1. Overview of the Program

a) Provide a brief description of the program/department, including the program's mission statement.

The Machine Tool Technology program prepares students for employment in machine shops, tool rooms, instrument, and experimental laboratories, and provides upgrade opportunities for employed industrial personnel. Students gain proficiency in the set up and operation of drilling machines, conventional lathes, mills, grinders, electrical discharge machines (EDM), Computer Numerical Control (CNC) lathes, CNC milling machines, Computer Aided Design (CAD) and Computer Aided Manufacturing (CAM) systems. Competencies will be assessed regularly following skill standards established by the National Institute of Metalworking Skills (NIMS). Students completing the program may enter industry as an advanced apprentice machinist or machine operator and anticipate advancement to machinist, tool and die maker, experimental machinist, or numerical control (NC) programmer."

Note: From here forth we will refer to Machine Tool Technology as "MTT."

b) Describe the degrees and/or certificates offered by the program.

The MTT program offers 2 Associate in Science Degree and 3 Certificates of achievement (16-48 units)

Associate in Science Degree

To receive an Associate in Science degree from Compton College, a student must complete at least 60 units in degree applicable college courses which must include general education requirements and course work in an approved transfer major or associate degree program. Course work toward the degree must be completed with a cumulative grade point average (GPA) of 2.00 or higher. A minimum of 12 of the required 60-degree applicable units must be successfully completed at Compton College. A notation of "Graduation with Honors" is earned with a cumulative GPA of 3.5 or higher. Students must file an intent to graduate in the evaluations area found in the Admissions Office by the deadline date published in the schedule of classes.

Certificates

The Machine Tool Technology program prepares students for employment in machine shops, tool rooms, and instrument and experimental laboratories and provides upgrade opportunities for employed industrial personnel. Students gain proficiency in the set-up and operation of drilling machines, lathes, mills, grinders, electrical discharge machines,

Computer Numerical Control

(CNC) lathes, CNC milling machines, and computer aided manufacturing systems. Competencies will be assessed regularly following skill standards established by the National Institute of Metalworking Skills (NIMS). At least 50 percent of the courses required for the major must be completed at Compton College.

Program Goals and Objectives:

• Solving Engineering Problems: students will apply principles from mathematics, physics, and chemistry to solve applied problems in engineering.
• Digital and Analog Sensor Technologies: Upon completion of the courses in this discipline, the student will be able to name different digital and analog sensor technology.
• Industry Standards: Upon completion of the courses in this discipline, the student will be able to follow and build robotic devices and components following industry standard schematics and diagrams.

Machinist Option:
Program Requirements for AS Degree:
MTT 101 Introduction to Conventional and CNC (Computer Numerical Control) Machining (4)
MTT 103 Conventional and CNC Turning (4)
MTT 105 Conventional and CNC Milling (4)
MTT 107 Advanced Manufacturing Processes (4)
MTT 110 Introduction to CAD/CAM (3)
MTT 120 Manufacturing Print Reading (3)
MTT 140 Machine Shop Calculations (3)
MTT 160 General Metals (3)
Total Units: 28

Numerical Control Programmer Option:
Program Requirements for AS Degree:

MTT 101 Introduction to Conventional and CNC Machining (4)
MTT 103 Conventional and CNC Turning (4)
MTT 105 Conventional and CNC Milling (4)
MTT 110 Introduction to CAD/CAM (3)
MTT 112 Computer Numerical Control Programming (3)
MTT 115 Numerical Control Graphics Programming (3)
MTT 118 3D Numerical Control Graphics Programming (3)
MTT 120 Manufacturing Print Reading (3)
MTT 140 Machine Shop Calculations (3)
MTT 160 General Metals (3)
Total Units: 33
Recommended Electives:
MTT 95 Cooperative Work Experience Education (2-4)
MTT 99 Independent Study (1-3)
WELD 105 Basic Welding for Allied Fields (3)

CNC Machine Operator – Certificate of Achievement

Program Description: The CNC Machine Operator certificate of achievement aims to supply basic to advanced training in manual or conventional machining, computer numerical programming and operation, advanced multi-axis programming and operation. These form the fundamental skills necessary for the average and expected workload in the machining industry. Enrolled students are strongly positioned for employment in the machining industry throughout the course of the program.

Program Requirements:
MTT 101 Introduction to Conventional and CNC Machining (4)
MTT 103 Conventional and CNC Turning (4)
MTT 105 Conventional and CNC Milling (4)
MTT 107 Advanced Manufacturing Processes (4)
Total Units: 16

Machinist - Certificate of Achievement
Program Description: The Machinist certificate of achievement program aims to supply basic to advanced training in manual or conventional machining, computer numerical programming and operation, and advanced multi-axis programming and operation. These form the fundamental skills necessary for the average and expected workload in the machining industry. Enrolled students are strongly positioned for employment in the machining industry throughout the course of the program.

Program Requirements:
MTT 101 Introduction to Conventional and CNC Machining (4)
MTT 103 Conventional and CNC Turning (4)
MTT 105 Conventional and CNC Milling (4)
MTT 107 Advanced Manufacturing Processes (4)
MTT 110 Introduction to CAD/CAM (3)
MTT 120 Manufacturing Print Reading (3)
MTT 140 Machine Shop Calculations (3)
MTT 160 General Metals (3)
Total Units: 28

Numerical Control Programmer – Certificate of Achievement
Program Description: The Numerical Control Programmer certificate of achievement aims to supply basic to advanced training in manual or conventional machining, computer numerical programming and operation, advanced multi-axis programming and operation. These form the fundamental skills necessary for the average and expected workload in the machining industry. Enrolled students are strongly positioned for employment in the machining industry throughout the course of the program.

Program Requirements:
MTT 101 Introduction to Conventional and CNC Machining (4)
MTT 103 Conventional and CNC Turning (4)
MTT 105 Conventional and CNC Milling (4)
MTT 110 Introduction to CAD/CAM (3)

MTT 112 Computer Numerical Control Programming (3)
MTT 115 Numerical Control Graphics Programming (3)
MTT 118 3D Numerical Control Graphics Programming (3)
MTT 120 Manufacturing Print Reading (3)
MTT 140 Machine Shop Calculations (3)
MTT 160 General Metals (3)

c) **Explain how the program fulfills the college's mission and aligns with the strategic initiatives.** (see Appendix A)

Improve recruitment, enrollment, retention, and completion rates for our students.

MTT regularly attends recruiting events within Compton College and to other local career events to gather interest in the field of manufacturing and machining. Keeping students interested once they are in the program with various industry specific projects and field trips. MTT students visit local aerospace manufacturing facilities for a chance to see the career path firsthand. Students will be briefed on the employment opportunities and have an opportunity to begin a dialog with the hiring management. With help from the counselors, a guided pathway has been written by the instructor to easily allow the students to see what classes are needed to earn a degree and/or certificates in this field.

Support the success of all students to meet their education, and career goals.

Meeting with industry gives the instructor a chance to ask the employers what would make the MTT students more valuable to their industry. Knowing what companies are looking for in potential employees, we can focus on those aspects of the job training. Success for the students is contingent upon receiving proper training with relevant technology. With manufacturing advancements in technology happening at a rapid rate, the instructor keeps current by attending related trade shows and workshops while also encouraging and incentivizing engagement from the students. The Career and Technical Education support staff is also very proactive in guiding the students through their educational path while also supplying transitional help into a career or 4-year university.

Objective 1. Attract and retain traditional students and focus on retaining non-traditional students.

- Highlighting some of our impressive computer controlled (CNC) machinery is proof that the college and state is investing a large amount of capital to facilitate gainful employment opportunities for our community. Students need to feel that they can accomplish the necessary curriculum while also understanding the value of their commitment and efforts.
- Our students begin with a variety of easy projects but will quickly progress to machining aerospace quality parts using Compton Colleges industry relevant machinery. During the process of becoming an

educated machinist, students are regularly reminded of the enormous value that they bring to the aerospace and manufacturing industry. Evidence of their value is reinforced by scheduling representatives from local businesses to visit the class and solicit employment opportunities with their company.

<u>Objective 2.</u> Minimize the equity gap for access, retention, and graduation rates.

- Information about the services and resources the campus provides for our students is shared at the start of each class. One resource is the Student Equity Program that helps to supply the necessary tools to ensure that all our students have the same opportunity to achieve their academic and career goals. Another resource that is listed and highly recommended to every student is meeting with a college counselor. Students who meet with counselors are more on track towards the goal to graduate within a suitable amount of time. Students are also encouraged to meet the instructor during office hours to receive private one on one communication.

<u>Support the success of students through the use of technology.</u>

The full-time instructor has taken 2 of the 3 courses necessary to begin offering online courses and hybrid classes. One of the advantages of offering hybrid and online courses is with the gained opportunity to use the campuses Learning Management System (LMS) called Canvas. A learning management system is a software application for the administration, documentation, tracking, reporting, automation, and delivery of educational course resources.
Visiting relevant trade shows and expos we can see the emerging technologies being used and develop implementation into the program. It is important to keep our students ahead of the technological curve.

<u>Objective 1.</u> Implement an early alert program to find and notify students of support services and programs promptly.

- Compton College recently began offering an early alert system that was implemented to give the instructor an online tool that connects their student to the proper support service. Instructor finds this to be a valuable tool and is happy with its early implementation performance.

<u>Objective 2</u>. Supply robust distance education course and service offerings.

- Distance education courses are under consideration and will give students with travel or availability constraints an increased opportunity to achieve their educational goals. Instructor is currently taking the necessary courses to become certified in online learning.

<u>Objective 3</u>. Enhance technology for teaching and learning through professional development.

- Learning Management System courses have been one of the current focuses of professional development and this will enhance the

technology for teaching and learning. The "LMS" incorporates communication tools for making announcements, assessment tools to quickly assess coursework and outcomes, content tools to supply the various class files, interactive tools to help facilitate student collaboration and then a set of data analytic tools to help understand and optimize learning.

Offer excellent programs that lead to degrees and certificates in Allied Health and Technical fields.

Objective 1. Increase the number of degrees and certificates awarded in the Allied Health and Technical fields.

- Beginning in the Fall of 2018, with the new full-time instructor Michael VanOverbeck, the program now offers all the courses needed for a student to be awarded the CNC Operator certificate, the Machinist Certificate, and an AS degree in Machining.

Objective 2. Implement a plan to target outreach of working professionals in Healthcare and Advanced Manufacturing.

- MTT participates in the annual advisory committee where working professionals in the advanced manufacturing sector are invited to provide valuable insight to current and future trends.

Objective 3. Create collaborative partnerships with industry leaders in the Allied Health and Technical fields.
Establish partnerships in the community and with the K-12 schools.

- Through the work of the CTE division, MTT offers routine tours and talks with the MTT instructor for the local K-12 schools.
- In 2019, MTT was involved with the City of Compton STEM fair where we set up a booth that highlighted one of our robotic arms arranging a set of blocks along with a functional CNC controller for participants to interact with. This was also an opportunity to display a variety of MTT completed projects and to pass out promotional material.
- Once a year, through the work of the CTE division support staff, local aerospace and manufacturing businesses are invited to setup a table to solicit our students towards their companies' employment opportunities.
- Tours to local manufacturing and aerospace companies are regularly scheduled for our students.

Objective 1. Establish faculty to faculty partnerships with K-12 feeder schools to better align curriculum between the two segments, and to improve student preparation.

- Regular tours and meetings with local K-12 feeder school students, faculty and administrators is an ongoing commitment for the program.

<u>Objective 2.</u> Continue to develop more Career and Technical Education programs that meet the needs of the community.

- Through advisory meetings and active communication with local companies that are program relevant, modifications to the courses are made to continue the goal of adding value and relevance to the program.

<u>Objective 3.</u> Strengthen the broader needs of the community served by Compton Community College District.

- Some of the broader needs of the community served by Compton community college district is with alleviating the food and shelter insecurities. Compton college has taken measures to offer food and shelter resources to students that are in need. Compton college has made this a top priority and calls upon the instructors to share the provided information with their students.

d) Discuss the status of recommendations from your previous program review.

- The only previous program review was written and submitted in the Spring of 2012. That report was conducted by Philip Yaghmai, a part-time instructor at the time. Two of the recommendations was to hire a full-time Instructor and a full-time Toolroom Attendant. The college hired both recommended positions, but both have resigned since then. After about a 2-year period without having a full-time instructor, Michael VanOverbeck (writer of this program review) was hired during the Fall of 2018 to fill the vacant full-time instructor position. And during the Fall of 2019, Edgar Castellanos was hired to fill the vacant Tool Room Attendant position.
- Obviously, I cannot accurately discuss a lot of the recommendations from the 2012 program review but will offer my observations 8 years later to the top 16 prioritized recommendations. Refer to the blue copy below.
    1. MTT 203 is an offered class but no certificates were implemented.
    2. A full-time instructor position was created and filled.
    3. A Toolroom attendant position was created and filled.
    4. A second full-time instructor position was not created.
    5. A second Toolroom attendant position was not created.
    6. We currently have 1 part-time instructor that teaches the fastener courses.
    7. We do not have any of the listed software subscriptions.
    8. We currently have the mentioned Haas CNC vertical Mill.
    9. We currently have the mentioned Haas CNC Lathe
    10. MTT 105 course has been implemented.
    11. MTT 103 course has been implemented.
    12. There are currently missing tiles. I am not sure if there is sound insulation.
    13. 3D printers have been moved multiple times.

14. CMM (Coordinate Measuring Machine) machine is not in working condition.
15. aerospace fastener lab's parts storage room has been locked.
16. I do not know what location is being discussed on this line.

Copy of 2012 Recommendations (in blue).

8. **Prioritized Recommendations**

a) Provide a single, prioritized list of recommendations and needs for your program/department, including *cost estimates* for salaries, expenditures and/or purchasing needs.

Priority	Description	Cost $	Freq.
1	Implement new proposals noted in section 3e: a) Aerospace Fasteners Manufacturing Curricula: MTT 202, 203, 205, 207, 209b) Aerospace Fasteners Manufacturing Certificates: AFCH, AFI, AFSO, AFT, AFTR	NA	NA
2	Hire a full-time instructor with strong technical and organizational capabilities and assign this one to be the **lead instructor**.	130,000	Yearly
3	Hire a full-time assistant with strong conventional and CNC machining capability.	66,500	Yearly
4	Hire a full-time instructor with strong technical capabilities and assign this one to be the **supporting instructor**.	159,600	Yearly
5	Hire a full-time assistant with aerospace fastener manufacturing and conventional machining capabilities.	66,500	Yearly
6	Hire a part-time instructor.	20,000	Yearly
7	Eliminating or reducing the renewal and support for software that we have never used or have minimally utilized: CAMWorks-cancelrenewal$1,000, Mastercam University Renewal-Reduce from 20 to 5seats and save$15005 seats of 3DVia composer–Cancel we have never used it$500?	$3000	Yearly
8	Purchase one (1) modern vertical CNC Mill–HASS or equal	33,085	Once
9	Purchase one (1) modern CNC Lathe–HASS or equal	39,950	Once
10	Implement MTT 105 CNC Milling course	NA	Once
11	Implement MTT 103 CNC Lathe course	NA	Once
12	Replace missing ceiling tiles in the classroom and put sound insulation on top.	300	Once
13	Relocate the new 3-D printer and its caustic tank outside the computer room due to excessive heat generation and unsafe fumes in an enclosed area.	0	Once
14	Repair the existing CMM (Coordinate Measuring Machine)	500	Once
15	Install a lock on the aerospace fastener lab's parts storage room.	150	Once
16	Remove all items out of the existing conventional machine shop's tool and spare tools storage.	200	Once

- It is my observation that the 2012 prioritized recommendations were mostly fulfilled, and I recommend that this list be cleared.

2. Analysis of Research Data (include data provided by Institutional Research)

A sharp decline in annual enrollment beginning in 2016. and as the date of this program review, most of the recommendations are still the same. A substantial portion of the machines in the shop should be replaced or repaired. Hand tools are always needed because they are constantly used and eventually break or too worn out to safely use. All the 3D printers that are in the lab are broken and need to be replaced. One CNC lathe and CNC mill needs to be replaced because they were improperly used by the previous staff.

Machine Tool Technology:

a) Head count of students in the program

Fall Terms 2014-2017						Compton Student Population
		Term				
		2014	2015	2016	2017	Fall 2017
	Term Headcount	61	51	11	50	*7,422*
Gender	F	14.8%	11.8%	9.1%	20.0%	*63.3%*
	M	85.2%	88.2%	90.9%	80.0%	*36.7%*
Ethnicity	African-American	16.4%	9.8%	0.0%	18.0%	*25.1%*
	Amer. Ind. or Alask. Native	0.0%	0.0%	0.0%	0.0%	*0.1%*
	Asian	9.8%	2.0%	18.2%	0.0%	*5.1%*
	Latino	67.2%	84.3%	81.8%	74.0%	*63.1%*
	Pacific Islander	0.0%	0.0%	0.0%	0.0%	*0.5%*
	White	3.3%	3.9%	0.0%	4.0%	*2.9%*
	Two or More	3.3%	0.0%	0.0%	4.0%	*3.0%*
	Unknown or Decline	0.0%	0.0%	0.0%	0.0%	*0.2%*
Age/ Age Group	<17	0.0%	0.0%	0.0%	10.0%	*5.3%*
	17	0.0%	2.0%	0.0%	4.0%	*3.9%*
	18	4.9%	3.9%	0.0%	6.0%	*7.1%*
	19	6.6%	3.9%	0.0%	0.0%	*9.3%*
	20	3.3%	3.9%	0.0%	10.0%	*10.0%*
	21	4.9%	0.0%	0.0%	4.0%	*8.0%*
	22	8.2%	9.8%	0.0%	8.0%	*6.9%*
	23	8.2%	5.9%	0.0%	8.0%	*5.9%*
	24	3.3%	11.8%	9.1%	0.0%	*5.8%*
	25-29	14.8%	17.6%	9.1%	10.0%	*17.3%*
	30-39	16.4%	15.7%	36.4%	14.0%	*12.7%*
	40-49	11.5%	13.7%	36.4%	10.0%	*4.7%*
	50-64	16.4%	11.8%	9.1%	16.0%	*2.8%*
	65+	1.6%	0.0%	0.0%	0.0%	*0.3%*
Class Load	Full-time	14.8%	9.8%	9.1%	0.0%	*19.7%*
	Part-time	85.2%	90.2%	90.9%	100.0%	*80.3%*
Academic Level	College degree	13.1%	5.9%	0.0%	2.0%	*10.0%*
	HS Grad	72.1%	86.3%	72.7%	64.0%	*81.6%*
	Not a HS Grad	3.3%	0.0%	0.0%	0.0%	*0.4%*
	K-12 Special Admit	0.0%	0.0%	0.0%	20.0%	*2.1%*
	Unknown	11.5%	7.8%	27.3%	14.0%	*5.9%*

Educational Goal	Intend to Transfer	9.8%	31.4%	27.3%	36.0%	*52.8%*
	Degree/Certificate Only	16.4%	11.8%	18.2%	28.0%	*8.9%*
	Retrain/recertify.	9.8%	13.7%	18.2%	8.0%	*4.8%*
	Basic Skills/GED	4.9%	3.9%	0.0%	2.0%	*6.1%*
	Enrichment	0.0%	2.0%	0.0%	6.0%	*3.7%*
	Undecided	13.1%	11.8%	27.3%	18.0%	*16.6%*
	Unstated	45.9%	25.5%	9.1%	2.0%	*7.1%*

Spring Terms 2015-2018						**Compton Student Population Spring 2018**
		Term				
		2015	**2016**	**2017**	**2018**	
	Term Headcount	68	32	18	23	*6,821*
Gender	F	7.4%	6.3%	11.1%	21.7%	*64.7%*
	M	92.6%	93.8%	88.9%	78.3%	*35.3%*
Ethnicity	African-American	8.8%	6.3%	5.6%	8.7%	*24.6%*
	Amer. Ind. or Alask. Native	0.0%	0.0%	0.0%	0.0%	*<0.1%*
	Asian	8.8%	3.1%	5.6%	0.0%	*5.7%*
	Latino	76.5%	87.5%	88.9%	78.3%	*63.4%*
	Pacific Islander	0.0%	0.0%	0.0%	0.0%	*0.5%*
	White	5.9%	0.0%	0.0%	8.7%	*2.9%*
	Two or More	0.0%	3.1%	0.0%	4.3%	*2.6%*
	Unknown or Decline	0.0%	0.0%	0.0%	0.0%	*0.2%*
Age/ Age Group	<17	0.0%	0.0%	0.0%	0.0%	*4.8%*
	17	0.0%	0.0%	0.0%	0.0%	*2.6%*
	18	4.4%	6.3%	5.6%	4.3%	*5.6%*
	19	2.9%	9.4%	0.0%	0.0%	*9.3%*
	20	4.4%	3.1%	5.6%	0.0%	*10.6%*
	21	7.4%	3.1%	11.1%	8.7%	*8.9%*
	22	2.9%	3.1%	0.0%	4.3%	*7.1%*
	23	10.3%	6.3%	0.0%	4.3%	*6.0%*
	24	5.9%	9.4%	0.0%	0.0%	*5.5%*
	25-29	23.5%	28.1%	33.3%	17.4%	*18.2%*
	30-39	11.8%	15.6%	11.1%	21.7%	*12.9%*
	40-49	13.2%	15.6%	22.2%	13.0%	*5.4%*
	50-64	13.2%	0.0%	11.1%	26.1%	*2.7%*
	65+	0.0%	0.0%	0.0%	0.0%	*0.3%*
Class	Full-time	8.8%	6.3%	0.0%	0.0%	*16.2%*

	Part-time	91.2%	93.8%	100.0%	100.0%	*83.8%*
Academic Level	College degree	7.4%	0.0%	5.6%	0.0%	*13.0%*
	HS Grad	83.8%	81.3%	88.9%	87.0%	*74.3%*
	Not a HS Grad	0.0%	0.0%	0.0%	0.0%	*0.2%*
	K-12 Special Admit	1.5%	0.0%	0.0%	4.3%	*7.9%*
	Unknown	7.4%	18.8%	5.6%	8.7%	*4.6%*
Educational Goal	Intend to Transfer	22.1%	21.9%	27.8%	34.8%	*52.7%*
	Degree/Certificate Only	10.3%	15.6%	33.3%	30.4%	*9.0%*
	Retrain/recertify.	11.8%	15.6%	16.7%	8.7%	*4.8%*
	Basic Skills/GED	8.8%	6.3%	0.0%	4.3%	*6.9%*
	Enrichment	1.5%	0.0%	0.0%	0.0%	*3.9%*
	Undecided	10.3%	15.6%	5.6%	17.4%	*16.0%*
	Unstated	35.3%	25.0%	16.7%	4.3%	*6.7%*

The head count took a sharp decline in 2016-17 due to a staffing shortage. The only full-time instructor for the MTT program had resigned with short notice and some of the certificate critical course offerings had to be put on hold. Students were sent to El Camino college to finish their educational goals.

Part-time instructors were quickly recruited to fill in where possible, but the program suffered from not having a dedicated professor for the program.

In 2017-18, the full-time technician for the department filled in as a part time instructor and that helped with course continuity but took away from maintenance support. Later in 2018, this part-time instructor/ technician also resigned from Compton College.

Starting in the Fall of 2018, a new full-time instructor was hired.

b) Course grade distribution

				Grade Distribution												
Year	COURSE	Method	Weeks	'A'	'B'	'C'	'P'	'D'	'F'	'NP'	'W'	*Total*	Successful	Retained	Success	Retention
2014	MTT-101	Lecture	16	27	9	1			8		9	***54***	37	45	68.5%	83.3%
	MTT-105	Lecture	16	22		1					2	***25***	23	23	92.0%	92.0%
	MTT-2	Lecture	16	10	8	1		2			8	***29***	19	21	**65.5%**	72.4%
	MTT-201	Lecture	8	5	3	1		1	2		1	***13***	9	12	69.2%	92.3%
	MTT-40	Lecture	16	17	5	4		1	2		7	***36***	26	29	72.2%	80.6%
2014 Total				81	25	8	-	4	12	-	27	***157***	114	130	**72.6%**	**82.8%**
2015	MTT-101	Lecture	16	32	3	4			6		10	***55***	39	45	70.9%	81.8%
	MTT-103	Lecture	16	20		1			4		2	***27***	21	25	77.8%	92.6%
	MTT-107	Lecture	16	16	10	4			2		2	***34***	30	32	88.2%	94.1%
	MTT-10A	Lecture	8	11	5	6			2			***24***	22	24	91.7%	*100.0%*
	MTT-2	Lecture	16	12	4	2					6	***24***	18	18	75.0%	75.0%
	MTT-201	Lecture	16	9	3	1					5	***18***	13	13	72.2%	**72.2%**
	MTT-203	Lecture	16	3							3	***6***	3	3	**50.0%**	**50.0%**
	MTT-40	Lecture	16	8	4						4	***16***	12	12	75.0%	75.0%
2015 Total				111	29	18	-	-	14	-	32	***204***	158	172	**77.5%**	**84.3%**
2016	MTT-101	Lecture	16	4							2	***6***	4	4	66.7%	**66.7%**
	MTT-103	Lecture	16	8	3							***11***	11	11	*100.0%*	*100.0%*
	MTT-105	Lecture	16	15	3				1			***19***	18	19	*94.7%*	*100.0%*
	MTT-10A	Lecture	16	12	4	1		1	1		1	***20***	17	19	85.0%	95.0%
	MTT-201	Lecture	16	3							1	***4***	3	3	75.0%	75.0%
2016 Total				42	10	1	-	1	2	-	4	***60***	53	56	**88.3%**	**93.3%**
2017	MTT-101	Lecture	16	40	12	4			1		4	***61***	56	57	91.8%	93.4%
	MTT-2	Lecture	16	11					2		2	***15***	11	13	73.3%	86.7%
2017 Total				51	12	4	-	-	3	-	6	***76***	67	70	**88.2%**	**92.1%**
2018	MTT-105	Lecture	16	10	2	3						***15***	15	15	*100.0%*	*100.0%*
	MTT-201	Lecture	6	11	2							***13***	13	13	*100.0%*	*100.0%*
2018 Total				21	4	3	-	-	-	-	-	***28***	28	28	**100.0%**	**100.0%**

Elaborating on the significant figures that are colored in purple, 2014 MTT-2 results were below the standard average. MTT-2 (blueprint reading) is a specialized course that lacks tutor resources with knowledge in this field. An improvement was achieved the following year, but a specialized tutor would help the student's success rate.

In 2014, both the Aerospace Fastener courses (MTT-201 and MTT-203) struggled with student retention. This was the first time offering MTT-203 and only the second time offering MTT-201. These courses are unique courses that were created with local industry professionals in the aerospace fastener sector. These courses are highly specialized and require unique machines that are not found in a typical machine shop. At the time of offering these courses, there was only one other program in the United States offering this type of program and this created unique challenges.

One of the challenges in offering the Aerospace Fastener program is in getting enough industry specific machinery along with the space needed to properly facilitate a successful program. While the machinery acquired was a good start to begin the program, a filled class could create frustration caused by the lack of machinery and space provided per student enrolled.

Another challenge that makes retaining student difficult in all the MTT courses comes from the success of the program. Retaining the students is often difficult because of the high demand in the labor market. A single employer can decimate the enrollment by hiring a significant percentage of the students all at once. A single company has hired 6 students during a semester with word of mouth spreading to other students as the course progressed. This causes problems with the current course retention but also with subsequent courses towards the path of a certificate or degree.

I would suggest a partnership with these large manufacturing facilities to create a work experience program that could help the student finish their educational goals while also getting on the job training. Although there are plenty of jobs to go around, the students feel a sense of urgency to jump into employment when an opportunity presents itself.

c) Success rates (Discuss your program's rates, demographic success characteristics and set a success standard for your program.)

Program Success Standard*	***76.3%***
5-year Program Success Average	***80.0%***

*Calculated as the average between the 5-year average and the lowest yearly rate in the 5-year period.

Year	*Total Grades*	Success Rate
FA 2014	***157***	72.6%
2015	***204***	77.5%
2016	***60***	88.3%
2017	***76***	88.2%
SP 2018	***28***	100.0%

Fall Term Demographic Success (2014-2017)

	Fall 2014		Fall 2015		Fall 2016		Fall 2017	
Ethnicity	Success	N	Success	N	Success	N	Success	N
African American	50.0%	14	22.2%	9	--	0	100.0%	9
Amer. Ind. or Alask. Native	--	0	--	0	--	0	--	0
Asian	100.0%	X	100.0%	X	100.0%	X	--	0
Latino	81.7%	71	80.6%	72	100.0%	9	94.6%	37
Pacific Islander	--	0	--	0	--	0	--	0
Two or More	33.3%	X	--	0	--	0	100.0%	X
Unknown or Decline	--	0	--	0	--	0	--	0
White	50.0%	X	50.0%	X	--	0	100.0%	X
Gender								
M	72.2%	79	73.3%	75	100.0%	10	95.0%	40
F	94.4%	18	77.8%	9	100.0%	X	100.0%	10
X	--	0	--	0	--	0	--	0
Age Groups								
19 or less	80.0%	15	77.8%	9	--	0	100.0%	11
20 to 24	65.5%	29	69.0%	29	100.0%	X	85.7%	14
25 to 49	76.9%	39	72.5%	40	100.0%	9	100.0%	17
Over 49	92.9%	14	100.0%	6	100.0%	X	100.0%	8
X: Counts are suppressed for groups with less than 5 students.								
Shaded regions indicate groups achieving at a rate less than 80% of the reference group. Respectively, reference groups are White, male, and 20 to 24 years old.								

Spring Term Demographic Success (2015-2018)

	Spring 2015		Spring 2016		Spring 2017		Spring 2018	
Ethnicity	Success	N	Success	N	Success	N	Success	N
African American	28.6%	7	0.0%	X	0.0%	X	--	0
Amer. Ind. or Alask. Native	--	0	--	0	--	0	--	0
Asian	100.0%	6	100.0%	X	0.0%	X	--	0
Latino	82.8%	64	89.7%	39	82.6%	23	100.0%	13
Pacific Islander	--	0	--	0	--	0	--	0
Two or More	--	0	100.0%	X	--	0	100.0%	X
Unknown or Decline	--	0	--	0	--	0	--	0
White	40.0%	5	--	0	--	0	100.0%	X
Gender								
M	78.9%	76	85.0%	40	77.3%	22	100.0%	11
F	50.0%	6	100.0%	X	50.0%	X	100.0%	X
X	--	0	--	0	--	0	--	0
Age Groups								
19 or less	57.1%	7	85.7%	7	100.0%	X	100.0%	X
20 to 24	72.4%	28	92.3%	13	100.0%	X	100.0%	X
25 to 49	83.3%	38	82.6%	23	61.1%	18	100.0%	8
Over 49	77.7%	9	--	0	100.0%	X	100.0%	X
X: Counts are suppressed for groups with less than 5 students.								
Shaded regions indicate groups achieving at a rate less than 80% of the reference group. Respectively, reference groups are White, male, and 20 to 24 years old.								

Success rate has increased over time, but improvements could be achieved by offering program specific tutoring. There are currently no program specific tutors that could offer struggling students assistance with mastering course work. This could be remedied by offering some advanced students a paid opportunity to become a tutor. This would provide students an opportunity to make some money while also fostering a mentorship culture with fellow classmates.

Demographically, Latinos were the majority of students with most other ethnicities comprising of less than 5 students per semester.

African Americans had the lowest success rate and should be offered appropriate assistance to increase success rate. I believe tutoring would be the appropriate support to begin offering.

Success is also dependent upon retention of the students. Along with tutoring, I believe a work experience program would help in retaining each student to complete the course successfully.

d) Retention rates

Year	*Total Grades*	Retention Rate
FA 2014	***157***	82.8%
2015	***204***	84.3%
2016	***60***	93.3%
2017	***76***	92.1%
SP 2018	***28***	100.0%

Retention rate has increased over time, but improvement could be achieved by creating partnerships with local industry to provide work experience opportunities to our students. If a student is scouted by a manufacturing facility, the work schedule often interferes with their education and a choice to work or to continue school must be made. We lose a significant number of students because of this.

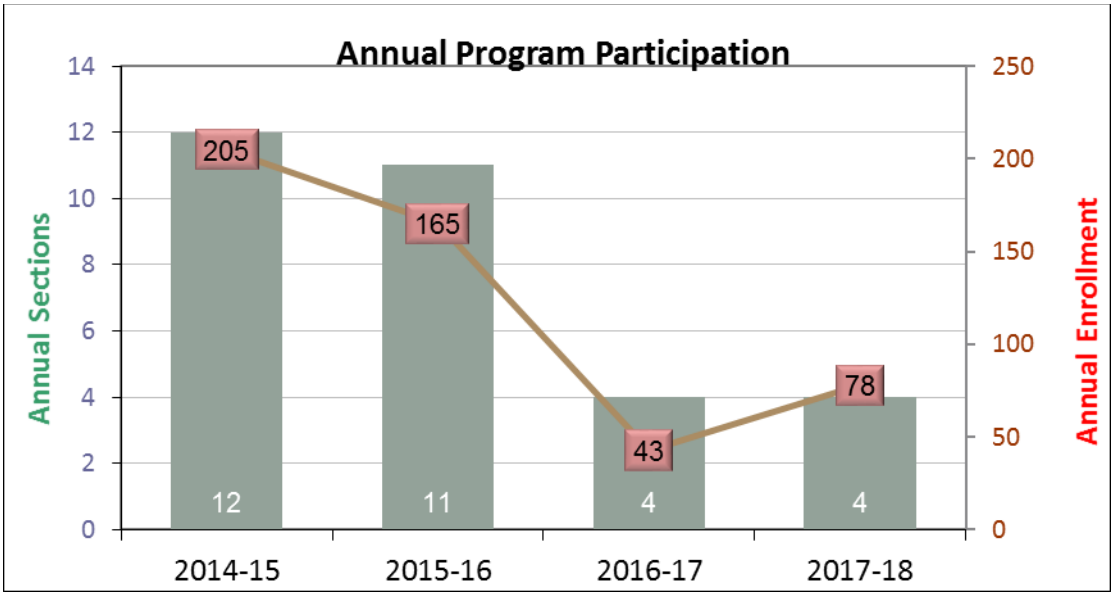
It is my recommendation that a work experience program be created. On the job training would be provided with provisions to ensure that grades be maintained, and educational goals are achieved. A schedule to accommodate both school and work experience would give students more opportunity. This would be beneficial to both the employer and the student.

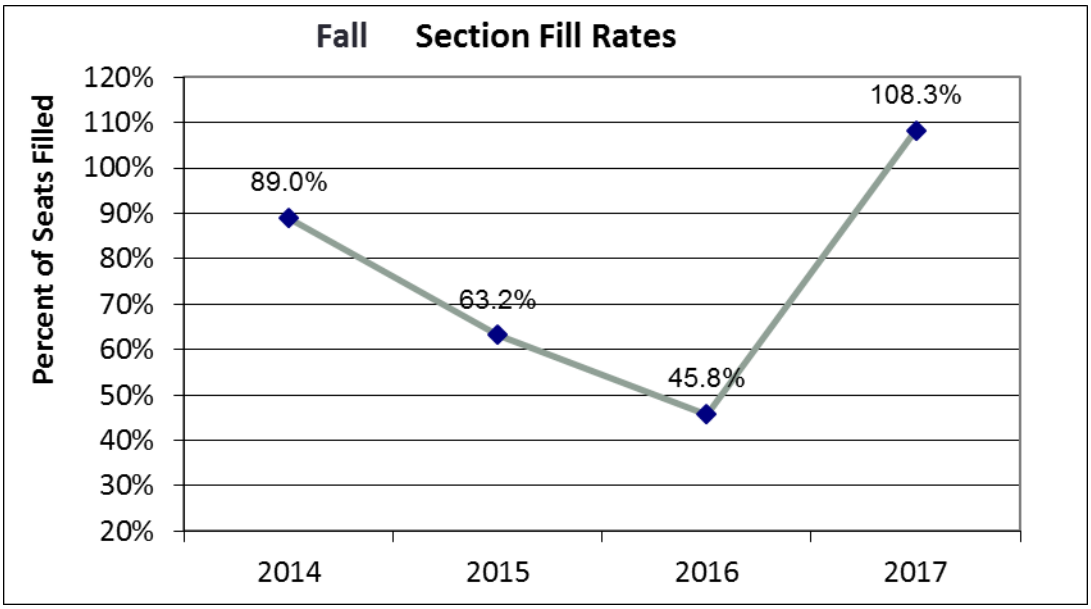
e) A comparison of success and retention rates in face-to-face classes with distance education classes

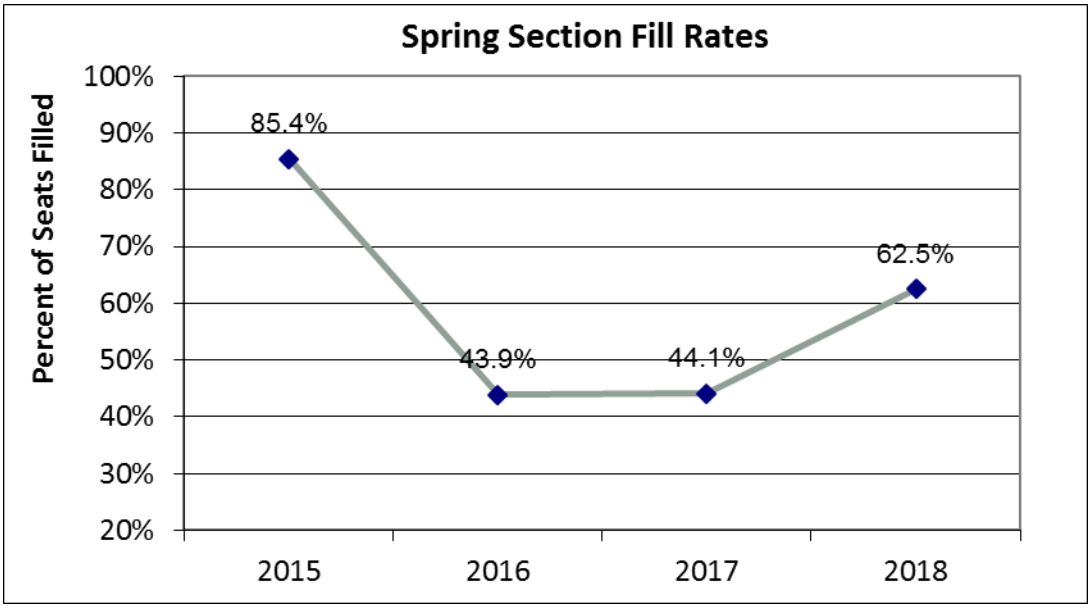
- A comparison cannot be made because MTT does not offer any distance education courses at this time. Soon, distance education is being considered for implementation so students can take courses to provide more accessibility to education.

f) Enrollment statistics with section and seat counts and fill rates.

	2014-15	2015-16	2016-17	2017-18	4-Year Avg
Annual Enrollment	205	165	43	78	123







With the departure of the programs faculty and staff, a sharp decline in sections being offered, seat count and fill rates occurred for 2016-2017. There was a 2-year period without a full-time instructor and the program suffered because of that vacancy. Emergency part time instructors were hired but it was a struggle to maintain the sections being offered dropped from 11-12 per year to just 4 sections. This caused a lot of students being sent to neighboring colleges to fulfill their education goals.

During Spring 2017 and 2018, more consistent part-time instructors were maintained to give students some educational continuity and an increase in enrollment was achieved but not enough sections were being offered to be able to fulfill degree requirements for the program.

g) Scheduling of courses (day vs. night, days offered, and sequence)

Enrollment by Time of Day

Fall Term	2014	2015	2016	2017
Day	78.7%	62.7%	63.6%	74.0%
Night	21.3%	37.3%	36.4%	26.0%
Weekend/Unknown	0.0%	0.0%	0.0%	0.0%

Enrollment by Time of Day

Spring Term	2015	2016	2017	2018
Day	57.4%	59.4%	94.4%	80.0%
Night	42.6%	40.6%	5.6%	20.0%
Weekend/Unknown	0.0%	0.0%	0.0%	0.0%

Most courses are offered in the day to accommodate the majority of full-time student's schedule. Because most students are looking for day courses, the day courses are the first sections to be offered.

Night courses offer individuals that work during the day an opportunity to upgrade their employment options with night courses that can fit into their schedule. This is an important function of the program and more night courses need to be established but more instructors are needed. We have a limited number of instructors and only a single full-time professor.

h) Improvement rates (if applicable)

Beginning in the Fall of 2016, courses were dependent upon finding available instructors. Classes were drastically cut, and students were limited in the courses being offered at Compton college.

Consistently offering the required progression of courses would remove uncertainty for the student and create a clear path for them to achieve their educational goals. A program map was created to provide a clear path for the student.

i) **Additional data compiled by faculty.**

The additional data that would be most helpful is data that tracks the students after their time at the college. This data is not available, but I strongly advise a system to effectively procure and share this data.

Some important data would include.

- How many students transitioned into gainful employment after completing their schooling?
    a. Was it degree/certificate applicable?
    b. What company do they now work for?
- How many students stopped school because of a job opportunity?
    a. How many were recruited by program specific employers?
    b. Was there something that could have been made available for them to continue schooling while working?

j) List any related recommendations.

- Procurement of more industry relevant CNC machinery has been a recommendation from students and industry professionals.
- Develop a work experience course that would connect students with on-the-job-training and a gateway opportunity into gainful employment.
- Somehow track the students after they have left the college.
- Hire another part-time instructor to teach nights.

Manufacturing Technology:

k) Head count of students in the program

Fall Terms 2014-2017						Compton Student Population
		Term				
		2014	2015	2016	2017	Fall 2016
	Term Headcount	38	11	11	--	*7,422*
Gender	F	21.1%	36.4%	18.2%	--	*63.3%*
	M	78.9%	63.6%	81.8%	--	*36.7%*
Ethnicity	African-American	31.6%	0.0%	0.0%	--	*25.1%*
	Amer. Ind. or Alask. Native	0.0%	0.0%	0.0%	--	*0.1%*
	Asian	0.0%	0.0%	0.0%	--	*5.1%*
	Latino	65.8%	90.9%	90.9%	--	*63.1%*
	Pacific Islander	0.0%	0.0%	9.1%	--	*0.5%*
	White	0.0%	9.1%	0.0%	--	*2.9%*
	Two or More	2.6%	0.0%	0.0%	--	*3.0%*
	Unknown or Decline	0.0%	0.0%	0.0%	--	*0.2%*
Age/ Age Group	<17	26.3%	45.5%	54.5%	--	*5.3%*
	17	23.7%	36.4%	36.4%	--	*3.9%*
	18	2.6%	9.1%	9.1%	--	*7.1%*
	19	0.0%	0.0%	0.0%	--	*9.3%*
	20	7.9%	0.0%	0.0%	--	*10.0%*
	21	5.3%	0.0%	0.0%	--	*8.0%*
	22	2.6%	0.0%	0.0%	--	*6.9%*
	23	7.9%	0.0%	0.0%	--	*5.9%*
	24	0.0%	0.0%	0.0%	--	*5.8%*
	25-29	13.2%	9.1%	0.0%	--	*17.3%*
	30-39	2.6%	0.0%	0.0%	--	*12.7%*
	40-49	2.6%	0.0%	0.0%	--	*4.7%*
	50-64	5.3%	0.0%	0.0%	--	*2.8%*
	65+	0.0%	0.0%	0.0%	--	*0.3%*
Class Load	Full-time	5.3%	0.0%	0.0%	--	*19.7%*
	Part-time	31.6%	0.0%	0.0%	--	*80.3%*
Academic Level	College degree	2.6%	0.0%	0.0%	--	*10.0%*
	HS Grad	44.7%	9.1%	0.0%	--	*81.6%*
	Not a HS Grad	0.0%	0.0%	0.0%	--	*0.4%*

	K-12 Special Admit	50.0%	90.9%	100.0%	--	*2.1%*
	Unknown	2.6%	0.0%	0.0%	--	*5.9%*
Educational Goal	Intend to Transfer	18.4%	45.5%	54.5%	--	*52.8%*
	Degree/Certificate Only	2.6%	0.0%	0.0%	--	*8.9%*
	Retrain/recertify.	2.6%	0.0%	0.0%	--	*4.8%*
	Basic Skills/GED	10.5%	9.1%	0.0%	--	*6.1%*
	Enrichment	13.2%	9.1%	0.0%	--	*3.7%*
	Undecided	34.2%	36.4%	45.5%	--	*16.6%*
	Unstated	18.4%	0.0%	0.0%	--	*7.1%*

Spring Terms 2015-2018						**Compton Student Population**
		Term				
		2015	**2016**	**2017**	**2018**	**Spring 2018**
	Term Headcount	-	18	-	-	*6,821*
Gender	F	-	38.9%	-	-	*64.7%*
	M	-	61.1%	-	-	*35.3%*
Ethnicity	African-American	-	0.0%	-	-	*24.6%*
	Amer. Ind. or Alask. Native	-	0.0%	-	-	*<0.1%*
	Asian	-	0.0%	-	-	*5.7%*
	Latino	-	94.4%	-	-	*63.4%*
	Pacific Islander	-	0.0%	-	-	*0.5%*
	White	-	0.0%	-	-	*2.9%*
	Two or More	-	5.6%	-	-	*2.6%*
	Unknown or Decline	-	0.0%	-	-	*0.2%*
Age/ Age Group	<17	-	11.1%	-	-	*4.8%*
	17	-	44.4%	-	-	*2.6%*
	18	-	33.3%	-	-	*5.6%*
	19	-	11.1%	-	-	*9.3%*
	20	-	0.0%	-	-	*10.6%*
	21	-	0.0%	-	-	*8.9%*
	22	-	0.0%	-	-	*7.1%*
	23	-	0.0%	-	-	*6.0%*
	24	-	0.0%	-	-	*5.5%*

	25-29	-	0.0%	-	-	*18.2%*
	30-39	-	0.0%	-	-	*12.9%*
	40-49	-	0.0%	-	-	*5.4%*
	50-64	-	0.0%	-	-	*2.7%*
	65+	-	0.0%	-	-	*0.3%*
Class Load	Full-time	-	0.0%	-	-	*16.2%*
	Part-time	-	5.6%	-	-	*83.8%*
Academic Level	College degree	-	0.0%	-	-	*13.0%*
	HS Grad	-	5.6%	-	-	*74.3%*
	Not a HS Grad	-	0.0%	-	-	*0.2%*
	K-12 Special Admit	-	94.4%	-	-	*7.9%*
	Unknown	-	0.0%	-	-	*4.6%*
Educational Goal	Intend to Transfer	-	44.4%	-	-	*52.7%*
	Degree/Certificate Only	-	5.6%	-	-	*9.0%*
	Retrain/recertify.	-	5.6%	-	-	*4.8%*
	Basic Skills/GED	-	44.4%	-	-	*6.9%*
	Enrichment	-	0.0%	-	-	*3.9%*
	Undecided	-	0.0%	-	-	*16.0%*
	Unstated	-	0.0%	-	-	*6.7%*

A single Manufacturing Technology course (MTEC 70 - Basic Robotics) was offered and instructed by an instructor from El Camino College. Bob Diaz was the instructor, and he is a full-time faculty member at El Camino college. Professor Diaz would offer this single course in basic robotics to expose students at the Compton college location to the subject.

l) Course grade distribution

				Grade Distribution														
Year	COURSE	Method	Weeks	'A'	'B'	'C'	'P'	'D'	'F'	'NP'	Inc P	Inc NP	'W'	*Total*	Successful	Retained	Success	Retention
2014	MTEC-70	Lecture	12	21	5				2		-	2	8	***38***	26	30	**68.4%**	**78.9%**
2014 Total				21	5				2		-	2	8	***38***	26	30	**68.4%**	**78.9%**
2015	MTEC-70	Lecture	12	6	1						3	-	1	***11***	10	10	*90.9%*	*90.9%*
2015 Total				6	1						3	-	1	***11***	10	10	**90.9%**	**90.9%**
2016	MTEC-70	Lecture	12	17	3	2		2			-	-	5	***29***	22	24	75.9%	82.8%
2016 Total				17	3	2		2			-	-	5	***29***	22	24	**75.9%**	**82.8%**

m) Success rates (Discuss your program's rates, demographic success characteristics and set a success standard for your program.)

- The professor during this period is no longer available to answer this specific question but the data is provided.

Program Success Standard*	***71.4%***
5-year Program Success Average	***74.4%***

*Calculated as the average between the 5-year average and the lowest yearly rate in the 5-year period.

Year	*Total Grades*	Success Rate
FA 2014	***38***	68.4%
2015	***11***	90.9%
2016	***29***	75.9%
2017	-	-
SP 2018	-	-

Fall Term Demographic Success (2014-2017)

	Fall 2014		Fall 2015		Fall 2016		Fall 2017	
Ethnicity	Success	N	Success	N	Success	N	Success	N
African-American	41.7%	12	--	0	--	0	--	0
Amer. Ind. or Alask. Native	--	0	--	0	--	0	--	0
Asian	--	0	--	0	--	0	--	0
Latino	84.0%	25	90.0%	10	50.0%	10	--	0
Pacific Islander	--	0	--	0	100.0%	X	--	0
Two or More	0.0%	X	--	0	--	0	--	0
Unknown or Decline	--	0	--	0	--	0	--	0
White	--	0	100.0%	X	--	0	--	0
Gender								
M	73.3%	30	100.0%	7	55.6%	9	--	0
F	50.0%	8	75.0%	X	50.0%	X	--	0
X	--	0	--	0	--	0	--	0
Age Groups								
19 or less	90.0%	20	90.0%	10	54.5%	11	--	0
20 to 24	55.6%	9	--	0	--	0	--	0
25 to 49	28.6%	39	100.0%	X	--	0	--	0
Over 49	50.0%	X	--	0	--	0	--	0

X: Counts are suppressed for groups with less than 5 students.

Shaded regions indicate groups achieving at a rate less than 80% of the reference group. Respectively, reference groups are White, male, and 20 to 24 years old.

Spring Term Demographic Success (2015-2018)

	Spring 2015		Spring 2016		Spring 2017		Spring 2018	
Ethnicity	Success	N	Success	N	Success	N	Success	N
African-American	--	0	--	0	--	0	--	0
Amer. Ind. or Alask. Native	--	0	--	0	--	0	--	0
Asian	--	0	--	0	--	0	--	0
Latino	--	0	88.2%	17	--	0	--	0
Pacific Islander	--	0	--	0	--	0	--	0
Two or More	--	0	100.0%	X	--	0	--	0
Unknown or Decline	--	0	--	0	--	0	--	0
White	--	0	--	0	--	0	--	0
Gender								
M	--	0	100.0%	11	--	0	--	0
F	--	0	71.4%	7	--	0	--	0
X	--	0	--	0	--	0	--	0
Age Groups								
19 or less	--	0	89.5%	18	--	0	--	0
20 to 24	--	0	--	0	--	0	--	0
25 to 49	--	0	--	0	--	0	--	0
Over 49	--	0	--	0	--	0	--	0
X: Counts are suppressed for groups with less than 5 students.								
Shaded regions indicate groups achieving at a rate less than 80% of the reference group. Respectively, reference groups are White, male, and 20 to 24 years old.								

n) Retention rates

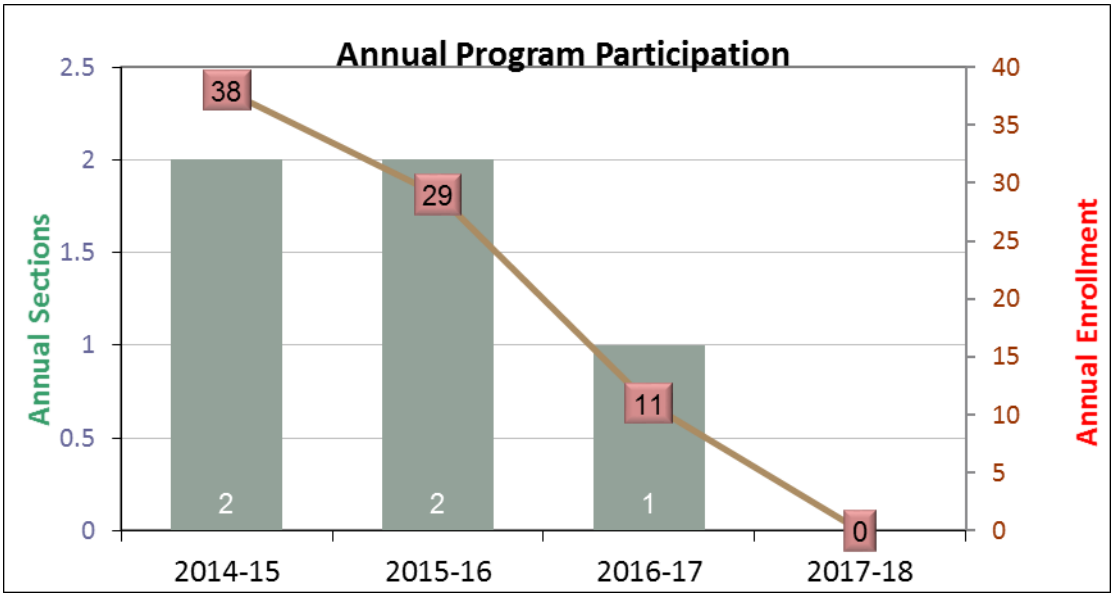
Year	*Total Grades*	Retention Rate
FA 2014	***38***	78.9%
2015	***11***	90.9%
2016	***29***	82.8%
2017	-	-
SP 2018	-	-

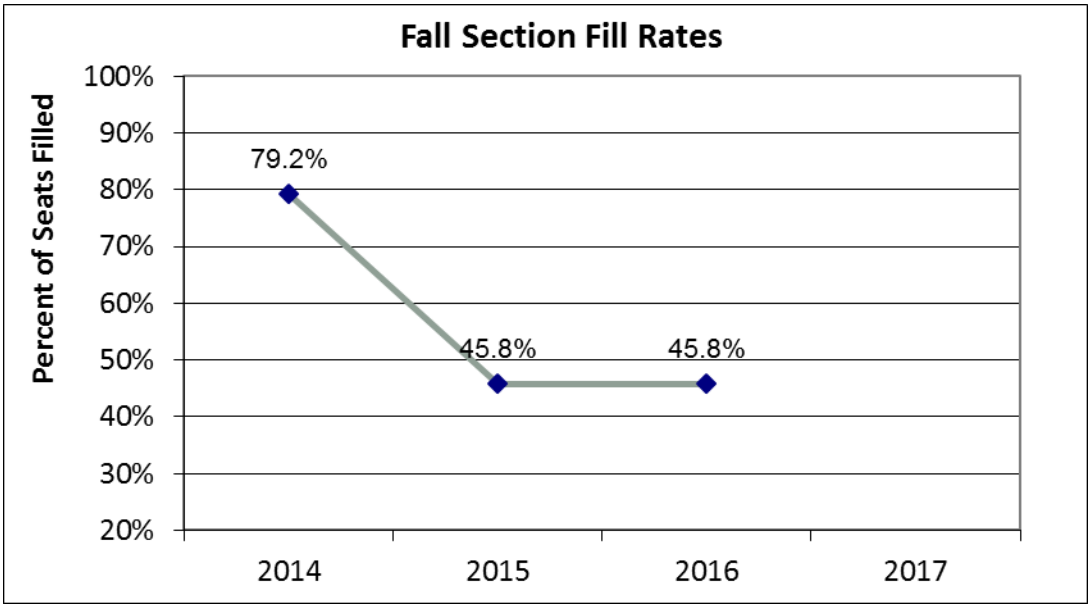
o) A comparison of success and retention rates in face-to-face classes with distance education classes

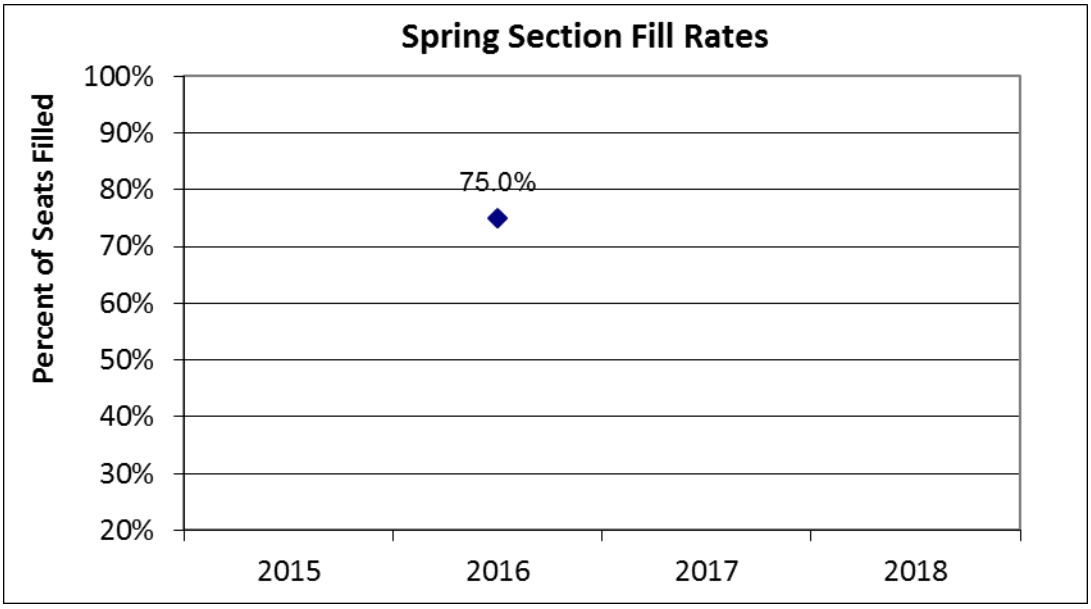
- A comparison cannot be made at this time because we do not offer distance education. Soon we hope to implement distance education courses that do not require lab time.

p) Enrollment statistics with section and seat counts and fill rates.

	2014-15	2015-16	2016-17	2017-18	4-Year Avg
Annual Enrollment	38	29	11	0	20







Fall of 2016 was the last time this course was offered.

q) Scheduling of courses (day vs. night, days offered, and sequence)

Enrollment by Time of Day

Fall Term	2014	2015	2016	2017
Day	89.5%	100.0%	100.0%	-
Night	10.5%	0.0%	0.0%	-
Weekend/Unknown	0.0%	0.0%	0.0%	-

Enrollment by Time of Day

Spring Term	2015	2016	2017	2018
Day	-	100.0%	-	-
Night	-	0.0%	-	-
Weekend/Unknown	-	0.0%	-	-

r) Improvement rates (if applicable)

s) Additional data compiled by faculty.

t) List any related recommendations.

3. Curriculum

Review and discuss the curriculum work done in the program during the past four years, including the following:

a) Provide the curriculum course review timeline to ensure all courses are reviewed at least once every 6 years.
(Copy the matrix, guided pathway) align it.

Machine Tool Technology (MTT) Cert of Achievement
CNC Machine Operator Option
Career Pathways Matrix Program's Recommended Course Sequence

1st Year – Fall Semester	1st Year – Winter	1st year – Spring	1st Year – Summer
MTT 101 4 units Introduction to Conventional & CNC Machining **(1st 8 Weeks/Day Class)** **Offered every Fall.**		**MTT 105 4 units** Conventional & CNC Milling **(1st 8 Weeks)** **Offered Every Spring**	
MTT 103 4 units Conventional & CNC Turning **(2nd 8 Weeks)** **Offered Every Fall**		**MTT 107 4 units** Advanced Manufacturing Processes **(2nd 8 Weeks)** **Offered Every Spring**	
		MTT 101 4 units Introduction to Conventional & CNC Machining **(16 Weeks/Evening)** ***Offered every Spring.**	

Machine Tool Technology (MTT) Cert of Achievement
Machinist Option
Career Pathways Matrix Program's Recommended Course Sequence

1st Year – Fall Semester	1st Year – Winter	1st year – Spring	1st Year – Summer
MTT 101 4 units Introduction to Conventional & CNC Machining **(1st 8 Weeks/Day Class)** **Offered every Fall.**	**MTT 110 3 units** Introduction to CAD/CAM Offered Every Winter	**MTT 101 4 units** Introduction to Conventional & CNC Machining **(16 Weeks/Evening)** ***Offered every Spring.**	**MTT 160 3 units** General Metals **Day Course** **Offered Every Summer**
MTT 103 4 units Conventional & CNC Turning **(2nd 8 Weeks)** **Offered Every Fall**		**MTT 105 4 units** Conventional & CNC Milling **(1st 8 Weeks)** **Offered Every Spring**	
MTT 120 3 units Manufacturing Print Reading **Offered Every Fall**		**MTT 107 4 units** Advanced Manufacturing Processes **(2nd 8 Weeks)** **Offered Every Spring**	
		MTT 140 3 units Machine Shop Calculations	

		Offered Every Spring	

Machine Tool Technology (MTT) Cert of Achievement
Numerical Control Option
Career Pathways Matrix Program's Recommended Course Sequence

1st Year – Fall Semester	1st Year – Winter	1st year – Spring	1st Year – Summer
MTT 101 4 units Introduction to Conventional & CNC Machining **(1st 8 Weeks/Day Class)** **Offered every Fall.**	**MTT 110 3 units** Introduction to CAD/CAM Offered Every Winter	**MTT 105 4 units** Conventional & CNC Milling **(1st 8 Weeks)** **Offered Every Spring**	**MTT 160 3 units** General Metals **Day Course** **Offered Every Summer**
MTT 103 4 units Conventional & CNC Turning **(2nd 8 Weeks)** **Offered Every Fall**		**MTT 107 4 units** Advanced Manufacturing Processes **(2nd 8 Weeks)** **Offered Every Spring**	
MTT 120 3 units Manufacturing Print Reading **Offered Every Fall**		**MTT 140 3 units** Machine Shop Calculations **Offered Every Spring**	
		MTT 101 4 units Introduction to Conventional & CNC Machining **(16 Weeks/Evening)** ***Offered every Spring.**	

2nd Year – Fall S	2nd Year – Winter	2nd year – Spring	2nd Year - Summer
MTT 112 3 Units Computer Numerical Control Programming ***TBD Contingent on Staffing**		***MTT 118 3 units** 3D Numerical Control Graphics Programming ***TBD Contingent on Staffing**	
MTT 115 3 units Numerical Control Graphics Programming ***TBD Contingent on Staffing**			

Machine Tool Technology (MTT) AS Degree
Machinist Option
Career Pathways Matrix Program's Recommended Course Sequence

1st Year – Fall Semester	1st Year – Winter	1st year – Spring	1st Year – Summer
MTT 101 4 units Introduction to Conventional & CNC Machining **(1st 8 Weeks/Day Class)** **Offered every Fall.**	**MTT 110 3 units** Introduction to CAD/CAM Offered Every Winter	**MTT 101 4 units** Introduction to Conventional & CNC Machining **(16 Weeks/Evening)** ***Offered every Spring.**	**MTT 160 3 units** General Metals **Day Course** **Offered Every Summer**
MTT 103 4 units Conventional & CNC Turning **(2nd 8 Weeks)** **Offered Every Fall**	**AS/GE AREA-3 3 units** Humanities	**MTT 105 4 units** Conventional & CNC Milling **(1st 8 Weeks)** **Offered Every Spring**	**AS/GE AREA-4B 3 units** Communication & Analytical Thinking
MTT 120 3 units Manufacturing Print Reading **Offered Every Fall**		**MTT 107 4 units** Advanced Manufacturing Processes **(2nd 8 Weeks)** **Offered Every Spring**	
MATH 3-7 units **AS/GE Area 6** (Based on Assessment Level)		**MTT 140 3 units** Machine Shop Calculations **Offered Every Spring**	
		ENGLISH 3-6 units **AS/GE Area 4A** (Based on Assessment Level)	

2nd Year – Fall S	2nd Year – Winter	2nd year – Spring	2nd Year - Summer
MTT 112 3 Units Computer Numerical Control Programming ***TBD Contingent on Staffing**		***MTT 118 3 units** 3D Numerical Control Graphics Programming ***Elective** ***TBD Contingent on Staffing**	***MTT 203 3 units** Advanced Inspection of Fasteners and Measuring Instruments ***Offered Every Summer** ***Elective**
MTT 115 3 units Numerical Control Graphics Programming ***TBD Contingent on Staffing**		**MTT 201 4 units** Introduction to Airspace Fastener Technology ***Evening Course** ***Elective Option** ***Offered every Spring.**	
AS/GE AREA-1 3-4 units Natural Sciences			
AS/GE AREA-2 3 units Social & Behavioral Sciences			
AS/GE AREA-5 3 units Health & Physical Education			

Machine Tool Technology (MTT) AS Degree
Numerical Control Programmer Option
Career Pathways Matrix Program's Recommended Course Sequence

1st Year – Fall Semester	1st Year – Winter	1st year – Spring	1st Year – Summer
MTT 101 4 units Introduction to Conventional & CNC Machining **(1st 8 Weeks/Day Class)** **Offered every Fall.**	**MTT 110 3 units** Introduction to CAD/CAM Offered Every Winter	**MTT 101 4 units** Introduction to Conventional & CNC Machining **(16 Weeks/Evening)** ***Offered every Spring.**	**MTT 160 3 units** General Metals **Day Course** **Offered Every Summer**
MTT 103 4 units Conventional & CNC Turning **(2nd 8 Weeks)** **Offered Every Fall**	**AS/GE AREA-3 3 units** Humanities	**MTT 105 4 units** Conventional & CNC Milling **(1st 8 Weeks)** **Offered Every Spring**	**AS/GE AREA-4B 3 units** Communication & Analytical Thinking
MTT 120 3 units Manufacturing Print Reading **Offered Every Fall**		**MTT 118 3 units** 3D Numerical Control Graphics Programming **TBD Contingent on Staffing**	
MATH 3-7 units **AS/GE Area 6** (Based on Assessment Level)		**MTT 140 3 units** Machine Shop Calculations **Offered Every Spring**	
		ENGLISH 3-6 units **AS/GE Area 4A** (Based on Assessment Level)	

2nd Year – Fall S	2nd Year – Winter	2nd year – Spring	2nd Year - Summer
MTT 112 3 Units Computer Numerical Control Programming ***TBD Contingent on Staffing**		**MTT 107 4 units** Advanced Manufacturing Processes **(2nd 8 Weeks)** **Offered Every Spring**	***MTT 203 3 units** Advanced Inspection of Fasteners and Measuring Instruments ***Offered Every Summer** ***Elective**
MTT 115 3 units Numerical Control Graphics Programming ***TBD Contingent on Staffing**		**MTT 201 4 units** Introduction to Airspace Fastener Technology ***Evening Course** ***Elective Option** ***Offered every Spring.**	
AS/GE AREA-1 3-4 units Natural Sciences			
AS/GE AREA-2 3 units Social & Behavioral Sciences			
AS/GE AREA-5 3 units Health & Physical Education			

b) Explain any course additions to current course offerings.

- Previously, Compton college was only offering the courses required for a Certificate of Achievement CNC operator option (MTT 101, MTT 103, MTT 105 and MTT 107). The new full-time professor, Michael VanOverbeck has added course offerings to provide a possibility for an added 2-certificates and 1-degree options. An added degree opportunity has been made possible with added faculty support.

c) Explain any course deletions and inactivation's from current course offerings.

- N/A

d) Describe the courses and number of sections offered in distance education. (Distance education includes hybrid courses.)

- There are no Distance Education Courses offered at this time.

e) Discuss how well the courses, degrees, or certificates are meeting students' transfer or career training needs:

- The structure of the new offerings will give opportunity to a diverse range of student goals.

1. Have all courses that are required for your program's degrees and certificates been offered during the last two years? If not, has the program established a course offering cycle?

- MTT 101, MTT 103, MTT 105 and MTT 107 have been offered for a certificate.

2. Are there any concerns regarding program courses and their articulation?

- no

3. **How many students earn degrees and/or certificates in your program? Do students take licensure exams? If so, what is the pass rate? If few students receive degrees or certificates or if few students pass the licensure exam, should the program's criteria or courses be re-examined? Set an attainable, measurable goal for future degrees, certificates, and/or licensure pass rates.**
    - N/A

f) List any related recommendations.

- N/A

4. Assessment and Student and Program Learning Outcomes (SLOs & PLOs)

a) Provide a copy of your alignment grid, which shows how course, program, and institutional learning outcomes are aligned.

INDUSTRY AND TECHNOLOGY
Institutional (ILO), Program (PLO), and Course (SLO) Alignment

Program: **Automation, Robotics, and Manufacturing**	**Number of Courses:** 34	**Date Updated:** 11.26.2014	**Submitted by:** SueEllen Warren, ext. 4519 Renee Newell, ext. 3308

ILOs	**1. Critical Thinking** *Students apply critical, creative and analytical skills to identify and solve problems, analyze information, synthesize and evaluate ideas, and transform existing ideas into new forms.*	**2. Communication** *Students effectively communicate with and respond to varied audiences in written, spoken or signed, and artistic forms.*	**3. Community and Personal Development** *Students are productive and engaged members of society, demonstrating personal responsibility, and community and social awareness through their engagement in campus programs and services.*	**4. Information Literacy** *Students determine an information need and use various media and formats to develop a research strategy and locate, evaluate, document, and use information to accomplish a specific purpose. Students demonstrate an understanding of the legal, social, and ethical aspects related to information use.*

SLO-PLO-ILO ALIGNMENT NOTES:

Mark boxes with an 'X' if: SLO/PLO is a major focus or an important part of the course/program; direct instruction or some direct instruction is provided; students are evaluated multiple times (and possibly in various ways) throughout the course or are evaluated on the concepts once or twice within the course.

DO NOT mark with an 'X' if: SLO/PLO is a minor focus of the course/program and some instruction is given in the area but students are not formally evaluated on the concepts; or if the SLO/PLO is minimally or not at all part of the course/program.

PLOs	**PLO to ILO Alignment** *(Mark with an X)*			
	1	**2**	**3**	**4**
PLO #1 Solving Engineering Problems Students will apply principles from mathematics, physics, and chemistry to solve applied problems in engineering.	X			
PLO #2 Digital and Analog Sensor Technologies Upon completion of the courses in this discipline, the student will be able to identify different digital and analog sensor technologies.	X			
PLO #3 Industry Standards Upon completion of the courses in this discipline, the student will be able to follow and build robotic devices and components in accordance with industry standard schematics and diagrams.	X			

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment *FOR OFFICE USE ONLY*			
	P1	P2	P3	1	2	3	4
ETEC 10 Principles of Engineering Technology: SLO #1 Careers Students will research engineering and engineering technology careers and create a report.	X			X			
ETEC 10 Principles of Engineering Technology: SLO #2 Marble Sorter Students will build an automated marble sorter.	X		X				
ETEC 10 Principles of Engineering Technology: SLO #3 Six Simple Machines Student will build the SMET project demonstrating the six simple machines.	X		X				
ETEC 10A Principles of Engineering Technology I: SLO #1 Careers Students will research engineering and engineering technology careers and create a report.	X			X			
ETEC 10A Principles of Engineering Technology I: SLO #2 Six Simple Machines Student will build the SMET project demonstrating the six simple machines.	X		X				
ETEC 10A Principles of Engineering Technology I: SLO #3 Mousetrap Car Student will build a mousetrap-powered car.	X	X					
ETEC 10B Principles of Engineering Technology II: SLO #1 Marble Sorter Students will build an automated marble sorter.	X	X	X	X			
ETEC 10B Principles of Engineering Technology II: SLO #2 Optimized Bridge Students will build an optimized bridge using West Point Bridge simulation software.	X	X					
ETEC 10B Principles of Engineering Technology II: SLO #3 Bridge Construction & Testing Students will build a bridge from popsicle sticks and load test their design to failure.	X						
ETEC 12 Introduction to Engineering Design: SLO #1 Missing Orthographic Views Given an incomplete set of orthographic views of a simple machined part, the student shall be able to complete the given views and to construct the missing views.	X			X			
ETEC 12 Introduction to Engineering Design: SLO #2 Two and Three-Dimensional Models Given a simple set of design constraints, the student shall be able utilize AutoCad Inventor software to produce a design package including two-dimensional drawings and three-dimensional models.	X						
ETEC 12 Introduction to Engineering Design: SLO #3 Design Project Upon completion of the course, the student shall be able to take a design project from problem statement to final production drawings.	X						

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment *FOR OFFICE USE ONLY*			
	P1	P2	P3	1	2	3	4
ETEC 12A Introduction to Engineering Design I: SLO #1 Two and Three-Dimensional Models Given a simple set of design constraints, the student shall be able utilize AutoCad Inventor software to produce a design package including two-dimensional drawings and three-dimensional models.	X			X			
ETEC 12A Introduction to Engineering Design I: SLO #2 Missing Orthographic Views Given an incomplete set of orthographic views of a simple machined part, the student shall be able to complete the given views and to construct the missing views.	X						
ETEC 12A Introduction to Engineering Design I: SLO #3 Making Revisions Given an incorrect design package and a list of needed revisions, the student shall be able to correctly and effectively incorporate the revisions into the drawings and models.	X						
ETEC 12B Introduction to Engineering Design II: SLO #1 Two and Three-Dimensional Models Given a simple set of design constraints, the student shall be able utilize AutoCad Inventor software to produce a design package including two-dimensional drawings and three-dimensional models.	X			X			
ETEC 12B Introduction to Engineering Design II: SLO #2 Design Project Upon completion of the course, the student shall be able to take a design project from problem statement to final production drawings.	X						
ETEC 12B Introduction to Engineering Design II: SLO #3 Design Process Upon completion of the course, the student shall be able to describe the steps of the design process and give examples of documents appropriate for each step.	X						
ETEC 14 Electronics for Engineering Technologists: SLO #1 Logic Equivalencies Students will be able to use NAND and NOR Gates to configure and test logic equivalencies of: NOT, AND, OR, Exculsive OR and Exclusive NOR logic functions.	X	X		X			
ETEC 14 Electronics for Engineering Technologists: SLO #2 Logic Circuit Using discrete TTL or CMOS Logic Gates to design, construct, and demonstrate a logic circuit which displays the students Birth Date using three toggle switches, various logic gates, and a single seven segment common anode LED display.	X	X					
ETEC 14 Electronics for Engineering Technologists: SLO #3 Karnaugh Map Given a 4 bit (16 items) binary truth table, generate a Karnaugh Map to find a simplified solution.	X	X					
ETEC 14 Electronics for Engineering Technologists: SLO #4 Base 10 Conversion Given a negative two's complement binary number, convert this to a base 10 number.	X	X					

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment *FOR OFFICE USE ONLY*			
	P1	P2	P3	1	2	3	4
ETEC 14A Electronics for Engineering Technologists I: SLO #1 2 Logic Circuit Using discrete TTL or CMOS Logic Gates to design, construct, and demonstrate a logic circuit which displays the students Birth Date using three toggle switches, various logic gates, and a single seven segment common anode LED display.	X	X					
ETEC 14A Electronics for Engineering Technologists I: SLO #2 Karnaugh Map Given a 4 bit (16 items) binary truth table, generate a Karnaugh Map to find a simplified solution.	X	X		X			
ETEC 14A Electronics for Engineering Technologists I: SLO #3 Unsigned Binary Conversion Given an unsigned binary number, convert this number to base 10.	X	X					
ETEC 14A Electronics for Engineering Technologists I: SLO #4 Series Circuit Resistance & Current Given a series circuit with several resistors, calculate the total resistance; and given a voltage across this series circuit, calculate the current.	X	X					
ETEC 14B Electronics for Engineering Technologists II: SLO #1 Logic Equivalencies Students will be able to use NAND and NOR Gates to configure and test logic equivalencies of: NOT, AND, OR, Exculsive OR and Exclusive NOR logic functions.	X	X					
ETEC 14B Electronics for Engineering Technologists II: SLO #2 Base 10 Conversion Given a negative two's complement binary number, convert this to a base 10 number.	X	X		X			
ETEC 14B Electronics for Engineering Technologists II: SLO #3 Asynchronous Counter Design and build a basic 4-bit Asynchronous Counter.	X	X					
ETEC 14B Electronics for Engineering Technologists II: SLO #4 JK Flip Flop Given a JK Flip Flop, identify what the output will be for all possible states of J and K.	X	X	X				
ETEC 16 Computer Integrated Manufacturing: SLO #1 Solid Modeling Students will measure and solid model a provided assembly.	X	X					
ETEC 16 Computer Integrated Manufacturing: SLO #2 Robotic Arm: Palletize Students will program a robot arm to palletize parts.	X		X	X			
ETEC 16 Computer Integrated Manufacturing: SLO #3 CNC Mill: Initials Students will program a CNC mill to engrave their initials in a block of wood.	X		X				
ETEC 16A Computer Integrated Manufacturing I: SLO #1 Solid Modeling Students will measure and solid model a provided assembly.	X						
ETEC 16A Computer Integrated Manufacturing I: SLO #2 CNC Mill: Initials Students will program a CNC mill to engrave their initials in a block of wood.	X		X	X			
ETEC 16A Computer Integrated Manufacturing I: SLO #3 MasterCam Toolpath Student will create a toolpath using MasterCam from a given solid model.	X		X				

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment *FOR OFFICE USE ONLY*			
	P1	P2	P3	1	2	3	4
ETEC 16B Computer Integrated Manufacturing II: SLO #1 Robotic Arm: Palletize Students will program a robot arm to palletize parts.	X		X				
ETEC 16B Computer Integrated Manufacturing II: SLO #2 Robotic Arm: Tool Frame Students will program a tool frame (tool coordinates) for a robot arm.	X		X	X			
ETEC 16B Computer Integrated Manufacturing II: SLO #3 Robotic Arm: User Frame Students will program a user frame (workpiece coordinates) for a robot arm.	X		X				
ETEC 18 Engineering Design and Development: SLO #1 Engineering Notebook The student will use the United States Patent office Protocol, Engineering Notebook, for compiling design data, testing results, dates, signatures, page format, and Mechanical Drawings.	X		X				
ETEC 18 Engineering Design and Development: SLO #2 Research Methodology & Technology After carefully defining a technical problem, the student will use both research methodology and technology to choose, build, validate and justify an engineering solution to a design challenge.	X		X	X			
ETEC 18 Engineering Design and Development: SLO #3 Tech Review Presentation The student will make a formal presentation to defend their research, design criteria, prototype, applications, and conclusions to a technical review panel.	X		X				
ETEC 18A Engineering Design and Development I: SLO #1 Engineering Notebook Students will develop and maintain an engineering notebook. This legal document contains all the information that is relevant to its purpose of original design. It includes contact information, correspondence, telephone logs, sketches and drawings, reference citations, collected data, and a chronological listing of the events dates and time, connected to the journal's purpose. Documentation is a vital part of engineering. In the case of liability suits, good documentation has kept many engineering firms out of court because it proved there was no wrong doing on their part.	X		X				
ETEC 18A Engineering Design and Development I: SLO #2 Research Methodology & Technology After carefully defining a technical problem, the student will use both research methodology and technology to choose, build, validate and justify an engineering solution to a design challenge.	X		X	X			
ETEC 18A Engineering Design and Development I: SLO #3 Design Project The student will employ the use of technologies and knowledge learned, in this and previous ETECH courses, to construct and test their design project.	X		X				
ETEC 18B Engineering Design and Development II: SLO #1 Redefining & Justifying Alternative Solutions The students will be able to conduct preliminary patent searches to determine the originality of their alternative choices.	X		X				
ETEC 18B Engineering Design and Development II: SLO #2 Project Tracking The student will employ industrial scheduling techniques to demonstrate project tracking.	X		X	X			
ETEC 18B Engineering Design and Development II: SLO #3 Tech Review Presentation The student will make a formal presentation to defend their research, design criteria, prototype, applications, and conclusions to a technical review panel.	X		X				

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment (Mark with an X)			
	P1	P2	P3	1	2	3	4
MTEC 70 Basic Robotics: SLO #1 Robot Types & Components The student will be able to define 'robot', distinguish between the different types of robots, identify the purposes of robots and identify the electronic and mechanical components of a robot. Students will also be able to interpret the different number systems used by robots and convert numerical data between ASCII, binary, decimal and hexadecimal numbers.	X	X	X				
MTEC 70 Basic Robotics: SLO #2 Programming & Debugging The student will be able to compose logical instructions such as basic navigation and maneuvers for a robot to follow, debug and compile instruction codes onto the robot's micro-controller, and test and run the functional prototype robot.	X	X	X	X			
MTEC 70 Basic Robotics: SLO #3 Robot Build Final Project By the end of the course, the student will be able to build or assemble a prototype robot, build electronic circuits and attach electronic devices (e.g., light-emitting diodes, piezospeaker) to the micro-controller, and equip the robot with DC motors or servo motors.	X	X	X				
MTEC 75 Integrated Robotic and Automated Technologies: SLO #1 Programming a Robot Students will correctly program a robot to travel 5 feet, turn 180 degrees and return to the start point.	X		X				
MTEC 75 Integrated Robotic and Automated Technologies: SLO #2 Motors & Motion The student will be able to use the concepts of torque, inertia, pressure, and force to design appropriate gear and drive trains for robotic systems as well as modify simple Servo Motors to obtain a determined objective.	X		X	X			
MTEC 75 Integrated Robotic and Automated Technologies: SLO #3 Programming and Troubleshooting The student will be able to program robotic systems to perform operational tasks using programming languages such as PBASIC and diagnose hardware and software errors in robotic systems.	X	X	X				
MTEC 75A Integrated Robotic and Automated Technologies I: SLO #1 Programming a Robot Students will correctly program a robot to travel 5 feet, turn 180 degrees and return to the start point.	X		X				
MTEC 75A Integrated Robotic and Automated Technologies I: SLO #2 Motors & Motion The student will be able to use the concepts of torque, inertia, pressure, and force to design appropriate gear and drive trains for robotic systems as well as modify simple Servo Motors to obtain a determined objective.	X		X	X			
MTEC 75A Integrated Robotic and Automated Technologies I: SLO #3 Embedded Electronic Devices Students will be able to compare and contrast electrical motor configurations, transducers, sensors, PWM (Pulse Width Modulation), and associated electronics imbedded devices to build robotic systems in accordance with industry standard schematics and diagrams.	X	X	X				
MTEC 75B Integrated Robotic and Automated Technologies II: SLO #1 Programming a Robot Students will correctly program a robot to travel a total of 10 feet. Within the travel the robot will reach maximum velocity by smoothly accelerating and deaccelerating.	X		X				
MTEC 75B Integrated Robotic and Automated Technologies II: SLO #2 Interface Circuits The student will be able to build simple interface circuits capable of driving electromechanical devices such as motors, solenoids, and relays in accordance with industry standard manufacturing processes.	X		X	X			
MTEC 75B Integrated Robotic and Automated Technologies II: SLO #3 Programming and Troubleshooting The student will be able to program robotic systems to perform operational tasks using programming languages such as PBASIC and diagnose hardware and software errors in robotic systems.	X		X				

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment (Mark with an X)			
	P1	P2	P3	1	2	3	4
MTT 101 Introduction to Conventional and CNC Machining: SLO #1 Measuring and Recording Dimensions Given a ground steel block of known and verified dimensions, measure and record the three dimensions of the block using a micrometer to a precision of .001 inches.	X		X				
MTT 101 Introduction to Conventional and CNC Machining: SLO #2 Blue Prints Given a Blue Print, student will use all manufacturing equipment available to manufacture the project on the Blue Print to noted specifications.	X		X	X			
MTT 101 Introduction to Conventional and CNC Machining: SLO #3 Orthographic Projections The student will be able to solve shop math problems and interpret orthographic projection engineering drawings that incorporate geometric dimensioning and tolerancing to produce assigned work within the tolerances specified on engineering drawings.	X						
MTT 103 Conventional and CNC Turning: SLO #1 Lathe Dimension Students will turn a part on the lathe to a given drawing dimension to an accuracy of +/- .001 inches.	X		X				
MTT 103 Conventional and CNC Turning: SLO #2 CNC Lathe Programs Read, de-bug and edit CNC lathe word address programs and enter Manual Data Input (MDI) CNC word address lathe programs to produce work within the tolerances on engineering drawings.	X		X	X			
MTT 103 Conventional and CNC Turning: SLO #3 Shop Math Solve shop math problems that include speeds and feeds, trigonometry, tapers, threads, engineering drawing interpretation and calculations relating to machine tools.	X						
MTT 105 Conventional and CNC Milling: SLO #1 Squaring the Block Given a rough-cut aluminum block, square the block using a milling machine, cutters and measurement tools.	X		X				
MTT 105 Conventional and CNC Milling: SLO #2 Power Machines Using proper safety procedures and precautions, students will be able to set up and operate vertical and horizontal milling machines, rotary tables, indexing and dividing heads, and vertical milling machines to produce assigned work within the tolerances specified on engineering drawings.	X		X	X			
MTT 105 Conventional and CNC Milling: SLO #3 Soft Jaws Project Students will be able to read, de-bug and edit CNC vertical milling machine word address programs and to enter Manual Data Input (MDI) CNC word address milling machine programs to produce vise soft jaws for holding work to produce parts within the tolerances specified on engineering drawings.	X						

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment (Mark with an X)			
	P1	P2	P3	1	2	3	4
MTT 107 Advanced Manufacturing Processes: SLO #1 Pros and Cons of Cuttings Record the benefits and downsides of the following processes: Waterjet cutting, EDM wire cutting, Plasma cutting and Laser cutting.	X						
MTT 107 Advanced Manufacturing Processes: SLO #2 Measuring & Inspection Students will be able to select and use cylindrical squares, precision height gauges, vernier bevel protractors, gauge blocks and sine bars to inspect assigned work within the tolerances specified on engineering drawings.	X		X	X			
MTT 107 Advanced Manufacturing Processes: SLO #3 Grinding and Cutting Machinery Using proper safety procedures and precautions, students will be able to set up and operate surface grinders, cylindrical grinders, coordinate measuring machines, optical comparators, sinkers, wire electrical discharge machines, and abrasive water jet machines to produce assigned work within the tolerances specified on engineering drawings.	X		X				
MTT 10A Introduction to CAD/CAM: SLO #1 High Speed Steel End Mill Student will calculate the correct rotations per minute (RPM) for a high speed steel end mill using the correct cutting speed and end mill diameter.	X						
MTT 10A Introduction to CAD/CAM: SLO #2 2-D Computer Drafting Students will be able to identify, differentiate between and use computer drafting system hardware, components, software systems and operating systems to create points, lines circles, dimensions and notes in two dimensions.	X			X			
MTT 10A Introduction to CAD/CAM: SLO #3 CNC Machined Objects Students will be able to input, edit, print and plot a CNC program and create toolpaths for two-axis CNC machines to create objects within specified tolerances.	X		X				
MTT 10B Computer Numerical Control Programming: SLO #1 Inputting a Program Student will input a program in to a Computer Numerical Control (CNC) machine.	X		X				
MTT 10B Computer Numerical Control Programming: SLO #2 Write, Edit and Input Programs Students will be able to write and alter word address programs for three-axis milling machines and input and edit programs into a CNC machine using manual input keyboard or local input.	X			X			
MTT 10B Computer Numerical Control Programming: SLO #3 Programming Routines & Loops Students will be able to write word address programs using routines, loops and macro subroutines as well as perform simple contouring operations on a CNC lathe.	X						
MTT 10J Numerical Control Graphics Programming: SLO #1 Geometric Elements Student will create geometric elements such as points, lines, and circles.	X						
MTT 10J Numerical Control Graphics Programming: SLO #2 File Manipulation Students will be able to utilize computer operating systems to manipulate files, convert geometry from CAD databases to numerical control part geometry, and obtain listings and graphic plots.	X		X	X			
MTT 10J Numerical Control Graphics Programming: SLO #3 Tool Motion Routines Students will be able to create, manipulate and edit tool motion routines including: turning, boring, drilling, profiling, pocket roughing and turning, using interactive graphic techniques.	X		X				

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment (Mark with an X)			
	P1	P2	P3	1	2	3	4
MTT 10K 3D Numerical Control Graphics Programming: SLO #1 Creating a 3D Solid Model Student will correctly create a 3D solid model in CAD software and practice roughing the 3D surface using CAM software.	X		X				
MTT 10K 3D Numerical Control Graphics Programming: SLO #2 4th and 5th Axis Positioning The student will be able to describe and demonstrate appropriate 3D editing operations, and use 4th and 5th axis positioning and simultaneous rotary axis machining operations on 3D process models.	X		X	X			
MTT 10K 3D Numerical Control Graphics Programming: SLO #3 Surfacing The student will be able to construct appropriate profile geometry on which to base 3D surfaces, recognize what surface type would be required, and practice roughing of 3D surfaces.	X		X				
MTT 16 General Metals: SLO #1 HSS Cutting Speed and Mill Diameter Student will calculate the correct rotations per minute (rpm) for a high speed steel end mill using the correct cutting speed and end mill diameter.	X						
MTT 16 General Metals: SLO #2 Tool Selection & Use Using proper safety procedures and precautions, students will be able to select correct metal working hand tools, measure and layout, utilizing semi-precision and precision measuring tools, and produce projects or exercises within the tolerances specified on engineering drawings.	X		X	X			
MTT 16 General Metals: SLO #3 Casting, Welding & Cutting Using proper safety procedures and precautions, students will be able to operate foundry equipment to produce aluminum castings and to operate welding equipment to braze, weld and cut materials to produce projects within tolerances specified on engineering drawings.	X						
MTT 2 Manufacturing Print Reading: SLO #1 Orthographic Orientation Student will correctly sketch a part in orthographic orientation.	X						
MTT 2 Manufacturing Print Reading: SLO #2 Multi-View Orthographic Drawings Demonstrate basic understanding or Multi-View Orthographic drawings, including part visualization and interpretation and the mechanics of: dimensioning, tolerancing and drawing.	X		X	X			
MTT 2 Manufacturing Print Reading: SLO #3 Total Position Tolerance Gain a basic understanding of GD&T (Geometric Dimensioning and Tolerancing) practices. Presented with a Feature Control Frame, students will calculate total positional tolerance of a hole utilizing Maximum Material Condition, Least Material Condition and Regardless of Feature Size Modifiers.	X		X				

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment (Mark with an X)			
	P1	P2	P3	1	2	3	4
MTT 40 Machine Shop Calculations: SLO #1 HSS Setting the Speed Student will calculate the correct feed per minute for a high speed steel (HSS) end mill using the correct feed per tooth (CL), rotations per minute (RPM), and number of teeth.	X						
MTT 40 Machine Shop Calculations: SLO #2 Screw Threading The student will be able to compute and perform screw threading operations to include 60 degree thread formulas, acme thread formulas and calculations of the parts of a screw thread to industry standard tolerances.	X			X			
MTT 40 Machine Shop Calculations: SLO #3 Geometric Figures The student will be able to sketch geometric figures to include perpendicular bisectors, parallel and tangent lines and use trigonometric principles to solve problems that include similar triangles, isosceles triangles, right triangles and polygons.	X						
MTT 46 Basic Machine Tool Operation: SLO #1 HSS Setting the Milling Machine Student will calculate the correct rotations per minute (rpm) for a high speed steel end mill using the correct cutting speed and end mill diameter. Then the student will demonstrate setting the speed of the milling machine.	X						
MTT 46 Basic Machine Tool Operation: SLO #2 Micrometers & Measuring The student will be able to use and read micrometers, vernier measuring tools, semi-precision and precision measuring tools to measure and produce projects within the tolerances specified by engineering requirements.	X		X	X			
MTT 46 Basic Machine Tool Operation: SLO #3 Power Machines Using proper safety procedures and precautions, students will be able to set up and operate drilling machines, engine lathes, vertical and horizontal milling machines, and grinding machines to produce projects within the tolerances specified by engineering requirements.	X		X				

SLOs	SLO to PLO Alignment (Mark with an X)			COURSE to ILO Alignment (Mark with an X)			
	P1	P2	P3	1	2	3	4
(Compton-Only Course) **MTT 201 Introduction to Aerospace Fastener Technology: SLO #1 Measurement tools** Identify type, size, and parts of a Header, Automatic Turning Machine, Centerless Grinder, Thread-roller, and various measurement tools.		X		X			
MTT 201 Introduction to Aerospace Fastener Technology: SLO #2 Tools and Equipment Operate the equipment and tools noted in SLO #1.		X					
MTT 201 Introduction to Aerospace Fastener Technology: SLO #3 Aerospace Fasteners Identify type and size of common Aerospace Fasteners.		X					
(Compton-Only Course) **MTT 203 Advanced Inspection of Fasteners and Measuring Instruments: SLO #1 Inspect Fasteners** Inspect three fasteners to standard criteria.		X		X			
MTT 203 Advanced Inspection of Fasteners and Measuring Instruments: SLO #2 Compare Findings Compare findings to the standard engineering specifications.		X					
MTT 203 Advanced Inspection of Fasteners and Measuring Instruments: SLO #3 Result Display Record and display the results in the Statistical Process Control (SPC) table and chart with variances to standard engineering specifications.		X					

b) Provide a timeline for course and program level SLO assessments.

- At the time of writing this, SLOs are now to be done every semester. The SLO timeline during this timeline is not available.

c) State the percent of course and program SLO (Student Learning Outcome) statements that have been assessed.

- The required course and program SLOs have been assessed. There are no outstanding statements due.

d) Summarize the SLO and PLO assessment results over the past four years and describe how those results led to improved student learning. Analyze and describe those changes. Provide specific examples.

- A lot of this data has been difficult to find because the administration, faculty and staff are no longer employed at Compton College. During this time there was also a transition to become an independent college, transitioning away from El Camino College.

e) Describe how you have improved your SLO process and engaged in dialogue about assessment results.

- SLOs were created and documented after this program review timeline.

f) List any related recommendations.

- N/A

5. Analysis of Student Feedback

Provide a copy of any feedback reports generated by Institutional Research and Planning. Review and discuss student feedback collected during the past four years including any surveys, focus groups, and/or interviews.

- A lot of this data has been difficult to find because the administration, faculty and staff are no longer employed at Compton College. During this time there was also a

transition to become an independent college, transitioning away from El Camino College.

a) Describe the results of the student survey in each of the following areas:

i. Student Support

N/A

ii. Curriculum

N/A

iii. Facilities, Equipment, and Technology

N/A

iv. Program Objectives

N/A

b) Discuss the implications of the survey results for the program.

N/A

c) Discuss the results of other relevant surveys.

N/A

d) List any related recommendations.

N/A

6. **Facilities and Equipment**

a) Describe and assess the existing program facilities and equipment.

When I (Michael VanOverbeck) first began my position as full-time instructor for MTT, the laboratory facilities were in poor condition. I have no knowledge of the condition before my arrival but after communicating with some staff and students at the time, I presume that the laboratory suffered from not having a full-time instructor for a lengthy amount of time.

Some of the current machinery at the MTT lab needs repair and replacement. All the conventional lathes need to be replaced. Conventional mills need to be overhauled or replaced.

After about a year of working on servicing and repairing shop equipment, the facility is starting to look good. There are a lot of things that need to be replaced and a list of big-ticket items has been prepared and supplied below.

b) Explain the immediate (1-2 years) needs related to facilities and equipment. Provide a cost estimate for each need and explain how it will help the program better meet its goals.

- Haas ST-20Y Lathe ($120,000)
- TW90 Vertical/Horizontal Grinder ($4,500)
- Plasma Table Side kick 8 by Shopsaber ($16,000)
- 8 Conventional Mills
- 10 Lathes PM-1228VF-LB Precision 12”x28” Lathe ($50,000)
- 10 Heavy Duty rolling Toolboxes to mount the lathes and keep tool inside ($4,000)
- Vertical Band Saw ($5000)
- 2 Haas TM1P CNC Mill ($120,000)
- Probe System for CNC mill ($15,000)
- 20 Prusa i3 mk3s 3d printer ($25,000)
- Shopsaber is-m 408 router ($80,000)
- 2 Pierson Pro Pallet System with 10”x16” PPS pallet ($6,000)
- 2 Microsoft Surface Studio 2 ($10,000)
- CS-350 COLD SAW, 14″, VARIABLE SPEED ($4,000)

c) Explain the long-range (2-4+ years) needs related to facilities and equipment. Provide a cost estimate for each need and explain how it will help the program better meet its goals.

- Tumbler for parts ($17,000)
- 5 axis CNC Mill ($200,000)
- Better Lighting ($15000)

d) **List any related recommendations.**
More space, more lighting, an effective air conditioner and an update to the interior space. Properly showcase the fantastic equipment. This shop should be presented proudly, and an updated remodel of the space would help in recruitment opportunities during facility tours.

7. Technology and Software

a) Describe and assess the adequacy and currency of the technology and software used by the program.
Most of the programs the students are using for CNC operations are now open source or free to download with a .Edu email account. Autodesk Fusion 360 is a free program that enables the students to create industry standard g-code. This is a fantastic way to get the students started with CAD (Computer Aided Design) and CAM (Computer Aided Manufacturing) without them having to pay the enormous amount of money to use some of the other CAD/CAM software packages.

b) Explain the immediate (1-2 years) needs related to technology and software. Provide a cost estimate for each need and explain how it will help the program better meet its goals.
- 2 Surface Studio 2 1TB, Intel Core i7, 32gb Ram ($10,000)
- Brother - MFC-L5900DW Wireless Black-and-White All-In-One Laser Printer with Ink Cartridges ($1000)
- Brother SE600 Sewing, Quilting and Embroidery Machine ($1000)
- Adobe Creative Cloud yearly subscription ($600 per year)

c) Explain the long-range (2-4+ years) needs related to technology and software. Provide a cost estimate for each need and explain how it will help the program better meet its goals.

Update laptops as they become obsolete. ($25,000)

d) List any related recommendations.

8. Staffing

a) Describe the program's current staffing, including faculty, administration, and classified staff.
The current staff for the MTT program consists of one full time instructor (Faculty), one full time tool room attendant (classified), and one part time instructor (Aerospace).

b) Explain and justify the program's staffing needs in the immediate (1-2 years) and long-term (2-4+ years). Provide cost estimates and explain how the position/s will help the program better meet its goals.
MTT needs another part time instructor to teach night courses. Salary for this part time instructor would be around $30,000.

c) List any related recommendations.
Hire Part time Instructor.

9. **Future Direction and Vision**

a) **Describe relevant changes within the academic field/industry. How will these changes impact the program in the next four years?**
This industry changes as quickly as the technology changes. As time progresses the method and tools used in manufacturing evolves. New machines, new software and constant training needs to be pursued to give our community the opportunity they need and deserve.

b) **Explain the direction and vision of the program and how you plan to achieve it.**
The direction for the MTT program is to maintain current technology standards and to continue thinking forward into the future. We want to prepare our students for a job today while also preparing them for the jobs in the future. As technology and manufacturing equipment evolves, we need to see spot the trends and capitalize on emerging technologies to give our students an advantage over anyone else.

c) List any related recommendations.

10. <u>Prioritized Recommendations</u>

a) Provide a single, prioritized list of recommendations and needs for your program/department (drawn from your recommendations in sections 2-8). Include cost estimates and list the college strategic initiative that supports each recommendation (see Appendix A). Use the following chart format to organize your recommendations.

Recommendations	Cost Estimate	Strategic Initiatives
1. Haas ST-20Y CNC Lathe with tooling and installation	$120,000	*A, *B, *C, *D
2. 20x Prusa i3 mk3s 3d printers	$25,000	*A, *B, *C, *D
3. CS-350 COLD SAW, 14″, VARIABLE SPEED	$5,000	*A, *B, *C, *D
4. Additional part-time instructor for night courses	$30,000	*A, *B, *D
5. Probe system for Haas TM1P	$10,000	*B, *C, *D
6. Plasma Table Side kick 8 by Shopsaber	$16,000	*A, *B, *C, *D
7. TW90 Vertical/Horizontal Grinder	$5,000	*B, *C, *D
8. 2 Pierson Pro Pallet System with 10”x16” PPS pallet	$6,000	*B, *C, *D
9. Shopsaber is-m 408 router	$80,000	*A, *B, *C, *D
10. Vertical Band Saw	$6,000	*B, *C, *D
11. 2 Microsoft Surface Studio computers	$10,000	*B, *C, *D
12. 10 Lathes PM-1228VF-LB Precision 12”x28” Lathes	$50,000	*A, *B, *D
13. 5 axis CNC Mill	$200,000	*A, *B, *C, *D
14. Tumbler for parts	$17,000	*B, *D

*A Improve recruitment, enrollment, retention, and completion rates for our students.
*B Support the success of all students to meet their education, and career goals.
*C Support the success of students through the use of technology.
*D Offer excellent programs that lead to degrees and certificates in Allied Health and Technical fields.

b) Explain why the list is prioritized in this way.

- Industry relevant machinery is what the students need to become familiar with to become valuable to employers. This is going to give our students an opportunity to run the same machines that industry is using.

<u>NOTE</u>: *Dissenting opinions should be included when consensus is not reached among program faculty and/or between program faculty and the division dean. A report should be added to the program review as an appendix. This report should clearly state the areas of dissension and reason for dissenting opinion.*

CAREER AND TECHNICAL EDUCATION – SUPPLEMENTAL QUESTIONS

CTE (Career and Technical Education) programs must conduct a full program review every 4 years. The full review includes answering these supplemental questions. Every two years (once between full reviews) these supplemental questions must be answered and submitted to Academic Affairs for posting on the College website.

Use labor market data, advisory committee input, institutional data, and the provided CTE 2-year Program Review data to respond to the following questions:

1. **How strong is the occupational demand for the program? As you analyze demand over the past 5 years and projected demand for next 5 years, address state and local needs for the program.**
    - Occupational demand is high for this industry because workers are retiring or leave their job every day. Since most of these jobs train worker on the job they will be promoted and need someone to fill their spot. According to the Bureau of Labor Statistics the demand for machinist is rising each year by 1.0%. Indeed.com shows that within a 25-mile radius of Compton college there are 344 job listing listed by companies looking for skilled technicians to run machines.

2. **How does the program address needs that are not met by similar programs in the region?**

    - Being called "The Hub City" because of its unique position is in the exact geographical center of Los Angeles County, Compton College is perfectly situated to accommodate much of the underserved community that surrounds it. Compton is a large industrial and manufacturing center in Los Angeles County that needs trained employees to support the current employment demand.

3. **What are the completion, success, and employment rates for the students? Discuss any factors that may impact completion, success, and employment rates. If applicable, what is the program doing to improve these rates?**
    - During this program review timeline, I would not be able to comment about the student employment rate. I am not sure there was a system to gather that information in place. Currently there is development of a system to gather student job placement data. With the new funding formula incentivizing job placement, this data will be crucial for our program to grow.

      From personal experience, job placement has been outstanding in this field.

Advisory meetings have also discussed their high demand for trained people in this field.

4. **If there is a licensure exam for students to work in their field of study, please list the exam and the pass rate. If there are multiple licensure exams in the program, include them all. Discuss any factors that may impact licensure exam pass rates. If applicable, what is the program doing to improve these rates?**

    - N/A

5. **Is the advisory committee satisfied with the level of preparation of program graduates? How has advisory committee input been used in the past two years to ensure employer needs are met by the program? Describe any advisory committee recommendations that the program is either unable to implement or is in the process of implementing.**
    - As the new faculty member to the program with nobody from this timeline and program still employed at the college, I unfortunately do not have the advisory minutes for this period. I will be conducting my own program review for the timeline that I have been employed here but for this time period, that data is not available.

California Education Code 78016 requires that the review process for CTE programs includes the review and comments of a program's advisory committee. **Provide the following information:**

a. **Advisory committee membership list and credentials**
    - N/A
b. **Meeting minutes or other documentation to demonstrate that the CTE program review process has met the above Education Code requirement.**
    - N/A