaranteed that all post-secondary institutions will recognize these credits.

If the Application for Alternative Credit is denied, the student will be notified in writing by the program coordinator or Dean. The Application and a copy of the denial letter must be submitted to the Records Evaluator for inclusion in the student's academic record and archival. The student may appeal the decision to the Vice President Academic Affairs. The appeal must be made in writing and submitted within 10 business days of the denial.



## **Policy Statement**

This policy explains agreements for converting non-credit coursework, training or experience to technical college credit coursework.

## **Reason for Policy**

The granting of college credit must meet institutional and accrediting agencies' standards.

## **The Policy**

Non-credit work that is eligible for conversion to technical college credit coursework is:

1. Kirkwood Continuing Education coursework
2. Industry recognized, third-party portable certification, credential or licensure
3. Work experience/experiential learning

Approvals are required from the program coordinator, Dean and VP Academic Affairs.

Approved conversion agreements will be in effect for three years from the signature date at which time they must be reviewed and resubmitted for renewal. The renewal process is initiated by the office of the VP of Academic Affairs.

A record of all approved non-credit to credit coursework will be archived by the office of the VP Academic Affairs.

## **Roles and Responsibilities**

**Non-Credit Requester:** Works with VP Continuing Education to prepare conversion proposal. Completes Instructor Qualification, Non-Credit Course Competencies and Non-Credit to Credit Conversion forms.

**Credit Course Instructor:** Works with non-credit requester to evaluate non-credit course competencies in comparison to credit course competencies.

**Program Coordinator:** Reviews and approves Non-Credit to Credit Conversion form and supporting documentation.

**Dean:** Reviews and approves Non-Credit Course Competencies, Instructor Qualification and Non-Credit to Credit Conversion forms

VP Academic Affairs: Reviews and approves Non-Credit to Credit Conversion form and supporting documentation. Maintains archival of approved forms. Initiates renewal process for approved conversions.

VP Continuing Education: Reviews and approves Non-Credit to Credit Conversion form and supporting documentation. Maintains instructor qualification standards for faculty subsequently hired to teach non-credit course.

#### Process for converting Kirkwood Continuing Education coursework

The course must meet the following requirements:

1. Completion of 80% of required course competencies
2. Required seat time
3. Instructor has credentials to teach the equivalent credit course

Forms to complete and route for approval:

1. Non-Credit to Credit Conversion form
2. Non-Credit Course Competencies form
3. Credit course master syllabus
4. Instructor Qualification
5. The non-credit course's assessment instrument

#### Process for converting industry recognized, third-party portable certification, credential or licensure

A credit department may convert certification, credential or licensure from a recognized state or national examination to technical college credit coursework.

Forms to complete and route for approval:

1. Non-Credit to Credit Conversion form

#### Process for converting work experience or experiential learning

Credit for work experience/experiential learning will be evaluated by the program coordinator and Dean on a case-by-case basis upon examination of the student's portfolio. The portfolio will include but will not be limited to:

- d. Tangible examples of competencies or a completed Portfolio Worksheet
- e. A current resume
- f. A job description that clearly defines duties and a letter from the employer verifying that the student has met the competencies of the course(s) requested.







**INDUSTRY RECOGNIZED, THIRD-PARTY PORTABLE CERTIFICATE, CREDENTIAL OR LICENSURE**

\* \* \* Copy of certificate/credential/licensure(s) must be attached to this application \* \* \*

Credit being requested:

Title of Certificate/Credential/Licensure Completed	Date Completed	Title of Kirkwood Course	Course Number	Credits

I request the above credit for my certificate/credential/licensure(s).

I understand that the credit may or may not be awarded.

I understand my certificate/credential/licensure(s) must not have been earned more than two years from the Application for Alternative Credit date to receive credit.

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
K number

\_\_\_\_\_  
Date

I have reviewed the attached Certificate/Credential/Licensure(s) and after evaluation determined them to be equivalent to the above Kirkwood coursework. Attached is documentation of the evaluation of the certificate/credential/licensure(s).

\_\_\_\_\_  
PROGRAM COORDINATOR

\_\_\_\_\_  
DATE

Approve  Deny

\_\_\_\_\_  
DEAN

\_\_\_\_\_  
DATE

Approve  Deny

\_\_\_\_\_  
VP ACADEMIC AFFAIRS

\_\_\_\_\_  
DATE

Approve  Deny

## NON-CREDIT COURSE COMPETENCIES

Non-Credit Course Title: \_\_\_\_\_ Course Number: \_\_\_\_\_

Credit Course Title: \_\_\_\_\_ Course Number: \_\_\_\_\_

For each credit course competency listed on the master syllabus, describe how, and the degree to which, this non-credit course meets the competency.

*Competency 1:*

*Competency 2:*

*Competency 3:*

*Competency 4:*

*Competency 5:*

*Competency 6:*

*Competency 7:*

*Competency 8:*

Non-Credit Course Instructor \_\_\_\_\_ Date \_\_\_\_\_

Credit Course Instructor \_\_\_\_\_ Date \_\_\_\_\_

Dean \_\_\_\_\_ Date \_\_\_\_\_

## SAMPLE PORTFOLIO WORKSHEET

(Example of a completed form.)

	Experience	Description of Duties (What I did)	Skills/Competencies (What I had to know)	Analysis of Learning (What I learned)	Documentation (How is this verified?)
Employment experience (Use this for work experience credit)	2008-2012 Administrative Assistant position, ABC Company, Inc. 124 E. Main Street Tampa, Florida 52230	<ul style="list-style-type: none"> <li>• Maintained inventory control of publications</li> <li>• Correspond with clients</li> <li>• Wrote a copy for press</li> <li>• Prepared monthly budget</li> <li>• Supervised clerical staff</li> </ul>	<ul style="list-style-type: none"> <li>• Organizational procedures</li> <li>• Problem solving</li> <li>• How to write letters and memos</li> <li>• How to prepare new copy</li> <li>• How to set up account books</li> <li>• How to deal with difficult personnel issues</li> </ul>	<ul style="list-style-type: none"> <li>• How to develop inventory control</li> <li>• How to write more effectively</li> <li>• Public relations</li> <li>• How to monitor accounts</li> <li>• Personnel policies and procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Office job description from employer</li> <li>• Letter from supervisor</li> <li>• Resume</li> <li>• Documentation of past work (copy of a budget, letters written)</li> <li>• Any documentation of training taken place at work</li> </ul>
	2012-Present Elected Board Treasurer	<ul style="list-style-type: none"> <li>• Prepared budget proposals for Board</li> <li>• Reviewed expenditures of school district</li> <li>• Worked with state auditors</li> <li>• Prepared budget statements for district newsletter</li> <li>• Gave public presentations of annual budget report</li> </ul>	<ul style="list-style-type: none"> <li>• Thorough knowledge of state and local budget</li> <li>• How to explain budget and provide necessary information</li> <li>• How to write professionally</li> <li>• How to speak professionally</li> </ul>	<ul style="list-style-type: none"> <li>• Budgeting for \$5 million annual budget</li> <li>• Prudent fiscal management</li> <li>• Professional writing procedures</li> <li>• How to be persuasive</li> <li>• Improvement of public speaking</li> <li>• Public relations</li> </ul>	<ul style="list-style-type: none"> <li>• Examples of professional writing</li> <li>• Examples of prepared budgets</li> <li>• Video or documentation of presentations made</li> </ul>

	Experience	Description of Duties (What I did)	Skills/Competencies (What I had to know)	Analysis of Learning (What I learned)	Documentation (How is this verified?)
Education: Non-Credit courses, training, licensure and seminars (Use for non-credit to credit conversion. Be sure to match to Kirkwood credit competencies)	Stress Management Workshop Kirkwood Continuing Education			<ul style="list-style-type: none"> <li>• Effective breathing exercises</li> <li>• How to decrease burn out</li> </ul>	<ul style="list-style-type: none"> <li>• Certificate from course – earned 2.5 CEUs</li> <li>• Registration form</li> </ul>
Volunteer Experience/Other (Use for experiential learning, life experience, work, portfolio, etc)	2002-2007 GRRAND (Golden Retriever Rescue and Adoption of Needy Dogs)	<ul style="list-style-type: none"> <li>• Home visits</li> <li>• Coordinated follow up calls</li> </ul>	<ul style="list-style-type: none"> <li>• How to explain policies and procedures very clearly</li> </ul>	<ul style="list-style-type: none"> <li>• Public speaking</li> <li>• How to lead other volunteers effectively</li> </ul>	<ul style="list-style-type: none"> <li>• Pictures from events</li> <li>• Information given out at home visits</li> <li>• Letter of reference from volunteer supervisor</li> </ul>
	Volunteer vacation to Australia	<ul style="list-style-type: none"> <li>• Lived on conservation property</li> <li>• Worked throughout property (feeding animals, planting trees, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• How to live/work with different cultures</li> </ul>	<ul style="list-style-type: none"> <li>• Ecological concerns in foreign countries</li> </ul>	<ul style="list-style-type: none"> <li>• Acceptance letter</li> <li>• Pictures</li> <li>• Itinerary</li> </ul>

# PORTFOLIO WORKSHEET

(May use multiple sheets to fully document competencies)

	Experience	Description of Duties (What I did)	Skills/Competencies (What I had to know)	Analysis of Learning (What I learned)	Documentation (How is this verified?)
Employment experience (Use this for work experience credit)					
Education: Non-Credit courses, training, licensure and seminars (Use for non-credit to credit conversion. Be sure to match to Kirkwood credit competencies)					
Volunteer Experience/Other (use for experiential learning, life experience, work, portfolio, etc)					
	Experience	Description of Duties (What I did)	Skills/Competencies (What I had to know)	Analysis of Learning (What I learned)	Documentation (How is this verified?)
Employment					

experience (Use this for work experience credit)					
Education: Non-Credit courses, training, licensure and seminars (Use for non-credit to credit conversion. Be sure to match to Kirkwood credit competencies)					
Volunteer Experience/Other (use for experiential learning, life experience, work, portfolio, etc)					



## Building a Successful Articulation Agreement

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The NIMS team conducted research and analysis of NIMS educational partner programs and agreements. In addition to a series of best practices, this checklist was designed to serve as a guide in the facilitation and development of an agreement which provides a student with a certain amount of articulated credit in a specific program based on NIMS credentials within an education program. This checklist is intended to serve as a resource for institutions considering a new articulation agreement. It is highly recommended that institutions perform additional research when developing an articulation agreement to align with their curriculum. Once the agreement is established, a final review of the agreement annually is encouraged to reflect curriculum and/or NIMS certification changes.<sup>1</sup>

*October 2015*

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<sup>1</sup> Please note: Based on research, NIMS highly recommends contacting the state Department of Education for details on requirements and templates.





## Articulation Agreement between [Insert College/Technical School Name] and [Insert Organization Name]

### Key Information

(To be included in the written articulation agreement)

- I. **Purpose:** Short description of the purpose of the articulation agreement with start date for the agreement.
  
- II. **Admissions and Conditions for Credit:** Provides details on applicant's admissions after successfully completing the articulated NIMS credentials and secondary school program. If applicable, indicate what NIMS credentials in the agreement will fulfill the requirements for the degree. Crosswalk the NIMS credentials to the program credits in a table (sample template provided below).

NIMS Credential Name	Program / Class Name & Code	Core Competencies/KSAOs	Total Credit Hours

**Please Note:** The NIMS credential translation toolkit is available to support instructors in streamlining the alignment of courses with NIMS credentials. This toolkit is available at [www.nimsready.org](http://www.nimsready.org).

- III. **Credit Acceptance:** Details on total number of credit hours from NIMS credentials that will be allowed toward fulfillment of the number of credit hours required for completion of the identified program/degree. Clearly identify any additional requirements for credit acceptance.



- IV. Scholarship and Financial Aid:** Include this section if students will be given consideration for scholarship and/or financial aid.
- V. Benefits to School:** List benefits to school under this agreement. Examples might include: increased enrollment, better prepared students, etc.
- VI. Benefits to Students:** List benefits to students under this agreement. Examples might include: early registration, guaranteed admission, or application fee waiver.
- VII. Promotion/Outreach:** Name of institution and Name of institution partner agree to publicize this agreement via XYZ [examples might include via marketing materials, social media, and program information sessions]
- VIII. Monitor and Review:** Name of institution will establish a process to monitor the performance of this agreement and revise it as necessary. The review process will take place annually and changes will be communicated to the public in a timely manner.
- IX. Termination:** Provide termination language that is suitable to Name of institution's legal department.
- X. Signatures Page:** Include a signature page for all parties to sign off on the documented articulation agreement.



## Sample Agreement

### **Articulation Agreement Between [Insert College/Technical School Name] And [Insert Organization Name]**

IN WITNESS THEREOF, the parties hereto have executed or approved this AGREEMENT on the date entered below

\_\_\_\_\_

\_\_\_\_\_

TITLE

TITLE

NAME OF INSTITUTION

NAME OF ORGANIZATION

Dated: \_\_\_\_\_



## Action Steps

- Have you checked with local/state education institutions about their best practices and templates for articulation agreements?
- Will you form an advisory committee of internal and external leadership to support the development of the articulation agreement?
  - Institutions surveyed recommend a mix of education and industry representatives
- Has a review of state, local and institutional policies been conducted?
  - This is a critical step, as it positions the institution to access federal and state funding.
- How will you offer credit? Via certifications, course-to-course or another avenue?
- What are the plans for promotion with the articulation agreement?
  - Articulation agreements are often a strong recruitment tool.
- How will you research and strategize next steps?
  - There are many online resources and tools available, including the [NIMS credential translation toolkit](#) and [college transfer guidance websites](#).