

Advanced Technology Division

Manufacturing Technology

Unit Plan 2004 - 2005





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Part I. Alignment with the College

1) <u>Core Values</u>

The manufacturing technology program is a credit instructional program and has been offered at Lane Community College since 1976. The program is administered under the Office of Instruction and Student Services through the Advanced Technology Division. This program is centrally aligned with the College's strategic directions, core values, and learning centered principles.

Learning: Learning is both theoretical and applied. Student learning progresses from basic to advanced technical, academic and employability skills.

Diversity and Accessibility: The program faculty welcome students from diverse backgrounds. Students with special needs are accommodated with appropriate supplemental learning technologies and experiences.

Innovation: Faculty maintain their expertise in the field and incorporate advanced technologies in the curriculum. The faculty has made a commitment to maximize the use of innovative instructional technologies to transform the curriculum.

Collaboration and Partnership: The faculty work very closely with their program advisory committee. This committee is a representation of active community business partners who provide advice and program support. The manufacturing technology faculty work very closely with other divisional programs.

Integrity: The program faculty has demonstrated a high degree of integrity. They are openly accountable to perform according to the policies, procedures and expectations of the College, the division, the advisory committee and most importantly, the students.

 	Fransforming Students' Lives Foster the personal, professional, and intellectual growth of learners by providing exemplary and nnovative teaching and learning experiences and student support services. Commit to a culture of assessment of programs, services and learning. Position Lane as a vital community partner by empowering a learning workforce in a changing economy.	The manufacturing technology program is a professional technical education credit program that provides career learning and counseling. The program includes both classroom and industry equivalent laboratory instruction using current equipment and technologies. The curriculum provides instruction in employability, applied academic and technical skills. The program and course outcomes are assessed using multiple measures including: attainment of program outcomes, core abilities and learning college principles. Each course has identified specific assessment methods including: technical skill demonstration, group projects, research, portfolios, written tests, etc. The program has an active advisory committee, with representation from the employer community. The program works closely with other credit and non-credit programs to facilitate training a "learning workforce"
-	Fransforming the Learning Environment	workforce". This is an inclusive learning-centered program that

2) <u>Strategic Directions</u>

Create a diverse and inclusive learning college: develop institutional capacity to respond effectively and respectfully to students, staff, and community	actively seeks and responds to diversity in its students and staff.
members of all cultures, languages, classes, races, genders, ethnic backgrounds, religions, sexual orientations, and abilities.	The faculty create and maintain the best learning environments possible, within their existing resource constraints, to support students in obtaining their educational goals. Instructors in this
Create, enhance, and maintain inviting and	program must constantly renew and improve their
welcoming facilities that are safe, accessible,	curriculum and learning environments to align to
functional, well-equipped, aesthetically appealing	the industry training standards.
and environmentally sound.	
Transforming the College Organization	The manufacturing technology program is
Achieve and sustain fiscal stability.	constantly assessing its operational efficiency and effectiveness. The program has been developing
Build organizational capacity and systems to	operating benchmarks (performance indicators) by
support student success and effective operations.	which it can compare its actual to its planned operations. This methodology provides the basis
Promote professional growth and provide increased development opportunities for staff both within and outside the College	for analyzing deviations and trends, identifying causes, and formulating solutions.
	The faculty in the program have continuously
	developed their knowledge, skills and abilities as
	I instructors and as industry experts.

3) <u>Learning Centered Principles</u>

Lane provides opportunities for transformation through learning.	The primary learning outcome of the Manufacturing Technology program is to provide instruction and hands-on training to enable students to obtain career employment. The program prepares students by focusing on both technical and employability skill development. Qualifying for entry-level and advanced employment transforms the student's life.
Lane engages learners as active partners in the learning process.	Students must actively demonstrate their technical and employability skills. Students initiate and manage their progress through the learning process.
Lane creates a learning environment that motivates and inspires students to recognize their responsibility for their own learning.	Students recognize their active involvement may lead to high-paying career positions. The learning environment includes both classroom and laboratory experiences that emulate the workplace.
Lane offers multiple options for learning based on proven and innovative theories and methods that address the needs of diverse learners.	Learning methods include lectures, reading, writing, demonstrations, laboratories, problem solving, researching, building, diagnosing, repairing, modeling, computer-based, cooperative work experiences, group/team projects, formal and self- assessment. Students receive appropriate learning accommodations to ensure success in the program.
Lane commits to a culture of assessment of programs, services and learning, honoring the values of intellectual freedom, community	The manufacturing technology program conducts both formative assessment of a student's knowledge, employ-abilities, technical skills and

responsibility and student need.	academic skills; and, summative assessment based on industry or national standards. Faculty assess the stated achievement of the program learning and operational outcomes. Advisory committees provide additional assessment on the relevancy of the curriculum and the quality of the student completers.
Lane fosters knowledge and appreciation of	The mission of the manufacturing technology
diversity among staff and students and encourages	program is to transform student lives through
pluralism and intercultural competence. Lane	learning. The "student" should be representative of
engages learners from diverse cultural and social	the diversity of the community. The program
contexts.	faculty work closely with the college's cultural and
	diversity programs and initiatives.
Lane is committed to both individual and	Program students, faculty, staff, administrators and
organizational learning.	community members are committed to learning.
	Each organizational member gains knowledge and
	intrinsic reward for actively engaging in learning.
Lane students and staff are a community of	The program faculty are continuously engaged in
learners, all of whom contribute to learning.	keeping current with the new advances in the
	industry. They are active learners engaged with
	students and other colleagues to promote a
	community of learners.
Lane promotes open communication among staff,	The students, faculty and staff have open access to
students and the community within and across	many forms of operational and governance
organizational and physical boundaries.	communications: e-mail, The Daily, the web,
	meetings, forums, governance councils, etc.

Part II. Unit Description

1) <u>Unit Mission/Vision</u>

The manufacturing technology program aligns with the College's mission. Lane is a learning-centered community college that provides affordable, quality, lifelong educational opportunities that include: Professional technical and lower divisional college transfer programs.

The manufacturing technology program's vision is the same as the College's vision: *Transforming lives through learning.*

2) <u>Catalog Description</u>

Program Description

The manufacturing technology program is an occupational, preparatory, two-year Associate of Applied Science degree with a Computer Numerical Control Technician option and/or a two-year certificate of completion program.

The manufacturing technology program features state-of-the-art laboratories where students learn the basic principles and fundamentals in manufacturing (machine shop) and related work. The advanced equipment and expertise of the faculty make Lane's manufacturing technology program the best way to enter the field.

Faculty in the program bring considerable field experience to the classroom and regularly attend workshops at manufacturer training centers to help them keep up with technological changes in the industry.

The program provides classroom instruction and considerable shop training in the laboratories that prepares you for employment in manufacturing field. Graduates of this program begin careers in machine repair and maintenance shops for mill and construction contractors, and high tech and specialty machine shops.

This training can lead to employment in entry-level occupations with a median salary of \$36,900 annually. The growth in this industry is expected to be slower than average. Annual new openings are expected to be much higher than average. Outlook for this and related occupations is dependent on manufacturing industry activity levels. During periods of industry growth, reasonable opportunities would exist for competitively trained workers. Those with an associate's degree would have a competitive advantage in this labor market.

New students can enter the program at the beginning of fall, winter, or spring terms. For consent to enroll in major courses, students must attend a program orientation in fall terms (dates available in Counseling of the Student's First! Center) or contact the department advisor/counselor in winter and spring terms. All interested applicants should complete placement testing (Assessment & Testing Office, Building 1) in reading, writing and math. A minimum score of 68 in reading and 64 in Writing is required. Take testing results to the program orientation and/or advisor/counselor for assistance with course selections. Students are selected on a first-come, first-served basis by or date of application to this program.

Purpose

This program provides training in basic principles and fundamentals in manufacturing (machine shop) and related work. A graduate qualifies for entrance occupations as a machinist in manufacturing shops or related machine tool industries. Employment opportunities include machine repair and maintenance shops, tool and die shops, manufacturing industries, metalworking plants, repair and maintenance shops for mill and construction contractors, and high tech and specialty machine shops.

Learning Outcomes The graduate will:

- demonstrate the use of all standard machine tools employed by the modern machine shop.
- use a 3 Axis CNC milling machines with a G-code controller and a 2 Axis CNC lathe with G-code controller.
- demonstrate and use industrial safety standards for safe operation of all machine tools.
- access library, computing, and communications services and obtain information and data from regional and national networks.
- use basic math skills, formulas and right angle trigonometry.

Employment Trends

Employment in this industry is estimated to be much larger than average. Growth is projected to be slower than average. Annual new openings are expected to be much higher than average. Outlook for this and related occupations is dependent on manufacturing industry activity levels. During periods of industry growth, reasonable opportunities would exist for competitively trained workers. Those with an associate degree would have a competitive advantage in this labor market.

Entry-Level Hourly and Annual Wages

Statewide \$11 hourly, \$18 median hourly, \$15-21 middle range, and \$36,971 average annually

Costs in Addition to Tuition (estimates)

Books - \$700 Tools -\$725-900 Fees - \$975 Total - \$2,400-2,575 Fees are subject to change without notice.

Prerequisites

Minimum placement scores - Reading 68, Writing 64. A high school diploma or equivalent is recommended for all applicants to this program. Note: See a counselor or advisor to learn what entry-level skills are suggested for successful completion of this program.

Criteria Used for Admission

For consent to enroll in major courses, students must attend a program orientation for fall terms (dates available in Counseling or the Students First! Center) or contact advisor/counselor in winter and spring terms.

3) <u>History/Significant Program Events</u>

How did your instructional unit evolve at Lane? This program has been offered at the college since 1976.

What significant events have marked your growth?

Do you have a system for maintaining an archival history of your unit? Yes. We use the unit planning process.

Do you have annual events that are representative of your unit's goals or teaching methods?

4) <u>Degrees and Certificates</u>

Two-Year Certificate of Completion	Credits
Two-Year Certificate of Completion Totals	85-88
First Year	
Fall	
Manufacturing Technology MFG 197	12
Applied Geometry for Technicians MTH 076 or higher	4
Total Credits	16
Winter	
Manufacturing Technology MFG 197	12
Workplace Safety HE 125 or First Aid HE 252 or PE/Health requirement	3
Total Credits	15
Spring	
CNC Lathe (G-Code) MFG 206	6
Manufacturing Technology MFG 197	6
Total Credits	12
Second Year	
Fall	
Manufacturing Technology MFG 197	12
Total Credits	12
Winter	
Manufacturing Technology MFG 197	12
Introduction to College Writing: Workplace Emphasis WR 115W or higher	3
Total Credits	15
Spring	
Manufacturing Technology MFG 197	12
Human Relations requirement	3
Cooperative Education: Manufacturing MFG 280 (optional)	3
Total Credits	15-18

Two-Year Associate of Applied Science Degree	Credits
Two-Year Associate of Applied Science Degree Totals	107-109
First Year	
Fall	
Manufacturing Technology MFG 197	12
Applied Geometry for Technicians MTH 076 or higher	4
Math/Science/Computer Science requirement or CS 160 or CS 120	4
Total Credits	20
Winter	
Manufacturing Technology MFG 197	12
Workplace Safety HE 125 or First Aid HE 252 or PE/Health requirement	3
Applied Algebra for Technicians MTH 086 or higher	4
Total Credits	19
Spring	
CNC Lathe (G-Code) MFG 206	6
Manufacturing Technology MFG 197	6
Introduction to College Writing: Workplace Emphasis WR 115W or higher	3
Total Credits	15

Second Year	
Fall	
Manufacturing Technology MFG 197	12
Cad 1 DRF 167	4
Metallurgy: Fundamentals and Welding WLD 151	3
Total Credits	19
Winter	
Manufacturing Technology MFG 197	12
Arts & Letters requirement	3
Cooperative Education: Manufacturing MFG 280 (optional)	3
Total Credits	15-18
Spring	
Manufacturing Technology MFG 197	12
Human Relations requirement	3
Shielded Metal Arc Welding 1 WLD 121	4
Total Credits	19

Computer Numerical Control Technician Option	Credits
Two-Year AAS with CNC Option Totals	107-110
First Year	
Fall	
Manufacturing Technology MFG 197	12
Applied Geometry for Technicians MTH 076 or higher	4
Math/Science/Computer Science requirement or CS 160 or CS 120	4
Total Credits	20
Winter	
CNC Lathe (G-Code) MFG 206	6
Manufacturing Technology MFG 197	6
Applied Algebra for Technicians MTH 086 or higher	4
Workplace Safety HE 125 or First Aid HE 252 or PE/Health requirement	3
Total Credits	19
Spring	
CNC Mill MFG 207	6
Manufacturing Technology MFG 197	6
Introduction to College Writing: Workplace Emphasis WR115W	3
Total Credits	15
Second Year	
Fall	
CAM 1 MFG 203	6
CNC: Special Projects MFG 208	6
CAD 1 DRF 167	4
Metallurgy: Fundamentals and Welding WLD 151	3
Total Credits	19
Winter	
CAM 2 MFG 204	6
Manufacturing Technology MFG 197	6
Mechanical Drafting DRF 121	4
Cooperative Education: Manufacturing MFG 280 (optional)	3
Total Credits	16-19
Spring	
CAM 3 MFG 205	6
Manufacturing Technology MFG 197	6

Arts & Letters requirement	3
Human Relations requirement	3
Total Credits	18

Cooperative Education

Cooperative Education (Co-op) offers students college credit and a grade for on-the-job work experience related to their educational and career goals. Through Co-op a student can integrate theory and practice, develop skills, expand career knowledge, and make contacts for the future. Work schedules and work sites vary. Under the supervision of the Manufacturing Technology Co-op Coordinator and with instructor consent, a maximum of 18 Co-op credits may be earned in lieu of required Manufacturing Technology course credits.

5) Organizational Structure

Board of Education President Vice President of Instruction Associate Vice President of Instruction Division Chair Advanced Technology

Faculty Manufacturing Technology Program

6) <u>Staff/Faculty</u>

Name	Al Hill
Classification	Full-Time Faculty
Year Hired	2001
Degrees/Credentials	Associate of Arts; Journeyman Machinist

7) <u>Student Profile</u>

Please refer to the Program Learning Outcomes, Goals and Performance Indicators on page 10.

8) Facilities and Equipment

The Manufacturing Technology program is housed in building 12.

What are its strengths?

The program has very good facilities and equipment.

Its challenges?

The program has \$468,969 in existing equipment. It is very difficult to maintain, replace and upgrade this equipment. Additionally, the program must keep current with new advances in the industry and in instructional technologies. The program is reliant upon Carl Perkins and the local business for support.

What are your utilization ratios? This program is exceeding the expected student to faculty ratio (expected is 26 : 1, actual is 30.87 : 1)

Provide a copy of your equipment inventory. Please refer to the Equipment Inventory Spreadsheet on page 28.

What are your equipment strengths? Students learn on well equipped computers running the industry standard software.

Challenges? It has been challenging to continuously upgrade the computers and software.

Do you have any plans in place for equipment replacement?

Refer to the Existing Equipment Inventory Spreadsheet on page 28.

9) Budget Profile

Refer to the Program Operations charts on pages 13 and 14.

Program Learning Outcomes, Goals and Performance Indicators

Program Learning Outcomes/Goals	Performance Indicators
1) Demonstrate employability skills required for initial employment and advancement in the industry that include: attendance, proper attire, customer relations, following directions, working in teams, and understanding work rules and ethics.	80% of the first year students will qualify for the "select student" status by receiving a recommendation from a full-time contracted faculty member. 90% percent of the second year students will complete their programs as "select students". Criteria to qualify for the "select" status will be determined and published by the faculty prior to the start of the academic year.
2) Demonstrate safe work practices and equipment usage while performing operations in a workstation environment.	90% of all students will pass a safety written and demonstration test.
3) Demonstrate the use of standard machine tools employed by the modern machine shop.	90% of the students who complete the program will have gained the necessary competencies to obtain entry level employment in a manufacturing related occupation.
4) Operate 3 Axis CNC milling machines and 2 Axis CNC lathes using G-code controllers.	90% of the students who complete the program will pass an industry standards examination.
5) Use basic mathematics skills, formulas and right angle trigonometry.	90% of the program completers will pass a final program computations examination with a 70% or better score.
6) Demonstrate technical abilities in researching, accessing and interpreting written, computer program or web-based reference materials.	All students will conduct research with citations in a written report in both the first and second year of the program.
Student Success Goals	Performance Indicators
Students will have access to the program.	The program will achieve the following student to faculty ratios: R-SFTE / FFTE = 26 : 1 CH-SFTE / FFTE = 16 :1 This means for every funded faculty position 26 reimbursable student full-time equivalents should be enrolled or 16 credit hour student full-time equivalents. The program exceeded this student access goal by achieving a 30.87 to 1 R-SFTE/FFTE ratio, and a 18.52 to 1 CH-SFTE to FFTE ratio.
Students who declare their major in this program will increase as a percentage of the total students enrolled.	FY2004 was the base year. 44 of the unduplicated headcount were declared majors.
Program graduates will increase as a percentage of the total students enrolled.	No data available
The percentage of enrolled female students in the program will exceed the percentage of females in the division programs.	12% of students enrolled in the advanced technology division were female. 7% of the manufacturing technology students were female

The percentage of enrolled non-Caucasian program students will exceed the percentage of the non-Caucasian students in the college.	23% of the manufacturing technology students are non-Caucasian.
The percentage of program students who complete each term will exceed the college completion rate.	The college completion rate was 83.24%. The program completion rate was 95.74%.
The percentage of program term completers who receive a C- or greater will exceed the college "success" rate.	The college "success" rate was 79.08%. The program "success" rate was 95.7%.
Students will complete the program within three years.	90% of the students who complete the two-year manufacturing program will have completed within nine terms.
Student completers will be asked to evaluate their overall satisfaction with the program training.	95% of the students who complete the manufacturing technology program will express satisfaction with the level of training provided.
Employers will be satisfied with the job performance of the prior year's program completers.	90% of employers will express job performance satisfaction with the program's student completers. On a five point Likert scale, satisfaction is greater than the midpoint.

Program Learning Outcomes Assessment Matrix

		Proc	ram		Supp	ort Co	ourse	S		G	ener	al Edi	ucatio	n	
Manufacturing Technology	MFG 197 Manufacturing Technology	MFG 201 CNC Mill	MFG 202 CNC Lathe	HE 125 Workplace Safety or Alternative	WLD 151 Fundamentals of Metallurgy	WLD 121 Shielded Metal Arc Welding 1	DRF 167 CAD 1	ENRG 280 Cooperative Education*	Arts and Letters *	CS 120 Concepts of Computing *	CS 160 Orientation to Programming	MTH 076 Applied Geometry for Technicians	MTH 086 Applied Algebra for Technicians	WR 115W Intro to College Writing	Human Relations Requirement
Associate Degree Credit Hours (107 Total Credits)	66	6	6	3	3	4	4		3	4	1	4	4	3	3
Two-year Certificate Credit Hours (85 Total Credits)	66	6	6	3								4		3	3
Program Learning Outcomes															
Demonstrate employability skills required for initial employment and advancement in the industry that include: attendance, proper attire, customer relations, following directions, working in teams, and understanding work rules and ethics.	Ρ	F	D	Ρ	s	s	s	Ρ	S	S	6	S	S	S	s
Demonstrate safe work practices and tool usage while performing operations in a shop environment.	Ρ	F	5	Р	s	Р	S	Ρ							
Demonstrate the use of standard machine tools employed by the modern machine shop.	Ρ	F	D	Ρ	Р	s	S	s							
Operate 3 Axis CNC milling machines and 2 Axis CNC lathes using G-code controllers.	Ρ	F	D	S			S								
Demonstrate technical abilities in researching, accessing and interpreting written, computer program or web-based reference materials.	Ρ	F	D		s	s			Ρ					Ρ	
Use basic mathematics skills, formulas and right angle trigonometry.	Ρ	F	D				Р					Ρ	Ρ		
Core Abilities															
Communicate effectively.	Р	F	2	S	S	S	S	S	S	5	3			Ρ	Ρ
Think critically and solve problems effectively.	Ρ	F	2		Ρ	Ρ	Ρ		S	05	3	Ρ	Ρ	Ρ	Ρ
Increase understanding of the relationship between self and community, including self-awareness and personal responsibility.	s	5	6	s				Ρ							Р
Explore academic disciplines of liberal arts, social sciences, and physical sciences.				s	s	s	s		Ρ	F	5	Ρ	Ρ	Ρ	Р
Learning College Principles															
Learners are active partners in the learning process.	Ρ	F	2												
Learners are self-directed.	P	F	5		P	P	P								
Multiple learning options for diverse learners.	Р	ŀ		 	_										
Learning is promoted across organizational boundaries.	S		5	Р	Р	Р	Р	Ρ	Р	F	,	Ρ	Ρ	Ρ	Р
Learning is substantive and documented.	Р	ŀ	, 												
Assessment Methods	_			-	-	-	-	1	-						
Technical Skill Performance Observation/Evaluation	P														
Employability Skills Evaluation	P														
	5		<u> </u>												
Journaing	0		2												
Oral Report/Presentation	0		, ,												
	3		<u></u>												
Portfolio	5		<u></u>						-						
Pre and Post Test	P		5												
Project Evaluation	P		>		<u> </u>	<u> </u>	-								
Quizzes	s		3												
Self Assessment	P	F	2												
Written Report	S	5	3												
Written Tests/Examinations	S	5	3												

P = this is a primary course for meeting the program learning outcome, core ability, learning college principle, or assessment method.

S = this course meets some of the program learning outcome, core ability, learning college principle or assessment method.

Unit Performance

Program Operations – Actual to Expected Analysis

		mana	laotaning	i connoiog	y
	2003 - 2004 Outcomes	Expected*	Actual	Difference	Analysis
1	Enrollment				
2	Reimbursable Student FTE	39.360	45.560	116%	
3	Credit Hour Student FTE	23.616	27.336	116%	Enrollment is higher than expected.
4	Student Head Count	59	44	75%	
5	Staffing				
6	Full-time Equivalent Faculty	1.367	1.000	73%	
7	Part-time Equivalent Faculty	0.342	0.476	139%	
8	Total Faculty FTE	1.709	1.476	86%	Faculty Staffing is lower than expected.
9	Budget				
10	FT Faculty Dollars	65,123	47,646	73%	
11	PT Faculty Dollars	12,566	17,505	139%	
12	Lab Assistant Dollars	5,904	9,569	162%	
13	Other Payroll Expenses	36,382	32,520	89%	
14	Materials and Supplies	11,960	5,497	46%	
15	Direct Instruction Costs	131,934	112,737	85%	Expenses are lower than expected.
16	Operating Ratios				
17	R-SFTE/Faculty FTE	23.04	30.87	134%	
18	CH-SFTE/Faculty FTE	13.82	18.52	134%	Faculty are serving more students.
19	Cost / R-SFTE	3,351.98	2,474.47	74%	
20	Cost / CH-SFTE	5,586.63	4,124.12	74%	Cost per student is lower than expected.
21	Non-tuition Revenues				
22	Course Fees				
23	Differential Fees				
24	Program Fees				
25	Sales				
26	Donations				

Manufacturing Technology

* Expected calculations are based on the instructional program benchmarks model.

* This program is a medium cost program in the benchmark model.



Program Operating Trends

Manufacturing Technology

	Operating Data	FY 02	FY 02 FY 03			
		Actual	Actual	Actual		
1	Full-Time Faculty FTE	1.000	1.000	1.000		
2	Part-Time Faculty FTE	0.670	0.500	0.476		
3	Total Faculty FTE	1.670	1.500	1.476		
4	Student FTE	36.450	32.368	45.560		
5	SFTE / FFTE	21.826	21.579	30.867		
6						
7	Full-Time Faculty	43,767	48,184	47,646		
8	Part-Time Faculty	18,621	18,962	17,505		
9	Lab Assistant	909	2,679	9,569		
10	Other Payroll Expenses	27,505	24,289	32,520		
11	Materials and Supplies	4,079	2,336	5,497		
12	Total	94,881	96,450	112,737		
13	Cost per Student FTE	2,603	2,980	2,474		





Part III – Unit Performance 1/12/2005

Program Outcomes Analysis

1. How effectively did you fulfill your unit's mission?

The program served 44 students who were declared majors (45.56 reimbursable student FTE). The program identified learning outcomes, goals and performance indicators which will be used in future unit plans to better respond to this question.

2. How well did students meet your learning outcomes?

Refer to the Program Learning Outcomes (pages 10 and 11) for the performance indicators. We Identified the performance indicators this year. It is our intent to measure these goals in next year's unit plan. The manufacturing program learning outcomes are in alignment with current industry standards provided by the manufacturing advisory committee.

Students are completing the program and obtaining employment.

3. How well did students meet the Core Abilities outcomes?

Refer to the Program Learning Outcomes Assessment Matrix on page 12. The students demonstrated their ability to communicate effectively, think critically and solve problems, plus show a mastery of knowledge in the manufacturing field.

4. How efficiently did you use the resources you were given?

Please refer to the Program Operations: Actual to Expected Analysis on page 13. In summary:

Enrollment: 16% more than expected. Staffing: 14% lower than expected. Budget: 15% lower than expected. Cost per Student: 26% lower than expected.

The best indicator for the program's efficiency is the cost per student ratio. The program is expending less per student than expected and less than the previous two years (refer to page 14).

5. How well are you utilizing current technology?

The manufacturing program has always been driven to provide students with the newest manufacturing technologies. Students have access to current manufacturing equipment and software (CAM).

6. How effective was your relationship with your advisory committee in achieving unit goals?

Advisory committee members review the manufacturing program curriculum during the year. One of the goals of the advisory committee is get involved in the unit planning process before the plan is due in December. New members are added to ensure diversity and innovation within our local industry.

7. How well did you meet faculty and staff goals?

The manufacturing program instructors meet their basic goals of updating course textbooks, creating new curriculum and adding new instructional materials.

The faculty is responsive to the recommendations of the advisory committee and are keeping the program current with the advances in technologies.

8. Did last year's funded initiatives meet your goals?

The program received \$67,000 in Carl Perkins funding last year to purchase machining lathes and mills. This equipment was ordered and is now being installed.

9. What are the overall unit's strengths?

Providing quality and relevant instruction is the strength of the program.

10. What are the overall unit's challenges?

The program is reliant on one full-time instructor. This limits the ability of the program enhance its curricula, especially in emerging areas such as CAD/CAM.

11. Program Analysis Findings

Finding 1: The manufacturing technology program needs to increase its staffing to support the additional enrollment and development of new curricula.

Finding 2: The manufacturing technology program needs to maintain its shop equipment and software.

Finding 3: The manufacturing technology program needs to continuously improve its curriculum and operations. The program should acquire new technologies to keep current with advances in manufacturing and instructional technologies.

Finding 4: The manufacturing technology program needs to improve its instructional facilities.

Part IV: Projected Performance

Program Initiatives

1.	1. Initiative Title and Identifier (Unit Abbreviation, Fiscal Year, Type, Sequence Number)	
	Division Priority:	11

Initiative 1: Increase Program Staffing

Manufacturing Technology, FY 2005, Enhancement, 01 = MT05E01

2. Linkage to Program Analysis Findings

Finding 1: The manufacturing technology program needs to increase its staffing to support the additional enrollment and development of new curricula.

3. Describe the Initiative

What is the need or intended use?

The manufacturing technology program needs to continuously improve its program to keep current with advances in the industry. The program needs to respond to the increased enrollments.

How was that need assessed?

An analysis of the enrollment trends (over three years) and of the operating efficiencies (student to faculty ratios) was conducted.

What is your evidence of the need?

Enrollment is 16% higher than expected. Staffing levels are14% lower than expected. The facilities have the capacity to handle more students.

Given college resources, is it feasible?

Yes. It would be a matter of hiring new shop aides and a full-time faculty member.

Is it an efficient use of college resources?

Yes. A current and relevant program will attract and retain more students. Students who complete a current and relevant program are much more employable.

What would be the campus location of this request/project? The manufacturing technology program is located on the main campus building 12.

How many students (per year) will benefit? The program serves approximately 44 students (majors) per year. (45.56 R-SFTE).

How will students benefit?

Students will have access to additional instructional help (shop aides). The addition of a full-time faculty member will provide the resource necessary to develop and implement new curricula.

4. Requested Resources

1) Instructional Aides (MFG 197) = \$36,000 (with OPE)

The program needs the equivalent of a 1.00 full-time classified instructional aide to assist the instructor in the shop and maintain the shop equipment. Additionally, this position will reduce the risks of operating in an unsafe environment due to the high student/teacher ratios.

2) Instructional Aide (CNG/CAM) = \$18,000 (with OPE) The program needs a .500 FTE instructional aide for the CNC and CAM courses. This aide would assist in the computer labs and with students using the CNC equipment.

3) Full-time Faculty Position = \$80,000 (with OPE) This program is growing. Historically, this program has had 3.0 full-time faculty. Currently, the program has a

1.000 full-time and a .476 part-time instructor. The full-time faculty has the responsibility to teach a 66 credit load equal to the entire core program for the AAS degree. This makes it very difficult to effectively serve students, maintain industry contacts, design and implement curricula, and perform other college-wide duties.

5. Funding Sources

General Funds

5.1 Alignment to Carl Perkins Act goals?

5.2 Alignment to Student Technology Fees.

5.3 Curriculum Development

How will this initiative improve learning?

By researching the needs of employers and students to increase student enrollment.

What specific curricular materials will be produced? New course laboratory training materials, projects and tests.

Why is this curriculum development and not just curriculum maintenance? These items are new to the curriculum. The faculty must become proficient with the equipment/software and prepare new learning materials.

6. Organization and Program Codes

611900 112000

7. Alignment to the College's goals

This initiative aligns with the following college goals:

- Transforming Students' Lives
- Transforming the Learning Environment

Program Initiatives

2. 1. Initiative Title and Identifier (Unit Abbreviation, Fiscal Year, Type, Sequence Number)
Division Priority: 22
Manufacturing Technology, FY 2005, Maintenance, 01 = MT05M01
2. Linkage to Program Analysis Findings
Finding 2: The manufacturing technology program needs to maintain its laboratory equipment and software. The total equipment inventory value is \$468,969. The average annual replacement and upgrade cost should average \$46,377.
3. Describe the Initiative
What is the need or intended use? The program has an existing inventory of equipment and software that needs to be replaced or upgraded. Students should have current and operational equipment to ensure they are appropriately trained.
How was that need assessed? There is a life cycle cost for all equipment and software. Equipment and software required for instructional program must eventually be replaced or upgraded (refer to the Existing Equipment Inventory on page 28).
What is your evidence of the need? The program has an equipment inventory.
<i>Given college resources, is it feasible?</i> Yes. The College should strive to maintain or improve its level of quality in the instructional programs.
<i>Is it an efficient use of college resources?</i> Yes. Funding the life-cycle costs of equipment will minimize the cost of funding critical failures.
What would be the campus location of this request/project? The Manufacturing Technology program is located on the main campus building 12.
How many students (per year) will benefit? The program serves approximately 44 students (majors) per year. (45.56 R-SFTE).
How will students benefit? Students will benefit by learning to industry entry-level how to operate equipment that they will be expected to operate as they obtain employment in the field for which they are being trained. They will benefit by having access to dependable, safe and current technology. They will benefit by learning to work efficiently with efficient equipment.
4. Requested Resources
 Maintenance initiatives are requests for resources to maintain the existing levels of program efficiency and effectiveness. Maintenance initiatives respond to: any mandatory changes in the program (recurring contracts, change in credits, implementing accreditation or other curriculum standards), and, costs to maintain the existing curriculum and program equipment.
 CNC/CAM Computer Stations (12) = \$18,000 The current computers are old and do not support the graphical/mathematical requirements for solid modeling, CNC and CAM software.
 Upgrade the Monitors in 12/119 to 19" LCD (12) = \$4,800 The computers in room 119 are used by the college for staff development and by the manufacturing program.

The monitors are 15" CRTs and are inadequate when using CAD/CAM graphical software.

- 3) Replace/upgrade the CNC Rhino Lathe = \$8,000 This lathe was purchased in 1980.
- 4) Replace/upgrade the surface grinder = \$10,500 This grinder was purchased in 1983.
- 5) Replace/upgrade the 4 sets of collet closures =\$ 3,000 These collets are over 20 years old.
- 6) Replace/upgrade the Kurt Vices (5) = \$2,500 These vices are over 20 years old.
- 7) Replace/upgrade 10 sets of Bench Tools = \$3,000 These bench tools are over 10 years old.
- 8) Replace/upgrade the CNC Fryer Mill =\$60,000 The CNC Fryer Mill is over 20 years old.
- 9) Replace/upgrade the Super Max Mill = \$30,000 The Super Max Mill is over 20 years old.
- 10) Replace/upgrade the Mori Lathe = 86,000 The Mori Lathe is over 20 years old.

5. Funding Sources

Carl Perkins Technology Fees

5.1 Alignment to Carl Perkins Act goals?

Student Skills Goal

This initiative will improve technical skills of students by providing opportunity for those students to learn how to operate safe and reliable equipment and software of a type that they will be expected to operate by their future employers

Work-based Learning Goal

Students should be trained on equipment and software similar to what they will work with when employed. Employers are seeking employees with knowledge and training on the equipment and software they have.

Effect on Profession Technical Education student success? Students will gain industry specified skills which lead to higher paying employment.

Brief Carl Perkins funding history

The Manufacturing Technology program is reliant upon Carl Perkins funding to maintain and enhance its equipment and other instructional resources. This funding has allowed the program to align its capabilities with the needs of the industry for which it trains students. The result is better qualified students, a better and broader relationship with industry and more efficient use of educational time.

5.2 Alignment to Student Technology Fees.

This initiative is seeking student technology fees (TACT).

5.3 Curriculum Development

6. Organization and Program Codes

611900 112000

7. Alignment to the College's goals	
This initiative aligns with the following college goals:	

- •
- •
- •
- Transforming Students' Lives Transforming the Learning Environment Transforming the College Organization o implementing a "life-cycle" approach for funding equipment

Program Initiatives

3. 1. Initiative Title and Identifier (Unit Abbreviation, Fiscal Year, Type, Sequence Number)

Division Priority: 17

Initiative 3: Acquire New Equipment, Software and Curriculum to Improve the Program Manufacturing Technology, FY 2005, Enhancement, 02 = **MT05E02**

2. Linkage to Program Analysis Findings

Finding 3: The manufacturing technology program needs to continuously improve its curriculum and operations. The program should acquire new technologies to keep current with advances in manufacturing and instructional technologies.

3. Describe the Initiative

What is the need or intended use?

The manufacturing technology program needs to continuously improve its program to keep current with advances in the industry.

How was that need assessed?

Faculty assess the need to adapt and or create new instructional opportunities. This assessment involves investigating the emerging technology needs of local industries. Additionally, the faculty research national and regional trends through reviewing the literature and talking with other professional colleagues.

What is your evidence of the need?

There is a discrepancy between what the program can teach and what an entry level graduate will be required to know. Industrial training videos, CNC software, creating new curriculum and increasing the annual funding for tooling maintenance are examples of new resource needs.

Given college resources, is it feasible? Yes. The College should strive to improve its level of quality in the instructional programs.

Is it an efficient use of college resources?

Yes. A current and relevant program will attract and retain more students. Students who complete a current and relevant program are much more employable.

What would be the campus location of this request/project? The manufacturing technology program is located on the main campus building 12.

How many students (per year) will benefit? The program serves approximately 44 students (majors) per year. (45.56 R-SFTE).

How will students benefit?

A current and relevant program will attract and retain more students. Students who complete a current and relevant program are much more employable.

4. Requested Resources

1) Increase the budget for tooling maintenance = \$3,500

All of the manufacturing machines require tooling maintenance (sharpening, replacement of worn parts, etc.). The current operating budget is insufficient to cover these mandatory costs. These costs are also beyond what is expected from the courses student fee revenue.

2) Manufacturing Instructional Videos (6) = \$3,000 These industrial videos would supplement the manufacturing curriculum.

3) Outside Speakers = \$1,500

Industry experts would be contracted to present specific manufacturing topics. This would give the students an opportunity to expand their knowledge and discuss the topic with an expert.

5) Produce an interactive curriculum (CD ROM and videos) for the CNC and CAM courses. = \$7,400 This project would require 200 hours of curriculum development. The product would enable students to learn CNC and CAM topics in an interactive and distributed environment (distance learning).

5. Funding Sources

Carl Perkins General Funds

5.1 Alignment to Carl Perkins Act goals?

Student Skills Goal

This initiative will improve technical skills of students by providing opportunity for those students to learn how to operate safe and reliable equipment of a type that they will be expected to operate by their future employers

Work-based Learning Goal

Students should be trained on equipment similar to what they will work with when employed. Employers are seeking employees with knowledge and training on the equipment they have.

Effect on Profession Technical Education student success? Students will gain industry specified skills which lead to higher paying employment.

Brief Carl Perkins funding history

The manufacturing technology program has utilized Perkins funding over the last 20 years to enhance its capability to offer effective, efficient training through purchase of equipment. In that time, Perkins money has allowed the program to align its capabilities with the needs of the industry for which it trains students. The result is better qualified students, a better and broader relationship with industry and more efficient use of educational time.

5.2 Alignment to Student Technology Fees.

This initiative is not seeking Student Technology Fees.

5.3 Curriculum Development

How will this initiative improve learning? By incorporating new technologies and training materials into the curriculum.

What specific curricular materials will be produced? New course laboratory training materials, projects and tests.

Why is this curriculum development and not just curriculum maintenance? Producing an interactive curriculum that facilitates distance learning a significant change in the instructional methodology.

6. Organization and Program Codes

611900 112000

7. Alignment to the College's goals

This initiative aligns with the following college goals:

- Transforming Students' Lives
- Transforming the Learning Environment

Program Initiatives

4. 1. Initiative Title and Identifier (Unit Abbreviation, Fiscal Year, Type, Sequence Number) Division Priority: 30
Initiative 4: Remodel Existing Facilities Manufacturing Technology, FY 2005, Maintenance, 02 = MT05M02
2. Linkage to Program Analysis Findings
Finding 4: The manufacturing technology program needs to improve its instructional facilities.
3. Describe the Initiative
What is the need or intended use? The instructional classroom is poorly designed and unsafe. It is located on the mezzanine overhang. The current supporting wall is inadequate and should be upgrade. Also, the HVAC ductwork in room 113 is inadequate for temperature control and airflow to support a computer lab.
How was that need assessed? Faculty have assessed the need by using the areas.
What is your evidence of the need? The faculty have identified the lack of adequate spaces and HVAC.
Given college resources, is it feasible? Yes. The College should strive to improve its level of quality in the instructional programs.
<i>Is it an efficient use of college resources?</i> Yes. These are facility safety and health issues.
What would be the campus location of this request/project? The manufacturing technology program is located on the main campus building 12.
How many students (per year) will benefit? The program serves approximately 44 students (majors) per year. (45.56 R-SFTE).
How will students benefit? Students will work in a safe and healthy environment.
4. Requested Resources
1) Modernize room 12/112 = \$25,000 Room 112 can handle more students in the CNC computer laboratory if the heating and ventilation system is expanded. Efforts by the LCC facilities staff to reroute the existing ductwork have been unsuccessful.
2) Mezzanine Classroom needs to be enclosed =\$30,000 Manufacturing lectures take place in a mezzanine area above the machine shop. All of the machine shop activities and noise from the machine tools can be heard all too clearly by the students as they try to listen and take notes. The instructor must shout over the shop din presenting such topics as math, trigonometry, tool bid geometry and blueprint reading. It is trying and difficult for all. In addition, there is a safety concern. The existing one-half wall is very weak and minimally supported. A student could easily push it through and fall a full story to the concrete floor

5. Funding Sources

Facilities Maintenance Funds General Funds

below.

5.1 Alignment to Carl Parking Act goals?
5.2 Alignment to Student Technology Fees.
5.3 Curriculum Development
6. Organization and Program Codes
611900 112000
7. Alignment to the College's goals
This initiative aligns with the following college goals:
Transforming Students' Lives
Transforming the Learning Environment

Initiatives Spreadsheet

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Division Prio	Initiative ID	Expected completion d	Initiative Title	Resource Description		\$\$	Recurring / Nonrecurrinç	Payroll (w/OPE)	Equipment	Space	Other	Existing	New Gen Fund	Carl Perkins	Stud Tech Fee	Curr Dev	Other	
1	MT05E01	6/30/2005	Increase Program Staffing	Instructional Aides MFG 197	\$	36,000	R	Х					Х					
2	MT05E01	6/30/2005	Increase Program Staffing	Instructional Aide CNC/CAM	\$	18,000	R	Х					Х					
3	MT05E02	6/30/2005	Acquire New Equipment, Software or Curriculum	Increase Maintenance Account	\$	3,500	R				х		х	х				
4	MT05E01	6/30/2005	Increase Program Staffing	Full-time Faculty (1.000)	\$	80,000	R	Х					Х					
5	MT05M01	6/30/2005	Replace/Upgrade Existing Equipment or Software	CNC/CAM Computer Stations (12)	\$	18,000	NR		х						Х			
6	MT05E02	6/30/2005	Acquire New Equipment, Software or Curriculum	Manufacturing Instructional Videos (6)	\$	3,000	NR		х					х				
7	MT05E02	6/30/2005	Acquire New Equipment, Software or Curriculum	Outside Speakers	\$	1,500	NR				х			х				
8	MT05E02	6/30/2005	Acquire New Equipment, Software or Curriculum	Curriculum Development (200 Hrs)	\$	7,400	NR	х								х		
9	MT05E02	6/30/2005	Acquire New Equipment, Software or Curriculum	CNC Software (10)	\$	3,500	NR		х					х		х		
10	MT05M02	6/30/2005	Remodel Space	Modernize 12/112	\$	25,000	NR			Х							Х	
11	MT05M02	6/30/2005	Remodel Space	Enclose 12/200 Mezzanine	\$	30,000	NR			Х							Х	
12	MT05M01	6/30/2005	Replace/Upgrade Existing Equipment or Software	Upgrade 12/110 Monitors to 19" LCD. (12)	\$	4,800	NR		Х						х			
13	MT05M01	6/30/2005	Replace/Upgrade Existing Equipment or Software	CNC Rhino Lathe	\$	8,000	NR		х					х				
14	MT05M01	6/30/2005	Replace/Upgrade Existing Equipment or Software	Surface Grinder	\$	10,500	NR		х					х				
15	MT05M01	6/30/2005	Replace/Upgrade Existing Equipment or Software	Collet Closures (4)	\$	3,000	NR		х					х				
16	MT05M01	6/30/2005	Replace/Upgrade Existing Equipment or Software	Kurt Vices (5)	\$	2,500	NR		х					х				
17	MT05M01	6/30/2005	Replace/Upgrade Existing Equipment or Software	Bench Tool Sets (10)	\$	3,000	NR		х					х				
18	MT05M01	6/30/2005	Replace/Upgrade Existing Equipment or Software	CNC Fryer Mill	\$	60,000	NR		Х					х				
19	MT05M01	6/30/2005	Replace/Upgrade Existing Equipment or Software	CNC Super Max Mill	\$	30,000	NR		Х					Х				
20	MT05M01	6/30/2005	Replace/Upgrade Existing Equipment or Software	CNC Mori Lathe	\$	86,000	NR		Х					х				

Equipment Inventory Spreadsheet

Existing Equipment Inventory

				Total	Years of	Annual
Program	Description	#	Unit Cost	Cost	Life	Cost
MT	CNC LATHE-USED	1	62,614	62,614	15	4,174
MT	MC 24 MILLING CENTER	1	54,480	54,480	5	10,896
MT	CNC LATHE SYS W/FUN EMUL	1	26,343	26,343	15	1,756
MT	CNC CONTROLLER THREE AXIS	1	22,850	22,850	15	1,523
MT	CAM Computer Stations	12	1,500	18,000	5	3,600
MT	CAM Software	12	1,500	18,000	3	6,000
MT	40" ON CENTER LATHE	1	17,296	17,296	15	1,153
MT	40" ON CENTER LATHE	1	17,296	17,296	15	1,153
MT	40" ON CENTER LATHE	1	17,296	17,296	15	1,153
MT	40" ON CENTER LATHE	1	17,296	17,296	15	1,153
MT	40" ON CENTER LATHE	1	17,296	17,296	15	1,153
MT	GRINDER SURFACE	1	15,344	15,344	15	1,023
MT	GRINDER, CYLINDRICAL	1	14,800	14,800	15	987
MT	MILLING MACHINE	1	12,225	12,225	15	815
MT	MILLING MACHINE	1	12,225	12,225	15	815
MT	MILLING MACHINE	1	12,225	12,225	15	815
MT	LATHE 14"X28 CC	1	9,633	9,633	15	642
MT	MASTERTURN ENGINE LATHE	1	9,390	9,390	15	626
MT	MASTERTURN ENGINE LATHE	1	9,390	9,390	15	626
MT	MASTERTURN ENGINE LATHE	1	9,390	9,390	15	626
MT	MASTERTURN ENGINE LATHE	1	9,390	9,390	15	626
MT	MASTERTURN ENGINE LATHE	1	9,390	9,390	15	626
MT	Heat treat oven	1	8,800	8,800	20	440
MT	LATHE 17"	1	8,696	8,696	15	580
MT	VERTICAL MILL-SUPERMAX	1	7,995	7,995	15	533
MT	SURFACE GRINDER	1	6,042	6,042	10	604
MT	MACHINE RADIAL DRILLING	1	5,808	5,808	15	387
MT	LATHE 15"	1	5,059	5,059	15	337
MT	VERTICAL MILLING MACHINE	1	5,000	5,000	15	333
MT	Network Printer	1	3,000	3,000	5	600
MT	Collet closure	4	600	2,400	20	120
MT	Kurt Vise	5	400	2,000	20	100
MT	Bench tools	10	200	2,000	5	400
	Existing Equipment Total			<u>468,96</u> 9		
	Annual Replacement Costs					46,377

Projected FY06 Program Outcomes

1. What program level outcomes do you expect to achieve?

The program has developed a set of learning outcomes and operational goals. Assessment of these program outcomes will be based on the measurement of the actual performance to the performance indicators. Please refer to the Program Learning Outcomes, Goals and Performance Indicators chart on page 10. Specifically, student enrollment should increase.

2. How will your program enhance your students' abilities to meet Core Abilities outcomes?

The program has developed a Learning Outcomes Assessment Matrix that maps the program and general education courses required to complete an associates degree against the program's learning outcomes, core abilities and learning college principles. The primary and secondary assessment methods are also identified. Please see this chart on page 12.

3. What course level outcomes do you expect to achieve?

What goals do you wish to set for 2004-2005?

Program goals remain as indicated for 2003-2004. That is that students would receive competent instruction in an effective and efficient learning environment that will lead to the acquisition of industrial entry-level skills. To accomplish this on-going goal the program will continue to prioritize equipment replacement needs and review its curriculum.

How will your courses grow, change or adapt?

We would like to adapt the courses to reflect the findings of the market research. Also, if funded, we would like to develop interactive courses in CNC and CAM.

How will your instructional methods change or adapt? If the initiatives are funded, the students will have better access to the instructors in a better learning environment.

What goals do you have for your instructional environment (classrooms and/or technologies and equipment)? We are seeking to maintain and enhance our instructional equipment. Please note the exiting equipment inventory is \$468,969 that requires a average replacement/upgrade cost of \$46,377.

4. What plans do you have for enhancing your use of current technologies?

The program is requesting upgraded instructional lab stations, tools and equipment. Refer to initiative 2. The program is request new instructional lab stations, tools and equipment. Refer to initiative 3.

5. What plans do you have for working more effectively with your Advisory Committee?

A goal of program staff is to recruit additional members to its advisory committee. If we are successful in reaching this goal we will have a broader based, more effective committee, representing more manufacturing technology disciplines.

6. How will you set faculty and staff goals?

The faculty and staff in this program will use this unit plan to help set goals. The inclusion of learning outcomes and operating goals provide the basis for assessment. The faculty and staff must continuously maintain and improve the program.

7. Enrollment Projections

The enrollment is current above what is expected. At this time, we need to be more concerned with the quality of instruction. If additional faculty can be funded, then the enrollment will increase.

8. Student Success Projections

The student success projections are part of the Program Learning Outcomes, Goals and Performance Indicators (page 10). Additional measures of student success will be developed during the year and added to the chart.

9. Facilities and Equipment Need Projection	
This program has sufficient facility but requires the continuous upgrading and acquisition of new equipment to conform to the advances in the industry and in instructional technologies.	

10. Budget Projections Carl Perkins and Technology Fee dollars will be required to maintain and enhance the equipment.

Advisory Committee Chair

Date

Division Chair

Date