

**El Camino College  
Industry and Technology Division  
Machine Tool Technology &  
Manufacturing Technology Departments  
Program Review  
Fall 2006  
Conducted by: Eric Carlson**

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## I. Overview

### A. Description of Program

Quoting the 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, Computer Numerical Control (CNC) lathes, CNC milling machines, and computer aided manufacturing 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 programmer.”

“The Manufacturing Technology program prepares students for employment in fields related to manufacturing. By completing the degree or certificate requirements, students acquire a foundation in computer aided design, machining, electronics, technical mathematics, and welding. Students also select a career field in which to specialize or broaden their knowledge. These fields include computer aided design/drafting, electronics, environmental technology, machine tool technology, quality assurance, or welding. Competencies will be assessed regularly by student performance in the classroom and laboratory.”

### B. Status of Previous Recommendations

No previous program reviews have been completed. In its place a review of previous recommendations made during Machine Tool Technology Department Advisory Committee meetings was conducted.

From the April 17, 2002 Advisory Committee meeting the following suggestions were made:

- Recruit at on-campus events
- Recruit at high schools
- Initiate a Saturday robotics course
- Offer Lean Manufacturing curriculum
- Focus on fundamental skills
- Improve CAD/CAM class links between TA and MCS buildings

The Machine Tool Technology Department has regularly participated in recruiting at on-campus events such as the Internship and Major Fairs. Recruiting at high schools is currently being strengthened especially with the local feeder school- Hawthorne High.

Two Saturday robotics courses Manufacturing Technology 70 and 75 were started since this suggestion and they have been very successful. Curriculum is currently being developed to greater utilize these courses to introduce students to manufacturing. Related curriculum will also be offered to the CAD/CAM classes to strengthen the ties between TA and MCS based classes and share resources. The Machine Tool Technology Department continues to focus on fundamental skill building, but intends

to use these new projects and curriculum to demonstrate to students the high technology potential of their work.

A new course is being developed through collaboration with the Manufacturing Skills Standards Council (MSSC) which focuses on high performance manufacturing techniques to improve productivity. This course would lead the way to addressing the needs for general productivity and Lean Manufacturing curriculum.

From the May 28, 2003 Advisory Committee meeting the following new suggestions were made:

Generate interest for manufacturing careers in high school students  
Market program in newspapers

The new projects and curriculum development currently underway is resulting in hardware that will be taken to local high schools and functions to market the program. This project will clearly show potential students the skills and capabilities of El Camino's MTT program.

Marketing Ads have been placed in publications in the past with little discernable effect. A new strategy is being developed to leverage local manufacturers and resellers and their clients base to distribute marketing materials promoting the MTT program to a refined target audience.

From the November 3, 2004 Advisory Committee meeting the following new suggestions were made:

Change the name of Manufacturing Technology program to Engineering Technology  
Investigate the process of revising curriculum and compare with TOP codes

Since this suggestion was made a new Engineering Technology department and major has been launched based on the largely successful Project Lead the Way curriculum. Although this new Engineering Technology curriculum is unique to the current Manufacturing Technology curriculum, there exists much potential for collaboration between these intertwined disciplines. Instead, effort is underway to consolidate the Machine Tool Technology and Manufacturing Technology Departments into a single Manufacturing and Automation Department to closer mirror the application and evolution of current industrial practice. The process of revising and adding new curriculum is underway and related to this consolidation effort.

## II. Program Statistics

### A. Demand: FTES by Course/Program

Instructions: Analyze the **FTES by Course/Program** using 1<sup>st</sup> census data and answer the following questions. At a minimum, your analysis must include a 3-year cycle comparing like semesters.

Course	Year 1 (FALL 2003)	Year 2 (FALL 2004)	Year 3 (FALL 2005)
MTT 2	1.70		1.17
MTT 10A	3.37	4.78	
MTT 10B		2.39	
MTT 10J			3.67
MTT 10K	2.62		
MTT 11abcd (MTT 10 G)			
MTT 13A	6.93	10.68	7.50
MTT 13B			6.06
MTT 13C	8.08	2.02	
MTT 13D			
MTT 13E			2.02
MTT 13F	2.89	5.20	
MTT 16ab			
MTT 40	2.12	1.49	1.70
TMAT 1	2.97	3.93	3.5
MTEC 1	1.2	.79	
MTEC 70			4.14
MTEC 75			
Grouped by types of courses			
MTT 2, MTT 40, TMAT 1	6.79	5.42	6.37
MTT 13 A	6.93	10.68	7.50
MTT 13 B-F	10.97	7.22	8.08
MTT 10 A-K, 11abcd	5.99	7.17	3.67
MTEC 1, MTEC 70, MTEC 75	1.2	.79	4.14
TOTAL	31.88	31.28	29.76

1. Given the data, can you recognize any trends in course demand in any of the Program's courses?

No significant trends are apparent from this data. A slight decline in FTES is seen from Year 1, to Year 2 to Year 3.

2. What are you doing to respond to trends?

A dip is evident the MTT 10X CAD/CAM series courses although these courses are known to be cyclical in demand due to the rapidly evolving with state of the art, and current employment opportunities.

A significant growth has been seen in the Manufacturing Technology robotics courses. These courses reflect the direction of industry towards increased use of robotics and automation- the new projects and curriculum currently being developed will demonstrate

the growing ties between Machine Tool Technology curriculum, general manufacturing technology and automation.

The gradual overall decline is best explained by the improved economy and abundance of employment positions. This has reduced the number of incumbent/ retraining students. A concentrated effort is being made to replace this reduction with high school graduates that are needed to replenish an aging workforce of skilled technicians.

3. Should a recommendation be written addressing the data?  Yes  No  
(If yes, list.)

Increase marketing and awareness efforts. Excellent employment and career opportunities are available, but there is little awareness among youth and younger students.

### B. Offerings: Fill Rate\*

Instructions: Review and analyze the **fill rate data** (including the fill rate per course for both day and evening), provided by Institutional Research for this program for a three year cycle and answer the following questions:

Average fill rate of courses in program: How does this program compare to:

	Year 1 (FALL 2003)	Year 2 (FALL 2004)	Year 3 (FALL 2005)
Day classes	42.3%	50%	38.5%
Evening classes	74.9%	71.9%	69.7%

Day  $\frac{10 + 12}{26 + 26}$   $\frac{19 + 7}{26 + 26}$   $\frac{13 + 7}{26 + 26}$

Night  $\frac{143}{191}$   $\frac{156}{217}$   $\frac{115}{165}$

1. Given the data, is the program in a growth mode?  Yes  No  
**Comment.**

No, the data does not show a growth mode. The evening classes show a moderate decline and the day classes do not show an obvious trend.

2. What adjustments are indicated?  
**Explain.**

The data appears to demonstrate the continued need to market and promote the program especially to recent high school graduates. As these younger students gain exposure and acquire part time employment and internships, this would in turn positively affect fill rates.

3. Should a recommendation be written that addresses the data?  Yes  No  
(If yes, list.)

Consider combining labs for like courses. The fall 2006 and spring 2007 performance improved significantly by combining like courses.

### C. Scheduling: Student Satisfaction with Scheduling

Instructions: Complete the chart below. Indicate the time when sections of courses in the program are currently scheduled to start. Analyze the data provided by Institutional Research on student satisfaction with scheduling in the program and answer the questions.

Course	During the early morning before 10 am	During the late am/early pm 10am –1:55 pm	During the late afternoon 2 pm -4:25 pm	During the evening 4:30 & later	During the weekend	During the summer	Via Telecourse	Via Online
MTT 2				7pm-10:10				
MTT 10A				5:45pm-10:10				
MTT 10B								
MTT 10J				5pm-10:15				
MTT 10K				5pm-10:15				
MTT 11abcd								yes
MTT 13A	8am – 12:15pm			5:45pm-10				
MTT 13B	8am – 12:15pm			5:45pm-10				
MTT 13C	8am – 12:15pm			5:45pm-10				
MTT 13D	8am – 12:15pm			5:45pm-10				
MTT 13E	8am – 12:15pm			5:45pm-10				
MTT 13F	8am – 12:15pm			5:45pm-10				
MTT 16ab		12:30pm-3:40				yes		
MTT 40				7pm-10:10				
MTT 46			3:45pm-6:25		9am-3:30			
MTT 47abcd	arranged	arranged	arranged	arranged	arranged	yes		
MTT 48abcd	arranged	arranged	arranged	arranged	arranged			
MTT 50								
MTT 95abcd	arranged	arranged	arranged	arranged	arranged			
MTT 99abc	arranged	arranged	arranged	arranged	arranged			
TMAT 1	9am-12:10pm			6pm-9				
MTEC 1								
MTEC 70			3:00pm-4:55		9am-3:20	yes		
MTEC 75					8am-3:20			

1. What (if anything) is indicated by the student satisfaction with scheduling?

In general students are satisfied with the current scheduling of classes. Some suggestions include later (10am) morning classes and later afternoon classes (2pm), weekend and summer offerings. The number of suggestions and current demand do not point to any recommended change in the current scheduling of classes.

2. Are there time periods of high student demand which are not being addressed?  Yes  No  
How could such demand be addressed?

No, there is not any period of high student demand that is not being addressed. Better marketing of the program will lead to higher demand. At this point in time student needs will be re-evaluated.

3. Should a recommendation be written addressing this area?  Yes  No  
(If yes, list.)

No recommendation is required at this time.

## D. Retention and Success

### 1. Retention

Instructions: Review and analyze the data on **retention (course completion with a grade other than W)** over a three-year cycle comparing day to evening classes, term to term (e.g. fall to spring, spring to summer, etc.), and course levels.

1. Given the data, what trends are observed?

**Comment.**

A detailed class-by-class analysis was conducted of six semesters, starting from spring semester of 2003 to the fall semester of 2005. No obvious trends were observed in the analysis of class-to-class groupings. A steady retention rate of around 85% was seen at the department level for the last (4) four semesters of data analyzed.

The lowest average retention of all regular classes was for MTT 13A. This is problematic in that this course is a prerequisite and feeder for the advanced level MTT 13B through 13F courses, yet understandable since it is most often the first course students take in the program.

2. Should a recommendation be written addressing the data?  Yes  No  
(If yes, list.)

Yes, a recommendation should be written to address the low retention rate of the MTT 13A course due to the fact much of the rest of the program's success is dependent on this feeder course.

### 2. Success Rate

Instructions: Review and analyze the data on **success rate (students who earned a grade of A,B,C, or Credit)** over a three-year cycle comparing day to evening classes, term to term (e.g. fall to spring, spring to summer, etc.), and course levels and answer the following questions:

1. What trends are observed?

A detailed class-by-class analysis was conducted of six semesters, starting from spring semester of 2003 to the fall semester of 2005. The only apparent trend was that of a continuous decline in the success rate of students in the MTT 13A in the last (5) five semesters of the analysis. A steady average success rate in the low nineties was seen at the department level.

2. Should a recommendation be written addressing the data?  Yes  No  
(If yes, list.)

Yes, a recommendation should be written to address the continuous decline in success of students in the MTT 13A classes from a level of 100% in the spring semester of 2003 to 76.2% in the fall semester of 2005.

**III. Curriculum**  
**A. Course and Content**

**1. Courses Not Offered**

Instructions: Indicate the total number of courses in the program and list all courses in the program which are in the catalog but have not been offered in the last three years. Refer to this list to answer the following questions:

Manufacturing Technology 2, Materials and Processes of Manufacturing  
Manufacturing Technology 3, Integrated Manufacturing Systems

1. Given the data, are there courses that should be inactivated? \_\_\_\_\_ Yes        X   No  
**Comment.**

No, the courses that have not been offered in the last three years will be needed in the future.

2. If there are courses not offered in the last three years that you do not wish to inactivate, what reasons are there to keep them active?

These courses were introduced with anticipated growth of the interdisciplinary field of Manufacturing Technology. The evolution of this field is continuous and has reached a point where Machine Tool Technology, Manufacturing Technology, Automation and Robotics are no longer independently discernable fields. Thus, these courses will be required in the near future.

3. Should a recommendation be written addressing the data? \_\_\_\_\_ Yes        X   No  
**(If yes, list.)**

No recommendation is necessary at this time.

**2. Course Revisions and Additions**

Instructions: Utilize the Course Review Chart from the Curriculum Office to answer the following:

1. Are there course outlines that should be revised?        X   Yes      \_\_\_\_\_ No  
**(If yes, list.)**

Yes, it is believed that a regular review of all the course outlines should be made to insure that the courses are maximizing their impact on students to best prepare them for industry.

2. Are there courses inconsistent with current practice in the field?    \_\_\_ Yes        X   No  
**Explain.**

No, in general the courses are solid in their focus and content, but regular review of course outlines is advised to prevent them from diverging from current practice in rapidly evolving industries.

3. Should new courses to be added to the program?  Yes  No  
**Explain.**

No, not at this time, but due to the rapid evolution of manufacturing technologies, it is recommended that a continuous process of researching future needs of students and industry be made to prevent the delay of adoption of these technologies at the instructional level.

4. Are adjustments necessary to the conditions of enrollment (Prerequisite, Corequisite, Recommended Preparation, and Enrollment Limitations) for a specific course to increase student success?

Yes  No  Uncertain **Comment.**

No immediate adjustments are necessary.

5. If the program offers a degree and/or certificate, list them and indicate when the requirements were last reviewed? (If not applicable, skip to Question 7.)

The Machine Tool Technology Department offers an A.S. Degree, certificate of Competence and a certificate of Completion. For each of these degrees and certificates there is a Machinist Option and a Numerical Control Programmer Option. These degrees and certificates were last reviewed and revised May 11, 2004.

For Manufacturing Technology, an A.S. Degree and certificate of Completion are offered. This degree and certificate were last reviewed and revised February 28, 2006.

6. Are these degree and/or certificate requirements inconsistent with current practice?  Yes  No  
**Explain.**

No, these degrees and certificates reflect current industry practices.

7. Is there a need to create or delete a degree and/or certificate?  Yes  No  
**Explain.**

Yes, faculty experience and industry needs suggest that CNC/Automation programming/ setup/ service technician training is a rapidly growing field with no significant pool of qualified technicians. The Machine Tool Technology/ Manufacturing Technology programs are working towards researching the equipment facilities and curriculum requirements to address this need before submitting a formal request for any new degrees of certificates

8. Should any recommendations be written that address the above responses?  Yes  No  
(If yes, list.)

No recommendation is necessary at this time.

\*

## B. Articulation

Instructions: Articulation is the process by which courses taken at ECC can be used to satisfy subject matter requirements at another college or university. This is important in the transfer process for students. To help you in this area, you can review articulation agreements at [www.assist.org](http://www.assist.org), the California Articulation Number Guide or meet with the Articulation Officer, Lori Suekawa (ext. 3517).

1. Are there any courses in your curriculum which are part of a lower division preparation for the major that are not articulated with our major transfer institutions?

There are no course-to-course articulation agreements with 4-year universities for the Machine Tool Technology Department. An Articulation agreement is in place with the Southern California Regional Occupational Center (SCROC) for MTT 13A. Articulation agreements have also been created with Hawthorne High for MTT 13A and MTT 16ab.

2. What problems, if any, are there in articulating these courses?

No problems exist for the articulation of these courses.

3. Should a recommendation be written addressing above responses?  Yes  No  
(If yes, list.)

No recommendation is necessary at this time.

## C. Instruction and Assessment

### 1. Learning Methods

1. What learning methods are incorporated inside and outside the classroom in the program to promote student success? **Explain.**

Many of the Machine Tool Technology and Manufacturing Technology classes are hands on learning with approximately 75% of class time spent with laboratory work. Laboratory planned instructional activities include: group demonstrations, individual instruction, exercises and projects. Classroom planned instructional activities include: lectures, class discussions, guest speakers, and video presentations. Outside classroom learning methods include: study of notes, answering homework problems, required reading, written research projects, and fieldtrips for plant tours and trade shows.

2. Should a recommendation be written addressing above response?  Yes  No  
(If yes, list.)

No recommendation is necessary at this time.

### 2. Assessment

1. How do you evaluate the extent to which the learning objectives, skills, and competencies are being met?

A) Courses

Students are evaluated by written homework, research reports, computational homework, laboratory exercises, laboratory projects, examinations, quizzes, laboratory reports, and class performance.

B) Program

Faculty continuously evaluate the components that comprise the degrees and certificates of the program to determine if they are guiding students to acquiring the skill sets they will need to be successful in industry. Post-graduation student data helps guide the program in technical directions and indicates potential strengths and weaknesses of the programs components.

2. How do you use the results of the above evaluation to improve student learning and the quality of the program?

At a course level, evaluations can indicate whether a class or individuals have learned material or skills. If required the methods of teaching can be adjusted if necessary or remedial work may be required. Due to the fast technological pace of student's general environment, it is apparent that student-learning methods are in a state of flux. Teaching methods are continuously being adapted and qualified to adjust for this state.

3. Should a recommendation be written addressing this area?  Yes  No  
(If yes, list.)

No recommendation is necessary at this time.

**IV. Program Requirements**  
**A. Instructional Support**

1. Identify key instructional support areas used by the program.

**Libraries & Programs:**

X	Library	X	Special Resource Center		Basic Skills Study Center		Library Orientation
	Music Library		Puente Program		Honors Transfer Program	X	Other (Please list.) Women in Technology
X	Learning Resource Center Media Materials Collection		Assessment/Testing Office	X	Counseling	X	Other (Please list.) Job Placement
X	EOP&S/CalWORKS	X	Transfer Center	X	First Year Experience		
	Learning Communities		Project Success		Honors Transfer Program		

**Computer Labs & Tutoring:**

	LMTC Computer Commons	X	SRC High Technology Center		Other Computer Lab: Please list.	X	Writing Center
	CAI MAC Lab		Writing Lab				LRC Tutorial Program
	CAI Windows Lab		Math & Science Lab			X	Math Tutoring
X	TOP Lab		Keyboarding Center				SRC Tutorial Program
	Hawthorne BTC					X	EOP&S Tutoring
	Inglewood Center						

**Faculty Support Services:**

	Graphic Arts	X	Copy Center		Distance Education		Other (Please list.)
	Media Services AV Production	X	Tech Services Help Desk	X	Teleconferences		
	Media Services AV Equipment Distribution	X	Support Staff	X	Webconferences		
X	ECC Vehicles	X	ECC hosted Websites	X	Staff Development		
X	ECC E-mail						

2. Do you have some instructional support needs that are not being met? \_\_\_\_ Yes        X   No

**Comment.**

No, no instruction support needs are currently unsupported.

3. Should a recommendation be written to address your needs? \_\_\_\_ Yes        X   No

(If yes, list.)

No recommendation is necessary at this time.

**B. Facilities and Equipment**

1. Does the program make effective use of its facilities and equipment? **Explain.**

Yes, faculty make an effort to expose students to the breadth of machining and manufacturing methods. This includes addressing individual student needs and interest beyond the scope of the basic course outlines. Due to the fast pace development of the field and interaction between specific processes this wide exposure to different equipment is critical.

2. Are adequate facilities, equipment and supplies available for the program? \_\_\_\_ Yes        X   No

**Explain.**

No, the program has equipment and supplies needs in order to stay current in technology. These needs include automation and robotic equipment, laboratory support equipment and supplies. The program has a need for industrial robots and work-cell equipment that are becoming standards of manufacturing. The program has also identified the need for an automated water-jet cutting machine to support many of the courses and demonstrate current industry practice.

3. Are the facilities and equipment adequately maintained?  Yes     No  
**Explain.**

Yes, the department technician adequately maintains the facilities and equipment.

4. Should a recommendation be written addressing the data?     Yes     No  
(If yes, list.)

No recommendation is necessary at this time.

### C. Staffing

Instructions: Analyze the data on **FTEF, adjunct FTEF, and the FT/PT ratio** for the most recent fall semester and answer the following questions:

**FTEF (full-time equivalent faculty):** # 2.834

**Number of full-time FTEF:** # 2

**Number of adjunct FTEF:** # 0.834

**FT/PT load ratio:** 71/29

1. How do the program numbers compare to a like semester (Fall to Fall) three years ago or the previous program review?

The data changed significantly from fall 2003 and fall 2004 because an additional full time instructor was hired in fall 2005.

2. What do the program data indicate? Comment on any trends or unusual data.

No comment needed.

3. How does the FT/PT ratio benefit or harm the program?

The FT/PT ratio is seen as a byproduct of the need for a technologically well-rounded staff.

4. Do you have a faculty mentoring program?  Yes     No  
**Describe.**

Yes, informal mentoring occurs on a continuous basis, as faculty share information on emerging technologies, curriculum and teaching strategies.

5. How do faculty maintain currency in their field?

Trade shows, trade publications, curriculum research grants, technical research, and meetings with local industry employers.

6. Fill in the faculty status data below and answer the questions that follow.

Name	Reassigned time (how much in %) 2005/2006	Currently on leave (check)	Retired in last 2 years (check)	FT hired last 3 years (check)	Anticipated to retire in next 3 years (check)
<b>Full Time Faculty</b>					
Carlson, Eric	10%			X	
Hofmann, Harold	0				
<b>Part Time Faculty</b>					
Bombassei, Roger	0				
Delatorre, Victor	0				
Kinnan, Jerry	0				
Seifert, Franz	0				

6a. How does this data impact the program?

The data does not suggest any imminent impact.

6b. Will this data affect the program in the future?

The data does not suggest any apparent future impact.

7. From this information, can you identify present and future staffing needs? X Yes \_\_\_ No  
**Explain.**

The faculty represents a broad range of experience and capabilities with the ability to address present and future program staffing needs.

8. What is the department doing to address any future staffing needs?

No immediate change in future staffing needs is anticipated.

9. Should a recommendation be written addressing the data? \_\_\_ Yes X No  
 (If yes, list.)

No recommendation is necessary at this time.

### D. Planning

1. Do the program faculty and other personnel have a clear idea of what is happening in the program, where it is headed, what external changes are affecting it, and what changes need to be made in order to enable the program to adapt and continue to be successful? **Explain.**

Yes, faculty either have recently departed from industry, continue to work with industry, or keep in touch with current industry trends and needs.

Industry surveys have been distributed to a number of local businesses with few surveys completed. A partial listing of businesses that received surveys:

Ramda Metals  
Matteson Screw  
Arias Pistons  
Techni-Mold Eng  
Custom Metal Products  
A K Industries  
Anderson Saw Co.  
Bourhis Mold Inc.  
Specialty Surface Grinding Inc.  
Robinson Helicopter (would not participate)  
Dasco Eng.  
Alcast  
Plasma Tech  
Specialized Welders Ring-o-steel Inc.  
Boeing El Segundo  
Northrop El Segundo  
Volt Services  
Bundy Mfg.  
Ross Racing Pistons  
Aerospace Eng. Support Corp.  
Perez Engineering  
Arvan  
Ducommun Aerostructures

No strong relationship with local feeder schools (like Hawthorne).

Employment opportunities have increased with respect to the number of qualified applicants.

2. What data, not currently provided, would be needed in order to improve planning for the development of the program? **Explain.**

More information on the different student populations served by the program and how these populations could be better reached to provide them information about the program.

3. What major external changes or trends do you expect to be of particular relevance to your discipline in the next five years?

In the next five years fewer machine operators will be required. More automation design, setup, maintenance technicians will be needed. This rapidly emerging need has already reached a crisis level. Graduates will be sought after for their problem solving abilities as well as their manual skill. Fundamental skills will continue to be important, but understanding of their influence at the complex system level will be critical.

4. What will the implications of these changes or trends be for the program and how will the program need to respond?

An increasing requirement will be to anticipate, rather than react to student and industry needs. With the delays of the student learning cycle, program and institutional adoption, in a fast paced competitive environment, the need to be proactive is magnified.

5. Based upon the information above, how would you like the program to evolve within the next five years?

To continue to introduce students to the fundamentals of manufacturing, and build upon these to instruct in complex competitive technologies like automation, and robotics, including the setup, repair and maintenance of these systems.

6. Should a recommendation be written addressing the data?        X   Yes         No  
(If yes, list.)

Yes, a recommendation should be written to provide specific direction, strategies and time-guidelines to achieve the evolution of the program that is required to properly serve students and industry needs.

## V. Conclusion

The Machine Tool Technology and Manufacturing Technology Departments are positioned to offer students and industry support that is needed in a rapidly evolving environment of technology.

### 1. Prioritized Recommendations

The prioritized recommendations for the program are:

1. Improved marketing of the program
2. Strengthen relationships with local feeder schools
3. Strengthen relationships with local industry
4. Update facilities to include automation and robotics

### 2. Major Needs

Dedicated internship coordinator time to develop industry relationships  
Industrial robotics equipment  
Automated water-jet cutting equipment  
Electric furnace  
Update MCS5 to reflect changes in student learning methods

### 3. Strategies

Intercampus efforts

Merge Manufacturing Technology Department and Machine Tool Technology  
Departments to share resources and strengthen offerings

Joint cooperation with CADD Department

Joint cooperation with Electronics Department

Joint cooperation with Engineering Technology Department

Joint cooperation with Mathematics Engineering Science Achievement (MESA) program

Develop Automation Technician Degree

Develop long-term internship programs

Further develop website presence to advertise program and open communication

Email regular newsletter of class offerings and current work

Develop curriculum and projects