

El Camino College Compton Center
Industry and Technology Division
Machine Tool Technology
Department
Program Review
Spring 2012
Conducted by: Philip Yaghmai

1. Overview of the Program/Department

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

According to El Camino College Catalog:

"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 (EDM), Computer Numerical Control (CNC) lathes, CNC milling machines, and computer aided manufacturing (CAM) systems. Competencies will be assessed regularly in accordance with 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" and Manufacturing Technology as "MTEC".

- b) Describe the degrees/certificates offered (where applicable)

Currently Compton Center does not offer any official MTT or MTEC certificates.

- c) Discuss the status of recommendations from the prior Program Review

There is no previous program review for Compton Center. The program review written for Torrance campus' MTT and MTEC in 2006 by Eric Carlson would not apply to Compton Center and was not intended to.

2. Analysis of Institutional Research Data (include IR data charts)

a) Provide and analyze the following statistics/data:

1. Course grade distribution; success and retention rates.

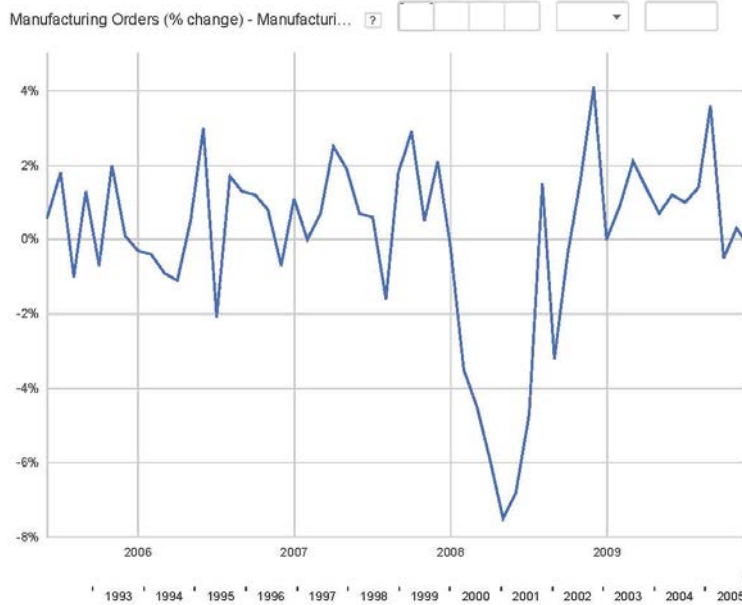
Following plots for MTT's 2006-2009 Retention and Success rates indicate that Compton Center's performance has been equal to or better than the state's performance, its Success Rate is 20%-30% higher and its Retention Rate is 15%-20% higher than that of "Industry and Technology" department. This could be due to many factors such as the ones noted below:

- Presently the rubrics to measure "retention" and "success" are as shown below:

Retention = (Remaining students)/(starting students), Success = [Remaining (A+B+C) students]/(Starting students)

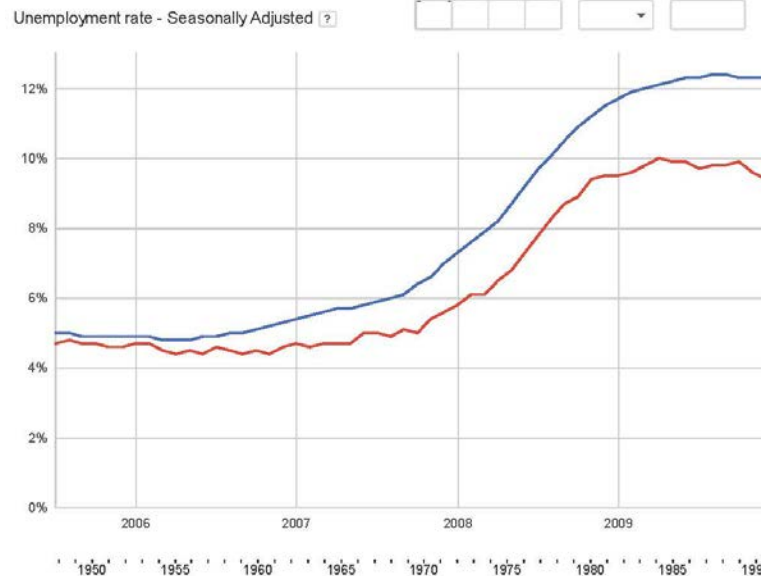
Therefore for program's instructors to show **high "retention"** and **high "success"** all they need to do is **drop no one**, unless they withdraw themselves and **give all remaining students final grades of "C" or above** some faculty worry this could have been happening. However, honest yet merciful instructors would drop the students who are not attending before the end of second week. Such approach will increase the program's "success rate" since the remaining serious students will receive better grades due to more instructor attention and equipment time and will result in increased "retention." This is especially true with regard to MTT lab oriented courses. However, it is worthy of mention that some students due to proper or improper reasons start missing shortly after the first two weeks, in which case more selfless and merciful instructors would drop these students before the final drop period near the semester's end. This will save the students from bad grades but will reduce the department's success rate and **in this I see a shortage in the present Rubric.**

- The US Bureau's labor statistics for California shown below (Fig 1 & 2) indicates that in Oct 2006 unemployment plunged to 4.8%, however due to the manufacturing orders heading for the abyss; -7.8% in 2008 unemployment went on a rapid ascent to 12.4% in Feb 2010 therefore many serious, desperate, and unemployed people began to attend community colleges to either learn technical skills or improve upon them.
- MTT performed better than Industry and Technology department (Fig 3 & 4) below due to the following reasons:
 - The MTT leadership at Compton Center, CACT, and CTE have done a great job in this area. Our Aerospace fastener manufacturing program is a success, but more is require; we need full-time faculty, more up-to-date equipment and tools, and better arranged facilities. We also must develop an advisory committee involving other colleges, and industries other than aerospace fastener manufacturing.
 - Please read the following section 2:a:I related to enrollment statistics



Data from U.S. Census Bureau Last updated: Oct 5, 2012
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Fig 1



Data from U.S. Bureau of Labor Statistics Last updated: Oct 5, 2012
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Fig 2

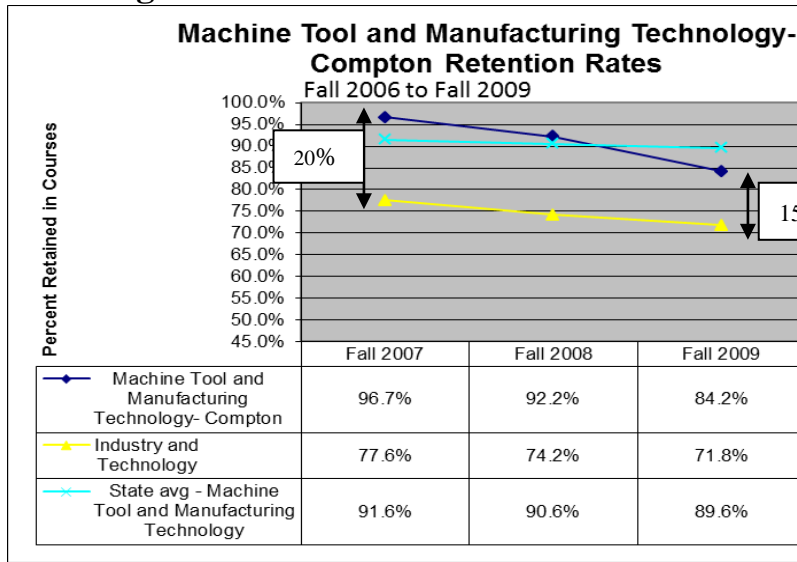


Fig 3

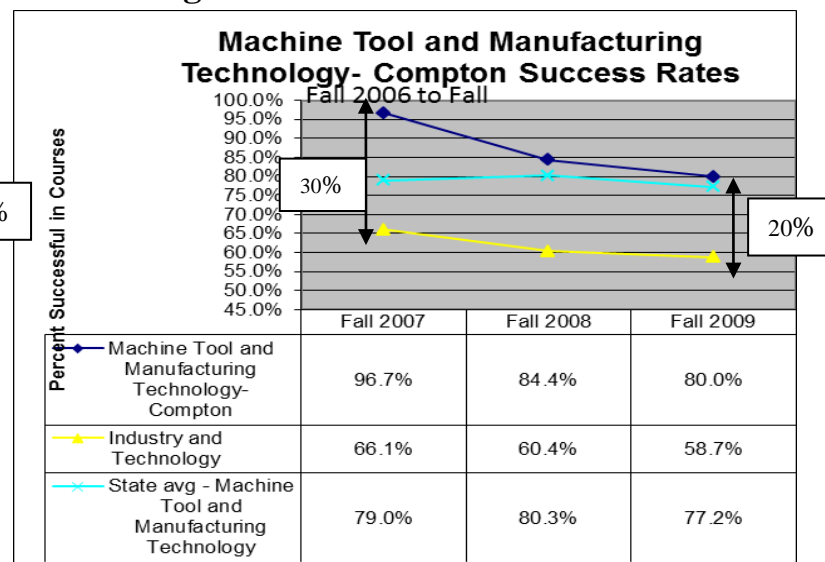


Fig 4

2. Enrollment statistics with section and seat counts and fill rates

a) As shown below (Fig 5 & 6) there was a large scale increase in seat count in the period 2008-2010 mainly due to HS grad and K-12 Special admit. However, I believe this was also because of the following reasons:

I. Our support services from CTE and CACT (Center for Applied Competitive Technology) have been outstanding; students and instructors receive excellent care. i.e.:

- a. Keeping in touch with local industry employers
- b. Keeping in touch with national organizations
- c. Preparing and distributing flyers
- d. Promoting the program in various high schools and religious assemblies
- e. Promoting the program via setting up booths in various educational shows
- f. Encouraging and receiving equipment, maintenance, training, and grant support from the industry

II. Currently MTT classes are filled through various promotional sources and if the instructors teach in a consistent manner to achieve the standardized SLO's, "retention" and "success" numbers can vary dramatically from term to term. For more accurate MTT related data I recommend the following be quantified and reflected in the overall statistics:

- a. Incoming students' capacity
- b. Student to machine ratio
- c. Facilities conditions i.e. Work lighting, HVAC, tools availability. For example Torrance campus is already 100% better than Compton in these areas and getting better yet.

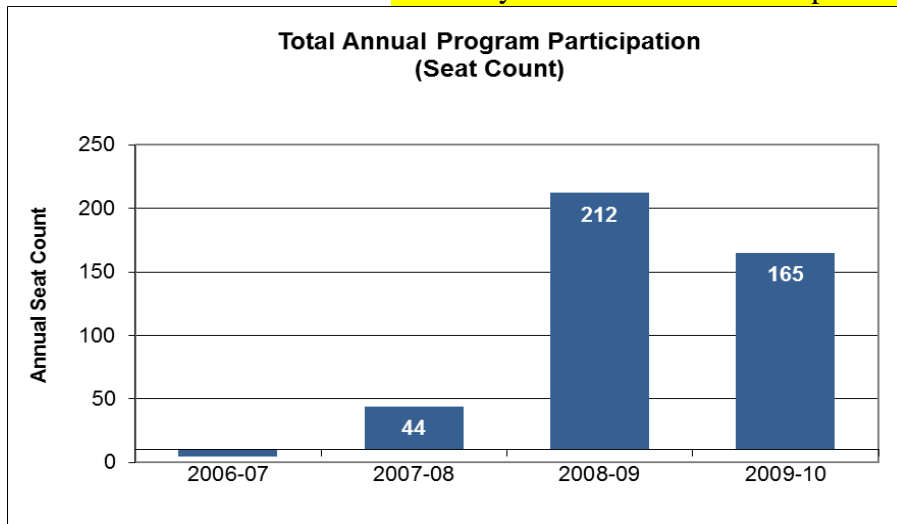


Fig 5

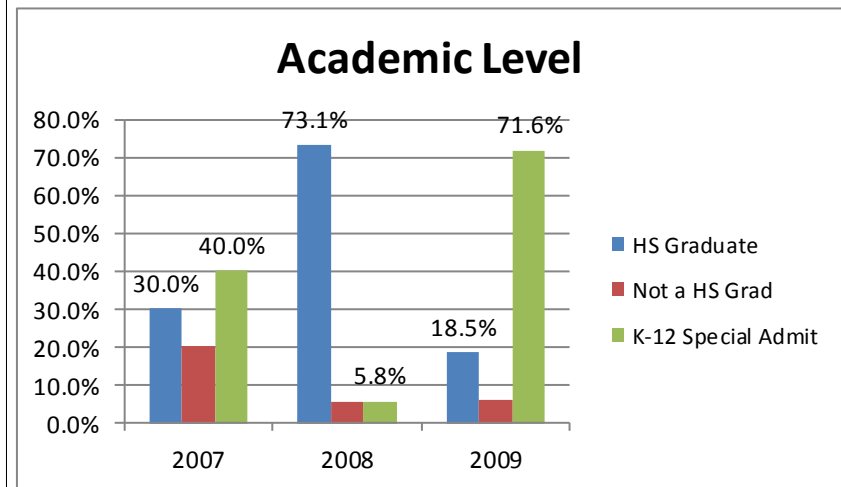


Fig 6

**Demographic and Enrollment
Characteristics
Machine Tool and Manufacturing
Technology- Compton
Fall 2006 to Fall 2009**

Characteristic	Category	Fall 2009 2000 Census									
		Fall 2007		Fall 2008		Fall 2009		Compton		Compton District	
		n	%	n	%	n	%	n	%	n	%
All Enrolled	Total	30	100.0%	5 2	100.0 %	81	100.0%	6,780	100.0%	521,014	100.0%
	Gender	Female	4	13.3%	6 4	11.5% %	18	22.2%	4,365	64.4%	265,196
	Male	25	83.3%	5	86.5%	63	77.8%	2,413	35.6%	255,818	49.1%
	Unknown	1	3.3%	1	1.9%	0	0.0%	2	0.0%	0	0.0%
Ethnicity	African-American	4	13.3%	1 7	32.7%	15	18.5%	3,247	47.9%	88,701	17.0%
	Amer. Ind. or Alaskan	0	0.0%	2	3.8%	0	0.0%	13	0.2%	1,219	0.2%
	Asian	2	6.7%	3	5.8%	13	16.0%	477	7.0%	58,779	11.3%
	Latino	18	60.0%	1 5	28.8%	39	48.1%	2,303	34.0%	157,138	30.2%
	Pacific Islander	0	0.0%	0	0.0%	1	1.2%	66	1.0%	2,061	0.4%
	White	5	16.7%	1 1	21.2%	9	11.1%	229	3.4%	197,570	38.0%
	Unknown or Decline	1	3.3%	4	7.7%	2	2.5%	445	6.6%	14,908	2.9%
Age/Age Group	Under 17	5	16.7%	3	5.8%	47	58.0%	394	5.8%	139,140	26.7%
	17	6	20.0%	1	1.9%	10	12.3%	206	3.0%		
	18	1	3.3%	4	7.7%	2	2.5%	505	7.4%	11,840	2.3%
	19	2	6.7%	0	0.0%	0	0.0%	597	8.8%		
	20	0	0.0%	2	3.8%	2	2.5%	575	8.5%	5,996	1.2%
	21	0	0.0%	1	1.9%	0	0.0%	440	6.5%	5,720	1.1%
	22	1	3.3%	1	1.9%	0	0.0%	374	5.5%	20,233	3.9%
	23	1	3.3%	4	7.7%	3	3.7%	291	4.3%		

	24	0	0.0%	0	0.0%	0	0.0%	315	4.6%			
	25-29	6	20.0%	6	11.5%	4	4.9%	973	14.4%	43,779	8.4%	
	30-39	3	10.0%	6	11.5%	5	6.2%	1,115	16.4%	97,447	18.7%	
	40-49	4	13.3%	8	15.4%	3	3.7%	686	10.1%	80,126	15.4%	
	50-64	1	3.3%	1	4	26.9%	4	4.9%	286	4.2%	69,852	13.4%
	65+	0	0.0%	2	3.8%	1	1.2%	23	0.3%	46,878	9.0%	
Class Load	Full-time	5	16.7%	5	9.6%	4	4.9%	1,469	21.7%			
	Part-time	25	83.3%	1	7	32.7%	50	61.7%	4,668	68.8%		
	Not enrolled or N/A	0	0.0%	3	0	57.7%	27	33.3%	643	9.5%		
			2007		2008		2009		Center			
Time of Classes*	Daytime	17	56.7%	3	9	75.0%	53	65.4%	4,642	68.5%		
	Evening	13	43.3%	1	3	25.0%	28	34.6%	1,660	24.5%		
	Unknown	0	0.0%	0	0	0.0%	0	0.0%	478	7.1%		
Academic Level	AA or Higher	1	3.3%	3	5.8%	3	3.7%	647	9.5%			
			2007		2008		2009					
	HS Graduate	9	30.0%	3	8	73.1%	15	18.5%	4,901	72.3%		
	Not a HS Grad	6	20.0%	3	5.8%	5	6.2%	469	6.9%			
	K-12 Special Admit	12	40.0%	3	5.8%	58	71.6%	573	8.5%			
	Unknown	2	6.7%	5	9.6%	0	0.0%	190	2.8%			
Educational Goal	Intend to Transfer	3	10.0%	1	1	21.2%	36	44.4%	2,223	32.8%		
	Degree/Certif. Only	8	26.7%	8	15.4%	3	3.7%	632	9.3%			
	Retrain/recertif .	2	6.7%	2	3.8%	6	7.4%	479	7.1%			
	Basic Skills/GED	2	6.7%	2	3.8%	8	9.9%	528	7.8%			
	Enrichment	4	13.3%	4	7.7%	8	9.9%	243	3.6%			
	Undecided	11	36.7%	1	1	21.2%	13	16.0%	1,157	17.1%		
	Unknown	0	0.0%	0	0.0%	7	8.6%	1,518	22.4%			

b) Fig 7 below indicates that during 2007-2009 the fill-rates doubled. Although this has been due to many positive recruiting efforts the numbers circled in the table below suggest that during 2008-2010 many students took MTT abcd classes more than once. This could be due to the fact that this class could be taken up to four times and could have been conducted in a very liberal way especially after the first time; basically do what you wish and get an easy “A” possibly four times. Although ideally speaking in a heavily lab oriented course such as MTT 101 repetition should help prepare the struggling students to progress to the more advanced level courses, more often than not the instructors struggle to keep such variety of students well supplied with the concentrated training they need. It has been observed that many such students end up doing the same things they previously learned over again with not much further learning.

Total Annual Program Participation (4-year Trend)
Years: 2006-07 to 2009-10
Machine Tool and Manufacturing Technology- Compton

	2006-07	2007-08	2008-09	2009-10	4 Yr Average
Annual Seat Count	5	44	212	165	107

Course, Section, Seat Counts
Years: 2006-07 to 2009-10

	2006-07	2007-08	2008-09	2009-10
Sections	1	3	9	8
Seats	5	44	212	165
Unduplicated Students	5	43	103	101
Seats/Unduplicated Students	1.0	1.0	2.1	1.6

Course Fill Rates

	Fall 2006	Fall 2007	Fall 2008	Fall 2009
	#DIV/0!	42.9%	88.5%	88.0%

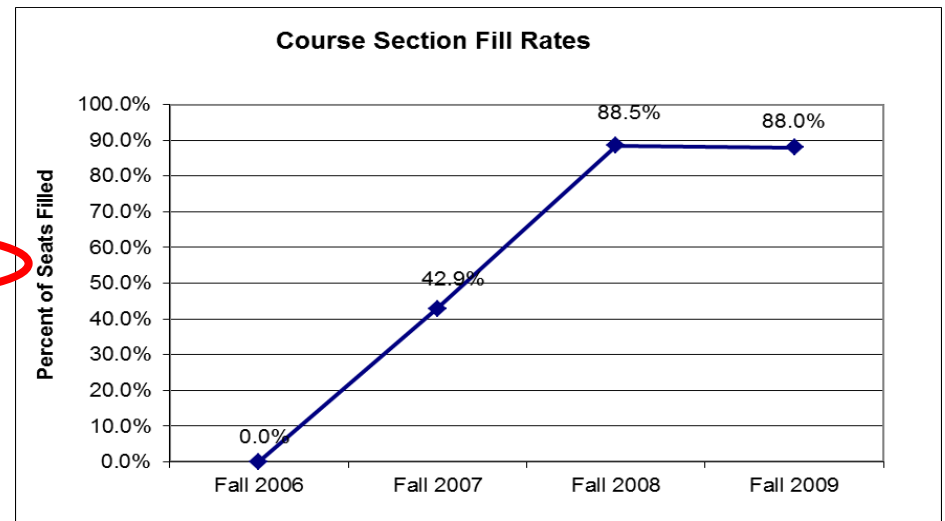


Fig 7

c) Author noted that according to Figures 8 and 9 below that MTT programs attracted more **Latino males** than other groups while Compton Center overall attracted more **African American Females**:

1. Compton Center experienced an increased rate of female attendees, where as MTT was steadily a very male oriented program (Fig 7). This indicates a need to promote manufacturing training among women of Compton Center.
2. MTT attracted 24% more Latinos than African Americans, while 12% more African Americans attended Compton Center (Fig 8). This indicates a need to promote manufacturing among African Americans attending Compton Center.

To address the above issues I suggest the following:

1. Apply posters all around the campus showing the “coolness” of this type work among the groups mentioned above
2. Bring in successful speakers from the industry who are of these groups
3. Put a pictures of VT students on the campus site.
4. Throw VT parties with DJs promoting practical and applied science as opposed to just theoretical
5. Implement constantly running VT promotion adds in the cafeteria and various lobbies
6. Make VT look more or just as much a smart a program as English, Math, and Science
7. Implement the president’s speeches on community colleges related to VT programs on the campus
8. Record videos of the employers who have hired our VT students and are asking for more of them
9. Display the national and global statistics on the need for skilled workers

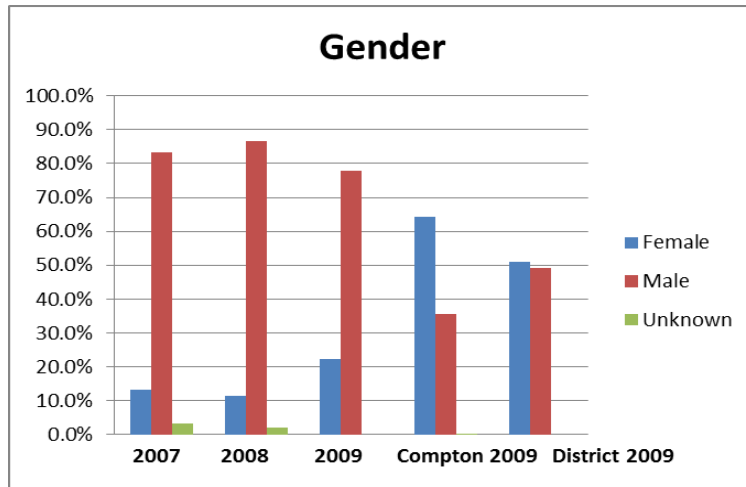


Fig 8

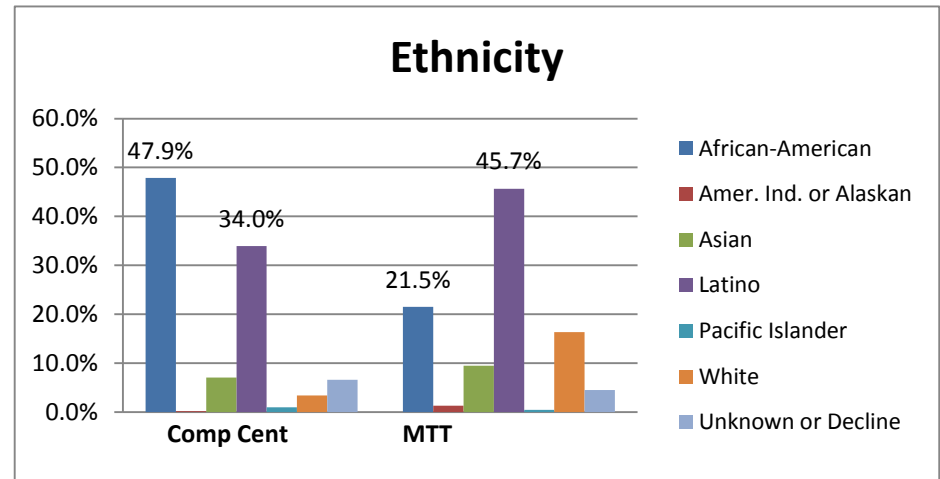


Fig 9

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

Figure 10 below indicates that there were in average about twice as many daytime students than evening ones. Considering the previous discussions related to Seat Counts and Fill Rates in section 2, one can attribute this phenomenon to the K-12 and HS graduates students. Compton Center's MTT instructors no longer teach at high schools therefore daytime and night time classes' percentage will approach more equalization.

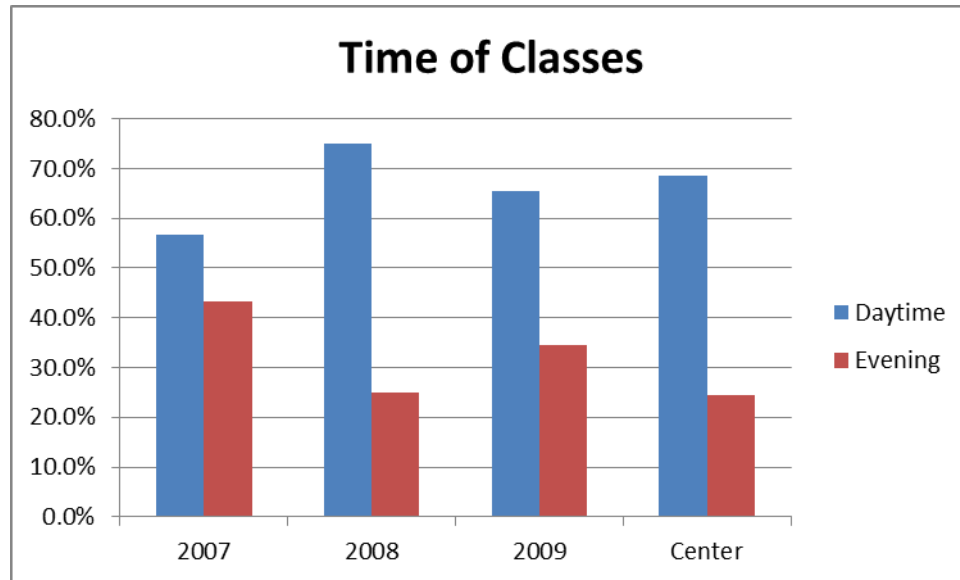


Fig 10

4. **Improvement rates (when applicable)**

Not applicable

5. **Additional data compiled by faculty**

None was collected

b) List related recommendations (when applicable)

No recommendation

3. Curriculum**a) Provide the curriculum course review timeline to ensure all courses are reviewed at least once every 6 years.**

This review is Compton Center's first MTT program review and although it is done in 2012 it will be done in a maximum of 4-year cycles. Our next review will be 2015. This is so to stay in stay in one accord with our Torrance campus. Dan Shrader (Associate dean I+T) wrote Torrance's MTT review in late 2011 and their next review will also be in 2015.

Exceptions:

Please note the following guidelines:

- California Education Code (§78016) cites the minimum review cycle for CTE programs as being every 2 years.
- Vocational programs funded via Perkins (VTEA) are required to undergo program review every year as a condition of funding.

As Compton Center's program does involve the above guidelines, the Center will exercise writing one year and two year reviews to fulfill the guidelines noted above.

b) Explain any course additions to current course offerings

See section "e" below.

c) Explain any course deletions from current course offerings

No inactivation need.

d) 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?

Compton Center does not offer a certificate program in MTT at this time. See below for more discussion.

e) Discuss any concerns regarding department/program's courses and their articulation

In 2011 and 2012 Compton Center has offered a hybrid form of MTT 101 in that it has mingled Aerospace Manufacturing Technology with conventional/CNC machining. This has created a concern for the Torrance campus instructors; the students who graduating from Compton Center's MTT101 while being more knowledgeable in metal forming/extruding technology they receive less education in metal removal due to time limitation.

The writer has already written and submitted the following to the curriculum committee:

a. Curricula: (Currently going through the approval process)

- | | |
|--------------|--|
| i. MTT 20 | Introduction to Aerospace Fastener Technology |
| ii. MTT 203 | Advance Inspection of Fasteners and Measuring Instruments |
| iii. MTT 205 | Cold Heading of Fasteners |
| iv. MTT 207 | Thread Rolling of Fasteners |
| v. MTT 209 | Secondary Operation (Centerless Grinding, and Automatic Screw Machine) |

b. Aerospace Certificates: (Currently going through the approval process)

- | | |
|-------------|---|
| i. AFCH - | Aerospace Fastener Cold-Heading |
| ii. AFI - | Aerospace Fastener Inspection |
| iii. AFSO - | Aerospace Fastener Secondary Operations |
| iv. AFT - | Aerospace Fastener Technologist |
| v. AFTR - | Aerospace Fastener Thread-Rolling |

- f) Discuss the degrees, certificates, and licensure exams (where applicable). 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?

Currently Compton Center does not offer an official certificate in MTT since the only rudimentary MTT courses are currently taught with a view that the students would then advance to either Torrance campus or another community college to complete their certification. A re-examination is needed as described above.

- g) List related recommendations (when applicable)

4. Student Learning Outcomes (SLOs)

- a) List each course and program level SLO in the discipline:

- i. **MTT 2** - Upon completion of the courses in this discipline, the student will be able to identify different digital and analog sensor technologies. Student will correctly sketch a part in orthographic orientation. Student will be given a part to draw in the orthogonal view.
- ii. **MTT 40** - 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. Student will correctly calculate the Feed per Minute (IPM) for a high speed steel (HSS) end mill using correct feed per tooth (CL), rotations per minute, and number of teeth. The end mill has 4 teeth, a cutting speed of 100 surface feet per minute and a feed per tooth of .005.
- iii. **MTT 101** - Upon completion of the courses in this discipline, the student will be able to identify different digital and analog sensor technologies. 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 0.001 inches. Students will record dimensions matching the verified values within +/- 0.0001 inch. Student will be given 2-4 tries using 2 different instruments.
- iv. **MTT 70** – Assessed in Fall 2011 but was Cancelled
- v. **MTT 75** – Assessed in Fall 2011 but was Cancelled

- b) Provide a timeline for the four-year cycle for course and program level SLO assessments
Please refer to the timeline attached to the end of this review.

- c) Describe the assessment results and explain the recommended/implemented changes resulting from course and program level SLO assessment. Analyze the changes that were implemented.

Currently the students meet these requirements of +/- 0.002, but achieving this spec may become more elusive due to increased equipment deterioration, lack of an adequate parts budget and unavailability of a staff mechanic.

- d) Based on the Accrediting Commission for Community and Junior Colleges' (ACCJC) Rubric for Student Learning Outcomes, determine and discuss the program's level of SLO/assessment implementation: Awareness; Development; Proficiency; or Sustainable Continuous Quality Improvement?

- My realization at this time is that we are somewhere between Development and Proficiency. (Refer to the last page of Rubric for Evaluating Institutional Effectiveness : Part III: Student Learning Outcomes)
- The writing of the SLOs is well enforced. However, Compton Center's MTT is without a full-time professor and it is difficult for part-timers who operate at mostly donated time to be with the

school long enough or be committed enough to lead a successful. Better staffing is needed. See section 6 (Staffing).

e) List related recommendations (when applicable)

I highly recommend that Compton Center would hire a fulltime MTT professor, and if possible a full-time MTT lab assistant.

5. Facilities, Equipment, and Technology

a) Describe and assess the adequacy and currency of the facilities, equipment, and technology used by the program/department

Most of the **facilities, equipment, and technology** used by the program are obsolete or near obsolescence.

We currently are experiencing the following challenges:

- 1- Two (2) out of five (5) conventional lathes are broken; parts are missing or need replacement
- 2- Nine (9) out of fourteen (14) mills are broken; Parts are missing or need replacement
- 3- The only available Electrical Discharge Machine (EDM) has not been used in years
- 4- Do not have an Electronic Furnace for teaching heat treating processes
- 5- Expendable tools i.e. cutting tools, edge finders, etc. are often in short supply
- 6- Expendable supplies i.e. proper cutting oil is often unavailable
- 7- Inspection tools i.e. indicators and calipers are often found to be broken, or missing
- 8- Storage cabinets are abundant, but inefficiently utilized, and do not have keys
- 9- Conventional machine-shop's tools and parts storage rooms are often in total disarray
- 10- Cleaning supplies i.e. push brooms, machine cleaning brushes, dust pans, and shop rags scarce
- 11- There are inadequate trash cans in the shop; either too small or of a makeshift construction
- 12- Shop's computer room is often too warm during warm days, and worsens when filled
- 13- Machine lighting is inadequate and unsafe
- 14- The new 3-D printer and its caustic tank should be relocated outside the computer room due to excessive heat generation and unsafe fumes in an enclosed area
- 15- Material Safety Data Sheets (MSDS) are not recorded, kept, or displayed
- 16- There are many pieces of equipment i.e. hydraulics control training kits, Robotics kits laying around the shop that have not been used for years and are not directly related to a machine-shop
- 17- There are two obsolete and dysfunctional CNC equipment; one lathe, and one mill in the shop that are in ill repair status
- 18- The A/C blower above the conventional shop is very loud making it hard for the students to hear the instructors or one another clearly. This is unsafe in case of an emergency cry for help.
- 19- The Aerospace fastener lab's parts storage area is insecure, bird infested, unorganized, and has been abused by just about anyone storing their junk parts there.
- 20- Mouse droppings are often found on the computer tables
- 21- Aerospace Manufacturing equipment are limited to one of each kind, therefore when one is broken a schedule gap is generated leaving often creating an unnecessary stress for the instructors
- 22- Many of MTT-101 students who desire to advance to higher MTT levels, cannot, because of the prohibitive costs of transportation and time away from their jobs and homes to other area regional campuses i.e. Torrance, Cerritos, LA Tech.
- 23- Classroom and office ceiling tiles are missing, broken, or badly stained

The following are needed in order to become current with today's technology:

- 1- At least one (1) modern CNC Mill
- 2- At least one (1) modern CNC Lathe
- 3- Repair the existing four (4) conventional vertical mills and replace their wornout parts
- 4- Repair the existing five (5) conventional lathes and replace their wornout parts

- 5- Repair the existing CMM (Coordinate Measuring Machine)
- 6- Implementation of a more efficient layout for the present Conventional/CNC Machine shop
- 7- Disposing of existing non-repairable/non-upgradable equipment
- 8- Relocating non-applicable equipment to other departments needing them or disposing of them
- 9- Appropriation of safer lighting for the equipment
- 10- Prepare a budget for consumables i.e. tools, shop rags, lubricants, and alike
- 11- Updating of our basic computer Windows operating system and browser
- 12- Installing programs such as Adobe Acrobat Pro pdf printing.
- 13- Eliminating software that we pay for and have not and do not use.
- 14- Purchase and prepare a budget for consumables i.e. tools, shop rags, lubricants, and alike.

b) Explain the immediate (1-2 years) needs related to facilities, equipment, and technology

2. Eliminate the renewal and support for software that we have never used:
 - a. CAMWorks - cancel renewal **\$1,000**
 - b. MasterCAM University renewal - Reduce from 20 to 5 seats and save **\$1500**
 - c. 5 seats of 3DVia composer – Cancel we have never used it **\$500?**
3. Purchase one (1) modern vertical CNC Mill – HASS or equal
4. Purchase one (1) modern CNC Lathe – HASS or equal
5. Implement MTT 105 CNC Milling course
6. Implement MTT 103 CNC Lathe course
7. Replace missing ceiling tiles in the class room and put sound insulation on top
8. 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
9. Appropriate Safety and procedural forms, record, and centrally locate and display Material Safety Data Sheets (MSDS)
10. Complete implementation of Compton MTT as a NIMS certification center.
11. Repair the existing CMM (Coordinate Measuring Machine)
12. Install a lock on the aerospace fastener lab's parts storage room
13. Remove all items out of the existing conventional machine shop's tool and spare tools storage rooms, clean-up the shelves, purchase plastic bins, organize, and labels
14. Replace worn-out parts on the existing four (4) conventional vertical mills
15. Repair the two (2) broken conventional lathes
16. Purchase replenishable tools i.e. cutting tools, edge finders, etc. are often in short supply
17. Purchase replenishable supplies i.e. various cutting oils, hand cleaners, paper towels, etc.
18. Purchase inspection tools i.e. indicators and calipers are often found to be broken, or missing
19. Purchase two 50 gallon roll-away industrial trash cans, 2 for the aerospace lab and 2 for the conventional machining lab
20. Purchase flexible spot-lights for the existing 4 mills, CNC V-Mill and 2 aerospace equipment
21. Purchase cleaning supplies i.e. push brooms, standard brooms and dust pans
22. Modify the existing lab tables to accommodate proper seating for students
23. Install a 12' x 12' (Including Chain Drive) roll-up door between the aerospace lab's storage room and the yard behind it.
24. Install a proper storage system for materials used in the lab, such as wire coils.
25. Implement pest control in conventional machining, aerospace fasteners, and computer labs.
26. Relocate the non-repairable hydraulics control training kits to the A/C shop
27. Design and implement a more efficient layout for the present Conventional/CNC Machine shop
28. Repair the existing micro-lathe and dispose of the non-repairable one

29. Repair, upgrade, and relocate the existing non-functional Mills and Lathes or dispose of them.
30. Update computer lab's Windows operating system and browser
31. Install Adobe Acrobat X-Pro to enable pdf conversion and printing to avoid paper printing
32. Remove the existing 10 non-operational vertical mills to the back yard
33. Repair and purchase supplies for the existing EDM (Electrical Discharge Machine)
34. Install hasps and combination pad locks on the existing storage cabinets and use them as:
 - a. Students' personal storage cabinets
 - b. Storage for various tools
35. Heat treatment electric furnace 12x12x6.5 inside
36. Repair the Amatrol Robotics kit and relocate it to the back of the shop
37. Appropriate back-up aerospace fasteners manufacturing equipment
38. Install vibration insulators on the A/C blower above the conventional shop to reduce excessive noise
39. Install a large automatically updated job-board display in the VT lobby for the students.

c) Explain the long-range (2-4 years) needs in these areas

1. Purchase a pick and place robot – MOTO-man SV3
2. Install vibration insulators on the A/C blower above the conventional shop to reduce excessive noise
3. Purchase and install a 12000 BTU Mitsubishi MR.SLIM Ductless Mini Split Air Conditioner SEER20 COOLONLY in the shop's computer room to cool at full capacity during warm days.
4. Upgrade the CMM to communicate with computers and SolidWorks for reverse engineering
5. Purchase a used set of washer and dryer to wash rags
6. Purchase a pick and place robot – MOTO-man SV3
7. Purchase SolidWorks PDM software

d) List related recommendations (when applicable) "See section 4e above"

6. Staffing

a) Describe current staffing (include all employees)

- Two adjunct instructors on Compton Center's payroll
- Two part-time assistants paid for by various grants through CACT.

b) Explain and justify the program/department's immediate and long-range staffing needs

As explained in section 3e we have proposed new curricula and certificate programs related to aerospace fastener manufacturing. In addition please note the following:

1. Hire two (2) full-time instructors in order to cover day and evening classes while offering the highest possible quality training. Both instructors must be technically apt, but one of them must possess stronger leadership, and organizational capabilities to function as the lead instructor. The following explains the reasons for this need:
 - a) Many students at Compton Center have expressed that they would like to continue their MTT education at Compton Center and receive their certifications at the Center. This is because with today's economy for many commuting to Torrance is prohibitive. However, because of unavailability of instructors and modern equipment this is not possible. Implementation of MTT 103, 105, and 107 is of utmost importance to this campus.
 - b) Currently there is no one to take ownership of the department. Therefore there is very

little accountability. This has created a chaos in the department with respect to efficient use of human capital, equipment, and tools. The present two part-time instructors are road warriors, teaching at three different schools, but both are open to accept full-time positions.

- c) Keep in mind: If not offered an opportunity, part-timers will leave to become full-timers !
2. Hire two full-time assistants. Below, note justifications:
- Our experience indicates that the present morning and evening MTT 101 course could not be properly taught without these two full-time assistants.
 - Teaching vocational courses properly is an all-consuming task and requires much work before and after each class to prepare needed tools, equipment, and documentation.
 - Shop safety rules demand that two people should be present when operating or repairing equipment.
 - Compton Center's Aerospace Fastener program demands that at least one assistant would know the fastener manufacturing machines well and concentrate on helping the students in that area.
 - Currently because the adjunct professors can only show-up at their paid time, there is a need for the assistants to be there before they arrive to assure equipment readiness before they arrive and perform needed repairs as the instructors teach. If the program continues at its present level and even more if it would grow to offer certificates this need will be even more intensified.
 - Keep in mind: part-timer leave to look for a full-time positions !

3. Hire a part-time instructor.

These days most students who are interested in technical programs are interested in learning CAD/CAM software, especially SolidWorks and MasterCAM. Many schools have arisen to meet this need. Both of the present part-time instructors are teaching these programs at other schools and also at a much lower level as part of their MTT 101 and MTT2 courses. However, if a part-time instructor would support them in teaching any of their present courses the MTT program at Center can climb to new heights.

c) List related recommendations (when applicable)

Refer to section 7-b-iii.

7. Direction and Vision

- a) **Are there any changes within the academic field/industry that will impact the program in the next four years?**

Globally there are a number of up and coming trends that will lead us to see our role in completing the first quarter of the 21st century:

- An article in Harvard International Magazine's Spring 2012 issue is titled "Commercialization in Space – Changing boundaries and future promises" The new era in commercial space is dawning. It is the private sector that is the vanguard of opening a new era in space – and it is closer than you might think." SpaceX in El Segundo California, Orbital Sciences Corp; it's originally met at Harvard business school in 1980s, Astrium in UK was formed in 2003. U.S. and Russians and have sending other nations' astronauts to low earth orbits since 1978. Soyuz TMA-03 spacecraft is still busy sending people to the international space station. In this realm, Japan is working with Vietnam, S. Korea with UAE, Brazil with China, and India with South Africa.
- Global climate change is now a fact and abandoning fossil fuel is now a more attractive proposal than ever before.

- According to Mongabay.com in the period 1990-2000 Africa lost 50% Of its forest and South America 36% and the Chines have now joined the superpowers to add to this terrible situation. Reduce, reuse, recycle and repair is the answer.
- The world beginning to go light on water. Saudi Arabia has been desalinating water using their oil as fuel to make drinkable water at the rate of about 1/6-1/3 of penny per gallon. T-bone Pickens and some other wealthy people and corporations have been buying fresh water sources expecting fresh water to be the oil of the future.
- In 2008, 4% of the U.S, GDP was spent on the Military and in order to save lives the Military has been moving towards, remotely controlled machines and robots.
- United Nations, World Urbanization Prospect performed in 2007 projects that in the period 2007-2050 percentage of population living in an urban region in North America will grow from 80% to 90%.
- U.S. aircraft sales are now at \$217.7 billion which is .4 billion less than last year's \$218.1 billion. This figure is 18.2 billion more than it was 4 years ago.

Let us apply the above information to our program:

- Compton is an urban area
- Aircraft industry prevails in this area
- SpaceX is just a few miles from the campus
- All divisions of the U.S. Military have a very strong presence in this region
- We are one of the most diverse areas of the nation with people from all over the glob
- In the past our water has come to threateningly low levels and most it is from other states

In the light of the above discussion Compton Center's MTT being a technical program is necessary and can only grow. The MTT program's contributions should be in the following areas:

1. CAD (Computer aided Design)
2. CAM (Computer Aided Manufacturing)
3. Conventional/CNC Machining
4. Aerospace Fasteners Manufacturing
5. Robotics
6. Rocketry
7. Alternative Energy
8. Fresh Water production/conservation

b) Explain the direction and vision of the program and how you plan to achieve it

Compton center's is currently offering the following courses:

MTT 101abcd, 40 and 2 – These were described in section four (4).

However our vision is as follows:

- i. Because of a strong industry demand from the local southern California ASF (Aerospace Fastener) manufacturing companies and them providing us with a number of fastener manufacturing equipment, support and expertise we have been teaching MTT 101 with a leaning towards fastener manufacturing. Meanwhile in order to remain true to the classic MTT 101 curriculum and yet prepare skilled workers for the ASF manufacturing industry we proposed five (5) new curricula and five (5) new certificates of completion programs for approvals.
- ii. For the past year there has been a strong demand from various employees from other manufacturing and utility companies for us develop our conventional/CNC program so they could receive their machining certificates from Compton Center. This is not because

the students dislike El Camino Torrance, but being from this area, leaving work late in the day makes going to Torrance a costly and time consuming endeavor.

- iii. There is another strong demand these days for CAD (Computer Aided Design) and CAM (Computer Aided Manufacturing); specifically SolidWorks and MasterCAM. The present adjuncts have the capacity to teach these programs and are both teaching these at other colleges. They are teaching these at Compton Center also, but only at an introductory level as a part of MTT101. We believe these programs should be taught at Compton under MTT 10A, 10J, and 10K

c) **How does the program fulfill the college's mission and align with the strategic initiatives?**

The mission statement is "El Camino College offers quality, comprehensive educational programs and services to ensure the educational success of students from our diverse community."

I do not believe that currently MTT at Compton Center is fulfilling this mission statement. The student body at Compton Center is quite diverse, but economically challenged. Since MTT at Compton Center does not offer any certificate programs, these students find themselves swimming against a heavy timing and gasoline cost tide. Not to mention that most of them do not possess a vehicle.

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.**

Below please find the priority, cost, and suggested implementation schedule for the items noted in sections 5 and 6 above:

Pro	Description	Cost \$	Freq.
1	Implement new proposals noted in section 3e: a) Aerospace Fasteners Manufacturing Curricula: MTT 202, 203, 205, 207, 209 b) 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 - cancel renewal \$1,000 , MasterCAM University renewal - Reduce from 20 to 5 seats and save \$1500 5 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 class room 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

	rooms, clean-up the shelves, purchase plastic bins, organize, and labels		
17	Replace worn-out parts on the existing four (4) conventional vertical mills	2,500	Once
18	Repair the two (2) broken conventional lathes	2,800	Once
19	Purchase replenishable tools i.e. cutting tools, edge finders, etc. are often in short supply	500	Yearly
20	Purchase replenishable supplies i.e. various cutting oils, hand cleaners, paper towels, etc.	500	Yearly
21	Purchase inspection tools i.e. indicators and calipers are often found to be broken, or missing	500	Yearly
22	Purchase two 50 gallon roll-away industrial trash cans, 2 for the aerospace lab and 2 for the conventional machining lab	200	Once
23	Purchase flexible spot-lights for the existing 4 mills, CNC V-Mill and 2 aerospace equipment	1200	Once
24	Purchase cleaning supplies i.e. push brooms, standard brooms and dust pans	250	Once
25	Modify the existing lab tables to accommodate proper seating for students	100	Once
26	Install a 12' x 12' (Including Chain Drive) roll-up door between the aerospace lab's storage room and the yard behind it.	1200	Once
27	Implement pest control in conventional machining, aerospace fasteners, and computer labs.	50	Once
28	Relocate the non-repairable hydraulics control training kits to the A/C shop	0	Once
29	Design and implement a more efficient layout for the present Conventional/CNC Machine shop	0	Once
30	Repair an existing micro-lathes and dispose of the non-repairable one	200	Once
31	Repair, upgrade, and relocate the existing old and no-functional Mill and Lathe	20,000	Once
32	Update computer lab's Windows operating system and browser	660	Once
33	Install Adobe Acrobat X-Pro to enable pdf conversion and printing to avoid paper printing	1500	Once
34	Remove the existing 10 non-operational vertical mills to the back yard and sell on ebay	-4,000	Once
35	Repair and purchase supplies for the existing EDM (Electrical Discharge Machine)	2,000	Once
36	Install hasps and combination pad locks on the existing storage cabinets and use them as: 1- Students' personal storage cabinets 2- Storage for various tools	300	Once
37	Appropriate forms, record, and centrally locate and display Material Safety Data Sheets (MSDS)	100	Once
38	Purchase a Heat treatment electric furnace 12x12x6.5 inside	1,600	Once
39	Repair the Amatrol Robotics kit and relocate it to the back of the shop	2000	Once
40	Appropriate back-up aerospace fasteners manufacturing equipment	NA	Once
41	Install vibration insulators on the A/C blower above the conventional shop to reduce excessive noise	1000	Once
42	Purchase and install a 12000 BTU Mitsubishi MR.SLIM Ductless Mini Split Air Conditioner SEER20 COOLONLY in the shop's computer room to cool at full capacity during warm days.	2,100	Once
43	Upgrade the CMM to communicate with computers and SolidWorks for reverse engineering	12,000	Once
44	Purchase a used set of washer and dryer to wash rags	300	Once
45	Purchase a pick and place robot – MOTO-man SV3	20,000	Once
46	Re-implement Robotics	8,000	Once
47	Implement Rocketry	10,000	Once
48	Implement Alternative Energy Program	25,000	Once
49	Implement a Fresh Water production/conservation program	30,000	Once
50	For more accurate MTT related data I recommend the following be quantified and reflected in the overall statistics: a. Incoming students' capacity b. Student to machine ratio c. Facilities conditions i.e. Work lighting, HVAC, tools availability. For example Torrance campus is already 100% better than Compton in these areas and getting better yet.	N/A	N/A

***Finally, make sure that your program/department's prioritized recommendations have been or will be submitted into Plan Builder, the college's planning software.**

Use labor market data, advisory board input, and institutional data to respond to the following questions:

1. How strong is the occupational demand for the program? How has the demand changed in the past 5 years and what is the outlook for the next 5 years?

Based on U.S. Bureau of Labor Statistics employment of machinists and tool and die makers is expected to **grow 8 percent** and employment of industrial machinery mechanics and maintenance workers is expected to **grow 19 percent** from 2010 to 2020, about as fast as the average for all occupations. Increased use of manufacturing machinery will require more mechanics and maintenance workers to keep the machines in good working order. Applicants with broad skills should have favorable job prospects. Workers with a range of skills who can perform multiple tasks in a machine shop and manufacturing plants will have the best job opportunities. Please note the line circled below. Since our MTT courses are very much CAD (**computer-aided design**) and **CNC** oriented, our students should rank at the highest level. Keep in mind we need automated manufacturing in the U.S. to stay ahead. Get us our CNC machines.

Job Outlook

About this section 

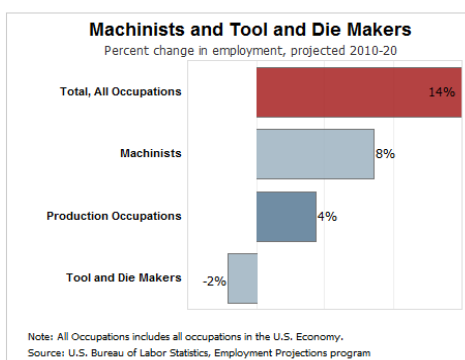
Overall employment of machinists and tool and die makers is expected to grow 7 percent from 2010 to 2020, slower than the average for all occupations. Employment growth will vary by specialty.

Employment of machinists is projected to grow 8 percent from 2010 to 2020, slower than the average for all occupations.


Despite improvements in technologies such as CNC machine tools, autoloaders, high-speed machining, and lights-out manufacturing, machinists will still be required to set up, monitor, and maintain these automated systems.

In addition, employers are expected to continue needing machinists who have a wide range of skills and are capable of performing modern production techniques and almost any task in a machine shop. As manufacturers will continue to rely heavily on skilled machinists as they invest in new equipment, modify production techniques, and implement product design changes more rapidly.

Employment of tool and die makers is projected to experience little or no change from 2010 to 2020. Foreign competition in manufacturing and advances in automation, including CNC machine tools and computer-aided design, should improve worker productivity, requiring fewer workers.



Job Outlook

About this section 

Employment of industrial machinery mechanics and maintenance workers is expected to grow 19 percent from 2010 to 2020, about as fast as the average for all occupations. Employment growth will vary by specialty.

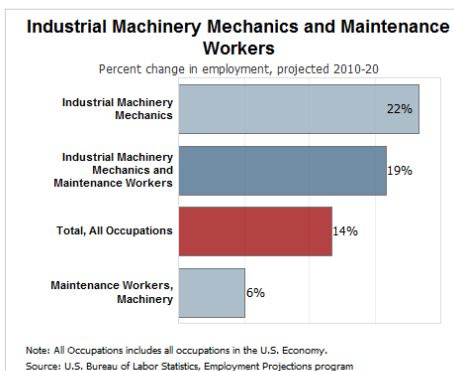
Employment of industrial machinery mechanics is projected to grow 22 percent from 2010 to 2020, faster than the average for all occupations. Increased adoption of sophisticated manufacturing machinery will require more highly skilled mechanics to keep the machines in good working order.

Employment of machinery maintenance workers is projected to grow 6 percent from 2010 to 2020, slower than the average for all occupations. Increased automation, including the use of many new computer-controlled machines in factories and manufacturing plants, should result in less demand for lower-skilled maintenance workers.

Job Prospects

Applicants with a broad range of skills in machine repair should have good job prospects overall. The need to replace the many older workers who are expected to retire, as well as those who leave the occupation for other reasons, should result in numerous job openings. Some employers have reported difficulty in recruiting young workers with the necessary skills.

Mechanics are not as affected by changes in production levels as are other manufacturing workers because mechanics often are kept during production downtime to complete overhauls to major equipment and to keep expensive machinery in working order.



2. What is the district's need for the program?

Los Angeles County's (2008-2018) is expecting a 16.6 percent increase in the need for such jobs.

3. What is the state's need for the program?

With the increased focus on the sustainable production of goods and manufacturing processes that are environmentally sound, there may be more opportunities for Machinists. They will become more efficient as a result of the expanded use of and improvements in technologies, such as computer numerically controlled machine tools, autoloading, and high-speed machining. Technology, however, is not expected to affect the employment of Machinists as significantly as that of most other production occupations because Machinists monitor and maintain many automated systems.

Most job openings will come from Machinists retiring or leaving the occupation for other reasons. Additional growth for Machinist jobs will occur from temporary help firms. As Machinists leave this kind of work, opportunities are created for workers entering the field who have mechanical aptitude, computer skills, and mathematical ability. Due to modern production techniques, employers prefer Machinists who have a wide range of skills and are capable of performing almost any task in a machine shop.

Projections of Employment

In California, the number of Machinists is expected to grow slower than average growth rate for all occupations. Jobs for Machinists are expected to increase by 13.1 percent, and for Industrial Machinery Mechanics 26.9 percent between 2010 and 2020.

4. How does the program address needs that are not met by other similar programs in the area?

Cerritos College and El Camino College Torrance are the only programs that have similar programs and our student body has not been able to easily commute to these schools otherwise they would not be attending our classes since these two schools are well endowed with better equipment and facilities than we are and are now progressing to progress even more via new construction projects and equipment purchases.

5. Are the students satisfied with their preparation for employment? Are the employers in the field satisfied with the level of preparation of our graduates?

The writer invites the readers to go to <http://www.youtube.com> and watch the before and after testimonials for El Camino College Compton Center Machine Tool Technologies Philip Yaghmai or just type in Philip Yaghmai.

Reports from the employers are extremely positive. We hear comments made to us such as “you should be very proud of such good students”, or “I know we have to give him (one of our MTT students) a raise to keep him with us.”

6. What are the completion success and employment rates for the students?

This data is not officially gathered yet. However some of our students are faced with such problems as:

- Blood THC levels due to Cannabis. Because of this some of our best students do not even apply because of the threat of never getting a job again.
- Many of them do not even have the transportation to go to their jobs.
- Many of them do not have a phone so they can be contacted.

7. What impact does the advisory board have on the program?

The writer knows of only one advisory board involved with Compton Center; Aerospace Fastener Manufacturing and IFI (International Fasteners Institute) and Compton Center board which has been very satisfied with our students quality, but dis satisfied with the quantity that actually seek employment in their industry.