

2013-14 Annual Program Plan

Name of Program: Machine Tool Technology
Name of Unit: Career & Technical Education
Name of Area: Academic Affairs
Date Completed: 3/8/2013

Program's Mission Statement

The mission of the Career Technology & Education at the El Camino college Compton Education Center (CEC) is to prepare students for employment or for further education in a career major or concentration which provide marketable skills in high wage growth industries. Students have the opportunity to obtain a certificate and/or an associate degree in the following areas: Administration of justice, automotive collision repair/painting, automotive technology, child care development, commercial music, computer and information systems, cosmetology, fashion, fire and emergency technology, machine tool technology, nursing, real estate, and welding.

MTT mission statement:

"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."

Overarching Outcomes

Competencies will be assessed regularly in accordance with the skill standards established by

the National Institute of Metalworking Skills (NIMS). Students completing the program may enter industry as an advanced or machine operator and anticipate advancement to machinist, tool and die maker, experimental machinist, or CNC Computer Numerical Control programmer. The students may also receive CSWA or CSWP certificates from SolidWorks Corp, and various certification from MasterCAM university.

Program's Characteristics, Outcomes, and Trends

The Machine Tool Technology curriculum offers the student 4 different classes to take in the field. The classes are offered on a rotating schedule. MTT 101abcd is offered every semester during the morning and evening hours. All other courses at Compton Center are not offered due to enrollment but are available in the future with increased enrollment. MTT2 and MTT 40 are offered alternating every semester. MTT 46 is offered as needed. In the Machine Tool Technology area, most classes involve a lecture and laboratory component. Those classes are set up to be 2 hours lecture and 6 hours laboratory per week. They include MTT 46, MTT 101abcd.

Classes like MTT 2 and MTT 40 are lecture only.

Program's Strengths and Weaknesses

Strengths:

The curriculum. Many courses are available with an increase in enrollment.

Fastener Manufacturing Lab is now available and should substantially increase the number of students in the program and is the only program in the state of California

The Manufacturing Student Computer Lab has state of the art equipment with programs such as MasterCam and Solid Works.

The available Staff is highly trained

Certificate or A. S. Degree

Regular class schedules

Evening and day classes;

El Camino Compton Center offers classes so that the student can obtain a certificate or AA. Degree in 2 years or less, depending on the students willness and schedule availability. By attending night classes and limited day classes, a student can do this in addition to attending the Torrance Campus

Year-round program;

El Camino - Compton College offers classes in the traditional Fall and Spring semester along with Summer and Winter schedules.

Start any semester;

There is a beginning level class offered during the fall and Spring semesters and during the summer session.

Weakness

- Lack of a full time instructor to take ownership of the department
- Lack of full-time tool crib - machine shop attendant who can double as a Teachers Assistant;
- Inadequate Tooling and Machine Shop Metal Stock Inventory - This is a serious problem.
- Day student cannot complete the certificates or A.S. Degree without attending night classes and attending the Torrance campus.
- Lack of Marketing/Advertising of program;
- Poor ratio of conventional and high tech CNC equipment to students attending;
- Willingness of Administration to cancel classes for the sake of "numbers".

Program's Opportunities and Challenges

Working with Local High Schools to bring Students into the Manufacturing, CAD, Fastener and Robotics programs especially during the Winter Intercession and Summer. This is an ideal program to have the student take the Manufacturing Program in the evening.

We presently have support from the Fastener industry who contributed Fastener Machinery to our new Fastener Lab.

The Challenge is to up the enrollment to fill all the classes presently running... ie MTT101abcd, MTT2, MTT40. Once these classes have full enrollment the next step is to expand the base of classes currently on the books with students . This should not prove to be difficult once the Fastener Industry starts recruiting from our student base.

We have excellent manual machinery in the regular machine shop but they are rapidly deteriorating. New CNC (Computer Numerical Control) Machines must be purchased to reflect state of the art machinery used in industry.

The student numbers have been increasing and will increase further if we should offer special programs to industry workers upgrading and expanding

their skills i.e. up-to-date CNC Mill and Lathe and full implementation of the Aerospace fastener programs and certificates already submitted.

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 recently been restarted but requires more use and instructor training.
- 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
- 7- More Inspection tools i.e. indicators and gauges are needed
- 8- Storage cabinets are abundant, but inefficiently utilized, and do not have keys
- 10- Need more cleaning supplies i.e. push brooms, machine cleaning brushes, dust pans, and shop rags.
- 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 with students
- 13- Machine lighting is inadequate and unsafe
- 14- The new 3-D printer should be relocated to 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 occupying precious floor space.
- 18- The A/C blower above the conventional shop is VETY 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 and is bad for the hearing.
- 19- Mouse droppings are often found on the computer tables
- 20- 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
- 21- 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.
- 22- 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 worn-out parts
- 4- Repair the existing five (5) conventional lathes and replace their worn-out 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.

Evaluation of Program's Performance

Evaluation of the programs performance is very good. There are a few things that MTT can do better, but MTT is limited by the type of equipment that it has. Local companies are extremely gratified with the quality of personnel we have trained.

Program's 3-5 Year Strategic Directions

1. Create another advisory board related to MTT in addition to the Fastener Mfg. program's advisory board.
2. Purchase one (1) modern vertical CNC Mill – HASS or equal
3. Purchase one (1) modern CNC Lathe – HASS or equal
4. Implement MTT 105 CNC Milling course
4. Implement MTT 103 CNC Lathe course
5. Replace missing ceiling tiles in the class room and put sound insulation on top
6. 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
7. Appropriate Safety and procedural forms, record, and centrally locate and display Material Safety Data Sheets (MSDS)
8. Complete implementation of Compton MTT as a NIMS certification center.
9. Repair the existing CMM (Coordinate Measuring Machine)
10. Replace worn-out parts on the existing four (4) conventional vertical mills
11. Repair the two (2) broken conventional lathes
12. Purchase replenishable tools i.e. cutting tools, edge finders, etc. are often in short supply
13. Purchase replenishable supplies i.e. various cutting oils, hand cleaners, paper towels, etc.
14. Purchase inspection tools i.e. indicators and calipers are often found to be broken, or missing
15. Purchase two 50 gallon roll-away industrial trash cans, 2 for the aerospace lab and 2 for the conventional machining lab
16. Purchase flexible spot-lights for the existing 4 mills, CNC V-Mill and 2 aerospace equipment
17. Purchase cleaning supplies i.e. push brooms, standard brooms and dust pans
18. Modify the existing lab tables to accommodate proper seating for students
19. Install a 12' x 12' (Including Chain Drive) roll-up door between the aerospace lab's storage room and the yard behind it.
20. Install a proper storage system for materials used in the lab, such as wire coils.
21. Implement pest control in conventional machining, aerospace fasteners, and computer

labs.

22. Relocate the non-repairable hydraulics control training kits to the A/C shop
23. Design and implement a more efficient layout for the present Conventional/CNC Machine shop
24. Repair the existing micro-lathe and dispose of the non-repairable one
25. Repair, upgrade, and relocate the existing non-functional Mills and Lathes or dispose of them.
26. Update computer lab's Windows operating system and browser to Windows 7 or 8 and Explorer 10
27. Install Adobe Acrobat X-Pro to enable pdf conversion and electronic printing to avoid paper printing
28. Replace the existing 10 non-operational vertical mills to the back yard
29. Repair and purchase supplies for the existing EDM (Electrical Discharge Machine)
30. 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
31. Heat treatment electric furnace 12x12x6.5 inside
32. Repair the Amatrol Robotics kit and relocate it to the back of the shop
33. Appropriate back-up aerospace fasteners manufacturing equipment
34. 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.
40. Purchase a pick and place robot – MOTO-man SV3
41. Install vibration insulators on the A/C blower above the conventional shop to reduce excessive noise
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.
43. Upgrade the CMM to communicate with computers and SolidWorks for reverse engineering
44. Purchase a used set of washer and dryer to wash rags
45. Purchase a pick and place robot – MOTO-man SV3
- 46- Recruit students for weekend programs.
- 47- Replace all 5 grinding machines with 5 new up-to-date surface grinding machines.
- 48- Add a 4-axis CNC tool and cutter grinder.
- 49- Add another center less grinder.
- 50- Add 1 new wire EDM machines- Sinker and Wire.
- 51- Add 1 new (real) water jet machines.
- 52- Add 1 New Laser Cutter CNC Machine.
- 53- Add 2 Rapid Prototype Machines - This is especially needed for the Fastener Program
- 54- Add more rapid proto-typing capability with 3D printer machines.
- 55- Expand A new computer lab class is needed with smart-room capabilities with 25 state of the art classroom seats.
- 56- Updated programing for MasterCAM, Solid Works
- 57 -Implement CATIA

An observation needy of attention:

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

Goal #1 Short term (1 year)

Status: in progress

S.I.A

Offer the core classes for the certificate and A.S. Degree during the Day hours. Core classes are the MTT2, MTT 40, MTT16ab and MTT10A.

Evaluation of Goal

Classes will be scheduled to fit the students needs. Offering core classes will increase student success and completion rates. Additionally increase student opportunity for employment

Objective #1.1

Status: on hold

Add core classes to the day schedule. This will increase FTES by 5%

Goal #2 Short term (1 year)

Status: in progress

S.I. F

Purchase the following software to support Manufacturing and Engineering Technology (see Program's Opportunities).

SolidWorks (To instruct Students in 3D Modeling)	\$2,066.25
MasterCam (To generate Codes for CNC)	\$2,515.00
MasterCam University	\$375.00
Printer paper	\$200.00
Printer cartridge	\$600.00
Misc. Price increase, Shipping and deliveries, etc.	\$400.00

Evaluation of Goal

Solid Works and Mastercam software supports CNC machines the generate tool pathways. CATIA and Predator softwares are used in the studentcomputer lab and greatly increase student capabilities.

Objective #2.1

Status: complete

Purchase the following software:

1. Mastercam (yearly maintenance agreement \$2634.00)
2. Robotmaster (yearly maintenance agreement \$450.00)
3. CATIA
4. Predator (yearly maintenance agreement \$150.00)

Existing Resources

Information Technology are responsible for the purchases of hardware and software.

Resources from Other Sources

Resources from Fund 11

Required for How Long: 2 years

Requested: \$ 3234

Received: \$ 0

Reason for the difference between the amounts:

Software not funded

Resources Needed: Additional Technology

Technology Classification: Computer Software

Requested Amount: \$ 3234

Description:

Software yearly maintenance has not been funded

Reason:

Enhance the success of our students with contemporary technology

Location: MCS 1A in the Vocational Technology building

New or Replacement: Replace Existing

Services Required: Electricity, Internet Access, Software Support, Hardware Support

Goal #3 Short term (1 year)

Status: in progress

Repair, upgrade, replace existing equipment and add up-to-date machinery matching the industry so the students would be more readily employable.

Evaluation of Goal

Existing shop equipment are obsolete or near obsolescence and MUST be upgraded. The student number far outweighs the equipment. Performing these purchases will enable Compton center to offer more courses and certificates.

Objective #3.1

Status: on hold

Hass TM-1P Tool Room CNC Mill, Hass Factory Outlet LLC, 1ea.

Hass TL-1 Tool Room CNC Lathe, Hass Factory Outlet LLC, 1ea.

Total misc. needed tools

TOTAL SECTION (6000)

Travers 2012 Master Catalog

Additional Needed Support Tools noted below :

2ea	63-005-565	V-Flange Drill Chuck w/ Integral Shank	Pg. 593	\$458.99
2ea	63-005-566	V-Flange Drill Chuck w/ Integral Shank	Pg. 593	\$518.99
3ea	67-815-371	CAT 40 End Mill Holder - 1/4"	Pg. 624	\$39.99
3ea	67-815-373	CAT 40 End Mill Holder - 3/8"	Pg. 624	\$39.99
3ea	67-815-374	CAT 40 End Mill Holder - 1/2"	Pg. 624	\$41.89
3ea	67-815-375	CAT 40 End Mill Holder - 5/8"	Pg. 624	\$44.79
3ea	67-815-376	CAT 40 End Mill Holder - 3/4"	Pg. 624	\$47.69
				(Total \$2479.01)
2ea	67-815-825	ER-16 Mini Milling & Drilling Extension Set	Pg. 625	\$296.79
2ea	67-815-100	ER-32 Collet Chuck Set	Pg. 627	\$112.50
20ea	67-814-001	Pull Studs (verify with HAAS)	Pg. 629	\$17.49
1ea	69-101-006	CNC Tool-holder Tightening Fixture	Pg. 630	\$69.99
1ea	99-998-022	Machine Vise w/ Accessories	Pg. 651	\$529.99
1ea	01-001-484	115 Pc. Drill Index	Pg. 4	\$78.74
3ea	01-091-014	14 Pc. Center Drill Set	Pg. 64	\$29.99
				(Total \$1936.71)
1ea	04-001-907	Over & Under Reamer Set	Pg. 85	\$130.68
1ea	04-001-901	Reamer Set - Fractional	Pg. 85	\$215.05
1ea	04-001-903	Reamer Set - Number	Pg. 85	\$386.62
1ea	04-001-905	Reamer Set - Letter	Pg. 85	\$233.52
1ea	07-042-901	90 deg. Counter Sink Set	Pg. 107	\$128.15
1ea	07-041-901	82 deg. Counter Sink Set	Pg. 107	\$128.15
1ea	01-800-100	NC Drill & Tap Set w/ Index	Pg. 123	\$45.23
1ea	01-800-103	NF Drill & Tap Set w/ Index	Pg. 123	\$45.23
1ea	01-800-101	Metric Drill & Tap Set w/ Index	Pg. 123	\$72.12
				(Total \$1384.76)
2ea	08-200-901	Rouging End Mill Set	Pg. 182	\$111.00
2ea	09-335-905	End Mill Set, 2 & 4 Flute	Pg. 182	\$127.32
5ea	20-055-008	1/8" Carbide Spade Tool for Engraving	Pg. 69	\$11.50
2ea	99-008-052	Tool Length Offset Gage	Pg. 791	\$136.49
1ea	57-030-013	Blake Co-Ax Indicator Set	Pg. 789	\$346.49
1ea	99-000-172	Deburring Set	Pg. 933	\$135.51

1ea 99-010-899 CutterKart

Pg. 1292 \$335.99
(Total \$1625.11)

	Total for all above items:	\$7,425.59
Misc. Taxes and Shipping for the added Items		\$800.00
Repair our present conventional lathe's broken breaking system		\$1000.00
Replace broken quill handles on vertical Mills plus other misc, items		\$600.00
Repair a vertical saw		\$1000.00
Repair saw blade welders on two vertical saws		\$800.00

Impact of Objective on Other Programs, Units, and/or Areas

Impact on the Career & Technical Education Program: Machine Tool Technology

Much improved program resulting in increased retention, success, certificates issuance for the department. Improved quality of life for Compton community.

Resources from Other Sources

Resources from VTEA

Required for How Long: 4 years
Requested: \$ 100000
Received: \$ 100000

Resources Needed: Additional Budget

Object Code: 6400 EQUIPMENT

Required for How Long: 1 time
Requested Amount: \$ 1000
Description:

Misc. support in installation, removal and disposal of various obsolete items.

Supporting Rationale

Every time you deal with equipment something minor details may need attention.

Goal #4 Short term (1 year) Status: in progress

S.I. B

Develop Fastener curriculum certificate course for Machine Tool tool technology

Evaluation of Goal

The evaluation of the program will be the completion of a certificated program that has been vetted through the Cuuricunet process. The result will be that student who complete this program will be job ready to enter into the Aerospace Fastener industry

Objective #4.1 Status: in progress

Faculty will work closely with aerospace fastener advisory board to develop a comprehensive curriculum and submit to Curricunet for vetting

Resources Needed: Additional Personnel

Position Classification: Faculty (hourly)

Required for How Long: 2 years

Position Description:

Faculty to develop and write curriculum specifically for the aerospace fastener

Estimated Cost: \$ 7500

Supporting Rationale:

This will enhance the quality of education services to promote student success

Resources Needed: Additional Budget

Object Code: 5100 PERSONAL AND CONSULTANT SERVICES

Required for How Long: 2 years

Requested Amount: \$ 3000

Description:

Consultant from aerospace industry to assist faculty in curriculum development

Supporting Rationale

This will enhance the quality of education services to promote student success

Appendix A

Individuals Who Participated in Developing this Plan

The following people acknowledge that they participated in the development of or reviewed this plan.

Name	Role
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1. Murray, Rodney Plan Leader