



SEMICONDUCTOR & ELECTRONICS MANUFACTURING TECHNICIAN CAREER LAUNCH PROGRAM PROPOSAL

Clark College & SEH America Partnership

Partners

Clark College

Shin Etsu Handotai (SEH America)

SW Washington High Technology Council (HTC)

Center of Excellence: Semiconductors and Electronic Manufacturing

Introduction

Clark College Mechatronics Program

Clark College's Mechatronics Program was initially offered in 2011, after a two-year development and retooling of the previously offered Electronics program. Through industry focus groups and advisory committees to address the needs of our regional employers, Clark College decided to retool the Electronics program to combine the science and skills of manufacturing and electronics.

In 2016, Clark College received a National Science Foundation Advanced Technological Education (NSF-ATE) grant for a Rural Access Mechatronics Program (RAMP) to develop a hybrid/online Certificate of Completion in Mechatronics Fundamentals. The curricula was validated and supported by multiple advanced manufacturing employers in the region who are concerned about the rapidly growing need for more skilled mechatronics technicians in the Washington-Oregon border area and the lack of qualified job applicants. SEH America was a partner on this grant, assisting in validating the curriculum for smooth and successful placement into the workforce, as well as serving as both a supplier of incumbent workers for upskilling and hiring graduates of the program. This partnership provided the foundation for this Career Launch partnership between Clark College and SEH America.

SHIN ETSU HANDOTAI (SEH America)

Headquartered in Tokyo, SEH America is an integral part of the ShinEtsu group of companies, and the world-leader in the manufacturing of silicon wafers for the semiconductor industry. One of the largest employers in SW Washington, SEH America employs over 800 employees. More specifically, sliced from an ultra-pure crystalline ingot and then polished, silicon wafers are processed by customers through the addition of circuit patterns arranged in tiny squares commonly referred to as "computer chips." These chips are then separated and packaged into electronic components that are at the heart of many products, including computers, lasers, automotive electronics, telecommunications and many consumer products.

High Technology Council (HTC)

The Southwest Washington High Technology Council (HTC) represents the largest assembly of semiconductor industry employers in Washington State, employing over 4,000 people in Clark County. The state of Washington has designated the semiconductor industry in Southwest Washington State as an "industry of State Wide Significance". The HTC was founded in 2001 by leading technology businesses to support this industry and other high technology industries in Southwest Washington.

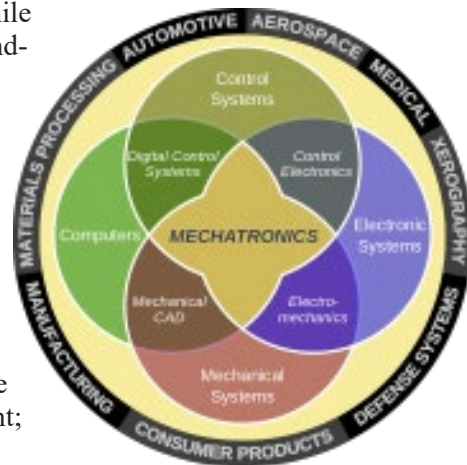
Currently, SEH America is the only employer on HTC for this Semiconductor & Electronics Manufacturing Technician Career Launch Program. All members of the HTC are committed to expanding on this endorsement proposal for regional approach to Manufacturing Career Launch. Each employer has committed to providing 1 to 5 interns to form additional regional cohorts. Currently, these additional HTC employers are developing their personalized model for providing employment, mentorship, recruitment, and benefits for future interns. Once details are finalized – and pending endorsement of the SEH and Clark College Career Launch – additional employers will submit endorsement proposals to expand the Semiconductor & Electronics Manufacturing Technician Career Launch Program.

Program Checklist

P1. Program description including length of program in years and total hours (including split between classroom and worksite).

Program Description: Mechatronics Technology is a growing career field that deals with the integration of mechanical and electronic components managed by control systems. Mechatronics technicians troubleshoot, maintain and repair mechanical equipment controlled by electrical, electronic and computer systems. These types of systems are increasingly used in a wide variety of manufacturing and industrial settings. Clark College's Mechatronics Technology (MTX) classes emphasize current concepts and technology by providing practical, hands-on experiences with the latest, industry standard equipment. In addition to the technical know-how needed to maintain and repair equipment, the certificate and degree programs will help prepare students to think critically, function as a successful team member and communicate clearly too internal and external customers.

First-year courses are taught within a protected environment while maintaining the integrity of the component characteristic. Second-year courses concentrate on troubleshooting and process improvement. Successful mechatronics technicians require comprehensive reading and mathematics skills as well as the ability to think analytically about interrelated systems. Mechatronics technicians perform a wide variety of tasks. Typical activities are the following: (1) Evaluate electro-mechanical systems for proper operation; (2) Troubleshoot and repair systems; (3) Communicate with other technical members on a team; (4) Use a wide assortment of test equipment; (5) Program devices and use these devices to service other programs; (6) Calibrate instrumentation and test equipment; and (7) Install and maintain industrial controls.



Length of Program: 8 quarters, 24 months.

Total Hours: 2,701 Hours. 101 instructional hours (59 lecture hours, 42 lab hours), and 2,600 worksite hours.

P2. Estimated number of hours per week at worksite and in classroom (this approach may shift throughout the program).

Hours per week at worksite: 25 hours.
Hours per week in classroom: 12-13 hours.

P3. Demonstration of labor market demand for specified skills/career in local region

The Semiconductor & Electronics Manufacturing Technician Career Launch Program addresses the occupations within Semiconductor Processors and Engineering Technicians (with a specific emphasis on Electrical and Electronics Engineering Technician and Mechanical Engineering Technicians). All of these occupations have a typical entry-level education of an Associate's Degree.

Within Clark College’s three county service district (Clark, Skamania, and Klickitat counties), there were 745 jobs in 2019, which is anticipated to grow by 12.5% in the next 10 years. During January – August 2019, there were 215 unique job openings - representing over one-quarter of the jobs in the region. Additionally, completions are not keeping up with the demand, with only 89 total annual completions; this creates an annual workforce shortage of 126.

Clark College is located within the Portland-Hillsboro-Vancouver metropolitan area, which means that the economic region includes a broader six county region (Clark, Skamania, Klickitat, Multnomah, Washington and Clackamas). Within this economic region, there were 10,804 jobs in 2019. There are 1,041 annual openings, with only 361 annual completions in this broader region; this creates an annual workforce shortage of 680.

This is further compounded with the aging workforce, where almost one-quarter (24.6%) of current employees in these occupations are age 55 years or older. With less than half of the overall workforce under age 45, the aging employee population presents a risk to addressing the regional workforce needs in the future.

Therefore, the Semiconductor & Electronics Manufacturing Technician Career Launch Program creates intentional career pathways for new and incumbent workers to address this workforce shortage.

P4. Projected count of student enrollment, student completion, and anticipated employer participation for 5 years, post-pilot.

	Baseline (2018-2019)	Year 1 (Winter/ Spring 2020)	Year 2 (2020-2021)	Year 3 (2021-2022)	Year 4 (2022-2023)	Year 5 (2023-2024)
Student Headcount	5	10	17	28	35	35
Full-Time Equivalent Student (FTES)	3.56	6 Overall (4 Wi/Sp)	9	15	18	18
Completion	0	10	17	28	35	35
Employer Participation	1	1	1	2	3	4

Baseline Year was 2018-2019, which included the pilot SEH / Mechatronics Program. This included 5 Career Launch participants, which generated 3.56 FTES. Increasing enrollment in the Career Launch

- Year 1: Participation in the program will expand to include incumbent workers at SEH America in the existing Mechatronics Program. Additionally, Clark College will leverage Perkins Funding to hybridize curriculum to increase capacity in our existing program to serve incumbent workers and apprentices for flexibility and alternative modalities.
- Year 2: Student participation increased due to availability of various modalities – with a hybrid cohort starting Winter 2021, and increased lab capacity to serve students on nights and weekends.
- Year 3: Continue growing enrollments through expanded employer participation, with two cohorts.
- Year 4-5: Stabilized enrollment in the Career Launch Program, with two cohorts (Summer and Winter) each academic year.

P5. Concise description of development process to create the Career Launch program (e.g., who was involved, when, how was the program piloted, etc.)

Clark College's Mechatronics Program was initially offered in 2011, after a two-year development and retooling of the previously offered Electronics program. Through industry focus groups and advisory committees to address the needs of our regional employers, Clark College decided to retool the Electronics program to combine the science and skills of manufacturing and electronics.

Clark College Mechatronics Professor Chris Lewis, designed this program based on his research and deep engagement with industry partners and previous students. One of the key questions that he asked was what are current electronics program lacking that is prohibiting employment and career advancement. Partners responded indicating that there was a need for advanced training beyond the scope of electronics. Mr. Lewis conducted a needs assessment and began to design curriculum that incorporated the voices of our industry partners which birthed the Mechatronics program. The Mechatronics program was launched at Clark in 2011 and has seen steady growth in enrollments since its launch.

Building on SEH America's work with Evergreen School District, Clark College and SEH America developed an Earn-and-Learn model for recent high school graduates interested in employment at SEH America. Working collaboratively with the Southwest Washington STEM Network, SEH America and Clark College's Mechatronics department – the Manufacturing Career Launch – a career-training program was piloted with 5 recent high school graduates in the summer of 2018. A second cohort started Fall 2019.

The pilot program is entering its second year and we are looking forward to expanding enrollment through additional cohorts in the Mechatronics program. In addition to identifying and resolving challenges inherent with partnerships between two distinctly different organizations, we have discovered a desire for SEH America incumbent workers to participate in the program. Clark College sees this increased demand as a proof of concept for the program and will look to increase our capacity in the near future.

P6. Signed letter of endorsement from all relevant partners, stakeholders and regional networks (including employers, labor organizations, academic institutions, community-based organizations, individuals, and other relevant stakeholders in support of the proposed Career Launch program). Regional network endorsement preferred.

Letters enclosed on subsequent pages are from the following partners:

- Clark College
- High Technology Council (HTC)
- Center of Excellence for Aerospace and Advanced Manufacturing
- Educational Service District 112 (Regional Network)
- Workforce Southwest (Program Intermediary)
- Southwest Washington STEM NetworkCLER

SEH America endorsement of the Career Launch Program is included in Employer Commitment Letter for I-R9 on Page 17.



October 10, 2019

To the Career Launch Endorsement Review Team:

I write this letter to affirm Clark College's institutional commitment to the Semiconductor & Electronics Manufacturing Technician Career Launch Program, with the initial partnership with SEH America. This program provides students with industry-defined curriculum and meaningful, high-quality on-the-job experience, as evidenced by the success of the pilot Mechatronics Technician Program.

I am proud to say that this program also supports Clark College's strategic plan in the core themes of academic excellence, social equity and economic vitality as well as the values of social justice, partnerships, and innovation. The Semiconductor & Electronics Manufacturing Technician Career Launch Program exemplifies this commitment through implementation of this creative and agile strategy to enhance student learning, and alignment of the Mechatronics program to meet regional workforce needs.

The Semiconductor & Electronics Manufacturing Technician Career Launch Program is applying for endorsement preliminarily between Clark College and SEH America, based on the infrastructure and success of the pilot program with SEH America. Students concurrently enroll in the Clark College Mechatronics program and work 25 hours per week at SEH America. To ensure that all students have the resources to address academic and non-academic issues, Clark College provides dedicated wrap-around student support to meet their individualized needs. This comprehensive program, with intentional integration of course curriculum and work-based learning opportunities, prepares students to enter the workforce with the knowledge, skills and abilities to be successful as a manufacturing technician.

Seeing the potential to increase the number of competitive candidates entering the job market, additional employers are interested in joining the partnership. Therefore, Clark College has been collaborating with the Southwest Washington High Technology Council (HTC) to increase employer participation and expansion of the program to include all nine employers represented by HTC.

Furthermore, the Associate Vice President of Instruction, Genevieve Howard and the Dean of Workforce Professional Technical Education, Armetta Burney have been closely involved in the development of this program with the Mechatronics Department Head and lead faculty member, Chris Lewis. Upon endorsement, all levels of leadership here at Clark College are confident that the implementation will continue to support the region's need for mechatronics technicians well into the future.

Sincerely,

A handwritten signature in blue ink that reads "Sandra Fowler-Hill". The signature is fluid and cursive, written in a professional style.

Dr. Sandra Fowler-Hill
President
Clark College



Southwest Washington
High Technology Council

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BOB SCHAEFER
Shin Etsu-SEH America

LARRY BLAUFUS
Clark Public Utilities

To the Career Launch Endorsement Review Team:

The Southwest Washington High Technology Council (HTC) is pleased to support the Semiconductor & Electronics Manufacturing Technician Career Launch Program, with the initial partnership between Clark College and SEH America. The Manufacturing Technician Career Launch Project is an exemplary program, providing students with meaningful, high-quality on-the-job experience that is concurrent with aligned academic curriculum – which will help meet our emerging workforce demand.

The Southwest Washington High Technology Council (HTC) represents the largest assembly of semiconductor industry employers in Washington State, employing over 4,000 people in Clark County. The state of Washington has designated the semiconductor industry in Southwest Washington State as an "industry of State Wide Significance". With nine employers, we recognize that private/public partnerships that provide students – both from K-12 and incumbent workers – with career pathways will provide competitive candidates to meet our business needs.

On behalf of HTC, we commit to working with the Semiconductor & Electronics Manufacturing Technician Career Launch Program to make this program successful in the following specific ways:

- Continued partnership of curriculum alignment with industry standards;
- Commitment to expand employer participation in the program, through completion of additional endorsement application components;
- Expand the program to include multiple employers in the HTC
- Supporting public policies and initiatives that promote an environment conducive to high technology development and growth.

The impact of this program is vital to meeting our regional workforce needs and we support endorsement of this exemplary program. We also look forward to expanding our participation through additional endorsement for all of our employers in the program.

Ben Bagherpour
Chair, High Tech Council



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PAINE FIELD, EVERETT, WA 98204
425-388-9196 | COEAEROSPACE.COM

October 15, 2019

To the Career Launch Endorsement Review Team:

The Center of Excellence for Aerospace & Advanced Manufacturing, in partnership with Clark College and SEH America, is pleased to support the Semiconductor & Electronics Manufacturing Technician Career Launch Project.

The Washington State Centers of Excellence grow and sustain Washington State's economic advantage through statewide leadership. Each Center focuses on a targeted industry that drives the state's economy and is built upon a reputation for fast, flexible, quality education and training programs. Centers are guided by industry representatives to lead collaborative and coordinated statewide education and training efforts to build a competitive workforce in a global economy.

As a Career Launch Program partner, the Center of Excellence for Aerospace and Advanced Manufacturing and the Center of Excellence for Semiconductors and Electronics Manufacturing is committed to supporting the Semiconductor & Electronics Manufacturing Technician Career Launch Program by:

- Helping develop articulation agreements between the manufacturers, regional high schools and Clark College's Mechatronics program
- Promoting employer engagement from the Southwest Washington High Technology Council (HTC)
- Assisting in outlining strategies for enrolling youth or young adults into the program, with an emphasis on underserved populations
- Helping identify best practices to support sustainable and inclusive practices that will continuously improve and build sustainability for this partnership
- Supporting the development and distribution of curriculum through Career Connect Washington statewide system for other regions, if applicable.

The impact of this program is vital to meeting our regional workforce needs and we look forward to continuing to support this exemplary program.

Mary Kay Bredeson
Executive Director
Center of Excellence for Aerospace & Advanced Manufacturing



EDUCATIONAL SERVICE DISTRICT 112

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SUPERINTENDENT

TIM MERLINO

10/10/2019

To the Career Launch Endorsement Review Team:

ESD112 is excited to support the Semiconductor & Electronics Manufacturing Technician Career Launch Project, with the initial partnership between Clark College and SEH America.

At ESD112, we recognize the need for...

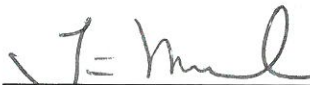
- Private/public partnerships that provide students with career pathways that also provide competitive candidates to meet our business needs
- Curriculum developed in partnership with employers and industry, to ensure state-of-the-art curriculum is aligned with occupations in-demand.
- Dedicated wrap-around student support to ensure students have the resources to be successful in academic and non-academic issues.
- Alignment of pathways from K-12 through postsecondary education and career trajectory.

The Manufacturing Technician Career Launch Project is an exemplary program, providing students with meaningful, high-quality on-the-job experience that is concurrent with aligned academic curriculum.

On behalf of ESD112, we commit to working with the Semiconductor & Electronics Manufacturing Technician Career Launch Project to make this program successful in the following specific ways:

- Convene and support Career Connect Intermediaries and other local partners in the region
- Help them achieve their outcomes related to Career Launch endorsement and participation of young people in Career Launch activities
- Ensure equitable inclusion of youth of color, low income youth, youth from rural communities and youth with disabilities.

The impact of this program is vital to meeting our regional workforce needs and we support endorsement of this exemplary program.


Tim Merlino
10/10/19
Date



To the Career Launch Endorsement Review Team:

Workforce Southwest Washington (WSW) is excited to support the Semiconductor & Electronics Manufacturing Technician Career Launch Program and the initial partnership between Clark College and SEH America.

WSW is the workforce development board serving Clark, Cowlitz, and Wahkiakum counties, and invests much of our time and talent in bringing together stakeholders from business, economic development, education, labor, government, nonprofit and community organizations to identify and address the regional workforce needs of specific industries and job seekers. WSW recognizes the need for public-private partnerships that provide youth with career pathways and provide employers with competitive candidates to meet their business needs. Through curriculum developed in partnership with employers and industry, combined with meaningful, high-quality on-the-job experience, the Semiconductor & Electronics Manufacturing Technician Career Launch Program is an exemplary program serving our students and community.

As a Career Launch Program Intermediary, WSW commits to working with the Semiconductor & Electronics Manufacturing Technician Career Launch Program to make this program successful in the following ways:

- Convene businesses and service providers to design a skills map to be utilized by regional high schools and opportunity youth providers to prepare students to enter SEMT Career Launch;
- Increase employer engagement from the High Technology Council (HTC) and other businesses serving as employers for semiconductor and electronics manufacturing techs;
- Develop a strategy for enrolling young adults in the program, with an emphasis on underserved populations (e.g., youth from low income families, people of color, youth from rural areas, out of school youth, English language learners, youth with disabilities, foster children, youth experiencing homelessness, single parents, and other populations that face barriers to employment);
- Identify inclusive, community-based, and business-vetted processes designed to sustain and improve the program over time;
- Assist in distribution of SEMT curriculum through the Career Connect Washington statewide system for other regions, if applicable.

This program is vital to meeting our regional workforce needs and we support the endorsement of the SEMT program. We look forward to working with Clark College, SEH America, and other Career Connect partners to ensure this program is successful.

Kevin Perkey

Kevin Perkey
Chief Executive Officer

P7. Description of resources, supports, or other processes to recruit and support students from underserved backgrounds; or create an implementation plan to do so.

For the pilot Mechatronics Technician program between SEH America and Clark College, Evergreen School District and the Southwest Washington STEM Network assisted with participant recruitment. Student recruitment from underserved backgrounds was identified as a significant area for improvement. With the next cohort and potential program expansion, the program will intentionally recruit students from underserved backgrounds with specific support from ESD 112 (Career Launch Regional Network), (Career Launch Program Intermediary), Workforce Southwest Washington (Career Launch Program Intermediary), as well as the NEXT Center (a comprehensive center serving young adults ages 16-24 that do not have a clear pathway to work, training or post-secondary education). These intentional partnerships aim to recruit participants that reflect the diversity in the community.

Once students enroll in the program, Clark College offers a variety of supports to assist students from marginalized populations in achieving their educational and professional goals – including the following:

- Appreciative Advising Model that supports students in a holistic manner. All new students are assigned an Academic Advisor who assists with academic and non-academic supports throughout their journey at Clark College.
- Workforce Education Services provides a variety of supports to assist low-income students to include, alternative financial aid, access to subsidized childcare, maintenance of public benefits while in school, emergency grants, and assistance in preventing homelessness. Students receive assistance in barrier removal and connections to internal and external resources.
- Disability Support Services (DSS) office assist students with disabilities in pursuing their educational goals. Clark College is committed to assuring that its services, programs, and activities are accessible to individuals with disabilities.
- The Office of Diversity and Equity is committed to serving marginalized populations. The Diversity Center, is a safe space for students to study, meet new people and experience a sense of belonging.
- The Penguin Pantry supports a healthy college community by reducing hunger on campus and connecting students to essential resources.
- Career Services provides a wide array of resources that can assist students with job search skills and securing full-time employment and internships. There are a variety of Student Success Workshops that are offered throughout the academic year to assist students with their professional development, academic success and personal development.

Industry-Related Checklist

I-R1. Address of worksite(s) where Career Launch students will complete supervised training.

SEH America
11309-11399 NE 39th St
Vancouver, WA 98682

I-R2. Hourly wage for Career Launch participants.

Participants start at \$14/hour with regular pay increases as skills advance.

I-R3. List of entry-level positions and associated job descriptions for which a Career Launch student would be eligible for upon completion.

CZ Clean Team

Entry level general production position with the main job function being prepping, cleaning, sanitation, and maintenance of machines between material processing runs

JOB DUTIES

- Work in a team of 4 to disassemble machinery, clean, and reassemble production equipment.
- Work closely with other teams to validate machine condition.
- Work with technology including computers, robots, and automated processes.
- Follow all company and department policies and procedures including wearing appropriate protective equipment, following operating procedures, abiding by employment and site policies.
- Acquire new skills over time.
- Participate in team safety activities.

MINIMUM QUALIFICATIONS

- Basic math and computer skills are required.
- Ability to read and follow written, multi-step instructions and accurately record data.
- Strong attention to detail and ability to multitask is a must.
- Good communication skills including ability to clearly communicate work status.
- Experience working successfully with a team of 3-5 people to accomplish a task
- Ability to analyze a situation and proactively troubleshoot problems.
- Able to work on feet for duration of shift.
- Must be able to follow safety guidelines and practice safe work habits.

PREFERRED KNOWLEDGE / SKILLS / EXPERIENCE

- Basic mechanical skills.
- Prior work experience preferred.

DSP Operator

Double-side polishing (DSP) is a chemical-mechanical process, in which the wafer is rotated under pressure between two polishing pads, with the incorporation of an alkali polishing slurry.

JOB DUTIES

- Set up, monitor and operate machines to polish and clean wafers according to customer required specifications.
- Address machine and/or quality issues (with assistance of team leader, supervisor or high level operator until trained).
- Input data into Excel, track and confirm each process, and complete computerized forms and labels for each order according to all requirements.
- Use Statistical Process Control (SPC) methodology to measure, identify, and correct processes and eliminate defects.
- Perform tasks to clean and maintain equipment and the area to meet quality and clean standards for each manufacturing process.
- Follow all company and department policies and procedures including wearing appropriate protective equipment, following operating procedures, abiding by employment and site policies.
- Acquire new skills over time.
- Participate in team safety activities.

MINIMUM QUALIFICATIONS

- HS Diploma or equivalent.
- Basic math skills. Experience accurately entering data into a computer system required.
- Ability to read and follow written, multi-step instructions and accurately record data.
- Strong attention to detail and ability to multitask is a must.
- Good communication skills including ability to clearly communicate work status.

- Strong sense of teamwork. Willing to learn and be trained.
- Ability to analyze a situation and proactively troubleshoot problems.
- Able to work on feet for duration of shift.
- Must be able to follow safety guidelines and practice safe work habits.

PREFERRED KNOWLEDGE / SKILLS / EXPERIENCE

- Basic mechanical skills useful.
- Vocational training and/or work experience relevant to the tasks is helpful but not required.
- Understanding of SPC ideal.

Inspection Operators

Various inspection techniques are used at each phase of crystal growing and wafer processing. Ensures wafers are processed according to specific customer requirements contained in a computerized work order. Specific job duties will vary by department/area.

JOB DUTIES

- Understand/follow product specs, SOPs/SOCs, control charts, and other documentation related to assigned process.
- Perform calibrations for each process tool and verify all calibration data meets process specifications.
- Continuously monitor, analyze, and verify that all data and all processes are correct and meet quality specifications before moving material to the next process step.
- Prepare charts and graphs to record data including averages, percentages, total outpour and yield.
- Understand and apply basic SPC concepts. Use SPC methods to identify process issues and implement routine process corrections.
- Understand basic maintenance processes of assigned equipment. Follow process for handling equipment issues through team and maintenance resources.
- Follow all company and department policies and procedures including wearing appropriate protective equipment, following operating procedures, abiding by employment and site policies.
- Acquire new skills over time.
- Participate in team safety activities.

MINIMUM QUALIFICATIONS

- HS Diploma or equivalent.
- Basic math skills. Experience accurately entering data into a computer system required.
- Ability to read and follow written, multi-step instructions and accurately record data.
- Strong attention to detail and ability to multitask is a must.
- Good communication skills including ability to clearly communicate work status.
- Strong sense of teamwork. Willing to learn and be trained.
- Ability to analyze a situation and proactively troubleshoot problems.
- Able to work on feet for duration of shift.
- Must be able to follow safety guidelines and practice safe work habits.

PREFERRED KNOWLEDGE / SKILLS / EXPERIENCE

- Basic mechanical skills useful.
- Vocational training and/or work experience relevant to the tasks is helpful but not required.
- Understanding of SPC ideal.

I-R4. List of specific skills and competencies required for completion of Career Launch program, with demonstrated alignment to entry-level positions, job descriptions, and average local salary ranges.

In order to identify the specific skills and competencies for Mechatronics, a Developing a Curriculum (DACUM) was conducted with industry representatives from four employers in the region (SEH America, Wafer Tech, Silicon Forest, and Kyocera). The end-result was identification of the knowledge, skills and desired abilities (KSAs) that an entry-level applicant should possess and/or demonstrate mastery of to be successful in a specific industry. Industry experts developed consensus around an agreed upon set of KSA's. The DACUM identified 13 technical knowledge, skills, and abilities for entry-level positions:

1. Maintain Process and Control Equipment
2. Monitor Process and Control Equipment Performance
3. Troubleshoot Process and Control Equipment
4. Install Process and Control Equipment
5. Repair Process and Control Equipment
6. Monitor and Improve System Performance
7. Perform Administrative Tasks as Required
8. Build Product Subassembly and Assemblies as Required
9. Maintain Tools and Test Equipment
10. Maintain Shop Equipment
11. Pursue Professional Development Activities
12. Apply "Lean" Principles to Job
13. Know/Apply Safe Practices

Each knowledge, skills, and abilities also included associated tasks that an entry-level position would require. Full results were not included due to space limitations, but are available upon request.

For the aligned positions, the entry-level hourly wage (10th percentile for occupation) is \$18.20 for the Clark, Skamania, and Klickitat counties region. The wage progression includes \$21.54 (25th percentile) and \$26.51 (median hourly wage).

I-R5. Employer attests that Career Launch program is in compliance with required federal, state, and local regulations.

Attestation is included in SEH Employer letter (See I-R9).

I-R6. Employers will outline a student supervision and mentorship model.

Career Launch participants will have extensive on-the-job training. Participants will be placed in positions on the manufacturing floor where they will be integrated into a production team. Their supervisor will assign them an on the job trainer who will work closely with the student to help the learn floor safety, as well as become certified in the area tools. As the student develops their basic skills, they will be assigned increasingly sophisticated tasks. They will also be assigned to shadow area technicians as they perform preventive maintenance, troubleshoot problems, review data, and do other associated tasks. Students will begin to perform basic maintenance as skills allow.

As students progress in the mechatronics pathway at Clark College, the supervisor will assign them additional tasks to support learning and integrate academic curriculum with the job site. For example, as the student takes technical writing they will be assigned standard work procedure rewrites.

In addition to the training, coaching, and support from their supervisors and team on the manufacturing floor, students will receive mentoring and support from SHE America's training and development specialist and from other program participants. Students will have a standing weekly meeting to discuss challenges and successes. They will receive mentoring and coaching to help resolve issues and inform continuous improvement for the program overall. Second year students will serve as mentors to first year students, helping them navigate the site and sharing best practices. This mentoring will not only serve to help newer students, but will help second year students develop their own leadership skills.

I-R7. Description of common career pathway(s) beginning with entry-level position specified with demonstration of likely salary growth over specified time period.

Potential Production Apprentice Career Paths

PRODUCTION APPRENTICE

- HS Diploma or GED
- \$14.00/hr starting pay. Incremental increases given as reach learning objectives.

SR OPERATOR

- 4 yrs production experience in a manufacturing environment or an appropriate combination of related experience, technical education /training. Must receive and maintain all required tool certifications.
- SEH meets/exceeds PDX/VAN median rate of \$17.65/hr.

PRODUCTION TECHNICIAN

- 8 yrs production experience in a manufacturing environment or an appropriate combination of related experience, technical education /training, and/or relevant technical military training and experience.
- Able to troubleshoot equipment issues and can perform minor to moderately complex repairs on equipment.
- SEH meets/exceeds PDX/VAN median rate of \$22.70/hr.

PRODUCTION SUPERVISOR

- At least 5 years of experience in a manufacturing process demonstrating leadership skills and potential.
- Experience leading a production staff at SEH highly preferred (includes Team Lead, Shift Coordinator roles)
- SEH meets/exceeds PDX/VAN median rate of \$63K/yr.

ENGINEER

- Bachelor's degree in engineering field.
- Experience with data collection. Working knowledge of statistical analysis and SPC.
- Process engineering experience gained through work experience or internship.
- SEH meets/exceeds PDX/VAN median rate of \$87K/yr.

PRODUCTION APPRENTICE

- HS Diploma or GED
- \$14.00/hr starting pay. Incremental increases given as reach learning objectives.

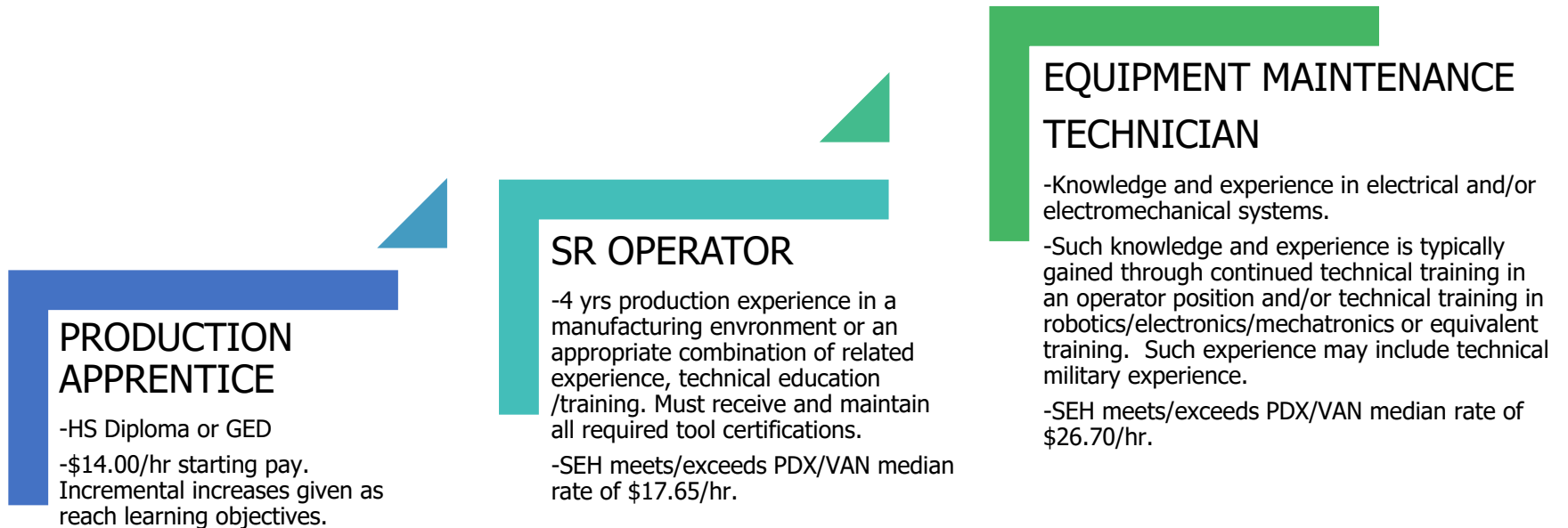
SR OPERATOR

- 4 yrs production experience in a manufacturing environment or an appropriate combination of related experience, technical education /training. Must receive and maintain all required tool certifications.
- SEH meets/exceeds PDX/VAN median rate of \$17.65/hr.

PROCESS TECHNICIAN

- 4 yrs experience in a process manufacturing environment OR a combination of education, training, and experience. AS degree in engineering related field preferred.
- Experience with data collection. Working knowledge of statistical analysis and SPC.
- SEH meets/exceeds PDX/VAN median rate of \$23.75/hr.

Potential Production Apprentice Career Paths (Cont.)



I-R8. Demonstrated competency alignment with relevant professional standards for specified entry-level positions when applicable.

There are no national professional standards identified for these occupations.

Regional competency alignment with relevant professional standards was conducted during the Developing a Curriculum (DACUM) for Mechatronics that was conducted with industry representatives from four employers in the region (SEH America, Wafer Tech, Silicon Forest, and Kyocera). Overview results are included in I-R4, with full DACUM results available upon request.

I-R9. Signed letter from employer partner.

Displayed on Page 16.

To the Career Launch Endorsement Review Team:

SEH America is pleased to collaborate with Clark College and its Mechatronics program for endorsement of the Semiconductor & Electronics Manufacturing Technician Career Launch Program. This partnership between Clark College and SEH America provides students with meaningful, high-quality on-the-job experience that is concurrent with aligned academic curriculum.

SEH America manufactures silicon wafers that are the foundation of the electronics industry. Employing over 800 people, access to an educated workforce is key to our success. Like other companies in the region (and other manufacturers in the US), we find it challenging to find employees with the STEM education, skills, and abilities needed to grow our company. We believe that this Mechatronics Technician Career Launch partnership has and will continue to produce an additional workforce with needed STEM skills and hands-on experiences.

SEH America has a long history of successfully partnering with Clark College, including the pilot Mechatronics Technician Program. The pilot program has students six currently participating in the pilot program.

Within an endorsed program, SEH America commits to partnering in the Semiconductor & Electronics Manufacturing Technician Career Launch Program to make this program successful in the following specific ways:

- Compliance with required federal, state, and local regulations for the Semiconductor & Electronics Manufacturing Technician Career Launch Program;
- Recruitment of students into the program through community partnerships with K-12, Clark College, and community-based organizations;
- Provide exemplary student supervision and mentorship that allows program participants to gain confidence and skills needed to successfully transition into the workforce;
- Completers of the program will have the knowledge, skills, and abilities for technical jobs at SEH A, at minimum as a senior machine operator; or an entry-level process or production technician.
- Consider using the program as an option to skill up our own employees;
- Share best practices to expand High Technology Council employer participation in the program; and
- Provide program participants with the career advancement opportunities, as applicable.

Regional industry needs employees with fundamental mechatronics competencies. We stand as partner with Clark College to build the best Semiconductor & Electronics Manufacturing Technician Career Launch Program that will fully support industry and future workforce needs. This program clearly supports our mission, too. By helping to provide students with the knowledge and exposure to industry needs and an early awareness of technology educational and career pathways, support of this Career Launch program offers SEH America an opportunity to identify high-quality potential graduates with work-ready Mechatronics technology skills.

We look forward to continuing this partnership with Clark College through the endorsement of the Semiconductor & Electronics Manufacturing Technician Career Launch Program.

Sincerely,



Ben Bagherpour
Vice President of Site Services and Government Affairs

Academic-Related Checklist

A-R1. List of academic institution(s) providing career-aligned instruction for Career Launch program.

Clark College

A-R2. Curriculum scope and sequence aligned to skills and competencies provided in employment checklist.

Program outcomes are overarching skills that are emphasized and reinforced throughout several courses in a specific program; they are measurable statements that define what students should know or be able to do by the end of a certificate or degree at Clark College. After successful completion of this program, students will be able to:

- Articulate well-considered ideas and written claims to an academic audience, using effective rhetorical techniques, properly credited evidence, and a command of Standard English. (GE)
- Demonstrate interpersonal/human relations skills. (GE)
- Demonstrate and clearly explain an effective strategy to solve a quantitative problem. (GE)
- Design, operate, and troubleshoot automation processes and systems.
- Communicate with colleagues, supervisors, clients, using written and verbal technical and/or nontechnical language.
- Actively participate as an effective team member, completing prescribed project tasks and meeting project goals.
- Use computational skills to analyze physical parameters within automated processes and systems.
- Assimilate/interpret technical and nontechnical descriptions to form a solution.
- Collect data based on sensory input and system performance to analyze and interpret process capabilities.
- Operate, measure, and modify, software-driven industrial control systems

To ensure alignment of the curriculum with industry standards, the High-Technology Council (HTC), SW WA STEM Network, Center of Excellence of Aerospace and Advanced Manufacturing, Clark College, School Districts all worked on developing a DACUM (Developing A Curriculum). This process was industry-driven and world class by creating an environment of collaboration between the industry, and the education systems and create pipelines of qualified future employees. The DACUM was designed to identify, adjust, and finalize what would Career Launch program should look like.

The DACUM was conducted on January 31, 2019 with industry representatives from four employers in the region (SEH America, Wafer Tech, Silicon Forest, and Kyocera). Based on the results of the DACUM, the current Mechatronics curriculum was revised to ensure alignment with the needs of all member companies on the High Tech Council with very few skills gaps, which can be addressed in on-the-job training opportunities. The revised course sequence is included on the following page.

Revised Mechatronics Course Sequence, After DACUM Review

Course Code	Course Title	Credits	Class Time	Lab Time	Comments
Year 1 Quarter 1		13	11	2	
PTCS 110	Professional Technical Computational Skills&!	5	5	0	
COLL 101	College Essentials	2	2	0	
BTEC 148	Business Professional Self Development	3	2	1	
MTX 100	Industrial Safety*+@&!#	1	1	0	
MXT 103	Basic Measurement Tools*@&!	2	1	1	
Year 1 Quarter 2		12	6	6	
MXT 101	DC Fundamentals*+@&!#	3	1	2	
MTX 106	Fluid Power Systems*&	4	2	2	
MTX 180	Mechanical Drive Systems@&	5	3	2	
Year 1 Quarter 3		12	6	6	Siemens I Cert
MXT 102	AC Fundamentals*+@&!#	4	2	2	
MTX 130	Programmable Logic Controllers 1s@	4	2	2	
MTX 132	Siemens PLC 1#	4	2	2	
Year 1 Quarter 4		13	9	4	RAMP Cert
MXT 110	Electric Motor Control 1*+@&	4	2	2	
MTX 140	Robotic Systems@	4	2	2	
PTWR 135	Introduction to Technical Writing	5	5	0	
Year 2 Quarter 1		12	6	6	
MXT 121	Semiconductor Fundamentals+@	3	1	2	
MTX 145	Electrical Power and Distribution Systems+&	4	2	2	
MTX 175	Mechatronics System Fundamentals@&!	3	2	1	
MXT 230	Laser Alignment&	2	1	1	
Year 2 Quarter 2		12	6	6	
MXT 221	Semiconductors 2+@	3	2	1	
MTX 224	Motor Drive Systems&	5	2	3	
MTX 250	Advanced Programmable Logic Controllers	4	2	2	
Year 2 Quarter 3		13	7	6	Electronics Cert
MXT 216	Mechatronics 2	5	3	2	
MTX 232	Digital Electronics Fundamentals+@	3	1	2	
MTX 275	Advanced Fluid Power Systems&	5	3	2	
Year 2 Quarter 4		14	8	6	NIMS, SC & CPT Cert
MXT 240	Process Control Systems&	6	4	2	
MTX 292	Manufacturing System Principles@!	4	3	1	
MTX 296	Capstone/Final Project	4	1	3	
Totals		101	59	42	Applied AA Degree

**RAMP Certification (18 Credits), +Electronics Certification (25 Credits), @Semiconductor Certification (43 Certification), &NIMS Certification (53 Credits), Certified Production Technician Certification (22 Credits), #Siemens 1 Certification (12 Credits)*

Non-Technical Skills

Revised Courses

New Courses

A-R3. Demonstration of student supports (e.g. mentoring, advising, financial aid, tutoring) available for Career Launch students enrolled in the course.

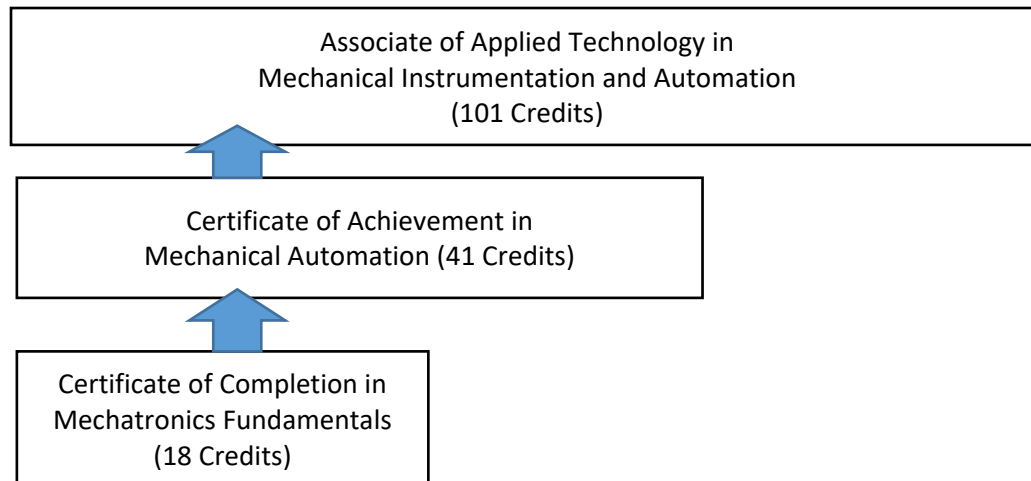
There are a number of supports available to Career Launch students to assist them in achieving academic success at Clark College:

- Clark College has implemented the Appreciative Advising Model that supports students in a holistic manner. This is an intentional collaborative practice of asking positive, open-ended questions that help students optimize their education experiences and achieve their dreams, goals, and potentials. All new students are assigned an Academic Advisor who assists with academic and non-academic supports throughout their journey at Clark College.
- Peer Mentors Clark College Peer Mentor Programs provide an opportunity for students to help others connect to Clark College and community resources, navigate the college, and work toward academic goals.
- Student Success Programs offers a variety of supports to students to include: strategies for balancing classes, work and personal responsibilities, access to college and community resources, assistance with developing and achieving academic goals, and one-on-one support from the Clark College Student Success Coach.
- Tutoring Services is designed to provide individualized attention that facilitates student learning and academic success. Tutors will help students develop skills and confidence to become a stronger, more independent learner. Students who come in for tutoring may also access computers, software, handouts, reference materials, and other resources.
- Financial Aid is available to provide students with a variety of funding supports to help cover the cost of education expenses to include tuition, fees, books and supplies. The Financial Aid Office is available to assist students in understanding financial aid options, to include student loans, grants, work study and scholarships.

A-R4. Number of postsecondary credits provided and / or credential earned upon completion of program.

Upon completion of the Associate of Applied Technology (AAT) Mechanical and Instrumentation Automation degree, students will have earned three stackable academic postsecondary credentials:

- Certificate of Completion, 18 credits
- Certificate of Achievement, 41 credits
- Associate of Applied Technology, 101 credits



A-R5. Demonstrated curricular alignment with relevant professional and / or academic standards associated with coursework and credential, when applicable.

Upon completion of the Associate of Applied Technology (AAT) Mechanical and Instrumentation Automation degree, students will have completed 15 credits of General Education Requirements, as required by accreditation through the Northwest Commission on Colleges and Universities (NWCCU):

- 5 credits of Technical Writing,
- 5 credits of Technical Math, and
- 5 credits of Human Relations.

These General Education Requirements are aligned with professional standards of soft skills identified in the DACUM for non-tech skills: (1) Team Dynamics; (2) Communication; (3) Green Computation and Science; and (4) Processing Information and Design.

In addition, students complete 86 credits of Mechatronics theory and lab skill development. As part of the degree pathway students earn 5 industry certificates:

- Siemens certificate, 12 credits
- Electronics Certification, 25 credits
- Production Technician Certification, 22 credits;
- Semiconductor Certification, 43 credits; and
- NIMS Certificate, 53 credits.

A-R6. Details of potential for current or future partnerships and/or scalability of the program within and across sectors and/or geographic locations (e.g. articulation, degree pathways), when applicable.

Once endorsed, this program plans to expand capacity with additional employer partnerships. All members of the High Technology Council (HTC) have committed to expanding on this endorsement proposal for regional approach to Semiconductor & Electronics Manufacturing Technician Career Launch Program. Each employer has committed to providing 1 to 5 interns to form additional regional cohorts.

Currently, these additional HTC employers are developing their personalized model for providing employment, mentorship, recruitment, and benefits for future interns. Once details are finalized – and pending endorsement of the SEH and Clark College Career Launch – additional employers will submit endorsement proposals to expand the Semiconductor & Electronics Manufacturing Technician Career Launch Program.

Due to the fact that the vast majority of the semiconductor companies in Washington State are located in Vancouver, there is no plan to grow this program at other community colleges in the state.