BUILD ELECTRONICS BETTER

APPRENTICESHIP PLAYBOOK

A PROGRAM RESOURCE GUIDE

IPC Workforce Partnerships

1ST EDITION
NOV
2024

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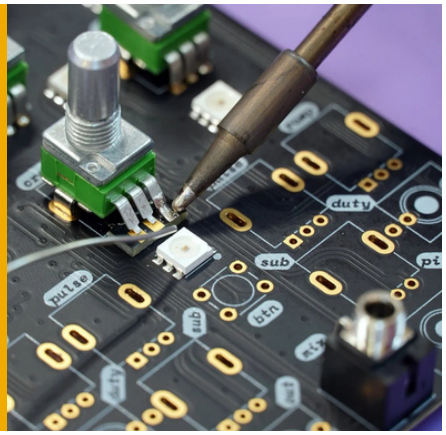


THE STATE OF THE WORKFORCE

2.1 Million

Expected number of unfilled manufacturing jobs by 2031

6.8 Million

Unemployed people in the US labor force Sept. 2024

US Bureau of Labor Statistics Sept. 2024

$36.31

Avg. Hourly Earnings in Electronics Manufacturing

US Bureau of Labor Statistics Sept. 2024

The electronics manufacturing sector is experiencing a severe shortage of qualified workers. Rising demand for electronic devices across the commercial, healthcare, automotive, and industrial sectors will see the global Electronic Manufacturing Services (EMS) market grow from about $534 billion in 2023 to $856 billion in 2030. At the same time, approximately 10,000 baby boomers, defined as those born between 1946 and 1964, are retiring each day. By the time the last member of this generation retires in 2031, U.S. manufacturing is expected to have 2.1 million unfilled jobs. The negative consequences of these long-term economic and demographic trends have been exacerbated by recent post-pandemic shifts in worker expectations and a persistent manufacturing skills gap. The mismatch between the skills that manufacturing employers need and those that available workers possess is driven by a lack of technological and social skills, false perceptions of the manufacturing industry, and the social stigma of blue-collar work.

IPC Workforce Whitepaper
April 2024

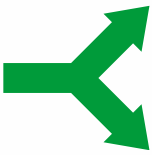
THE NEED FOR APPRENTICESHIP

The workforce challenge in the U.S. electronics industry is a byproduct of four key failures: the lack of an industry-driven pipeline, the lack of effective and efficient onboarding programs, the lack of a career pathways system, and the lack of a rapid upskilling infrastructure. Apprenticeship and pre-apprenticeship programs effectively address each of these failures.

Pipeline: The electronics industry has no well-defined and established school-to-industry pipeline which exacerbates the challenges precipitated by accelerated retirements, a widening skills gap, and geographic imbalances of labor. It also poses recruitment challenges unique to the skill level of the positions that electronics manufacturers seek to fill.

Onboarding: The lack of a workforce pipeline shifts the educational responsibility from academic institutions to employers, but most manufacturing companies do not count training among their core competencies. Most companies are forced to rely on inefficient and ineffective strategies, such as shadowing and investing in the development of internal training capabilities. Unfortunately, individualized solutions focused on immediate needs and specific processes deprive workers of foundational knowledge and skills, limiting their overall utility and professional growth. These employees are more likely to resign within a short period of time and leave the industry altogether.

Upskilling: The lack of a standardized training infrastructure limits the industry's ability to rapidly and effectively upskill the current workforce in response to new technologies, processes, and standards. The industry, in fact, is saddled with a teacher-centered instructional method that limits scale, undermines efficacy, and wastes valuable time.



Pathways: The industry also lacks a standardized industry-wide career framework that encompasses the essential roles in the electronics manufacturing industry, further limiting the effectiveness of training that academic institutions in industry pipeline partnerships impart to workers. A well-developed industry career framework includes industry-defined training and certification options that allow employees to demonstrate the acquisition of competencies at each stage of their professional journey. Employers that provide independently administered, stackable, and portable credentials help ensure both the proficiency and longevity of their workforce.

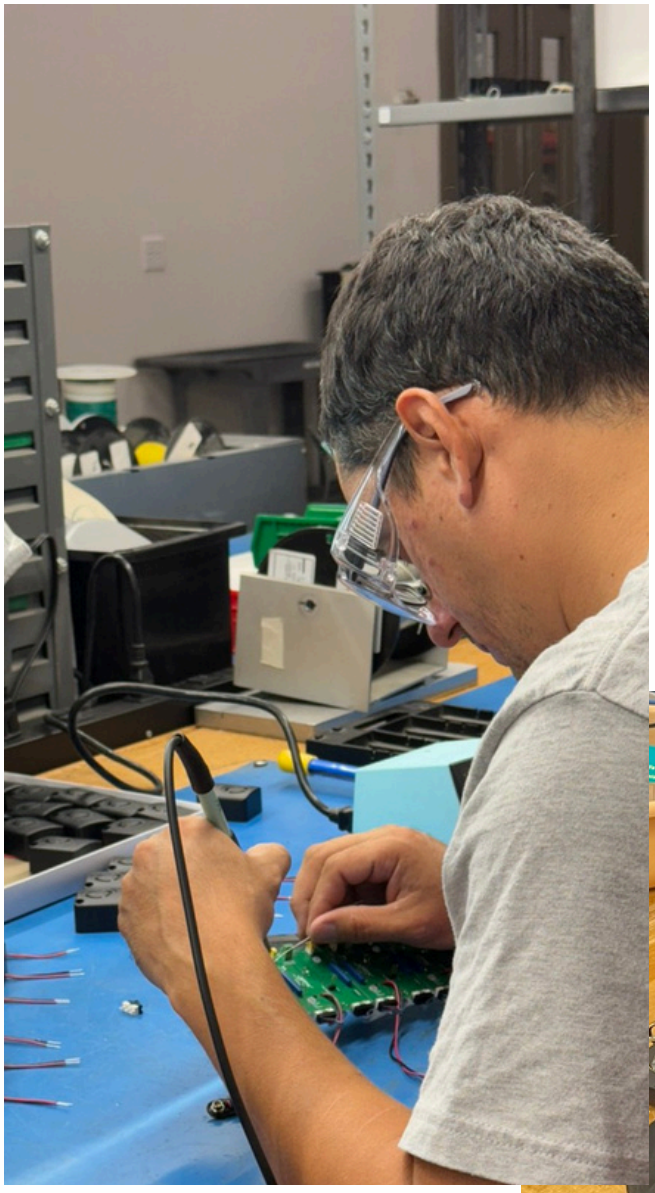
APPRENTICESHIP

Apprenticeship is a proven approach to developing a skilled workforce and can be customized to meet the needs of different industries, including microelectronics and advanced manufacturing. They are employer-driven and can be tailored to meet industry-specific skill requirements. Apprentices are considered employees from day one and work towards achieving proficiency in their chosen occupation.

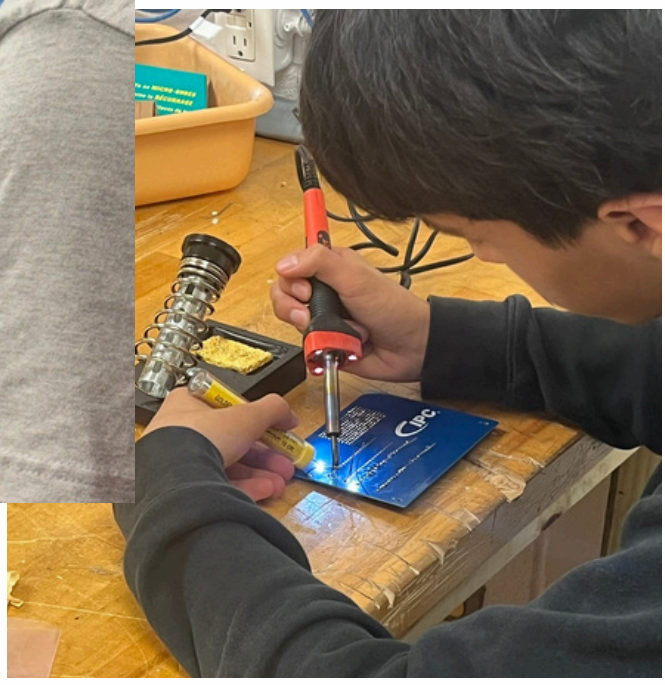
Unlike traditional training or internships, apprenticeships offer a formalized, competency-based approach where participants achieve specific skills and credentials. It provides a clear career path with recognized credentials, setting it apart from other models like internships, co-ops, or internal training programs.

PRE-APPRENTICESHIP

Pre-apprenticeship delivers foundational knowledge and industry-specific skills that align with the required courses of an apprenticeship. The pre-apprenticeship focuses on classroom-based learning and hands-on training, providing a strong starting point for individuals to seamlessly transition into a full apprenticeship.



Pre-apprenticeships are especially useful for individuals who may not yet possess the required skills or educational background for a registered apprenticeship. By offering training in core competencies and providing exposure to industry standards, pre-apprenticeships help candidates overcome potential barriers and prepare them for success.



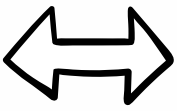
PRE-APPRENTICESHIP

Challenge

Youth and Emerging Workforce

Candidates lack exposure to career pathways and work-based learning.

Skills and Academic Gaps



Candidates lack specific skills or need additional academic preparation.

Career Transitions

Candidates need experience with industry-specific competencies.

Pre-apprenticeship as a Solution

High School CTE Programs

Pre-apprenticeship programs integrated into high school CTE curricula expose students to career opportunities early on and help them build skills that make them eligible for a registered apprenticeship upon graduation.

Community College

Pre-apprenticeships partnered with Community College courses serve as a bridge between traditional academic programs and work-based learning, helping students transition seamlessly into apprenticeships and the workforce.

Community-Based Organizations

For individuals seeking to upskill or reskill, pre-apprenticeship programs offered by community-based organizations can open doors to career advancement. These programs often focus on underserved or disadvantaged populations, providing an accessible entry point to high-demand occupations.

IPC'S COMPETENCY BASED APPRENTICESHIP MODEL

IPC's apprenticeship programs use a competency-based approach, which focuses on mastering specific skills and competencies instead of solely tracking the number of hours completed. This model allows for flexible progression based on the apprentice's demonstrated abilities.

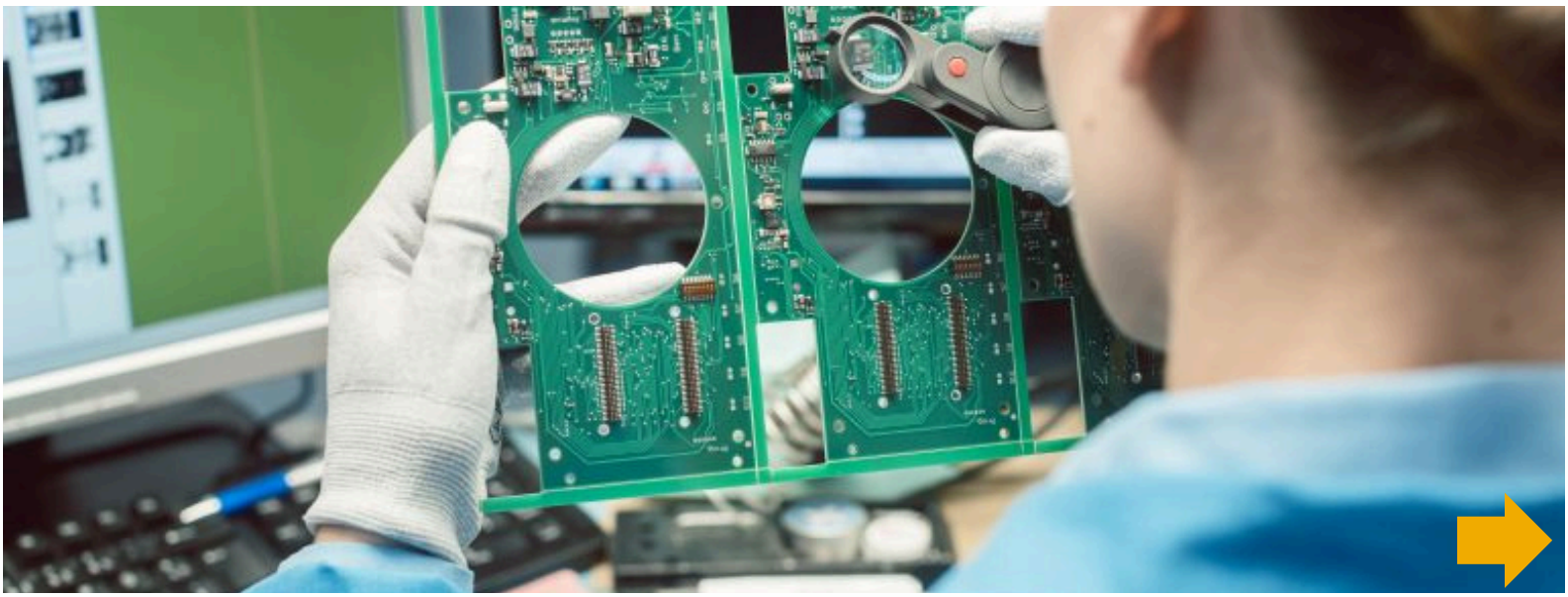
For apprentices that means **Credit for Prior Learning & Experience**

Apprentices may be eligible to receive credit for prior learning and work experience, accelerating their progression through the program. This helps recognize the value of their existing skills and reduces redundancy in training.

For employers that means **Flexibility with RTI methods.**

Employers can choose a delivery method for Related Technical Instruction (RTI) that aligns with their operational needs. RTI can be delivered through various methods, including:

· Online courses
· In-person classes
· Hybrid models



IPC & EMPLOYER PARTNERSHIP

IPC PROVIDES

Stackable Apprenticeship Programs
IPC offers a pathway of stackable credentials, allowing apprentices to advance through multiple levels of certification and training. This approach provides flexibility and promotes lifelong learning and career development.

Nationally Recognized Credentials
Completion of the apprenticeship program results in the U.S. Department of Labor's Certificate of Apprenticeship Completion and industry-related credentials from IPC. These credentials demonstrate to the global electronics manufacturing community that the credential-holder has demonstrated the knowledge and competencies required for effective job performance.

Guidance and Support
IPC provides expert guidance to new and experienced employers for registration, implementation, and compliance.

Administration and Recordkeeping
IPC reduces the workload for employers by managing program administration, including tracking apprentice progress, maintaining records, and ensuring compliance with DOL regulations.

Maintenance of Standards
Through continuous dialogue with industry partners, employers, and the U.S. DOL, IPC ensures that National Program Standards are kept up to date, aligning with the latest industry requirements and real-world needs.

Related Technical Instruction (RTI)
IPC offers a variety of RTI delivery methods, including online courses, in-person workshops, and hybrid models, ensuring that apprentices receive the necessary technical training to complement their on-the-job learning.

EMPLOYER PROVIDES

On-the-Job Learning Experiences
The employer will provide on-the job learning opportunities for behavioral competencies and employability skills in line with their company culture.

Mentoring
The employer identifies appropriate person(s) to mentor each apprentice as he or she performs each job responsibility. IPC's Workforce Partnership team helps employers by recommending resources to assist in developing valuable mentor relationships.

Paid Employment
The apprentice will be a full-time OR part-time employee, not a contractor, and eligible for merit-based wage increases over the term of the program.

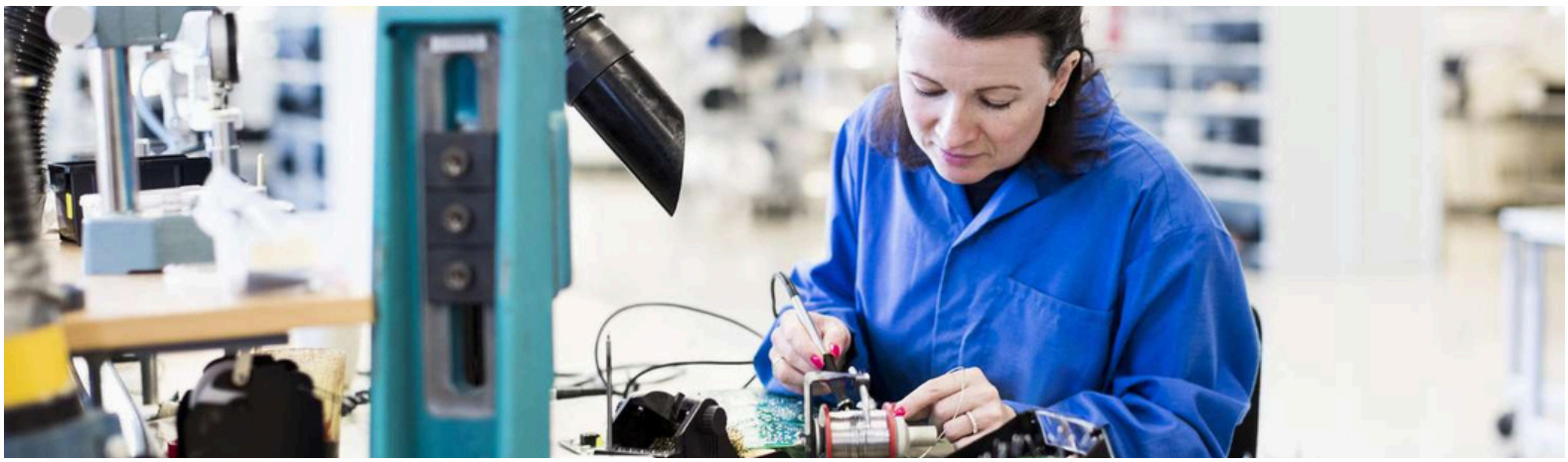
Journey Worker Certification
All employees who complete the apprenticeship program will receive Journey Worker Certification from the USDOL and pay commensurate with that status from their employer.

BENEFITS TO THE EMPLOYER

- Expanded talent pool.
- Authenticate workers and instill company culture.
- Recruit and develop a diverse and highly skilled workforce.
- Improved productivity, profitability, and the company's bottom line.
- Reduced turnover, improve loyalty, and retain top talent.
- Demonstrate investment in your community.

Return on Investment

- Reduced time to proficiency.
- Reduced attrition.
- Reduced training costs.
- Reduced rework, repair, and scrap.
- Increased product quality, reliability, and consistency.
- Increased productivity.
- Increased employee morale.



BENEFITS TO THE APPRENTICE

- Ease the transition from school to career by working and learning at the same time.
- Earn as you learn with a guaranteed wage increase as you develop new skills.
- Gain workplace-relevant skills in the field of your choice through on-the-job learning.
- Connect with mentor(s) in your chosen industry who can help you advance your career.
- Get academic credit toward a college degree for the skills you learn while avoiding student debt.
- Receive related technical instruction.
- Earn a nationally recognized, portable credential.

IPC APPRENTICESHIP MILESTONES

Employer Acceptance Agreement Signed

This signals the start of the pre-apprenticeship for the 1st cohort. Credit for prior learning for employer onboarding will be awarded at this time.

Pre-Apprenticeship Course Completion

- ESD
- Safety for Electronics
- FOD

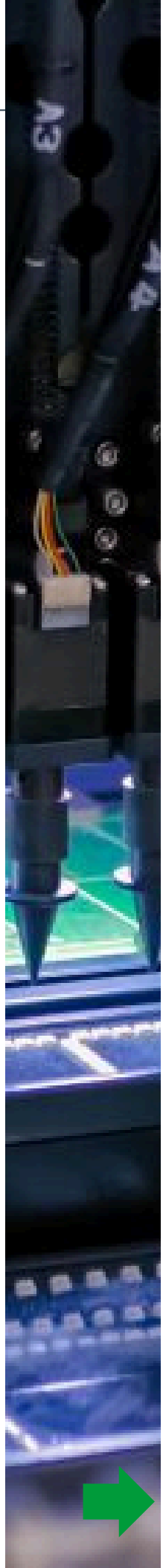
Once each of these courses are complete, this signals the pre-apprenticeship end date.

671 Completion

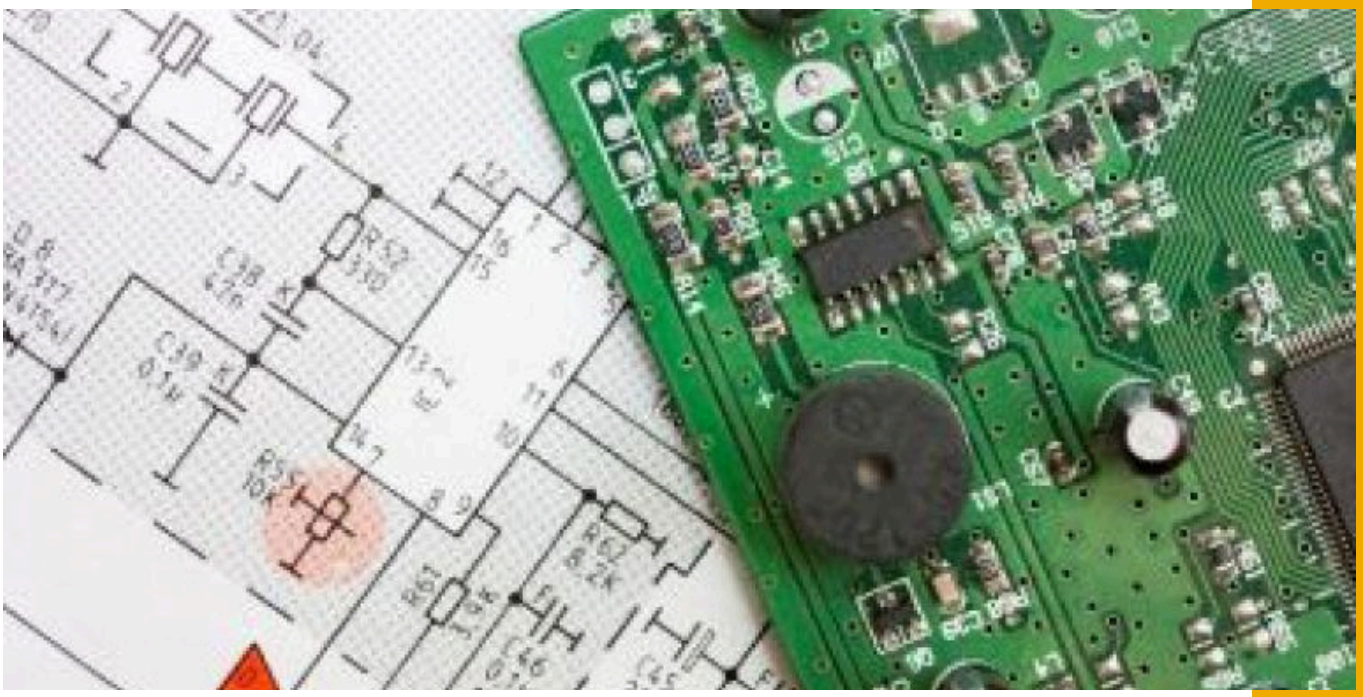
Once the apprentice completes and signs the 671 document, this signals the start of the apprenticeship.

Apprentice Registration in RAPIDS

Once apprentices are registered in RAPIDS and have been issued a RAPIDS number, the RAPIDS registration date is documented. This must occur within 45 days of the start of the apprenticeship.



BY THE NUMBERS



2023
US DOL Approves IPC's National Program Standards

9
Employers

87
Registered Apprentices

8
States

3
Occupations Currently Registered

$125K+
Funding Secured to Support Employers

DOL NATIONAL STANDARDS

National Program Standards outline the essential requirements and competencies an apprentice must achieve during their training. These standards are approved by the U.S. Department of Labor (DOL) and serve as the official guide for structuring apprenticeship programs.

U.S. Department of Labor Standards specify:

Job Competencies & Skills	The essential skills and competencies apprentices must master, which are aligned with industry needs and best practices.
On-the-Job Training (OJT)	A minimum number of hours or competency milestones that apprentices must complete under the supervision of a qualified mentor.
Related Technical Instruction (RTI)	A combination of classroom-based and hands-on learning that complements the on-the-job training.
Program Structure & Duration	The length of the apprenticeship and how it progresses based on either hours worked or competencies achieved.

U.S. Department of Labor National Apprenticeship Standards

BENEFITS TO MEETING U.S. DOL NATIONAL STANDARDS

All of IPC's Apprenticeship Programs are registered with the U.S. Department of Labor, meaning that each program meets the rigorous requirements laid out in the DOL's National Program Standards.

National Recognition & Portability of Credentials

Apprentices who complete IPC's registered apprenticeship programs can transfer their credentials and skills anywhere within the country, including all U.S. states and territories. This portability is a significant advantage for both apprentices and employers, as it allows for a mobile, skilled workforce that meets national industry standards.

Reciprocity with U.S. States & Territories

Employers implementing IPC's apprenticeship programs in their facilities across different states do not need to create separate, state-specific standards. The federal approval streamlines the process, allowing employers to adopt a unified apprenticeship program that is valid nationwide, including in U.S. territories such as Puerto Rico and Guam. This reciprocity reduces administrative burden, saving time and resources when launching apprenticeship programs in multiple locations. It also ensures that apprentices receive a consistent training experience regardless of the state or territory in which they are employed.

High Quality Standards

Apprentices receive high-quality training that meets industry benchmarks. For employers, this means they can rely on the apprenticeship program to produce skilled workers who are competent and capable of meeting their operational needs.

The U.S. DOL oversight also involves regular evaluations and updates to the standards to reflect changes in technology, industry practices, and workforce demands, keeping the apprenticeship program current and relevant.

CASE STUDY

DIBOLL INDEPENDENT SCHOOL DISTRICT P-TECH PRE-APPRENTICESHIP

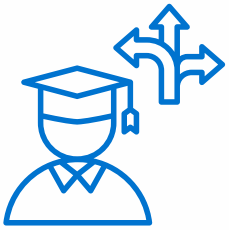
The Diboll Independent School District's (ISD) Career and Technical Education (CTE) program is pioneering a pathway for students interested in electronics manufacturing through its partnership with IPC. By incorporating IPC's pre-apprenticeship training into the CTE curriculum, Diboll ISD offers students hands-on experience and industry-recognized certifications that set them up for successful careers in a high-demand field. This program provides students with valuable skills, real-world training, and a direct pathway to a career in electronics manufacturing.

IMPACT ON STUDENTS

Through the IPC-aligned CTE program, students gain not only technical expertise but also employability skills like teamwork, problem-solving, and critical thinking. The experience has proven invaluable for graduates, many of whom have gone on to work in electronics manufacturing with major employers. In 2024 alone, Diboll ISD's program graduated five students who were hired by Lockheed Martin—an incredible testament to the program's success.

A GATEWAY TO THE FUTURE

Diboll ISD's IPC pre-apprenticeship program is more than just a curriculum—it's a stepping stone into a prosperous career. With plans to expand the program to serve even more students, Diboll ISD is empowering young talent to thrive in a technologically advanced workforce, fueling both individual career success and regional economic growth. This innovative approach to career training is transforming lives and strengthening the electronics manufacturing talent pipeline.



Career Pathways

The pre-apprenticeship model prepares students for seamless transitions into full registered apprenticeships and career opportunities with local employers, including Lockheed Martin.

Hands-On Learning

The IPC curriculum emphasizes practical skills in electronics assembly, soldering, and quality assurance—skills highly valued in today's manufacturing industry.

Industry Certification

Students in the Diboll ISD CTE program can earn IPC certifications, giving them a competitive advantage as they enter the workforce.

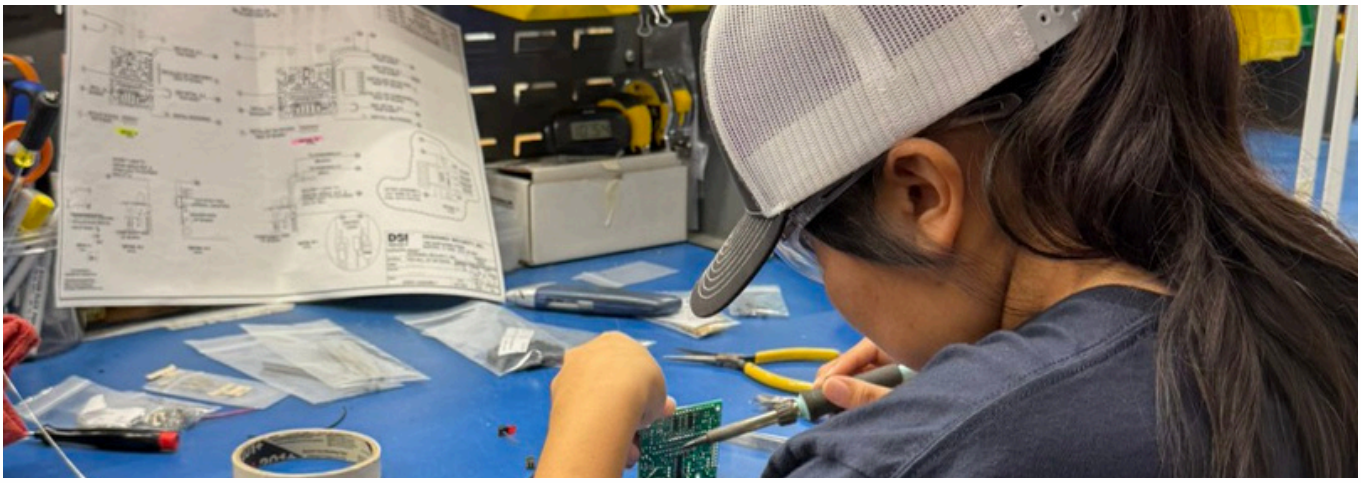
Strong Partnerships

Diboll ISD collaborates with industry leaders and local workforce boards to ensure that the training aligns with current industry needs, giving students relevant skills and a direct pipeline to employment.

DETEX APPRENTICESHIP

In 2024, 20 DETEX Corporation Employees joined IPC's Pre-apprenticeship Program for Electronics Assemblers. Those that completed the pre-apprenticeship requirements then moved into the Apprenticeship Program.

This program provides DETEX employees the opportunity to connect with a mentor, improve their skills, earn industry recognized certifications, and earn journey-worker status.



Jamie (pictured above) started at DETEX three years ago as a temp employee supporting the building's custodial work. Confident that she could be an asset to the company, Jamie quickly began cross-training into an Assembly-1 position. Taking every opportunity to expand her skill set, Jamie took forklift training and cross-trained into an Assembly-2 role. Showing aptitude for soldering, Jamie was soon trained and transitioned into a PCB board soldering role. She is now registered in IPC's apprenticeship program.

The Apprenticeship Program gives DETEX a structured pathway to continue to upskill and promote high-achieving employees like Jamie.

20

DETEX Employees Completed Pre-Apprenticeship

13.68%

Wage Increase for DETEX Employees upon Completion of Apprenticeship

DATA MANAGEMENT

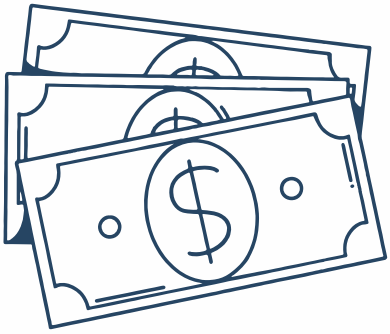
IPC's Workforce Partnerships Team manages program administration, including tracking apprentice progress, maintaining records, and ensuring compliance with DOL regulations. Apprentices' course progress, evaluations, and basic registration information are readily available to supervisors and employers, while personal information required for registration with the U.S. Department of Labor and other data points requested by grant providers are kept secure and confidential.

RAPIDS 2.0 - Registered Apprenticeship Partners Information Database System

Apprentices in the United States are required to complete U.S. DOL Form 671 – Apprenticeship Agreement. IPC uses the information provided on the form to register each US based apprentice with the Department of Labor. Apprentices based outside of the US will be asked to provide information similar to that requested on the USDOL Apprenticeship Agreement for IPC's use in tracking scope, trends, and other data.

WorkHands

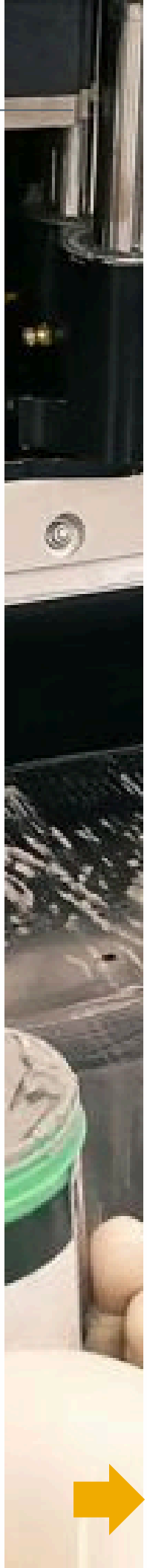
WorkHands is a secure, third-party platform used for managing Apprenticeship programs across the U.S. Through WorkHands apprentices, supervisors and employers can view relevant paperwork, track on-the-job learning, access IPC's virtual courses, submit and review evaluations, and more. In WorkHands, each person has access only to the information and resources relevant to their respective role.



Grant Reports

Due to the nature of grants and their often very targeted goals for scope and reach, grant reports regularly require detailed information on apprentices supported by their funding. When IPC is managing the grant, apprenticeship data will be shared as requested by the grant provider.

IPC Privacy Policy



START AN APPRENTICESHIP

STEP 01

Program Adoption

Employer meets with IPC Workforce Partnerships team to confirm adoption and discuss employer-specific needs.

STEP 02

Paperwork

IPC coordinates with employer on completion of DOL required paperwork, funding agreement, and submission of apprentice information.

STEP 03

Register Apprentices

IPC registers apprentices and supervisors in courses on EDGE, in WorkHands, and with DOL.

WORKFORCE PARTNERSHIPS

Vicki Hawkins

Director
Workforce Grants & Proposals

- Funding Opportunities
- Grant Management
- Invoicing

Cory Blaylock

Director
Workforce Partnerships

- Program Adoption
- Program Support
- Talent Pipeline Development

Cami Marcom

Manager
Workforce Partnerships

- Data Management
- Program Support

APPRENTICESHIP RESOURCES

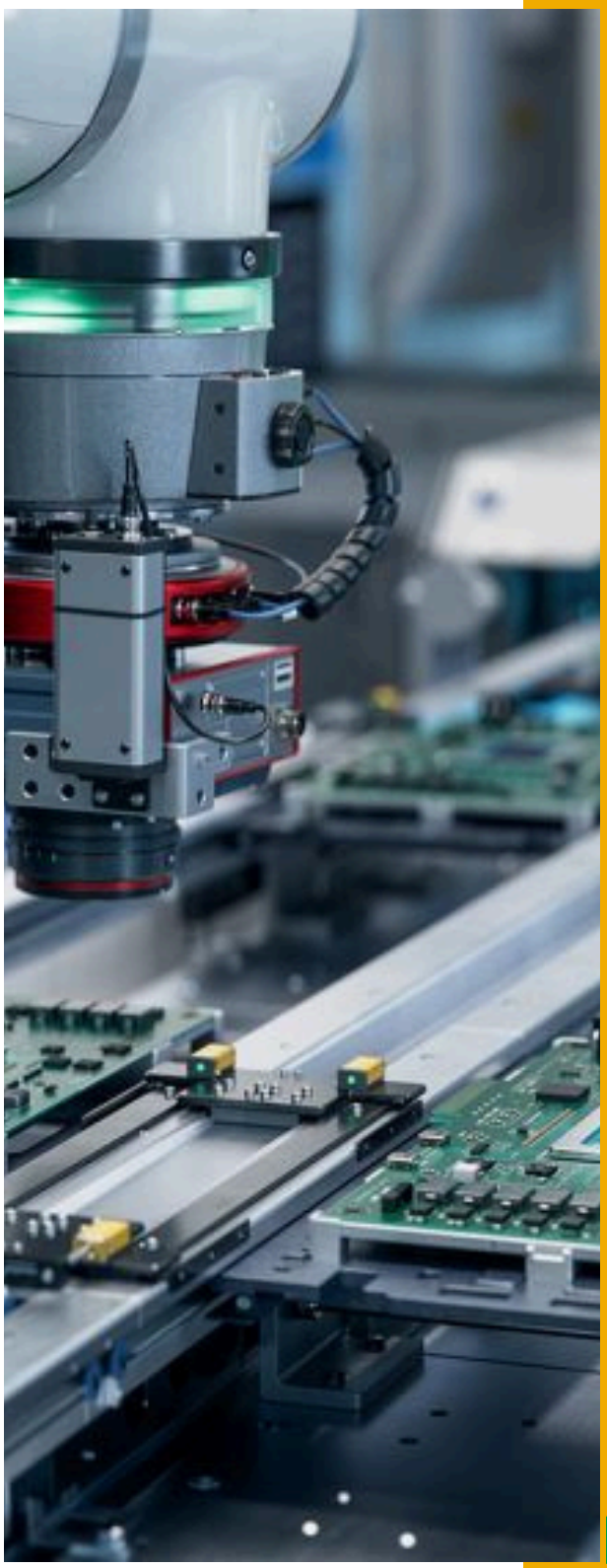
WorkHands Blog

APPRENTICESHIPUSA
Talent Moves You Forward

AFA APPRENTICESHIPS FOR AMERICA

U.S. Department of Labor

USDOL
Registered Apprenticeship
Program Standards



FUNDING RESOURCES

IPC's Workforce Partnerships team identifies and secures funding opportunities that align with the workforce needs of IPC's member companies and the services IPC offers. This encompasses a wide range of programs, including IPC's registered apprenticeship program, workforce training initiatives, Certified IPC Trainer (CIT) Training, and education foundation projects.

Federal resources, such as Workforce Innovation and Opportunity Act (WIOA) funding, provide significant support for workforce development. However, the WIOA landscape is complex, with opportunities varying greatly from state to state. Staying current with these nuances is essential to ensure that IPC's Workforce Partnership programs align with available resources.

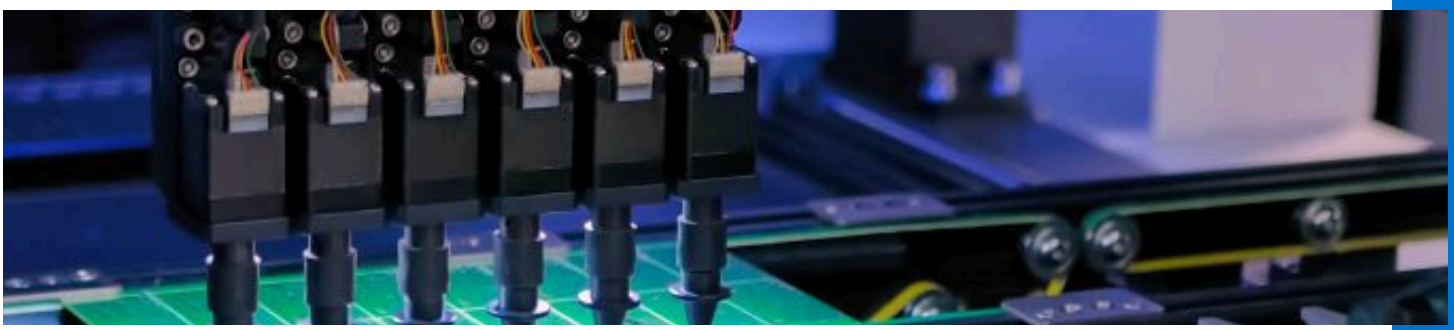
State-specific funding initiatives, **local funding** sources, and **private foundation grants** also present unique opportunities for member companies to access targeted financial support for apprenticeships and training programs.

The workforce partnerships team conducts in-depth research to identify these funding opportunities. When a funding source aligns with the team's goals, the team leads the development of grant proposals, ensuring compliance with all application requirements. Once funding is awarded, the team manages the grants to maintain good standing with the grantors and ensure effective use of the resources.

Collaborating with member companies, the Workforce Partnerships team provides technical assistance in the following areas:

- Identifying funding opportunities.
- Developing funding applications.
- Managing awarded funds.
- Maximizing the benefits of these financial resources.
- Compiling data for grant reporting.
- Submitting reports to the funding provider.

By strategically leveraging federal, state, and local funding opportunities, IPC not only strengthens its Registered Apprenticeship Program but also supports the long-term growth and resilience of the electronics manufacturing industry.



FINDING FUNDING

APPRENTICESHIPUSA
Talent Moves You Forward

The U.S. Department of Labor's official site offers comprehensive information on open funding opportunities, active grants, and contracts related to apprenticeship programs.

GRANTS.GOV

This portal provides a centralized location for finding and applying for federal funding opportunities across various agencies, including those supporting workforce development and apprenticeship initiatives.

State Apprenticeship Agencies

Many states have dedicated agencies or departments overseeing apprenticeship programs. Apprenticeships often fall under the purview of the Departments of Education, Labor, Economic Security, or Commerce. Each state is different, so it's important to find the department specific to the state(s) in which your company operates.

Workforce Development Boards

Local workforce boards often have information on funding opportunities and resources available for apprenticeship programs. Engaging with your local board can provide insights into regional funding initiatives.

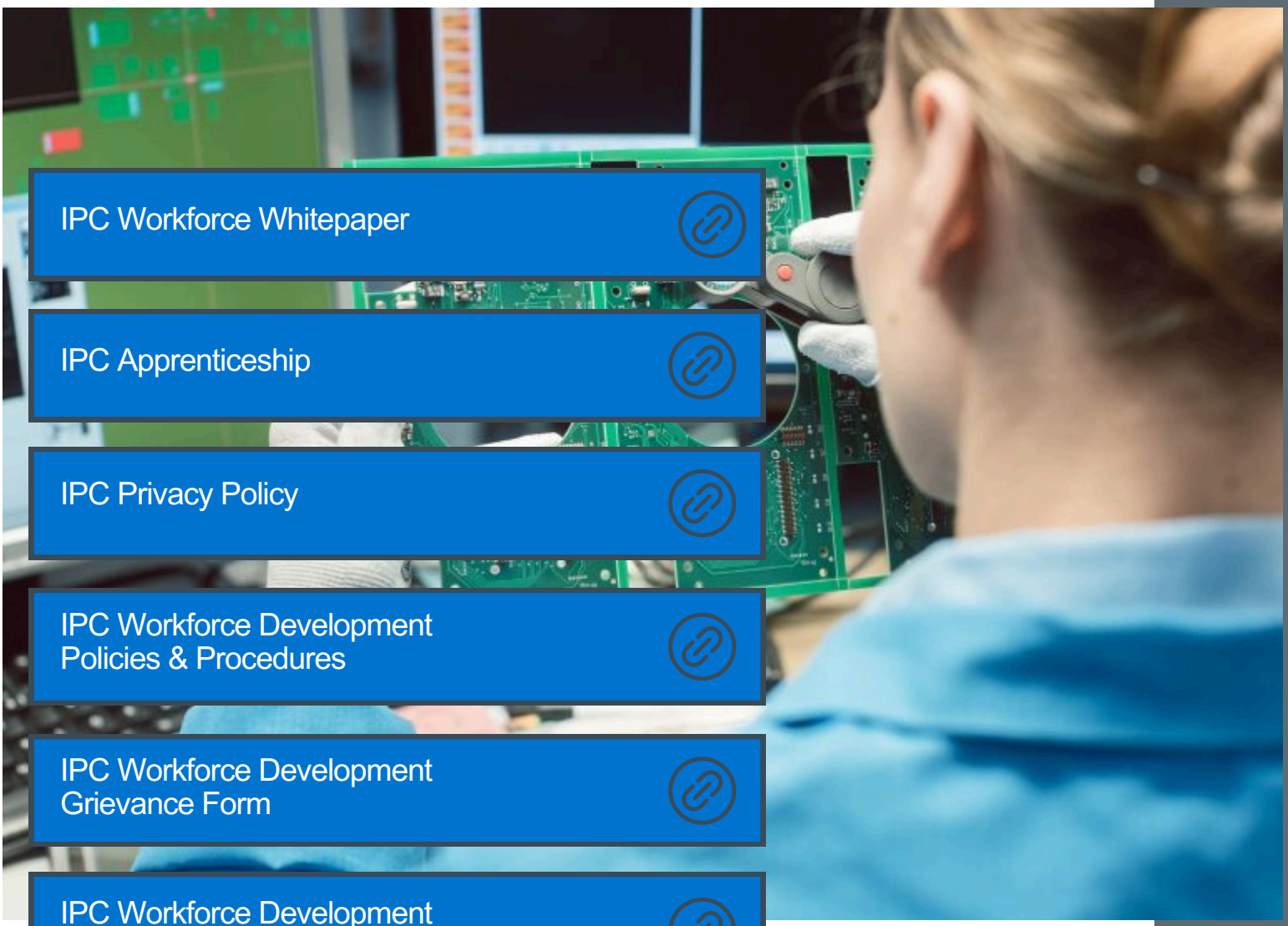
Private Foundations

Organizations such as the Lumina Foundation and the Annie E. Casey Foundation offer grants focused on workforce development and education, which can be leveraged to support apprenticeship programs.

Industry Associations

Associations related to your field may offer funding or resources to support apprenticeship programs. For example, the National Association of Manufacturers provides resources and potential funding opportunities for workforce development.

IPC RESOURCES



- IPC Workforce Whitepaper
- IPC Apprenticeship
- IPC Privacy Policy
- IPC Workforce Development Policies & Procedures
- IPC Workforce Development Grievance Form
- IPC Workforce Development Appeal Form
- Sample Employer Acceptance Agreement (Appendix D)
- Sample Work Process Schedule & Related Instruction Outline (Appendix A)

WORKHANDS RESOURCES

workhands.com

WorkHands Blog

WorkHands Help Center

- Completing the Apprenticeship Agreement | PDF | English
- Completing the Apprenticeship Agreement | PDF | Spanish
- Completing the Apprenticeship Agreement | Video | English
- Completing the Apprenticeship Agreement | Video | Spanish
- Navigating to the Apprenticeship Agreement | Video | English
- Navigating to the Apprenticeship Agreement | Video | Spanish
- Supervisor's Guide to Creating an Evaluation | PDF | English

APPRENTICE & MENTOR RESOURCES

BEHAVIORAL COMPETENCIES

- Maintains an Acceptable Attendance Record
- Reports to Work on Time
- Completes Assigned Tasks on Time
- Follows Safety Rules
- Demonstrates Respect for Co-workers & Supervisors
- Maintains a Positive Attitude
- Cooperates with & Assists Co-workers
- Follows Instructions & Directions
- Works Under Supervision
- Accepts Constructive Criticism
- Adheres to Workplace Policies, Rules & Regulations
- Takes Care of Equipment & Workplace
- Keeps Work Area Neat & Clean
- Meets Supervisor's Work Standards
- Demonstrates Trust, Honesty & Integrity

Behavioral Competency Resources

Mentor Resources

https://www.ipc.org/education/ipc-apprenticeships