



# Advanced Manufacturing Technology Career Pathway

Preparing secondary students for  
careers in advanced manufacturing and  
integrated technology through Regional  
Career Pathways

# Education Building Blocks

## PURPOSE

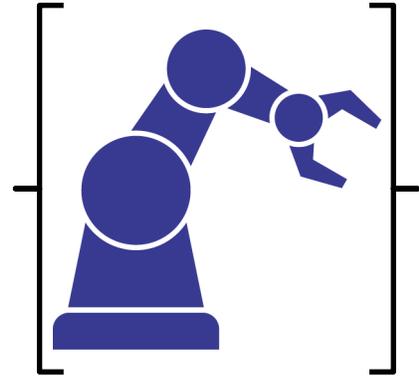
The purpose of **Educational Building Blocks** is to give secondary educators guidance on the skills and competencies that will prepare their students for careers in construction.

Education Building Blocks are not fully developed curriculum and lessons, **nor are they a replacement for state education standards in content areas**. Rather, they should be used as guidelines that reference the skills and competencies that employers are looking for in a particular industry. These guidelines should inform you as you develop curriculum aligned to state standards.

Education Building Blocks are comprised of four groups of skills:

- \*Employability Skills
- \*Digital Literacy Skills
- \*Academic Skills
- \*Technical Skills

The combination of these sets of skills comprise the necessary learning to prepare students to be future ready to transition to adulthood prepared for college AND careers.



## PROCESS

Groups of employers and employer professional associations (Appendix C) have gathered to develop this document in order to provide secondary educators with a current picture of skill sets desired in a particular high skill, high demand industry sector. Their input has been collated into this guidance document for use in regional career pathway development in secondary settings.

Once defined, the **State-Endorsed Career Pathway outline (page )** was developed showing the career ladder progression, as well as the desired industry-recognized credentials and education needed to advance to different levels in the industry sector.

The State-Endorsed Career Pathway outline is adopted into a **Regional Map** by Regional Councils of higher education and public agency partners to leverage their local resources for implementation. Regional Councils must address barriers to access, as well as connect secondary students directly to available work-based learning experiences, dual credit (high school and college) course opportunities, and local district course offerings. This “ready-made Academic and Career Plan (ACP)” highlights to students the series of activities for those interested in the career sector. Regional Maps, adopted by the local school, can be used with students and families in ACP planning and advising.

# Education Building Blocks

## SKILL SETS

All Regional Career Pathways require districts to identify a sequence of courses that students will take in order to complete the secondary pathway. The specific courses may vary from district to district. However, every district's sequence of courses should reflect Education Building Block learning for the pathway. This ensures a consistent approach to the skills and competencies that are being developed while providing local flexibility in delivery.

### Employability Skills

Often referred to as "Soft" skills, the source for the Employability Skills Set in the Education Building Blocks is the Wisconsin Department of Public Instruction's (DPI) Employability Skill Standards (Appendix A). Furthermore, because employers are also seeking job candidates that are able to think and act innovatively, it is also recommended to reference the Innovation Learning Outcomes (Appendix A) as part of this learning. Although this skill set was originally created for future entrepreneurs, it provides suggestions to prepare students to become innovation leaders with an entrepreneurial mindset.

### Digital Literacy Skills

Today's job market requires some level of digital literacy. Therefore, it is essential to include digital literacy skills in every Education Building Block model. For our purpose, Digital Literacy Skills are defined by DPI's Information and Technology Standards for Digital Literacy (Appendix B).

### Academic Skills

Academic Skills are clearly defined by states in standards which act as benchmarks of quality and excellence in education. The Wisconsin Academic Standards specify what students should know and be able to do in the classroom. Setting high standards enables students, parents, educators, and citizens to know what students should have learned at a given point in time. State standards serve as a model. Locally elected school boards adopt academic standards in each subject to best serve their local community. Educational Building Blocks point to specific groups of academic skills that employer partners have indicated are critical to their industry.

### Technical Skills

Often referred to as "Hard" Skills, employers recognize that developing basic occupational skills in secondary settings allows students to apply academic learning in unique and contextualized ways. Employers identify specific technical skills in the Educational Building Blocks that should be developed for anyone interested in pursuing a career in the this area.

"The solution is to pursue initiatives that instill both hard skills and soft skills into the available workforce, not settle for one at the expense of the other."

Matt Kirchner, Lab Midwest

# Education Building Blocks

## ADVANCED MANUFACTURING TECHNOLOGY

### Advanced Manufacturing Technology

The term advanced manufacturing technology has been coined for this particular pathway to encompass the rapidly changing nature of this industry. In its simplest definition, manufacturing takes in raw materials to produce products that are useful for a customer. Advanced Manufacturing builds on this definition by utilizing technology to improve products and/or processes; thereby increasing efficiency, reliability, and quality for newer and better products.

However, with the recognition of Industry 4.0 as an evolutionary integration of processes, equipment, and trained personnel, manufacturing must now account for an ever-changing, constantly-progressing wave of data and information integrated into combinations of technologies that impact products and processes in ways never before anticipated. For this reason, these educational building blocks embrace a more broad definition of what it means to build a career in manufacturing.

### BLOCK 1

#### Employability Skills

Appendix A

- Employability Skill Standards
- Innovation Learning Outcomes

### BLOCK 2

#### Digital Literacy Skills

Appendix B

- Standards for Information and Technology Literacy

### BLOCK 3: ACADEMIC SKILLS

#### Science Concepts

- Scientific Methods in Qualitative and Quantitative analysis, data gathering, direct and indirect observation, predictions, and problem identification.
- Forces
- Ohm's Laws
- Kirchhoff's Laws
- Pascal's Law and Delta-P
- Boyle's Laws
- Bernoulli's Law

# Education Building Blocks

## BLOCK 3: ACADEMIC SKILLS

### Math Concepts

- Number Systems and Relationships - whole numbers, decimals, fractions, alternate base systems (e.g. binary, octal, and hexadecimal numbers)
- Arithmetic – arithmetic operations on numbers, percentages, square root, exponentiation, and logarithmic functions
- Plane and Solid Geometry – distance, perimeter, area, and volume, spatial coordinates, visualization, spatial reasoning, and geometric modeling
- Measurement – measurement of length, mass, time, systems of measurement, units, and conversion between systems (e.g. from English to metric)
- Estimation -- estimate sizes, distances, and quantities; or determine time, costs, resources, or materials needed to perform a work activity
- Mathematical Notation - the language of mathematics to express mathematical ideas
- Mathematical Reasoning and Problem Solving – inductive and deductive reasoning, conjectures, arguments, strategies, and interpretation of results
- Elementary Statistics and Laws of Probability – mean, median, and standard deviation
- Algebra and Functions – equations, patterns, and functions
- Elementary Trigonometry – triangles and trigonometric functions

### Literacy and Communication

- Locate, understand, and interpret written technical and non-technical information in documents such as manuals, reports, memos, graphs, charts, tables, schedules, signs, and regulations
- Identify relevant details, facts, specifications, and main ideas
- Infer or locate meaning of unknown or technical vocabulary
- Create documents such as letters, directions, manuals, reports, graphs, and flow charts.
- Communicate thoughts, ideas, information, messages, and other written information, which may contain technical material, in a logical, organized, coherent, and persuasive manner
- Develop ideas with supporting information and examples
- Use standard syntax and sentence structure.
- Use correct spelling, punctuation, and grammar
- Write in a manner appropriate for business
- Receive, attend to, interpret, understand, and respond to verbal messages and other cues
- Apply active listening skills using reflection, restatement, questioning, and clarification.
- Pick out important information in verbal messages
- Understand complex instructions
- Speak clearly and confidently using proper grammar, tone, and pace
- Express information to individuals or groups taking into account the audience and the nature of the information (e.g., explain technical concepts to non-technical audiences)
- Ask questions or report problems or concerns to people in authority when information or procedures are unclear or need improvement, or when feeling unsafe or threatened in the workplace



# Education Building Blocks

## BLOCK 3: ACADEMIC SKILLS

### Basic Computer Skills

- Navigation & file management
- Internet & email
- Word processing
- Spreadsheets
- Presentations
- Databases
- Graphics

### Information and Analytical Thinking

- Locate information efficiently (time) and effectively (sources).
- Evaluate information critically and competently.
- Review information obtained for relevance and completeness.
- Recognize important gaps in existing information.
- Use logic and reasoning to identify strengths and weaknesses of alternative solutions, conclusions, or approaches to problems.
- Use inductive and deductive reasoning to analyze, synthesize, compare, and interpret information.
- Understand the underlying relationship among facts and connections between issues.
- Organize problems into manageable parts

## BLOCK 4: TECHNICAL SKILLS- CAREER SUCCESS SKILLS

### Be prepared for a Technology Career.

Students who want to pursue a career in Advanced Manufacturing Technology should begin to develop these core capabilities:

- Design Thinking & Customer/Worker Experience
- Problem Solving, Innovation & Change Leadership
- Ability to troubleshoot industrial processes and equipment

They also possess characteristics such as:

Attention to Detail	Dependability
Collaboration	Self Control
Flexibility	Time Management
Initiative	

# Education Building Blocks

## BLOCK 5: TECHNICAL SKILLS- EDUCATION STANDARDS

Technology and Engineering concepts are taught at all grade levels by classroom teachers. Elementary and middle school education serve as the foundational background to advanced study in high school technology and engineering pathways courses. Connect employer recommendations in this document to [Wisconsin's Standards for Technology and Engineering](https://dpi.wi.gov/sites/default/files/imce/cte/pdf/te_standards.pdf) at: [https://dpi.wi.gov/sites/default/files/imce/cte/pdf/te\\_standards.pdf](https://dpi.wi.gov/sites/default/files/imce/cte/pdf/te_standards.pdf) (Pages 55-101).

### Elementary

- Basic algebraic reasoning
- Scientific Investigation
- Engineering Design processes
- Physical Science
- Data Collection
- Foundations of Automation & Robotics
- Hands on projects

### Middle School

- Basic industrial systems and components
- Engineering Design
- Manufacturing Technology
- Rapid Manufacturing
- Electronics
- Robotics– industrial, mobile, programming, mechatronics
- Basic computer science

### High School

As students move through the Academic and Career Planning (ACP) process into high school, identify those interested in pursuing a career in integrated technology, manufacturing and engineering. Counselors and advisors should help these students create an ACP plan that is developed from the [published State-Endorsed Regional Career Pathway](#) plan, which includes:

- an appropriate sequence of courses,
- industry recommended certifications,
- related dual credit courses, and
- related work-based learning experiences

#### Standards specific to this Pathway in Technology and Engineering (TEE):

##### Foundational (Broad-Based BB)

- BB1.a. Analyze and use technological systems.
- BB1.b. Analyze and use tools and materials.
- BB1.c. Analyze and use mechanisms.
- BB1.d. Analyze and use electricity and electronic systems.
- BB1.e. Analyze, explain and use control systems.
- BB1.f. Identify and analyze structures.



# Education Building Blocks

## BLOCK 5: TECHNICAL SKILLS- EDUCATION STANDARDS

### Standards specific to this Pathway in Technology and Engineering (TEE):

#### Electronics (EL)

- EL1.a. Apply electronic theory to practice
- EL2.a. Construct and measure a basic circuit using electronic components
- EL2.b. Demonstrate electronic measurement to series, parallel, and combination circuits.
- EL3.a. Analyze, develop use, and apply digital electronics.
- EL4.a. Design and build a combinational logic circuit that satisfies a need to design constraints.
- EL5.a. Design and build a sequential logic circuit that satisfies a need to design constraints.
- EL6.a. Program and construct a microcontroller that satisfies a need to design constraints.
- EL7.a. Demonstrate, apply, and measure electronic safety concepts applied to circuits.

#### Engineering (ENG)

- ENG1.a. Analyze engineering design theory.
- ENG2.a. Analyze the attributes of engineering design.
- ENG2.b. Describe and apply engineering design.
- ENG3.a. Discuss the importance of the problem solving process.
- ENG3.b. Analyze the procedures for innovation and invention.
- ENG4.a. Research the background information of a project design.
- ENG4.b. Design solutions based on gathered information.
- ENG4.c. Evaluate completed solutions and provide feedback.
- ENG5.a. Use information to describe and design systems.
- ENG5.b. Use tools to maintain systems.
- ENG6.a. Collect information about products and systems.
- ENG6.b. Interpret data from collected information to assess impacts of products and systems.

#### Environmental Technologies (ET)

- ET1.a. Analyze waste management systems and technologies
- ET1.b. Describe energy technologies
- ET1.c. Describe environmental quality and management technologies.

#### Manufacturing (MNF)

- MNF1.a. Identify, select and safety use tools, machines, products, and systems for specific tasks.
- MNF1.b. Create and communicate alternative solutions.
- MNF1.c. Demonstrate cooperation with others in ways to exhibit respect for individual and cultural differences and for the attitudes and feelings of others.
- MNF1.d. Select, use and identify manufacturing processes, such as casting, forming, machining, joining, rapid manufacturing (CNC), and treating/coating.
- MNF1.e. Select and use and identify manufacturing systems.
- MNF1.f. Select and use manufacturing technologies.
- MNF1.g. Analyze and use GMAW, GTAW, SMAW and oxy-acetylene welding.
- MNF1.h. Analyze and use metal and manufacturing cutting operations.

# Education Building Blocks

## BLOCK 5: TECHNICAL SKILLS- EDUCATION STANDARDS

### **Power and Energy (PE)**

- PE1.a. Discuss, analyze and use energy systems.
- PE1.b. Analyze, use and discuss machine and tool use relating to energy and power systems.
- PE1.c. Identify and analyze responsible and efficient management of energy resources.
- PE1.d. Develop necessary skills in problem solving for future energy systems.

## BLOCK 5: TECHNICAL SKILLS- ESSENTIAL TECHNICAL SKILLS

### **Students pursuing a career in Advanced Manufacturing Technology should be familiar with these technologies:**

- Design, Fabrication, Materials, Tooling & Assembly
- Modeling, Simulation & Visualization
- Mechatronics, Robotics & Automation Control
- Internet of Things: Info Tech & Operating Tech
- AI/Machine Learning & Smart Systems
- Systems Integration & Human Interface Design
- Analytics & Visual Reporting
- Data Privacy / Cybersecurity / Risk Mitigation
- Automated & User Managed Testing
- Multi-platform Design, Implementation & Operation

### **Foundations of Advanced Manufacturing:**

- **Manufacturing Process**
  - Understanding of the production, process, equipment and technology of manufacturing
  - Fundamentals of Research & Development
  - Technical Drawings and Schematics
  - CAD Drawing Fundamentals
  - Process Assessment
  - Engineering Principles & Practices
- **Production**
  - Manufacturing Types
  - Systems
- **Lean Manufacturing/Continuous Improvement**
- **Production Materials**
- **Precision Measurement**
- **Manual Tool & Equipment Operations**
- **Basic Automated Systems & Control Operations**

# Education Building Blocks

## BLOCK 5: TECHNICAL SKILLS- ESSENTIAL TECHNICAL SKILLS

- **Maintenance, Installation, and Repair**
  - Basic Disassembly/Assembly Skills
  - Basic Maintenance and Troubleshooting Skills
- **Quality Assurance and Continuous Improvement**
  - Principles of Lean Manufacturing
  - Improving Quality
  - Inspecting for Quality
  - Continuous Improvement
- **Health, Safety, Security, and Environment**
  - Personal Safety
  - Regulations
  - Safety Procedures
- **Mechatronics**
  - Smart sensors and devices
  - Electrical
  - Computers
  - Controls
- **Connectivity and Networking**
- **Inform-Actionable© Data - skills and knowledge necessary to analyze data and prescribe corresponding action**
- **Math-Based & Model-based Engineering**

# Education Building Blocks

## THE STATE ENDORSED PATHWAY OUTLINE

LINK TO [STATE PATHWAY MAP](#)

**Pathways Wisconsin**  
Advanced Manufacturing Technology  
State Employer Pathway Outline

**CAREERS POSSIBLE**  
There are many exciting career options in Advanced Manufacturing Technology! Is this the pathway for you? Go to page two to learn how you can get started NOW!

<p><b>ENTRY LEVEL POSITIONS</b></p> <ul style="list-style-type: none"> <li>• Assembler</li> <li>• Data Entry Clerk</li> <li>• General Laborer</li> <li>• Material Handler</li> <li>• Packager</li> </ul> <p><b>Credentials Needed</b></p> <ul style="list-style-type: none"> <li>• Some positions require High School Diploma or GED</li> </ul>	<p><b>JOURNEY WORKER and SKILLED or TECHNICAL POSITIONS</b></p> <ul style="list-style-type: none"> <li>• Automation or Robotics Technician</li> <li>• CNC Machinist ✨</li> <li>• CNC Programmer ✨</li> <li>• Chemical Technician ✨</li> <li>• Electrical and Electronics Drafter ✨</li> <li>• Electrical and Instrumentation Technician</li> <li>• Electromechanical Technician</li> <li>• Food Science Technician</li> <li>• Industrial Electrician</li> <li>• Industrial Engineering Technician</li> <li>• Industrial Machinery Mechanic ✨</li> <li>• Machinist ✨</li> <li>• Maintenance Technician ✨</li> <li>• Mechanical Drafter (CAD)</li> <li>• Mechanical Engineering Technician</li> <li>• Millwright</li> <li>• Tool and Die Maker</li> <li>• Welder</li> </ul> <p><b>Credentials Needed</b></p> <ul style="list-style-type: none"> <li>• Completion of Industrial Apprenticeship Program or Associate Degree</li> <li>• Some positions may also require industry certifications, field training or experience</li> </ul>	<p><b>MANAGEMENT POSITIONS</b></p> <ul style="list-style-type: none"> <li>• Design &amp; Engineering Manager</li> <li>• Logistics Manager</li> <li>• Maintenance Manager</li> <li>• Manufacturing Manager</li> <li>• Operations Manager</li> <li>• Quality Manager</li> <li>• Safety Manager</li> <li>• Shipping Manager</li> </ul> <p><b>Credentials Needed</b></p> <ul style="list-style-type: none"> <li>• Completion of an Associate Degree or Bachelor Degree</li> <li>• Some positions may also require industry certifications, field training or experience</li> </ul>	<p><b>PROFESSIONAL POSITIONS</b></p> <ul style="list-style-type: none"> <li>• Automation Engineer ✨</li> <li>• Electrical Engineer</li> <li>• Electromechanical Engineering Technologist ✨</li> <li>• Environmental Specialist ✨</li> <li>• Food Scientist</li> <li>• Industrial Data Scientist</li> <li>• Industrial Engineer ✨</li> <li>• Industrial Engineering Technologist ✨</li> <li>• Material, Welding or Process Engineer ✨</li> <li>• Mechanical Engineer</li> <li>• Mechatronics Engineer ✨</li> <li>• Network or Cybersecurity Specialist</li> <li>• Quality or Reliability Engineer ✨</li> </ul> <p><b>Credentials Needed</b></p> <ul style="list-style-type: none"> <li>• Completion of Bachelor Degree</li> <li>• Some positions may require an additional Graduate Level Degree</li> </ul>
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**SEMI-SKILLED POSITIONS**

- CNC Machine Operator ✨
- Chemical Equipment Operator
- Finishing Technician
- Food Processing Operator ✨
- Food Batchmaker ✨
- Machine Setter and Operator ✨
- Machine Builder
- Mold Technician ✨
- Paint Technician ✨
- Quality Control Technician
- Sheet Metal Fabricator

**Credentials Needed**

- Completion of an Industry Recognized Certification or Technical Diploma
- Some positions may also require field training or experience

**Top Manufacturing Employment Categories in WI**

<ul style="list-style-type: none"> <li>• Computer and electronic products</li> <li>• Electrical equipment</li> <li>• Fabricated metal products</li> <li>• Food and Beverage</li> <li>• Machinery</li> </ul>	<ul style="list-style-type: none"> <li>• Paper</li> <li>• Plastics and rubber products</li> <li>• Printing</li> <li>• Transportation equipment</li> <li>• Wood products</li> </ul>
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Quarterly Census of Employment and Wages - Bureau of Labor Statistics, Annual 2016 employment

✨ High Demand, High Skill in WI, DWD projections 2016-2026

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**Pathways Wisconsin**  
Advanced Manufacturing Technology  
State Employer Pathway Outline

**HIGH SCHOOL OPTIONS**  
High schools offering a Regional Career Pathway need to include one option from each of the four elements. Students can get a head start in high school by completing 3 of the 4 pathway elements in a Regional Career Pathway.

<p><b>ELEMENT 1: Sequence of Courses</b></p> <ul style="list-style-type: none"> <li>• Must offer three courses</li> <li>• Course should include the Education Building Blocks for this pathway</li> </ul>	<p><b>ELEMENT 2: State Certified Work-Based Learning Program</b></p> <ul style="list-style-type: none"> <li>• Employability Skills (90 hrs)</li> <li>• State Skill Standards Co-Op (480 hrs/1 year)</li> <li>• Youth Apprenticeship (450-900 hrs/1-2 years)</li> </ul> <p><b>Manufacturing</b></p> <ul style="list-style-type: none"> <li>○ Production</li> <li>○ Production Operations Management</li> <li>○ Maintenance, Installation and Repair</li> </ul>	<p><b>ELEMENT 3: College Credit Opportunities</b></p> <ul style="list-style-type: none"> <li>• Early College Credit Program</li> <li>• Start College Now</li> <li>• Transcribed Credit</li> <li>• Advanced Placement Courses</li> <li>• Dual Enrollment Academies</li> </ul>	<p><b>ELEMENT 4: Industry Recognized Certifications</b></p> <p><a href="#">American Welding Society (AWS) *</a></p> <ul style="list-style-type: none"> <li>• Level 1: Entry Welder</li> </ul> <p><a href="#">Certified Solidworks Associate</a></p> <p><a href="#">Lean Six Sigma (ASQ)</a></p> <p><a href="#">Manufacturing Skills Standards Council (MSSC) *</a></p> <ul style="list-style-type: none"> <li>• Certified Production Technician (CPT) full program or any of the modules</li> </ul> <p><a href="#">NC3 Industry 4.0 and Mechatronics</a></p> <p><a href="#">OSHA 10 -General Industry Version</a></p> <p><a href="#">National Institute for Metalworking Skills (NIMS)</a></p> <ul style="list-style-type: none"> <li>• Industrial Technology Maintenance Level 1 (any)</li> <li>• Machining Level I (any) *</li> <li>• Metalforming Level I *</li> </ul> <p><a href="#">Smart Automation Certification Alliance (SACA)</a></p> <ul style="list-style-type: none"> <li>• Associate level (any)</li> </ul> <p><b>Snap On *</b></p> <ul style="list-style-type: none"> <li>• Precision Measurement Instruments Certification</li> <li>• Multimeter</li> <li>• Mechanical and Electronic Torque Certification</li> </ul> <p><a href="#">The Association for Packaging and Processing Technologies (PMMI) Mechatronics Certification</a></p> <p><small>*Approved for CTE Incentive Grants</small></p>
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**Manufacturing Related Career Awareness and Exploration Experiences**

- First Robotics
- Wisconsin SkillsUSA
- Hour of Code
- Wisconsin Manufacturing Month (October)

Also consider including regional experiences, such as:

- Inspire Profiles & Career Development Activities
- Specific Workforce Development programs
- Technical College Boot Camps or Summer Programs
- Project Based Learning programs
- Summer Exploration Camps

State-Endorsed

NEW V1: AUG2019

# Education Building Blocks

## THE STATE ENDORSED PATHWAY OUTLINE



Pathways Wisconsin  
Advanced Manufacturing Technology  
State Employer Pathway Outline



### POSTSECONDARY OPTIONS

You have many options after high school if you want to pursue this Regional Career Pathway!

#### ENTRY LEVEL WORK

Many entry level positions are available in this industry with great opportunities for advancement and on the job training.

#### TECHNICAL COLLEGE: SEMI-SKILLED POSITIONS

**Regional Postsecondary Options** should include industry recognized certifications and technical diplomas such as:

- Industrial Mechanic Technical Diploma
- Industrial Maintenance Technician Technical Diploma
- Electromechanical Technician Technical Diploma

<Specific program names will vary in each region.>

#### REGISTERED APPRENTICESHIPS

To become a Journey Worker, you must complete a Registered Apprenticeship (RA) Program. You can find the RA programs offered in WI that would prepare you for this pathway here: [https://dwd.wisconsin.gov/apprenticeship/industrial\\_trades.htm#industry](https://dwd.wisconsin.gov/apprenticeship/industrial_trades.htm#industry)

#### TECHNICAL COLLEGE: SKILLED/TECHNICAL POSITIONS

**Regional Postsecondary Options** should include associate degrees such as:

- Industrial Mechanic or Engineer Associate Degree
- Electromechanical Technology Associate Degree
- Automation Engineering/Systems Technology Associate Degree
- Advanced Manufacturing Technology Associate Degree
- Instrumentation Technician Associate Degree
- Mechanical Design Associate Degree

Some positions may also require industry certifications, field training or experience.  
<Specific program names will vary in each region.>

#### UNIVERSITY: MANAGEMENT POSITIONS

**Regional Postsecondary Options** should include bachelor degrees such as:

Some positions may also require industry certifications, field training or experience.  
<Specific program names will vary in each region.>

#### UNIVERSITY: PROFESSIONAL POSITIONS

**Regional Postsecondary Options** should include bachelor degrees such as:

- Electrical Engineering
- Industrial Engineering
- Mechanical Engineering
- Manufacturing Engineering
- Computer Science
- Data Analytics
- Industrial Software Engineering

Some positions may require an additional Graduate Level Degree.  
<Specific program names will vary in each region.>

#### MILITARY

- Communications Equipment Repairers
- Computer Repairers
- Electrical Instrument and Equipment Repairers
- Machinists
- Non-Destructive Testers
- Power Plant Electricians
- Power Plant Operators
- Powerhouse Mechanics
- Precision Instrument and Equipment Repairers
- Preventive Maintenance Analysts
- Radar and Sonar System Repairers
- Survival Equipment Specialists
- Tactical Data System Repairers
- Weapons Maintenance Technicians
- Welders and Metal Workers

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LINK TO [STATE PATHWAY MAP](#)

# Education Building Blocks

## APPENDIX A– EMPLOYABILITY SKILLS

### Wisconsin Employability Skill Standards

1. Develops positive relationships with others.
2. Communicates effectively with others.
3. Collaborates with others.
4. Maintains composure under pressure.
5. Demonstrates integrity.
6. Performs quality work.
7. Provides quality goods or service (internal and external).
8. Shows initiative and self-direction.
9. Adapts to change.
10. Demonstrates safety and security regulations and practices.
11. Applies job-related technology, information, and media.
12. Sets personal goals for improvement.



### Innovation Learning Outcomes

#### Art of Entrepreneurship– Critical Thinking

1. Information discovery
2. Interpretation and analysis
3. Reasoning
4. Problem Solving/Solution Finding
5. Constructing arguments

#### Art of Entrepreneurship– Communication

1. Engaging in conversations & discussions
2. Using 21st century communication tools
3. Listening
4. Delivering oral presentations

#### Art of Entrepreneurship– Collaboration

1. Leadership & initiative
2. Cooperation
3. Openness
4. Responsibility & productivity
5. Use if Tech Tools for collaboration
6. Responsiveness

#### Art of Entrepreneurship– Creativity

1. Idea generation
2. Idea design & refinement
3. Openness & courage to explore
4. Work creatively with others
5. Creative production & innovation

#### Attitude of Entrepreneurship

1. Adaptability & openness to change
2. Curiosity & imagination
3. Risk taking & being opportunistic
4. Optimism & persistence; Resilience
5. Focus; Goal-Oriented

#### Science of Entrepreneurship

1. Who is your customer?
2. What can you do for your customer?
3. How can you acquire your customer?

[Student Entrepreneurial Accelerator Program](#). The Commons, 2016.

# Education Building Blocks

## APPENDIX B– DIGITAL LITERACY SKILLS

### Wisconsin Standards for Information and Technology Literacy

#### Empowered Learner

1. Students leverage digital tools and strategies to take an active role in choosing and achieving their learning goals.
2. Students understand the fundamental concepts of technology operations and demonstrate the ability to choose, use, and troubleshoot current technologies.
3. Students are able to transfer knowledge to explore emerging technologies.

#### Digital Citizen

1. Students recognize the rights, responsibilities, and opportunities of living, learning, and working in an interconnected digital world.
2. Students will demonstrate an understanding of and respect for the rights and obligations of using and sharing intellectual property.

#### Knowledge Constructor

1. Students critically curate a variety of digital tools and diverse resources.
2. - Students produce creative artifacts and make meaningful learning experiences from curated knowledge for themselves and others.

#### Innovative Designer

1. Students use a variety of digital tools and resources to identify and solve authentic problems using design thinking.
2. Students use a variety of technologies within a design process to create new, useful, and imaginative solutions.

#### Computational Thinker

1. Students develop and employ strategies for understanding and solving problems.

#### Creative Communicator

1. Students communicate clearly and express themselves creatively for a variety of purposes using the platforms, tools, styles, formats, and digital media appropriate to their goals.
2. Students publish and present content customized for their audience(s), purpose, and task.

#### Global Collaborator

1. Students use digital tools to broaden their perspectives and enrich their learning with culturally responsive practices by collaborating and working effectively with local and global teams.
2. Students use digital tools to connect with a global network of learners and engage with issues that impact local and global communities.



[Complete Standards set](#) by grade band. November 2017.

# Education Building Blocks

## APPENDIX C- STATE PARTNERS

The Wisconsin Department of Public Instruction (DPI) and J.P. Morgan Chase New Skills for Grant project, Pathways Wisconsin, thank the following partners for contributing to the development of this secondary Career Pathway.

### Employer Partners.

- Teri Blumenthal, Plant Manager, Rockwell Automation
- Scott Bullack, Lab Midwest
- Wanda Cartrette, Senior Manager Advanced Technology Maker Center, Ashley Furniture
- Aimee Jo Castleberry, Vice President, Human Resources, Seneca Foods Corporation
- DeeAnna Deane, Human Resource Manager, Training Specialist, Teel Plastics, Inc.
- Michael Dietrich, K-12 Specialist, LabMidwestLLC
- Jim Dotta, Senior VP Advanced Manufacturing/Engineering, Ashley Furniture Inc.
- Jamie Eithun, Organizational Development Manager, Mayville Engineering Company (MEC)
- Amanda Falvey, Director, Human Resources, BRP US Inc
- Julie Foss, Vice President, Finance & Accounting, Nolato Contour
- Ann Franz, Director, NEW Manufacturing Alliance
- Kristopher Gengler, Public Relations, Ashley Furniture Industries, Inc.
- Kris Giuntoli, HR Generalist, Spuncast, Inc.
- Katelyn Gollberg, Human Resources, USEMCO
- Aubrey Green, Human Resources Manager, Charter Steel
- Charles Heidenreich, President, Swift Manufacturing & Engineering Inc.
- Ken Heins, President, KLH Industries Inc.
- Kurt Hellman, General Manager, Basic American Medical Products
- Jon Hirsch, Director of Business Development, Auer Steel and Heating Supply Company Inc.
- Aimee Hostettler, HR Business Partner II, Grande Cheese
- Amy Jones, Human Development Leader, Didion Milling and Ethanol
- Jeff Kennedy, Labor Relations Manager, John Deere
- Kevin Killam, Automation Technician, Nolato Contour
- Matt Kirchner, President, LabMidwest LLC
- Rebekah Kowalski, Vice President, Client Workforce Solutions, Manpower Group
- Eric Kramer, Manufacturing Engineer, Ashley Furniture
- Mitchel Lakowske, Degreed Elect Mech Tech, Ashley Furniture
- Scott Matenaer, Plant Manager, Dynamic Tool Corporation
- Fred Nicora, Workforce Development Manager, Carlson Tool
- Katie Rurup, Talent Specialist, Global Finishing Solutions
- Crystal Schuldt, Senior HR Generalist, SMC
- Aaron Sramek, Integral Recruiting Services
- Ryan Suerte, Account Manager, Siemens Industry Inc.
- Molly Sullivan, Director, Human Resources, Teal Plastics, Inc.
- Jared Thompson, IoT Technical Specialist, Ashley Furniture
- Steve Tubbs, Project Coordinator, Capitol Mechanical
- Gina Van Opens, President, Integral Recruiting Services
- Jeffrey Vor, Infrastructure Solutions, Trane
- James Wall, Executive Director, Smart Automation Certification Alliance
- Dawn Webber, Director of Human Resources, Royle Printing



# Education Building Blocks

## APPENDIX C – STATE CONSTRUCTION PARTNERS

The Wisconsin Department of Public Instruction (DPI) and J.P. Morgan Chase New Skills for Grant project, Pathways Wisconsin, thank the following partners for contributing to the development of this secondary Career Pathway.

### Educational Partners.

- Greg Chapman, Instructor, Gateway Technical College
- Beth Coyle, Education Consultant for Ashley Furniture, What's Possible Education LLC
- Gary Coyle, Education Consultant for Ashley Furniture, What's Possible Education LLC
- Andy Hepburn, Chief Innovation Officer, GPS Education Partners
- Patricia Hernandez, College & Career Readiness Coordinator, TAGOS Leadership Academy
- Brent Kindred, Technology & Engineering Consultant, DPI
- Cheryl Kothe, Coordinator of CTE, Kenosha Unified School District
- Andrew Kott, Manufacturing Lab Technician, Chippewa Valley Technical College
- Ray Koukari, Dean, Manufacturing, Engineering and IT, Gateway Technical College
- Amanda Langrehr, CESA 4
- Bao Lee, New Student Specialist, Gateway Technical College
- Jim Mackey, Education Director, Student Services, WI Technical College System
- Russell Martiny, Partner Services Manager, GPS Education Partners
- Steve McNaughton, Dean - Workforce Operations, Gateway Technical College
- Tricia Munoz, Regional Youth Apprentice Coordinator, GPS Education Partners
- Christopher Neff, Director of Academies, Racine Unified School District
- Zack Olsen, Mobile Skills Lab Instructor, Trempealeau Valley Co-op
- Michael Shiels, Dean, Applied Technologies, Waukesha County Technical College
- Kathy Spada, Interim Associate Dean, Applied Science, Engineering & Technology, Madison College
- Jeff Sullivan, Dean, Manufacturing Engineering and IT, Chippewa Valley Technical College
- Randy Way, Interim Dean, Applied Science, Engineering, & Technology, Madison College

### Public Agency Partners.

- Rebecca Deschane, Talent Director, WI Economic Development Corporation
- Juan Gomez, WI Economic Development Corporation
- Danica Nilsestuen, Southcentral Workforce Development Board
- Amy Phillips, State YA Coordinator, DWD Youth Apprenticeship
- Pat Schramm, Exec Director, Southcentral Workforce Development Board

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