



**Three-Year Instructional Program Review
Due date June 30 of Academic Year 2019**

Program Name: Manufacturing and Industrial Technology

Degrees and Certificates offered within the Program:

- AAS Manufacturing and Industrial Technology
- Certified Production Technician (MSSC CPT) Career Pathway Certificate
- Manufacturing Technician Career Pathway Certificate (Four Emphasis Areas)
 - Machining Emphasis
 - Welding Emphasis
 - Electrical Emphasis
 - Millwright Emphasis

Statement of Collaboration

The program faculty listed below collaborated in an open and forthright dialogue to prepare this Program Review. Statements included herein accurately reflect the conclusions and opinions of the program faculty.

Participants in the review:

- Darryl Spitzer Manufacturing and Industrial Technology Coordinator

Authorization:

After the document is complete, it must be signed by the Department Faculty and Chief Academic Officer prior to submission to the Curriculum and Assessment Committee.

Signatures of Department Faculty:

Signature of Chief Academic Officer

Date of Submission: 06/10/2019

1.0 Mission and Goals

1.1 Briefly describe the relationship of your program to the college's Mission, Vision, and Core Themes.

College Mission & Vision

The Manufacturing and Industrial Technology Program (MIT) directly supports the Mission and Vision of Tillamook Bay Community College by offering classes and curriculum that align with manufacturing and industrial business needs across Tillamook County. Courses in Manufacturing, Machining, AutoCAD, Lean, Industrial Maintenance, Safety, and Welding offer the students a significant advantage when they enter the workforce. This training equates to employed students and successful employers. The program, redesigned in 2015, provides all the heavy industrial training provided by the original Industrial Maintenance technology degree, but with expanded topics in Logistics, Predictive Maintenance, Fabrication, and Advanced Welding. These changes provide a more customizable educational platform and do more to meet the broader needs of businesses statewide.

The MIT program is also directed by an advisory committee made up of all of Tillamook's major manufacturing employers. These individuals help to ensure the subject matter and curriculum selections align with the needs in their shops and abroad. These members are direct employers of the college graduates.

In addition to TBCC's degree and certificate offerings, the program articulates to Oregon Institute of Technology. OIT takes the program without unpacking it. This means TBCC graduates seamlessly start as a junior and can earn an Applied Baccalaureate in Electrical and Mechanical Engineering.

Core Themes

The TBCC MIT program aligns with all of the College's core themes.

Education Excellence: The MIT program is taught by industry professionals who utilize their knowledge and experience to bring the concepts and challenges of the workplace to the classroom. This allows the students to experience business as they would if they were already in the industry.

Economic Success: Careers in Manufacturing and the Trades have an overall higher wage band than many other employment options. The students who complete the MIT program will be well suited to enter the field and enjoy the perks of working in a field populated with, "family wage" jobs.

Leadership, Partnership, and Community Engagement: Back at the very beginning of the program in 2009, the platform was built with the end user in mind. The degree, certificates, and Registered Apprenticeship tracks are built with the thoughts of the business partners and community in mind. Since the program is so closely aligned there is a minimal cultural adjustment when transitioning to the workforce. This benefits the students so they are able to demonstrate their learning and set high standards for themselves in the workforce. The program partners with the community for student employment, apprenticeship and creating products used by the community.

Program Description

The Manufacturing and Industrial Technology Program (MIT) is the second iteration of the Industrial Maintenance Technology (IMT) program started at TBCC in 2009. The first degree was designed to be a paired degree with the four Registered Apprenticeship programs the college offered, Industrial Maintenance Millwright, Industrial Plant Electrician, Inside Electrician, and Limited Maintenance Electrician. This program became a critical tool for local employers to train and retain industrial mechanics and electricians who keep the wheels of industry running at full speed.

In 2015, the program was redesigned to become the current Manufacturing and Industrial Technology program. The redesign was necessary because training offered in the previous degree program had succeeded in developing most of the heavy industrial and electrical employees needed for the community. The current degree was altered to broaden the topics and training to include more manufacturing components including Supply Chain, Lean, MIG and TIG Welding. We also adopted the Manufacturing Skills and Standards Council (MSSC) Certified Production Technician (CPT) Certification to give all our students a 50-State transferrable credential demonstrating a level of industry readiness. All alterations were completed with oversight of the Advisory Committee and by program faculty. (See Appendix A-1)

For 2019, the MIT program offers a very comprehensive array of classes introducing students too much of what they will see when they enter the workforce. As noted earlier the adoption of the MSSC curriculum aligned 5 courses directly to industry standards within the areas of Safety, Manufacturing Process, Lean Manufacturing, Predictive Maintenance, and Green Manufacturing. Additionally, the program expanded the welding offerings to include Wire Welding (GMAW/MIG) and Tungsten Arc Welding (GTAW/TIG). These additions helped to broaden the program to meet the needs of the counties manufacturing and food processing partners.

Graduates from the MIT program will be able to enter the workforce directly as operators and technicians ready to support Tillamook County in their work. These students allow local companies to hire qualified individuals who will work providing value to the company and raising their quality of life with higher wages.

2.0 Program Data and Trends Analysis

2.1 For each data point listed below, summarize the trend. (Attach three-year longitudinal data to the appendix.)

Program Name:

Data Point	Table	Trends/Rationale	Highest Year
Enrollment	A-2	The enrollment in the program is on a sharp upward trend from the year of the redesign. This suggests that the redesign was successful in its attempt to revitalize enrollment. The	211 (2018)

		annual enrollment numbers of 62, 120, and 211 demonstrate almost a 100% increase annually. Although I do see this trend continuing, it is likely to increase at a lesser rate due to market saturation if one considers the steady economic outlook and unemployment trend.	
Number Program Majors	A-4	Similar to the enrollment trend, the program majors have also increased annually. The 2018 major count of 37 is a slight increase to the 35 of the prior year. In relating the program majors to the number of classes taken, we see a sharp upward trend. This can be explained by to fill rate and availability of qualified instructors in the program. There was a historical trend of canceling classes because of instructor availability.	37 (2018)
Total FTE	A-3	The total FTE generated by the program is 19.94 for the program period. The breakdown is reflected by duplicated headcount trend by nearly doubling the annual FTE. I expect this trend to continue only at a slower rate because of the reasons noted above.	19.94
Number Sections Offered	A-2	The sections offered reflects a number of factors; student count, instructor availability, and the program redesign. The broader program allowed for an increase in the disciplines/subjects available in the degree. This broader appeal created higher interest and more enrollment. 2018 had a total course offering of 20 classes. This course load will likely be observed going forward because of special considerations and also instructor availability. The program is taught in a shared building and is taught entirely by adjuncts with other full-time jobs.	20
FTEF	A-3	Overall, the Full-Time Equivalent Faculty (FTEF) measure is low compared to other CTE programs. The numbers are increasing, but are low. The 2018 FTEF .20. This number is low, but reflects both the lack of dual credit offerings and fill rate/capacity issues related to equipment use.	.20
Fill Rate	A-3	Course fill rates are an indication of the level of excess capacity not being used by students. The MIT program ha a high fill rate of 26.9% in 2018. This percentage shows an upward trend	26.9

		<p>of classes filling in the program. However, I think the standard fill rate equation for classes is not entirely appropriate with equipment based CTE classes. When a student enrolls in a class that uses a specific equipment platform for learning, the expectation is the equipment will be available to use in the class. In the case of the Machining sequence, MCH 121, and 220, there are two machines to use in the classroom. They are big and they take up a lot of room. Only one to two people can operate a machine at a time. A class with a fill capacity of 35 would not be successful with only two machines to use. A class of 10, is more feasible from a learning outcome standpoint. There are book and theory-based classes in the program with more capacity, but equipment based courses have limitations that depress the fill rates.</p>	
WSCH/FTEF	A-3	<p>Weekly Student contact Hours per Full-time Equivalent Faculty- This is a productivity measure related to the FTE generated by 1 Regular/Full-time Faculty. The MIT program has no full-time faculty, only adjuncts. The WSCH measure of 210 for 2018 is in line if we take into consideration some of the limitations.</p>	210
% Students Persisting from Fall to Fall	A-4	<p>Overall, fall-to-fall retention is 42.9% this is a growing number as enrollment is experiencing a steep incline in numbers. The overall numbers are small as a percentage of total enrollment (15 of 35), however, this tells a story about the students in the program. The courses are attended by a lot of industry folks who take classes over a long period of time. They pop in and out of the program as it fits their schedule. Additionally, many students use the skills in the program for increasing their opportunities at work, so they only need a short sequence of classes and they leave the program. Only in the most recent cohort have full-time students been on the rise.</p>	42.9
Average Successful Completion Rate	A-4	<p>Since the redesign, the college has had one person complete the MIT degree and certificates. With the increase in enrollment, more individuals completing the program is anticipated. Low completion rate at this point is</p>	NA

		further evidence of the nontraditional type of students enrolling in the program.	
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2.2 Program Peer Comparison

How does your program compare with peers? (Peers include similar programs at the college or programs at peer institutions as identified by the Office of Institutional Research)

In considering peer institutions, the closest colleges in size are Coast, Clatsop, and Columbia Gorge Community College.

***It is important to note that the geography, location, and egress are important components to consider when bringing business to a community. The Oregon Coast has some specific restrictions when it comes to introducing and developing the industry. CTE Programs like MIT are paired with local and countywide business needs. Within Tillamook County, the need is more prominent. Tillamook County hosts several large food producers, primary forest product companies, and manufacturing companies. In Lincoln and Clatsop County, this is not the case. To find similar programs, (Outside of Apprenticeship) one would have to look to larger colleges in larger population centers.

Clatsop CC: Clatsop offers a Welding Program with many of the welding classes TBCC offers. However, they do not offer a manufacturing program. It is noteworthy that due to cost considerations at Clatsop, TBCC is currently conducting all Registered Apprenticeship classes for both Tillamook and Clatsop County.

Coast CC: Coast does not have a manufacturing program, nor does the county support the industry to develop one.

Columbia Gorge CC: Columbia Gorge Community College (CGCC) is the only college in similar size to have some similar classes. They have an Electro-Mechanical AAS that covers a number of the heavier mechanical and electrical courses offered in TBCC's Manufacturing and Apprenticeship Programs. CGCC's enrollment in the Electro-Mechanical program has been steadily increasing. Moving to larger institutions across the state, Blue Mountain CC, Klamath CC, and Rogue CC all have Manufacturing/Engineering/Mechatronics degrees and programs with similar offerings to TBCC. As with CTE programs across the state, enrollment is strong.

Analysis:

In many ways, TBCC's Manufacturing program is as unique as Tillamook County. The programs are matched with industry needs. A side by side comparison is difficult because of the broader focus of urban schools and their industrial needs. Across the state, CTE education industry is experiencing growth in all sectors. TBCC's plan moving forward is to harness this potential.

In terms of Registered Apprenticeship, TBCC is on par with 15 other community colleges in the state offering Mechanical and Electrical apprenticeships. Our programs are the same across the state

because of the consortium and the relationship with BOLI. Enrollment is steady across all the disciplines.

2.3 Student Enrollment and Achievement by Gender and Race/Ethnicity

Analyze the achievement levels for each of the groups listed below. Are there differences in achievement levels across groups? Are there strategies you can implement to provide more support for these populations?

(Attach to Appendix or provide below the Persistence and Success Rates by Gender and Race/Ethnicity as identified by the Office of Institutional Research)

Program Name: Manufacturing and Industrial Technology

The program has traditionally been populated by white males. This creates a challenge and an opportunity. Reporting appears one-sided because of the convention of withholding populations with a count of less than 5 to preserve student confidentiality. The opportunity is to have a broader spectrum of ethnicities and genders participate in the program. The 2019 academic year (not reported) already has a more diverse student population.

Group	Number of Students Enrolled	% Students Persisting from Fall to Fall	Average Successful Completion Rate
Males	61	15	NR
Females	NR	NR	NR
Asian-American	NR	NR	NR
African-American	NR	NR	NR
Filipino	NR	NR	NR
Hispanic	NR	NR	NR
Native American	NR	NR	NR
Other Non-White	NR	NR	NR
Pacific Islander	NR	NR	NR
White	NR	NR	NR
Unknown	NR	NR	NR

Analysis:

The program can improve its marketing and outreach to nontraditional student populations.

2.4 (CTE Programs Only) List the certifications students are able to earn through participation in your program.

Within TBCC's MIT program, students can earn the MSSC Certified Production Technician (CPT) credential. Under the umbrella of the CPT, students can earn the Green Production Certification Credential.

2.5 Other Data

Please include any other data (internal or external) that may be relevant to student achievement, learning, and trends within your Basic Skills, CTE, or Transfer Education program.

As already noted, TBCC enjoys the benefits of having incredible relationships with community business partners. Currently, the college has students being sponsored completely or in part by:

Hampton Tillamook
Tillamook County Creamery
Hampton Warrenton
Tillamook Smoker
Northwest Hardwoods
Angus Electric
T. Chestnut Electric
C. Lazzeri Electric
Borland Electric
Johnson and Sons Electric
JJ Electrical Services

Analysis

The MIT program should work to increase the Industry Certifications available to students. These certifications should be driven by the local business community to increase the availability of work-ready students.

2.6 Strengths, Weaknesses, Opportunities, Challenges (SWOC)

2.6.1 What are the strengths of your program as indicated in the above data?

- The program is growing annually, both in class size and offerings.
- The college is beginning to articulate more courses through dual-credit, increasing the likelihood of enrollment.
- The MSSC Certification is an industry-recognized and portable credential student can use outside of Tillamook County.
- Student participation and course completion are high.
- The program is aligned with area business needs.
- The program is improving and increasing its online presence, allowing for a greater degree of access.
- Adjunct Instructors work in the field and provide current and real-world scenarios in the class.
- Advisory committee members advise, hire, and teach in the program. They also work full time in major area employers. This increases the connection between industry and students.

2.6.2 What are the weaknesses of your program as indicated in the above data?

- Space and class size are constant consideration when scheduling classes.

- Because of specialized skills, instructors are not always available.
- All classes are taught by adjuncts, so all classes must be taught in the evenings/weekends.
- Because of scale, the program is offered over two years.
- Increased class offerings have the potential for diluting enrollment and increasing the cost.
- Equipment in CTE programs is expensive, additional technology is cost prohibitive.
- Space is limited.

2.6.3 What are the opportunities for your program as indicated in the above data?

- In many ways the MIT Program is just beginning to address the skills gap, there is huge potential for targeted growth.
- The program is just beginning to work with North and South County High Schools
- Increasing online courses will help more students take part in the program.
- More classes off-site. (North and South County)
- Business-oriented capstone projects offer an opportunity to bring a more relevant experience into the classroom.

2.6.4 What challenges exist for your program based on the above data?

- The program is quickly running out of space.
- Technology improvements are costly and may slow potential.
- Enrollment has the potential to vary as many students come to learn a specific skill and not get a degree.

3.0 Student Learning Outcomes Assessment

3.1 How has the assessment of course level SLOs led to improvements in student learning and achievement?

Due to internal systems, SLO assessment has been less formal than the ideal. Winter 2019 is the first term all courses were evaluated. The few formal evaluations collected suggest the students like to have well-developed hands-on activities to add to the classroom lectures.

3.2 How has the assessment of program-level SLOs led to improvements in the transfer or certificate/degree awards?

The AAS is considered a terminal degree. We do have the articulation with OIT, but no one as yet has taken up that opportunity.

3.3 What challenges remain to make course and program level Student Learning Outcome Assessment more effective for your program?

More data points will help answer this. Currently, the number of RFI responses is not enough to create an evaluative narrative.

4.0 Evaluation of Progress Toward Achievement of Previous Program Plans (Section 4.0 N/A 2017-18)

4.1 Evaluate steps taken to achieve plans established in the last program review.

Not applicable – This is the first program review.

4.2 In cases where resources were allocated toward goals, evaluate the efficacy of that spending.

Not applicable – This is the first program review.

5.0 Program Plans

5.1 Short-term Plans (three-year cycle)

5.1.1 *Based on the above data and analyses, identify 2 or more concrete plans, measurable outcomes, and activities that you would anticipate resulting in improvements to the program in the next three-year cycle.*

- **Bring the MSSC CPT to local High Schools (In progress)**

The Program Coordinator is currently working out the proposal and details to make this go live in the fall. Offering the CPT in the High School will give Seniors 13 credits and a Career Pathway Certificate within the MIT degree. Students not electing to go to college will take the CPT Industry Credential directly into the workforce exhibiting many of the skills they will need to be successful.

- **Develop the MSSC Certified Logistics Technician (CLT) Track**

The MSSC CLT Track is a two-class sequence that introduces the student to the concepts and framework involved in Logistics and Supply Chain Management. This is another portable and Industry Recognized Credential. There is potential to offer this at the High school in addition to the CPT

- **Expand Machining to include CNC and G-Code**

This is the natural evolution in the college's program. Currently, TBCC has a manual mill and lathe. Purchasing a CNC will open up more opportunities in the classroom and gravitate students towards machining automation which is an essential skill in the industry.

- **Expand the Advisory Committee**

The current advisory committee is generally attended by only a few people despite the large list of participants listed. A recruitment effort should be made to establish new committee members and reinvigorate old ones.

5.1.2 *What specific aspects of these plans can be accomplished without additional financial resources? (See 5.1.1 above)*

The development of the CLT and offering CPT to the high Schools can be accomplished with minimal expense to the program, and will in fact be profitable.

5.2 Long-term Plans (six-year cycle)

5.2.1 *Based on the above data and analyses, identify 2 or more concrete plans, measurable outcomes, and activities that you would anticipate resulting in improvements to the program in the next six years.*

- **Build a facility for the program.**

This type of program takes a lot of room to teach effectively. Currently, TBCC enjoys a tremendous relationship with Tillamook High School leveraging every square foot of available space and in many instances splitting space to accommodate both of our needs. The program will be able to maintain its current course, but major improvements to the program will require infrastructure.

- **Purchase additional equipment.**

In the current facility, more equipment will be needed to grow programs and increase their quality. This will compound the space problem, but at current, there is enough room to expand in some areas.

- **Add industry Credentials in Machining and Electrical.**

The college, given the correct equipment, could offer the ability for students to earn their National Institute for Metalworking Skills (NIMS) level 1 and level 2 certifications. NCCER offers electrical certifications.

5.2.2 *What specific aspects of these plans can be accomplished without additional financial resources?*

The credentials are a small lift. However, TBCC would not be able to offer NIMS without the purchase of a CNC machine.

6.0 Requests for Resources

For any specific aspect of a plan listed in 5.0 that would require additional financial resources, complete the form below. If you are aware of a potential funding source other than college general funds, identify the potential source below.

Type of Resource	Requested Amount	Potential Funding Source
Personnel		
Facilities		
Equipment	65,000	Grants/Partner support

Supplies	0	
Computer Hardware	20,000	Multiple sources
Computer Software	0	
Training	0	
Other (promotion)	0	
Total Requested Amount	85,000	Multiple Sources

6.1 Describe the resource request.

Computer Hardware:

We need to upgrade the Programmable Logic Controllers. The ones in use work, but need updating to meet the increased industrial use of PLC's. This is a booming technology within all industries, we need to strive to stay as close as we can to the changing and demanding industry.

Equipment:

In order to bring the machining component of the program to current standards, additional machines will need to be purchased. We can make space for this type of investment.

6.2 What program outcome(s) does the resource request address?

The hardware and equipment requests would increase the fulfillment of the program outcome; demonstrate the technical knowledge and skills necessary for industrial/manufacturing systems. The college is better able to train students if we own the equipment needed for training.

6.3 What measurable outcome(s) will result from filling this resource request?

With the additional machinery and hardware, we can issue more credentials both with NIMS credentials and in Programming through NCCER.

6.4 How does this request further college fulfillment of the college mission and its Core Theme objectives?

In all cases, TBCC's Mission and Core Theme objectives are addressed. Higher quality classes create a better learning environment, thus, in turn, increasing enrollment, term to term retention, and completion.

7.0 Advisory Committee and Employer Input (CTE Programs Only):

7.1 List of Current Advisory Program Members.

Spring 2018 Advisory Committee Members

Darryl Spitzer	Program Coordinator
Ross Tomlin	College President

Teresa Rivenes	CAO
Daniella Bivens	Dean of Academic Partnerships
Tami Schild	NWRES D CTE Coordinator
Greg English	TSD Principle
Nathan Radcliffe	TSD CTE/Math Faculty
Bruce Rhodes	TSD Grant Writer
Mark Elston	Plant Manager Hampton Tillamook
Mark Farrier	Signing Electrical Sup. Hampton Tillamook
Jack Mulder	Director of Engineering TCCA
Ryan Gentry	Maintenance Manager TCCA
Wes Coulter	Plant Manager Stimson Lumber
John Schneidecker	Maintenance Manager Stimson Lumber
Roby Lane	Plant Manager Northwest Hardwoods
Cliff Tuttle	Engineer Hampton Warrenton (Ret.)
Chris Fink	Signing Electrical Sup. Hampton Warrenton

7.2 Discuss the process your program followed to ensure advisory committee membership involvement in and contributions to this program review. Report on comments and concerns shared by members of the advisory committee.

The MIT advisory committee meets three times a year to discuss program status, updates, and needs. The advisory committee is an essential component in the success of the program. During the program redesign, members were given the opportunity to help reshape the program and help with SWOT analysis and needs assessments. Each meeting, updates are given and feedback is received to help align the program outcomes with industry expectations.

The advisory committee sees a lot of value in the MSSC CPT credential as many of the competencies are aligned with both internal and onboarding training. Additionally, at the committees urging, soft skills and customer considerations are now being taught within the foundational courses in the program. The committee also helps provide material and equipment used in class instruction. This adds a valuable layer to the instructional value as it keeps the students working with current industrial components.

In the coming year, the efforts will be made to expand the advisory committee to include some smaller shops to ensure every aspect of training are made available to students in the program.

7.3 Date final program review to be shared with advisory committee membership:

The program review will be shared and discussed at the next advisory committee meeting on October 15th, 2019.

8.0 High School, Community, and Employer Outreach

8.1 (CTE Programs Only) List the largest employers within the service area for your program completers. How do these employers provide input to the program curriculum and information about industry trends?

The MIT Advisory Committee members are the directors and managers of all the major employers in Tillamook County.

8.2: (CTE Programs Only) Discuss local employer perceptions of your program and its graduates. What mechanism did you use to gather this input during the program review process?

Given the above, the program receives feedback at the advisory committee meetings.

8.3 (CTE Programs Only) What employment opportunities are available to your program completers (list specific positions)? To your certificate completers?

Within Tillamook County, program and certificate completers can avail themselves to a veritable smorgasbord of job opportunities. Farming, Logging, Primary Forest Products, Food Production, Welding, Autobody, Sheet Metal, and HVAC all have opportunities utilizing the skills gained with the program. Jobs include Maintenance Technicians, Operators, Mechanic, and Fabricator.

8.4 (CTE Programs Only) Provide labor market data regarding the projected number of job openings in the region (northwest Oregon and Portland metropolitan area). Cite the source of this data.

See Appendix B for labor market projections. There is an upward trend in almost all sectors.

8.5 (CTE and Transfer Programs) What dual credit offerings does your program support? In which area high schools are these dual credit courses offered? How will your program support the expansion of dual credit offerings at area high schools?

At the end of this program review cycle, the MIT program had no dual-credit courses. However, in the coming year's dual credit will be put in place

9.0 Executive Summary

The Manufacturing and Industrial Technology program prepares students to enter the workforce in manufacturing and industrial maintenance. The program is designed to be broad enough to apply to a variety of fields, yet specific enough to address technical competencies needed to complete the work.

The program is very customizable allowing a student to develop an individual training track. At the core of the program is the MSSC CPT, a 50-state-recognized manufacturing credential. In addition to the core; students, through electives, can focus on fields such as programming, welding, and

machining. Graduates in the MIT program are able to enter the workforce across the broad spectrum of opportunities in Tillamook County.

In comparison to other programs, we find the MIT program stands alone in many ways. In part because colleges of similar size in the state do not offer this type of program. Larger colleges offer components of the program, but the tracks are separated into larger degree offerings. The MIT program, although similar to other college offerings, is as distinct as Tillamook County.

Reviewing the last three years, TBCC can make some observations and suggestions for improvement:

Observations:

- Based on degree completers and year to year retention, we see students using the program for targeted training as opposed to degree completion.
- The program offerings align well with the direct needs of Tillamook County.
- The Advisory Committee hosts the major stakeholders in the area.

Suggestions:

- The college needs to expand dual-credit in the program.
- TBCC need to market the program to a more diverse population.
- Additional equipment is needed to increase class size and offerings.

At this point in the program, one can observe the effects of the redesign. Enrollment, fill rate, and FTE are all on the rise. As a pair to the increased enrollment, many of the local industries are in expansion and require more skilled employees. Based on current enrollment and student progress, over the next year, a series of graduates will leave the program and fill that need.

The MIT program has identified some short and long term goals that will support and expand the program to meet the changing needs of business in the manufacturing and Industrial sectors.

Short-term goals include:

- Adding a track for Certified Logistics Training (MSSC).
- Adding G-code and 3-axis machining.
- Expanding the Advisory Committee to include more small business.

Long-term goals include:

- Expanding or developing a facility
- Purchasing additional equipment
- Adding NIMS Level I and II Certifications, NCCER Electrical certifications

Chief Academic Officer Program Review Summary Page

First, I would like to extend gratitude and congratulations to Darryl Spitzer for his work on this program review. Darryl has recently been promoted to Dean of Industrial Technology for his hard work that is showing dividends. Darryl, thanks for all you do. CTE at TBCC could not be nearly as successful as it currently is without your hard work and efforts.

The MIT, and new Welding programs, are expensive. First they require expensive machinery, consumable supplies, large space, smaller class sizes and specialized adjuncts. A school of our size does not often have these programs for all of these reasons. TBCC is special in that the community and industry have supported this program and championed it into existence and continued success. We are grateful for the continued support of the community, Advisory Committee and local employers. We would like to particularly recognize Stimson, Hampton, Northwest Hardwoods and the Creamery for their continued support!

This program is also only possible through the partnership with Tillamook School District (TSD). We share space and equipment with the high school and partner on new classes and projects. While this is a benefit to students and the community, it is also a risk. Our lease with TSD expires in the next decade and could leave us homeless. This is something we need to be thinking about and considering as we build as a college. It also limits our growth. In order to address this, we may need to consider creative scheduling options (e.g. weekends and late nights) and/or building our own facility.

From a data perspective, this program review would be improved with program completion data from similar sized colleges, and work should be done to explore this. What is the completion for Manufacturing at Rogue for example? It would be good to know where we stack up in relationship to our peers. Data also shows disparities in gender and ethnicity of program students. This is a common challenge in this career field and must be addressed with careful marketing, concurrent enrollment classes and expanding dual credit (all avenues of reaching non-traditional students). We also need to purposefully recruit female instructors with skills in the field as this has been shown to be a best practice in recruiting more female students.

MIT would benefit from becoming a Perkins program of study, so that other schools could align their dual-credit with our programs and we could seek additional funding for equipment and professional development. This has proven difficult with TSD, but we can, and should, explore this in additional areas.

Lastly, the MIT program would benefit from purposeful implementation of on the job work experience (CWE) and measuring those outcomes for program improvement. A program such as New World of Work would be one avenue for exploring this and documenting student skills achievement. MIT will continue to work on course learning outcomes (CLO), program learning outcomes (PLO) and institutional learning outcomes (ILO) development, tracking and use for program improvement. Currently strong systems exist for student and employer feedback, we now need to document and use this feedback to close the loop on student learning outcomes.

This program review has identified specific goals for moving the program forward. These include;

- Researching how similar programs are doing in terms of diversity, retention and completion.
- Creating a succession plan and operating manual.
- Developing short term industry based work credentials, which will allow students to complete their actual desired program goal (e.g. logistics, CLT, G Code, CNC). This can be done through Work Source which would allow for funding outside of the traditional funding streams (ETPL).
- Expanding through dual credit in TSD, north and south, county. This includes implementing and growing the CPT in local high schools which would allow students to earn a short-term certificate and industry recognized credential with their high school graduation!
- Adding dual credit pathways that allow students to transfer seamlessly into college programs of interest.
- Expanding the advisory committee to include small businesses and employers to ensure we are meeting the needs of all industry.
- Expanding machining courses and adding automotive classes.
- Researching New World of Work and badging for students and employers.
- Purchasing additional equipment to expand programs.
- Exploring funding to support equipment purchases.
- Growing space, offerings and faculty.
- Adding NIMS Level 1 and II, and NCCER certifications
- Eventually having our own space to grow new programs in automotive and diesel machining.

This program is truly going in an exciting direction, as evidenced by community support and growing student numbers. I look forward to the exciting things to come.

Appendix A-1



CERTIFIED PRODUCTION TECHNICIAN

CRITICAL PRODUCTION FUNCTIONS COVERED BY MSSC COURSES AND ASSESSMENTS:

The Manufacturing Skill Standards Council (MSSC) credentialing system leading to a CPT covers the four critical production functions, as defined by MSSC's industry-led, nationally validated skills standards, common to all sectors of manufacturing: Safety, Quality & Continuous Improvement, Manufacturing Processes & Production, and Maintenance Awareness. Each area is addressed with a separate assessment. MSSC training and assessments are organized around those four modules. An individual can earn a "Certificate" if they pass one or more assessments. However, they must pass all four assessments to earn the full "CPT" certification. MSSC strongly recommends that individuals be at the 9th grade level of math and 10th grade level of English before attempting MSSC courses and assessments. The four critical functions and their related key activities are described below:

SAFETY

1. Work in a Safe and Productive Manufacturing Workplace
2. Perform safety and environmental inspections
3. Perform emergency drills and participate in emergency teams
4. Identify unsafe conditions and take corrective action
5. Provide safety orientation for all employees
6. Train personnel to use equipment safely
7. Suggest processes and procedures that support safety of work environment
8. Fulfill safety and health requirements for maintenance, installation, and repair
9. Monitor safe equipment and operator performance
10. Utilize effective, safety-enhancing workplace practices

QUALITY PRACTICES & MEASUREMENT

1. Participate in periodic internal quality audit activities
2. Check calibration of gages and other data collection equipment
3. Suggest continuous improvements
4. Inspect materials and product/process at all stages to ensure they meet specifications
5. Document the results of quality tests
6. Communicate quality problems.
7. Take corrective actions to restore or maintain quality
8. Record process outcomes and trends
9. Identify fundamentals of blueprint reading
10. Use common measurement systems and precision measurement tools

MANUFACTURING PROCESSES & PRODUCTION

1. Identify customer needs
2. Determine resources available for the production process
3. Set up equipment for the production process
4. Set team production goals
5. Make job assignments
6. Coordinate work flow with team members and other work groups
7. Communicate production and material requirements and product specifications
8. Perform and monitor the process to make the product
9. Document product and process compliance with customer requirements
10. Prepare final product for shipping or distribution

MAINTENANCE AWARENESS

1. Perform preventive maintenance and routine repair
2. Monitor indicators to ensure correct operations
3. Perform all housekeeping to maintain production schedule
4. Recognize potential maintenance issues with basic production systems, including knowledge of when to inform maintenance personnel about problems with:
 - Electrical systems
 - Pneumatic systems
 - Hydraulic systems
 - Machine automation systems
 - Lubrication processes
 - Bearings and couplings
 - Belts and chain drives

NOTE: MSSC assesses core understanding of the key work activities and core technical knowledge and skills needed in high-performance manufacturing, as defined by MSSC Production Skill Standards. Given online, MSSC Assessments also help measure basic computer, problem-solving and analytical skills and one's ability to apply knowledge to specific situations identified in the assessments. There are no experiential or hands-on requirements for MSSC certification as it is expected that individual employers will determine those requirements based upon their own specific needs. MSSC does not require that individuals take MSSC courses prior to testing.

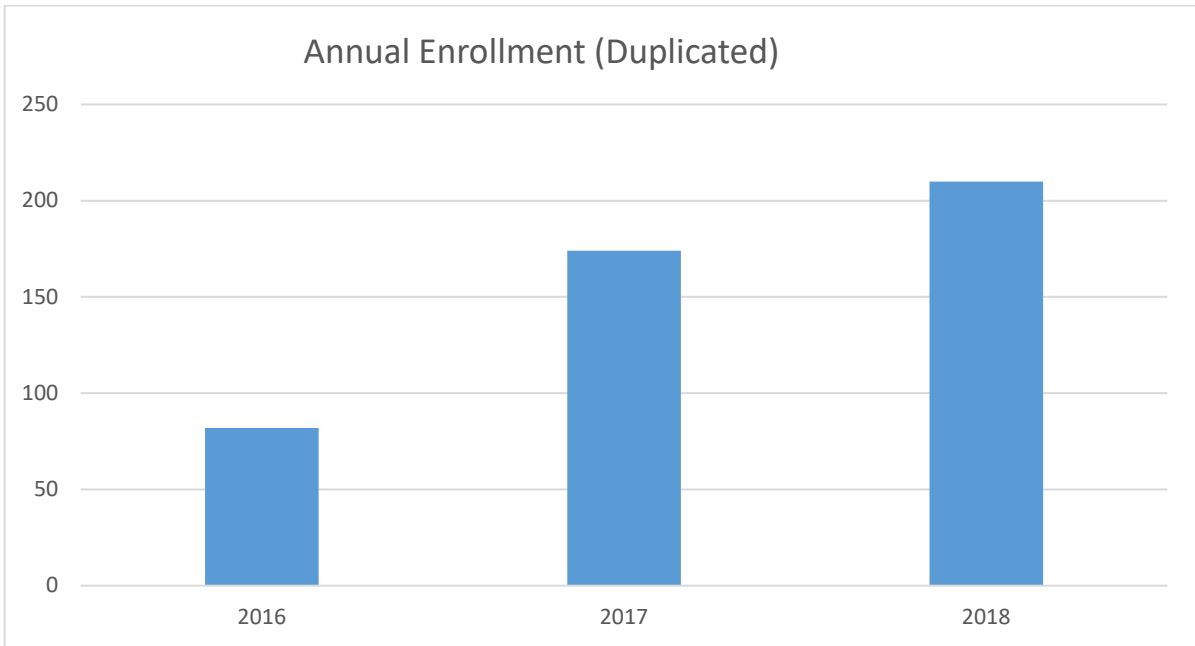
Program Review: MIT Program

2016-2018

1. Course Enrollment

- a. Below is the total number of enrollments in MIT courses for each of the 3 academic years. Individual students may be counted more than once if they enrolled in more than one MIT course. This courses included here are MIT core requirements with the prefix IMT, WLD, ELT, MCH, DRF and GT. The course HE112 is also included as it is an elective.

Year	Number of Enrollments
2016	62
2017	120
2018	211
Grand Total	393



Source: TBCC Student Data System

- b. Below is total enrollment and 'course passing rate' for each course – again students may appear more than once if they've taken more than one course. This isn't broken out by year or term but includes all courses and enrollments over the 3 year period.

Year	Passing		Not Passing		Total N	Total %
	N	%	N	%		
DRF 270 210 01	11	84.6%	2	15.4%	13	100.0%
ELT 110 210 01	8	88.9%	1	11.1%	9	100.0%
ELT 125 210 01	21	100.0%		0.0%	21	100.0%
ELT 126 210 01	11	84.6%	2	15.4%	13	100.0%
ELT 199 210 01	2	100.0%		0.0%	2	100.0%
GT 106 210 01	4	80.0%	1	20.0%	5	100.0%
HE 112 100 01	39	83.0%	8	17.0%	47	100.0%
HE 112 100 21	21	100.0%		0.0%	21	100.0%
IMT 100 210 06	16	88.9%	2	11.1%	18	100.0%
IMT 102 210 01	8	100.0%		0.0%	8	100.0%
IMT 103 210 01	2	100.0%		0.0%	2	100.0%
IMT 103 210 06	5	100.0%		0.0%	5	100.0%
IMT 104 210 01	14	100.0%		0.0%	14	100.0%
IMT 105 210 01	6	100.0%		0.0%	6	100.0%
IMT 106 210 01	4	100.0%		0.0%	4	100.0%
IMT 118 210 01	15	100.0%		0.0%	15	100.0%
IMT 200 210 01	15	93.8%	1	6.3%	16	100.0%
IMT 204 210 01	11	100.0%		0.0%	11	100.0%
IMT 204 210 81	8	100.0%		0.0%	8	100.0%
IMT 220 210 01	18	94.7%	1	5.3%	19	100.0%
IMT 222 210 01	8	88.9%	1	11.1%	9	100.0%
IMT 230 210 01	21	100.0%		0.0%	21	100.0%
MCH 102 210 01	15	93.8%	1	6.3%	16	100.0%
MCH 121 210 01	6	75.0%	2	25.0%	8	100.0%
MCH 135 210 01	5	83.3%	1	16.7%	6	100.0%
MCH 220 210 02	5	100.0%		0.0%	5	100.0%
WLD 102 210 01	6	66.7%	3	33.3%	9	100.0%
WLD 111 210 01	8	100.0%		0.0%	8	100.0%
WLD 112 210 01	9	100.0%		0.0%	9	100.0%
WLD 199 210 01	8	100.0%		0.0%	8	100.0%
WLD 199 210 81	12	100.0%		0.0%	12	100.0%
WLD 201 210 01	6	100.0%		0.0%	6	100.0%
WLD 202 210 01	8	100.0%		0.0%	8	100.0%
WLD 261 210 01	9	100.0%		0.0%	9	100.0%
WLD 299 210 01	2	100.0%		0.0%	2	100.0%
Grand Total	367	93.4%	26	6.6%	393	100.0%

Source: TBCC Student Data System

c. The number of courses by year:

Year	Courses
2016	8
2017	16
2018	20
Grand Total	44



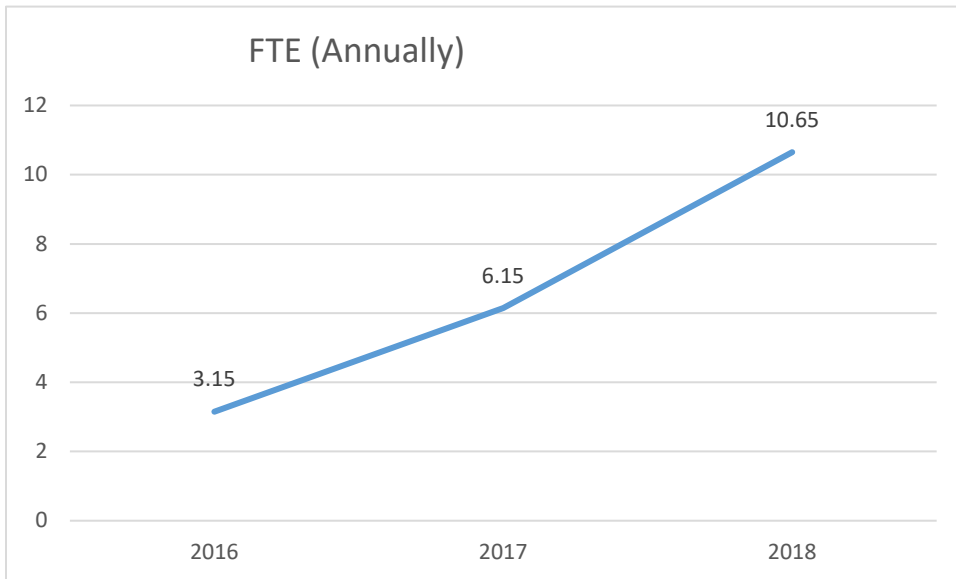
Source: TBCC Student Data System

Appendix A-3

2. FTE -

a. Total FTE earned by year, for the 44 courses in the table above

Year	Total FTE
2016	3.149018
2017	6.145093
2018	10.647053
Grand Total	19.941164



Source: TBCC Student Data System

b. FTEF – I believe this is FTE per full-time faculty load (16 credit load for 3 terms= 48 credits per year). A value of '1' equates to 1 full-time faculty member needed.

Year	Total FTE	FTEF
2016	3.149018	0.065604542
2017	6.060779	0.126266229
2018	10.043132	0.209231917
Grand Total	19.252929	0.401102688

Source: TBCC Student Data System

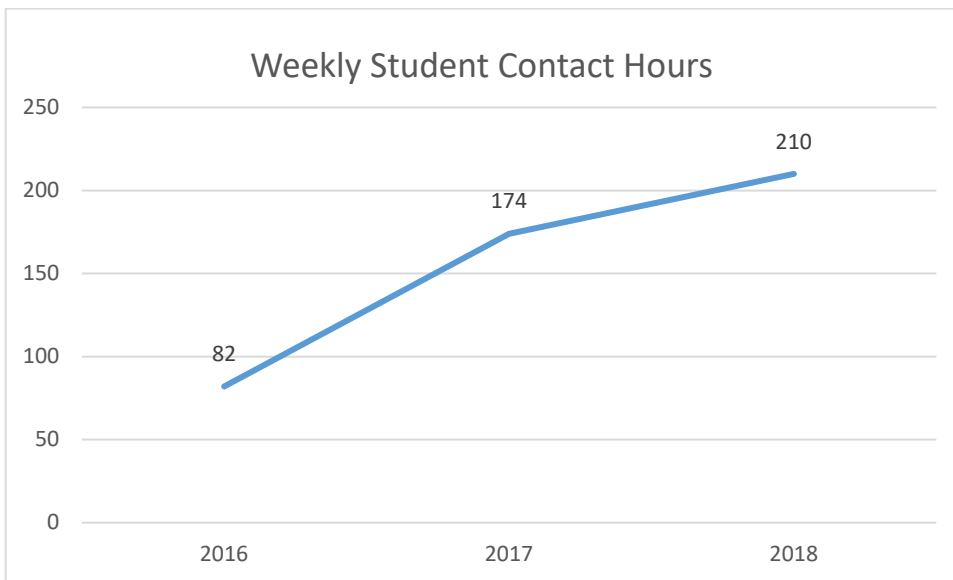
- c. Fill Rate – the percentage of seats filled each year. Percentages will necessarily be low because the formula is based on lower division classes and these classes use equipment which limits enrollment.

year	Average of Fillrate
2016	12.4%
2017	17.7%
2018	26.9%
Grand Total	20.3%

Source: TBCC Student Data System

- d. WSCH – Weekly Student Contact Hours – (total enrollment x weekly contact hours)

year	Sum of WSCH
2016	82
2017	174
2018	210
Grand Total	466



Source: TBCC Student Data System

Appendix A-4

Program Majors

Academic Year	MIT Majors		Other Majors		Total #	Total %
	#	%	#	%		
2016	28	9%	298	91%	326	100%
2017	35	10%	318	90%	353	100%
2018	37	10%	339	90%	376	100%
Grand Total	100	9%	955	91%	1055	100%

Source: TBCC Student Data System

Majors:

Majors	Women		Men		Total #	Total %
	#	%	#	%		
MIT		0.0%	61	100.0%	61	100.0%
Other	446	64.1%	250	35.9%	696	100.0%
Grand Total	446	58.9%	311	41.1%	757	100.0%

Majors	White		Latinx		Other		Total #	Total %
	#	%	#	%	#	%		
MIT	49	80%	7	11%	5	8%	61	100%
Other	489	70%	119	17%	88	13%	696	100%
Grand Total	538	71%	126	17%	93	12%	757	100%

Source: TBCC Student Data System

Major	Retained		Not Retained		Total #	Total %
	#	%	#	%		
MIT	15	42.9%	20	57.1%	35	100.0%
Other	157	34.7%	295	65.3%	452	100.0%
Grand Total	172	35.3%	315	64.7%	487	100.0%

Major	Retained		Not Retained		Total #	Total %
	#	%	#	%		
MIT						
White	9	32.1%	19	67.9%	28	100.0%
Latinx	4	100.0%		0.0%	4	100.0%
Other	2	66.7%	1	33.3%	3	100.0%
Other						
White	101	31.4%	221	68.6%	322	100.0%
Latinx	33	44.0%	42	56.0%	75	100.0%
Other	23	41.8%	32	58.2%	55	100.0%
Grand Total	172	35.3%	315	64.7%	487	100.0%

Source: TBCC Student Data System

AAS	IMT	6/16/2018	4/4/2018	Industrial Maintenance Technology
CPC	CPTP	6/16/2018	4/10/2018	MIT - Certified Production Technician
CPC	MTWP	6/16/2018	4/10/2018	MIT - Manufacturing Technician: Welding
CPC	MTRP	6/16/2018	4/10/2018	MIT - Manufacturing Technician: Millwright

Source: TBCC Student Data System

Appendix B-1

Area Employment Projections for Maintenance and Repair Workers, General

Area	2017 Employment	2027 Employment	% Change	Annual Change Openings	Annual Replacement Openings	Total Annual Openings
Oregon	15,375	17,294	12.5%	192	1,574	1,766
Central Oregon	650	724	11.4%	7	66	73
Columbia Basin	498	587	17.9%	9	52	61
Columbia Gorge	244	265	8.6%	2	24	26
East Cascades	1,176	1,289	9.6%	11	118	129
Eastern Oregon	937	1,063	13.4%	13	96	109
Eastern Six	439	476	8.4%	4	44	48
Lane	1,308	1,467	12.2%	16	133	149
Mid-Valley	2,040	2,354	15.4%	31	212	243
Northwest Oregon	1,071	1,136	6.1%	6	106	112
Portland Tri-County	7,231	8,176	13.1%	94	742	836
Rogue Valley	723	806	11.5%	8	73	81
South Central	282	300	6.4%	2	28	30
Southwestern Oregon	673	712	5.8%	4	66	70

Replacement openings occur when workers permanently leave an occupation for reasons such as retirement.

Area Employment Projections for Packaging and Filling Machine Operators and Tenders

Area	2017 Employment	2027 Employment	% Change	Annual Change Openings	Annual Replacement Openings	Total Annual Openings
Oregon	5,512	6,296	14.2%	78	671	749
Central Oregon	142	172	21.1%	3	17	20
Columbia Gorge	197	233	18.3%	4	24	28
East Cascades	384	451	17.4%	7	46	53
Eastern Oregon	455	494	8.6%	4	55	59
Lane	395	505	27.8%	11	51	62
Mid-Valley	1,250	1,385	10.8%	14	150	164
Northwest Oregon	426	470	10.3%	4	51	55
Portland Tri-County	1,806	2,062	14.2%	26	219	245
Rogue Valley	553	647	17.0%	9	68	77
South Central	45	46	2.2%	0	5	5
Southwestern Oregon	208	219	5.3%	1	24	25

Replacement openings occur when workers permanently leave an occupation for reasons such as retirement.

[Data Sources and Limitations](#)

**Area Employment Projections
for Structural Metal Fabricators and Fitters**

Area	2017 Employment	2027 Employment	% Change	Annual Change Openings	Annual Replacement Openings	Total Annual Openings
Oregon	1,875	1,716	-8.5%	-16	193	177
Central Oregon	43	45	4.7%	0	5	5
Columbia Gorge	44	45	2.3%	0	5	5
Eastern Oregon	83	82	-1.2%	0	9	9
Lane	158	148	-6.3%	-1	16	15
Mid-Valley	430	429	-0.2%	0	46	46
Northwest Oregon	95	95	0.0%	0	10	10
Portland Tri-County	888	836	-5.9%	-5	93	88
Rogue Valley	80	79	-1.2%	0	9	9

Replacement openings occur when workers permanently leave an occupation for reasons such as retirement.

Source: www.qualityinfo.org