

Quick-Turn Training Proposal

Version 1.3b

Semiconductor & Electronics Manufacturing Center of Excellence

VISION: *This Center shall serve as a local, regional, and State leader as a catalyst in developing partnerships among business, industry, education, talent, and government for the purpose of workforce development and enhancing economic vitality.*

MISSION: *Increase the availability of qualified workers for the Semiconductor and Micro-Electronic (High-Tech) Manufacturing industries.*

The Center liaises with business/industry, talent, and the education systems to create a highly skilled and readily available workforce. In addition, we are dedicated to finding new methods of learning that connect populations to family-wage careers with high growth potential. These actions and collaborations are critical to the success of the Semiconductor & Electronics Manufacturing and related supply chain industries, our state's economy, and our community.

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1. Intended Audience

This proposal and message are intended for:

- ✓ To those that can improve this proposal and project for better outcomes.
- ✓ Decision makers and finance controllers,
- ✓ Top-level business leaders of Advanced and High-Tech manufacturing industries,
- ✓ 11-14 grades CTE (Career and Technical Education) Director and Teachers,
- ✓ Post Secondary technical directors, specific technical college deans, vice presidents, and presidents.
- ✓ Community Leaders that will support and come together to help drive this project to its realization.
- ✓ Project suppliers to aid in equipment and parts selection.
- ✓ 3rd party service providers to guide, support, contribute to the project success.

Alternatively, decide to pause, shelve, or trash this proposal.

2. Executive Summary

In this proposal we'll examine an alternative workforce education process. A method that is not new although rarely used in our education systems. We can create an education & training model that meets the needs of all populations, not just a select few, to jump start their careers. Our current training method is considered a time-based model and primarily available to those with a support network. This program shall supply funds (for limited training courses) to pay the cost of education, some living expenses, and offers childcare support. Inviting in those who thought a family-wage career in a clean industry is out of reach.

- **Missing:**
 - Students and Qualified Workers.
- **Need:**
 - To create a sustainable supply chain of industry-qualified¹ workers that meet demand.
- **How:**
 - By defining new learning methods and opportunities.
- **For Whom:**
 - People from different cultures and diverse histories who want to work with people who appreciate others and are creating the future.
 - Marginalized Persons.
 - Underemployed and unemployed people wanting to work in a high-growth, high-wage career.
 - Current and potential employees want to improve their manufacturing KSA (Knowledge, Skills, and Abilities).
 - Students and Working Learners.
 - Education/Training institutions: wanting to attract more students and advance Equity and Inclusion.

While this Quick-Turn Training is a short-to-mid-term solution, we also need to address the mid-to-long-term flow of manufacturing KSA. Mid-to-long equates to increasing manufacturing industry awareness in the K-12 education system. Help young students to become aware of the Manufacturing industry and lucrative careers available to them, just like their awareness of being doctors, nurses, pilots, and astronauts. High schoolers can develop skills for direct entry into manufacturing via micro-credentialing before they graduate. All people can

¹ Semiconductor Supply Chain Manufacturing companies: Wafer, Semiconductor, Semi-Equipment, PCB and PCBA, Lasers, IIOT, STEM, Ceramics/Glass, etc.

be served better by improving instructions to ensure future workers are prepared and have the KSA to achieve manufacturing mastery in their lives.

Therefore, let's build a middle ground that supplies another path to enter, learn, and grow a life sustaining career. One that minimizes the time needed and is accessible to diverse and marginalized populations. With an outcome that supplies awards (transferable KSA supporting working learners' long-term continuing education goals).

Micro-Credentialing and Quick-Turn Education.

We will examine micro-credentialing, also referred to as Badging, for Technical and Professional-Skills. In addition, you will be introduced to the "Quick-Turn" training method. In conjunction with the Semiconductor and Electronics Manufacturing Center of Excellence, Clark College Community Development is revamping & piloting the "Quick-Turn" training methods. Training programs that are measured in hours, days, and weeks. Here are a few of the advantages,

- ✔ Increase the availability of Entry Level Qualified Technical Workers for the Advanced and High-Tech Manufacturing Industries.
- ✔ Achieve manufacturing operator/technician qualifications faster.
- ✔ Supplement the current education system to meet today's fast-moving technology and social pace.
- ✔ Replace time-based learning with competency-based learning to achieve badges and certifications.
- ✔ Students/Workers increase personal and career value with recognized awards.
- ✔ Enabling support for marginalized persons with stipends, childcare, and paid internships.²

3. Problem

Qualified Worker Availability. Let's face it head-on. Qualified workers are in very short supply.

According to US News³ the Washington State high school completion rate was 87% in 2020. Per the latest data available⁴ in 2018, Washington State had 67,034 students graduate high school. There were 932 students who also earned an associate degree. The result is 67,966 individuals available to be added to the workforce in 2018. However, there were 152,500 job openings, leaving a gap of 84,534, just in 2018. Job openings in Washington State in January 2020 were 198,000, then fell to a low of 80,000 in April 2020. Finally, in December 2020, 6.6% of the population retired, became disabled, or otherwise came out of the workforce⁵. In 2022, job openings rebounded to 256,000, a twenty-year high! As a side note, the labor participation rate for Washington State in 2020 was 51.2%.

² Limits to full support include but are not limited to; the student must remain in the program with a passing grade, be 18 years or older, and be eligible for support.

³ Link accessed May 2023: [See High School Graduation Rates By State \(usnews.com\)](https://www.usnews.com/education/college-rankings/articles/high-school-graduation-rates-by-state)

⁴ Link accessed May 2023: [Legislative Report: 2019 Graduation & Dropout Statistics \(www.k12.wa.us\)](https://www.k12.wa.us/legislative-report/2019-graduation-dropout-statistics)

⁵ Link accessed May 2023: [Fast Facts & Figures About Social Security, 2021 \(ssa.gov\)](https://ssa.gov/fast-facts-and-figures-about-social-security-2021)

TABLE 1: WORKER SHORTAGE 2020

	WF*	WF Needed	WF shortage	
	Current			
	3,955,200	-3,998,366	= 43,166	
WF current	removed from WF	new WF (HS Grads +)	new job openings⁶	WF needed
3,955,366	- 37,100	+67,966	+12,300	= 3,998,366

*WF = Workforce

FYI – WA State population was about 7.4 million residents.

The 2020 statistics, described and Table 1 above, boil down to a workforce shortage of 43,166 (minimum) persons. Since this data, students graduating in 2018 (latest data available) and current data of 2020, the workforce need has increased, student graduations have decreased, just as the student populations have decreased across the board. This all adds up to continued future workforce shortages.

TABLE 2: ADJUSTED 4-YEAR COHORT GRADUATION RATE (CLASS OF 2018)⁴

Student Group	Received high school diploma	Graduated w/ associate degree	Total All
All Students	67,032	932	67,964
Am. Indian/AK Native	725	3	728
Asian	5786	81	5,867
Black	2924	12	2,936
Hispanic	12858	99	12,957
Pacific Islander	674	2	676
Two or more races	4516	57	4,573
Sub-Total	27,483	254	27,737
White	39549	678	40,227

4. Solution

Wait, where do we get the other workers for training?

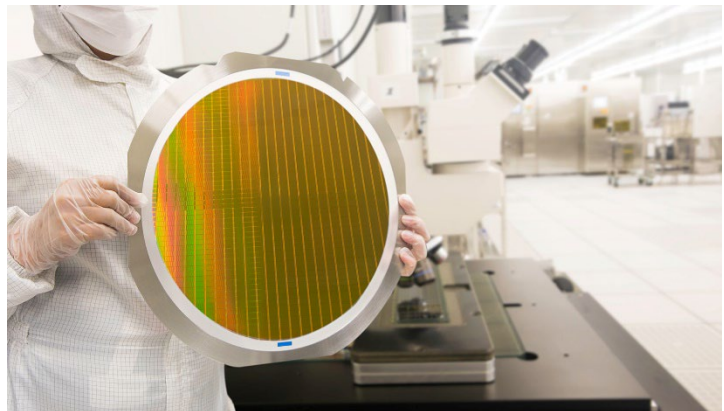
With a potential boost of 40% from the historically marginalized (identified with the blue font in Table 2). In Table 2, we evaluate Washington student group populations for 2018. While 2018 numbers may not match current (2022-2023) Student Groups (data not available); however, supplies scale to diversity of students.

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Industry Awareness

To start, for long-term results and sustainability, create industry awareness in the K-12 grades. Introduce and make available student exposure and opportunities to the Semiconductor supply chain of manufacturing. Provide students with industry visualizations, products, outcomes, working life, and quality life of those that take part in this field.



To solve the worker shortages in the advanced and high-tech manufacturing industries, we must shift or add to our education/training models. This proposal describes a path to engage populations, including those that have historically been unable to achieve meaningful careers—those specific careers with better-than-family wages in high-growth industries.

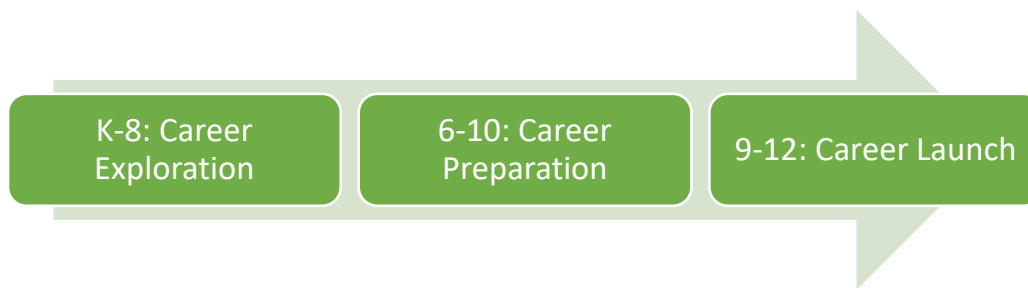
Then for short-term results, we need to up the marketing to potential new employees, graduating students, minimum wage job holders, under-employed and those without benefits, after all that is 48.8% (100% - 51.2%) of the populations (OK, not that many, but even accounting for the under 18 and over 70 should be about half of that). Once you have the employee onboard, ensure the employee is gaining skills and awards that support their long-term growth and ambitions. I once heard a statement that really fits: *“Teach employees so they are capable to go anywhere and succeed but treat them so well, they don’t want to leave the family.”* Author unknown.

This brings up the teaching staff; where are we going to get them? Industry persons who have recently or are planning retirement may want extra income and the opportunity to give back to their community. Also, retired military personnel with similar skill sets. It would also help to remove or reduce the degree requirements for vocational learning based on years in the industry or service. The industry could share in the training by

supplying their own experts in short-term teaching roles (days to max 1-week at a time). Those leaders have mastered their areas, subjects, tooling, and equipment.

Implement training that blends OJT with lessons: Industry internships, learning in class, and on-the-job. Ultimately, reducing the cycle time to achieve competency. Implement Quick-Turn Training models as explained and defined here.

First, a supply chain is as good as its weakest link, and the K-12 student group is the first few links in the Advanced/High-Tech manufacturing supply chain. Our community industries must be presented to students in a manner that builds wonder and curiosity. Every student in K-12 will be helped if they are aware of the learning-to-secure your future workflow, shown below. This will arm them with decisive information after graduating from high school. One of the biggest challenges is **Awareness** of the Manufacturing Industry. Of course, creating awareness needs to start as early as possible in a manner proper for each student's age group. The diagram below shows three steps in the awareness flow in the K-12 grades.



- The **Career Exploration** phase should be primarily fun activities the students will engage and play with (safe, of course) with products created in various industries and tools, like robots, sensors, and tabletop manufacturing examples.
- The **Career Preparation** phase increases awareness by showing what the various manufacturers build. Industry tours are fantastic; however, when not possible, industry show and tell at the school is the next best opportunity to set up the relationship between the fun examples showed in the Prep phase.
- The **Career Launch** phase is where the students should become fully engaged with real industry problems. Flipped-Intern and Internships during summer and school breaks are the perfect time to exemplify what manufacturing is. Using ideas from all three phases, build the manufacturing flow, and share the supply chain challenges and different departments (from floor workers to management roles). This lets the student understand that manufacturing is not just pushing buttons, reading a meter, turning a wrench, and wearing a clean-room suit.
- More phases after the high school diploma and with either work experience or education, still need to gain **Career Growth**, **Career Acceleration**, and **Career Mastery**. These three phases are outside the scope of this proposal.

Education revolution

We can add a new choice to the current educational programs. With the **Quick-Turn Training** model, we can compress the learning cycle to gain competency much faster. Utilizing competency-based (not time-based) learning models integrated with internships, we can place student operators & technicians into entry-level high-growth career and wage positions in manufacturing companies within weeks⁷. In addition, current

⁷ Courses, specialties, and internships may affect the number of weeks to complete.

workers in a low-growth/low-wage career or industry can also return to continuous learning. As a result, students and working learners can accelerate their career growth by increasing the manufacturing knowledge and skills needed to meet the current 4th Industrial and approaching 5th Industrial Revolutions.

Third, the author believes segments of the population, which are stalled, should be included in High-Growth High-Wage careers. In these cases, removing barriers and creating accessibility to receiving training must occur to allow this population segment to take part. There are three barriers for this population:

1. Affordability,
2. Time,
3. Childcare.

In short, we must **increase access** to education. To enable unaware or perceived out-of-reach populations to qualify for today's advanced and high-tech manufacturing jobs. We can do this by removing barriers, increasing learning access, and working.

Worth saying again ... To solve the worker shortages in the advanced and high-tech manufacturing industries, we must create awareness of local industry careers in K-12. Show the three primary paths to great careers (Work, School, and Hybrid), and engage students with industry as early in school as possible. Our success depends on increasing value to students, education, and industry. We must shift or add to our education/training models. This proposal describes a path to engage populations, including those that have historically been unable to achieve meaningful careers—those specific careers with better-than-family wages in high-growth industries.

A high-school graduate can go anywhere to work. Although more than likely, it is a job with a low wage, limited growth, and does not add real value to the student's future, as said in the US Census⁸ results.

To achieve a faster than expected (compared to time-based education methods) training, we begin with the knowledge of the changes occurring in the world today.

Why Now?

Manufacturing and parts of its supply chain are coming back to the USA, creating tens of thousands of jobs. Factories are expanding, and new sites are being built that will need more staff to open when completed. All Over 50% of those jobs are entry-level positions, creating tremendous opportunities in manufacturing. The entry-level jobs want individuals from high school graduates to associate-level degreed technology workers. These worker demands will continue to increase at a rate of 1.1% to 3.0% year over year. In Some areas the rate of increase will be much higher in short term cycles. Technology will improve and worker need will continue to outpace supply for the next 7 to ?? years.

Any sustainable process designer looks forward as much as they look back. The future can be daunting and exciting. In support of student growth, education centers must adapt to changes within their served industries to keep pace. Technology is not slowing down. Recently Nvidia (a chip designer) announced a new partnership with Intel (a vertical chip manufacturer), which also put TSMC (a chip foundry) on alert. Why? Because the leading-edge chips today are only as good as the software that runs it. Intel has the better chip software.

⁸ [Census Bureau Releases New Educational Attainment Data](#)

We are at/near the end of the Fourth Industrial Revolution and the beginning of the 5th Industrial Revolution. The Fifth Industrial Revolution arrives with the accumulation of small nudges: The pandemic to teach us remote/hybrid work, the accepted and widespread use of Artificial Intelligence (AI), Machine Learning (ML), commercially accepted Robots as a product to replace repeating pattern processes, Blockchain for security, commercialization of Space and extraterrestrial Planets, and lastly, the Industrial Internet Of Things (IIOT) which links the physical world to the cyber world. Finally, quantum, biological, and optical computing.

Quick-Turn Training Program Goals

Shown below are list of goals to achieve the desired outcomes of building the sustainable availability of qualified workers for the industry.

- 1) Create awareness early and build that awareness through the K-12 learning process.
- 2) Support students' growth of confidence and competence.
- 3) Create a competency-based Quick-Turn Training with micro-credentialing (badges). Each step is measured in hours, days, and weeks to achieve a set of skill competencies and earn awards: Badges and Certifications.
- 4) Enable and show the value to the working individual of continual life learning.
- 5) Enable 11-12 graders to earn Badges and Certificates before graduation.
- 6) Reduce the cycle time needed to enter a new career.
- 7) Engage new populations, typically those historically under-represented individuals whose accessibility to education may be out-of-reach.
- 8) Provide monetary and childcare support to those that cannot cover the cost of school, supporting a household with income for rent, utilities, staples, transportation, and childcare. Limitations are expected to qualify for those benefits remain to be determined.
- 9) Continue to support all students at each stage of their Working/Life Learning experience.
- 10) Supply educational value to students by increasing their personal competency and long-term career value.
- 11) Enable and promote roles in high-growth and high-wage manufacturing careers.
- 12) Industries must be fully committed to the Quick-turn program with commitments to support the program. Specific agreements are to be decided.
- 13) Education system must make every micro-credential open to receive course credit directly transferable to the supporting college. This will allow the student to engage in value added continuous learning.

5. Proposal

The idea of faster learning cycles is familiar, this method of training has a long history of coursework that is provided in short bursts and accompanied with industry experience in form of internships. Many of these examples come from industries engaging with local colleges. Shown below are links to several examples.

A. Existing Similar Quick-Turn education programs

College	Program Name	Awards: Degrees and Certificates
Portland Community College	Quick-Start Semiconductor Technician Paid Training	Certificate of Completion in 10-days

Maricopa Community College	Designed by Intel and local Colleges	\$500/week stipend and without other costs. 5-days per week, 8am to noon for two weeks.
Near most Intel Fab sites globally		
Loraine County Community College, Ohio	Fast-Track to Employment	Fast-Track certificates – 16 weeks
	NSF Award Search: Award # 2100108 - Industry 4.0 Curriculum Development and Occupation-Based Learning Outcomes In Automation	
Various Community and technical colleges	Multiple names	13-week quarters that are stackable to go from certificates to Associate to bachelor's degrees.

B. Challenges

- Overcoming Awareness, the stigma of manufacturing, reversing the attitude of *'I can't do that.'* Instead, to a philosophy of *'I can and will do this!'*.
- Enabling education credits for the compressed courses. Each course will use current course structure. The only difference is that each class will introduce the course concepts (cliff notes) that are done in hours and days.
- Receiving complete buy-in and commitment from the industry.
- Receiving supplemental operational funds through grants.
- Finding locations, equipment, and tooling.
- Hiring instructors, whether they are current College Faculty or currently practicing the discipline.

C. Budget

- Define initial goal of producing a reproducible product and the first of three pilots.
- Use available grants from Local, State, and Federal agencies.
- Seek ways to pay costs that may not be covered with Grants, like, faculty and administration wages.
- Plan sustainable solutions; what happens when the grants or outside funds dry up? How to make the program self-sustaining.
- Capture capital cost of equipment and materials. Some items can be removed using a current inventory of what is already available.

D. Funding

- Show how the costs of operating (classrooms, labs, teaching material, faculty salary, etc.) will be covered. Think long-term sustainability.
- Define expected revenue sources and the support term from each source.
- Describe what you can do within their funds and what more you can do beyond it.

6. Next steps

1. Gain supporting commitments (internships and FT job interviews) from manufacturing industry companies.
2. Gain support from named College(s)/Institutions, ensure staff and lab availability.
3. Name start-up teams and advisors.
4. Build a Basi Manufacturing DACUM with Advanced and High-Tech Manufacturing companies.

5. Find alignments between DACUM and current college technical programs curriculums.
 - Use those alignments to decrease course design process and approvals.
6. Define badge and certificate outcomes.
 - Find break-out points for specialization (Semi, Elec, Machining, Additive, Clean, etc.)
7. Evaluate the need for more or updated lab training tools.
8. Purchase and install new tools and perform updates on current tools, if applicable and funded.
9. Prepare and teach three pilot courses. Implement performance monitoring, quantitative and qualitative.
10. Monitor student, industry, and instructor performance and student path after course completion.
11. Review results, adjust as needed, set schedules, and repeat with another two cohorts.
12. Continually adjust to meet changing industry needs.
13. Celebrate and market the wins.
14. If performance measures and Industry feedback is negative, look for new ideas and opportunities.
15. Notify stake holders of the planned termination of the program.

7. Funding Options

US Economic Development Administration (EDA)

\$30M in FY 2023 Defense Manufacturing Community Support Program (DMCSP) competition funding

- The U.S. Department of Defense, Office of Local Defense Community Cooperation, is accepting applications for the Defense Manufacturing Community Support Program (DMCSP) competition, a competitive grant program to designed to undertake long-term investments in critical skills, facilities, research and development, and small business support to strengthen the national security innovation and manufacturing base. A total of \$30,000,000 is available for these grants under FY 2023 appropriations.
- Deadline for applications: June 26, 2023.
- More information: <https://www.grants.gov/web/grants/view-opportunity.html?oppld=347699>

Regional Technology and Innovation Hubs (Tech Hubs)

- The Economic Development Administration has launched the Regional Technology and Innovation Hubs (Tech Hubs) competition. Authorized by the CHIPS and Science Act of 2022 with \$500 million in funding, this program will create tech hubs in regions across the country by bringing together industry, higher education institutions, state and local governments, economic development organizations, and labor and workforce partners to supercharge ecosystems of innovation for technologies that are essential to economic and national security. EDA will designate at least 20 Tech Hubs across the country and will separately award approximately \$15 million in strategy development grants to accelerate the development of future Tech Hubs.
- More information: [Regional Technology and Innovation Hubs \(Tech Hubs\) | U.S. Economic Development Administration \(eda.gov\)](#)

Child Care Access Means Parents in School (CCAMPIS) Program

- The U.S. Department of Education is accepting applications for the Child Care Access Means Parents in School (CCAMPIS) Program, to support the participation of low-income parents in postsecondary education by providing campus-based childcare services.
- Deadline for applications: July 31, 2023.
- More information: <https://www.grants.gov/web/grants/view-opportunity.html?oppld=348389>

American Rescue Plan

- [American Rescue Plan](#)
- [Build Back Better Regional Challenge](#)
- [Good Jobs Challenge](#)
- [Economic Adjustment Assistance](#)
- [Indigenous Communities](#)

Science & ChiPS Act: National Science Foundation – Academic Technological Education (NSF-ATE)

Sec. 10318. Microelectronics workforce development activities.

- Directs the National Science Foundation to make awards, including through existing programs, supporting the development and expansion of microelectronics education and workforce development activities at all levels of education, including traineeships. Establishes a National Network for Microelectronics Education to enhance and broaden participation in microelectronics education in coordination with industry, led by a network coordination hub.
- NSF Advanced Technological Education (ATE) has grants available up to \$650,000. This is an ongoing program and has been renewed annually since 2018.
- ATE aims to support the education of the skilled technical workforce in high-technology fields via partnerships between academic institutions (including grades 7-12), industry, and economic agencies. Awards may also be used to support projects for educating the skilled technical workforce.

DGA PriMO Alert | DOL/ETA | Strengthening Community Colleges Training Grants

The U.S. Department of Labor, Employment and Training Administration, has announced the availability of \$65,000,000 for the fourth round of Strengthening Community Colleges Training Grants (SCC4). SCC4 projects will increase the capacity and responsiveness of community colleges to meet the skill development needs of employers and equitably support students in obtaining good jobs in in-demand industries. Applicants will use strategies rooted in evidence and designed to build further evidence on the effectiveness of sector-based career pathways programs in leading to positive employment outcomes. These strategies will also address identified equity gaps to increase full access to educational and economic opportunity – particularly for individuals from historically underserved communities. The lead SCC4 applicant may apply as a single institution or as a consortium of two or more colleges in a common labor market area.

- **Deadline for applications:** November 14, 2023.
- **More information:** <https://www.grants.gov/web/grants/view-opportunity.html?oppId=349016>

8. Pilot and Test

Opportunity is pounding on the door ... Washington State can become an early adopter a new teaching standard. A standard designed to meet the challenges of increasingly decreasing technical obsolescence and support all potential student. Appeal to the underrepresented and marginalized society. Competency-based training is a standard focused on the outcome, not specifically on meeting a time-based standard award.

Your Community and Technical College can reintroduce mechatronic studies in a additional and new format. A format that will serve industry better and faster. Enable students to enter a family-wage high-growth careers in a matter of weeks. It is straightforward to create micro-credentialing stackable badges and certificate programs which supply the students the first steps to life-long learning.

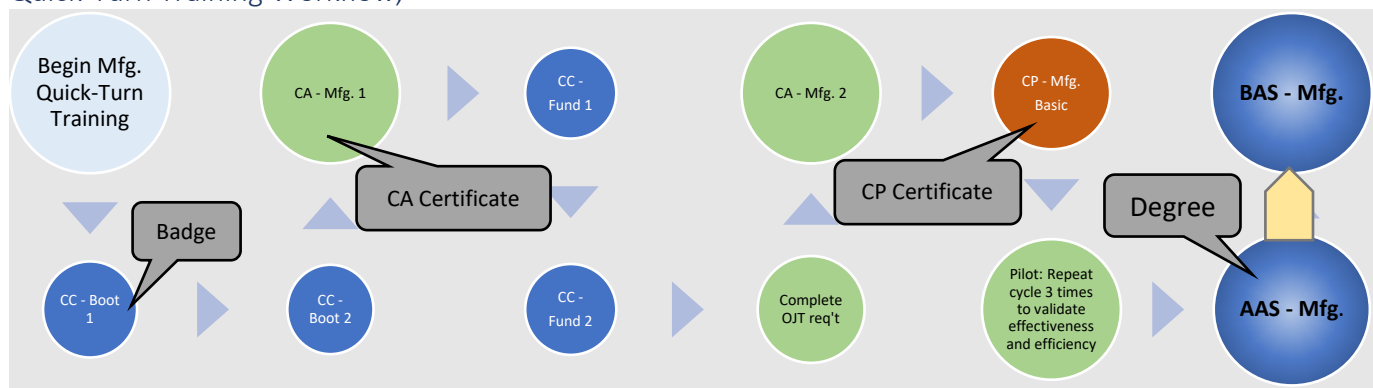
Take each curriculum and reduce each course down to its essential outcome requirement. Train the students in a full-time manner of 2-4-6-8 hour segments each day. Suggest planning for the student to complete 4-units of study each week. And combine that week with 8 hours of internship at one of the industry partners. This will begin the process of familiarization to the way of business.

For example, the workflow to reach the first two Certificate of Completions leading to the first Certificate of Achievement curriculums are shown below. With Quick Turn Training, the curriculum shown below will take the student 5-weeks, or less (due to realizing outcomes early) to complete. The student must complete four of these cycles to achieve an associate degree. If training occurs full time and linear fashion, the AAS would be achieved in less than a year. As progress is made intern/part time OJT training will increase in hours to achieve 80 hours of OJT before being eligible for the degree.

The hours of OJT will accumulate through interning, to reinforce lessons learned. The first Certificate complete requires 4 hours of Intern/OJT time. Each certificate following increases the hours until CA, which requires one day per week.

Lastly, if approved and moved forward, this program shall conduct three pilots, equivalents of about 20-22 units each. With outcomes that include 4-CCs, 2-CAs, and one-CP.

Quick-Turn Training Workflow,



NOTE: Curriculum can be adjusted to reach one of three disciplines; Advanced, Clean Energy, or Mechatronics.

Certification of Achievement

If pilots are successful, this process can be repeated to achieve 6 CPs to receive an AASAM (Adv. Mfg.), AASCE (Clean Energy), or a AASMM (Mechatronics Mfg.). When it comes right down to it, this will work for any current of future curriculum for multiple industries. **Accelerate Learning with the Quick-Turn Training model.**

Quick-Turn Curriculum Example

Shown on the next page is an example curriculum.

A completed industry DACUM will be used to decide courses and curriculum.

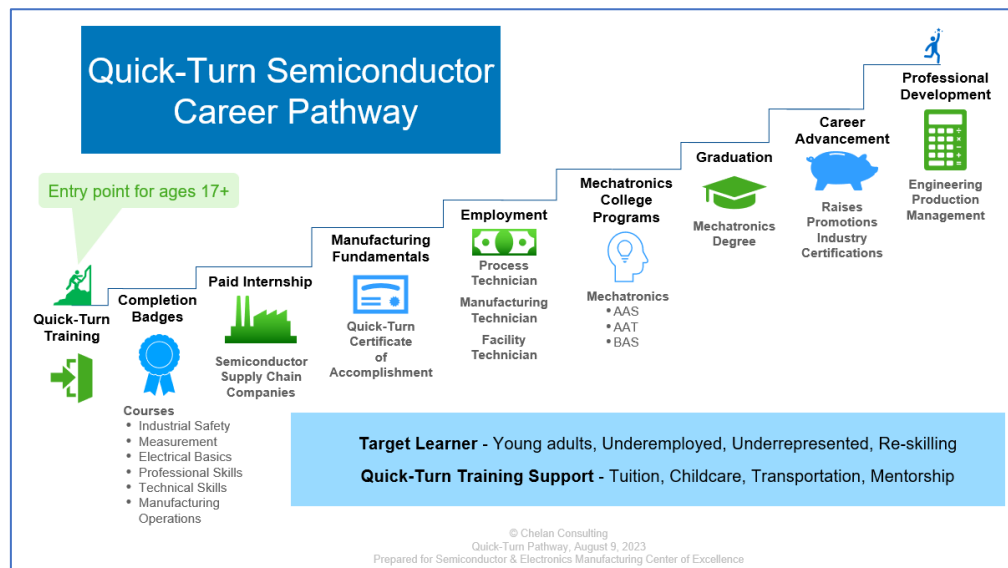
College Course – Name	# units	1 st Award	2 nd Award
MTX100 – Industrial Safety	1 unit	Completion Badge (2 hrs.)	Day 1
MTX103 – Basic Measurement Tools	2 units	Completion Badge (5 hrs.)	Day 1
COLL101 – College Introduction/Essentials	2 units	Completion Badge (6 hrs.)	Day 2
PTCS110 – Professional Technical Skills	5 units	Completion Badge (16 Hrs.)	Day 2-3
Lab/Theory make-up, if needed, no credit	per need	Class/Lab Time	Day 2 & 4
Internship – Company introductions	4 hours	Intern 1 (4 Hrs.)	Day 4
Basic Requirement to Become an Intern	10 units (34 hrs.)	Combine finished Badges →	Mfg. Bootcamp 1 Certificate of Completion
MGMT1010 or BUS148 – Choose One	3 unit	Completion Badge	Day 5
MTX101 – DC Fundamentals	3 units	Completion Badge	Day 6
MTX102 – AC fundamentals	3 units	Completion Badge	Day 7
COLL101 – College Introduction, Essentials	2 units	Completion Badge	Day 8
Lab/Theory makeup, if needed, no credit	as need	Manufactory Lab Time	Day 8
Internship – Company onsite	4 hours	Intern 2	Day 8
Basic Knowledge for an Intern or Employee	11 units (37 Hrs.)	Combine finished Badges →	Mfg. Bootcamp 2 Certificate of Completion
Manufacturing P/T ready	21 units (71 Hrs.)	Combine Mfg. Basics 1, 2, & 3 Certificate of Completions →	MFG Basic Certificate of Achievement
With two Certificates of Completion, the student will earn the Program Certificate	>45 units (>90 Hrs.)	MFG Fundamentals Certificate of Achievement	Mfg Fundamentals Program Certificate
With Four Program Certificates, the student will earn an Associate of Applied Science	>45 units (>90 Hrs.)	MFG Advanced Certificate of Achievement	Mfg Fundamentals Program Certificate

College courses, units are for example only.

NOTE 1: Defined courses shown above are only examples. A DACUM will help define curriculum and course inclusion.

NOTE 2: This example shows completing two quarters / one semester. This Quick-Turn training can be repeated for each 2- quarters / 1-semester of progressive training until an Associate of Applied Science in Mechatronics is achieved.

Quick-Turn Career Pathway Map



Micro-credentiaing & Badges Research and References

- [Small but Mighty, Why Micro-credentials are huge for the future of work.](#) Forbes
- [The power of Micro-credentials & America’s higher education dilemma.](#) Ed Surge