

WORKING DRAFT

9/28/00

ABRIDGED STRATEGIC PLANNING DOCUMENT FOR THE College Of Engineering Michigan Technological University

COLLEGE OF ENGINEERING MISSION, VISION, AND GUIDING PRINCIPLES

MISSION

We prepare students to Create the future.

VISION

The College of Engineering will develop nationally prominent educational programs and research thrusts that will benefit all of our constituencies and, in doing so, we will become a college of choice nationally.

OUR GUIDING PRINCIPLES

The success of our students will always be the most important measure of our success, and we will continually work to engage all of our students in the integration and creation of knowledge through teamwork, instruction, and research in an active, discovery-based learning environment.

II. OUR CURRENT CONTEXT

The College of Engineering at Michigan Technological University for many years has been recognized within the region as having high quality, rigorous undergraduate programs. Similarly, the college has led the institution toward further recognition in the research arena, again primarily at the regional level. We are now poised to move from regional recognition to national recognition in both education and research. If we look at Figures 1-2 below it becomes clear as to what we have to do to move toward our vision. Each of the figures compare four productivity measures -- baccalaureate degrees, masters degrees, doctoral degrees, and research expenditures -- normalized per faculty member and weighted to approximately be equivalent on a baccalaureate basis. The degree productivity comparison is based on the assumption that the College serves baccalaureate students 2 of their 4 years at Michigan Tech, that masters students require about 2 years for their degree, and that doctoral students require 4 years. Research expenditures are divided by \$50,000, an estimate of the amount of revenue received from an undergraduate student over 4 years.

Figure 1.a shows that our overall productivity over the past decade has been relatively constant. Figure 1.b is the same information plotted a bit differently. This figure illustrates the increase in productivity in research and graduate studies over this same decade. Figure 2 compares our productivity with in-state schools (Western Michigan, Michigan State), peers (Missouri-Rolla, Clarkson), and our benchmarks (schools of choice nationally/internationally). From Figure 2.a it is clear that we are as productive as most of the schools presented. Figure 2.b is equally clear in pointing out the difference between Michigan Tech and our benchmarks – research and graduate degrees. Table 1 shows similar information for the 25 largest engineering programs in the country. The schools of choice all have fewer than 20 undergraduate students per faculty and fewer than 4 BS degrees per year per faculty.

In addition to growing the graduate programs and research, the College is also building nationally recognized undergraduate educational offerings with more active, discovery based learning and flexible degree paths with programs such as the year long multi-disciplinary senior design projects and the Enterprise Program. These efforts, coupled with the continued need to develop our graduate programs and scholarship, will require a much lower undergraduate student to faculty ratio. It is this ratio that is one of the most important indicators of quality in our undergraduate programs. Therefore, to become a College of choice nationally, we must increase our scholarship and graduate degrees, particularly the Ph.D. degree, and we must increase the quality of our undergraduate educational experience by reducing the student to faculty ratio. The medium- to long-term goals for the College are shown on the right hand side of Figure 2 and these numbers are also discussed/presented in the next section.

Figure 1. Trends in Degree and Research Productivity in Michigan Technological University College of Engineering – 1991- 1999

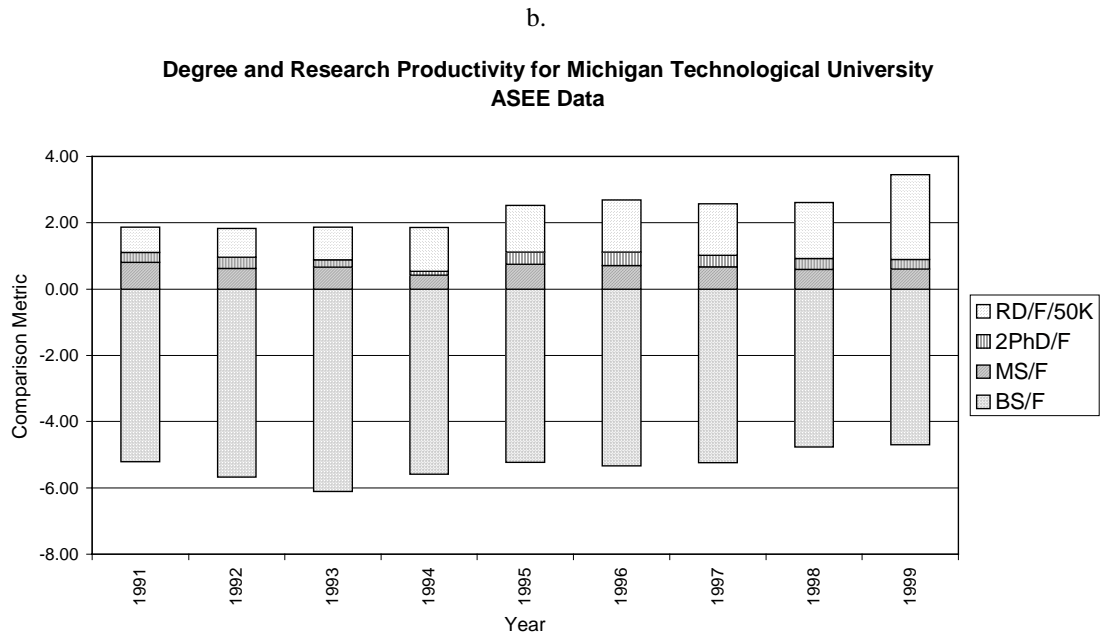
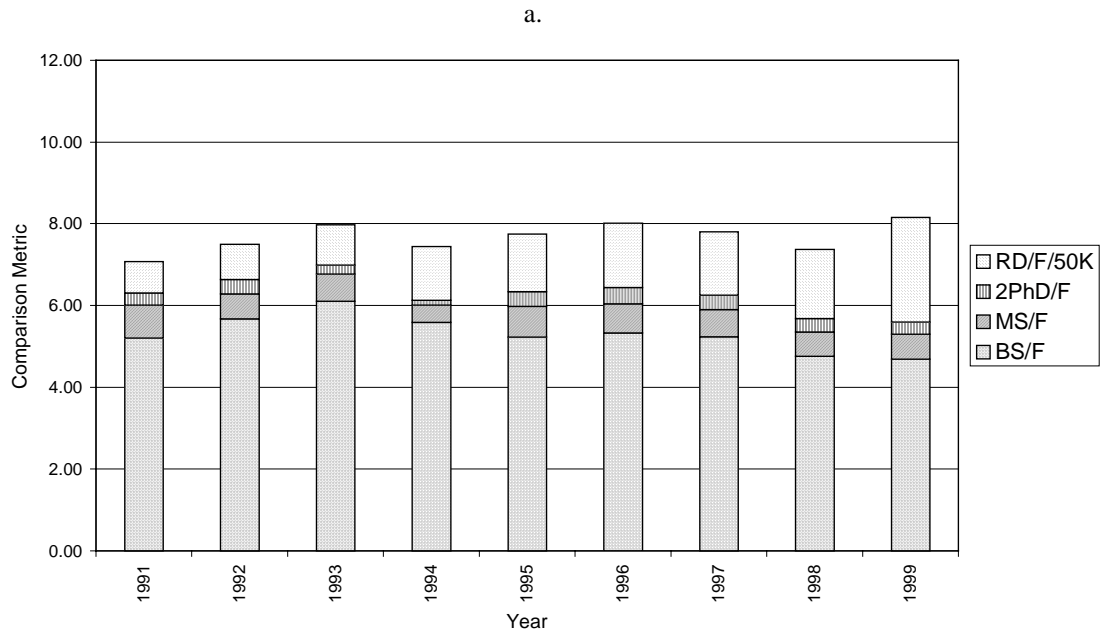
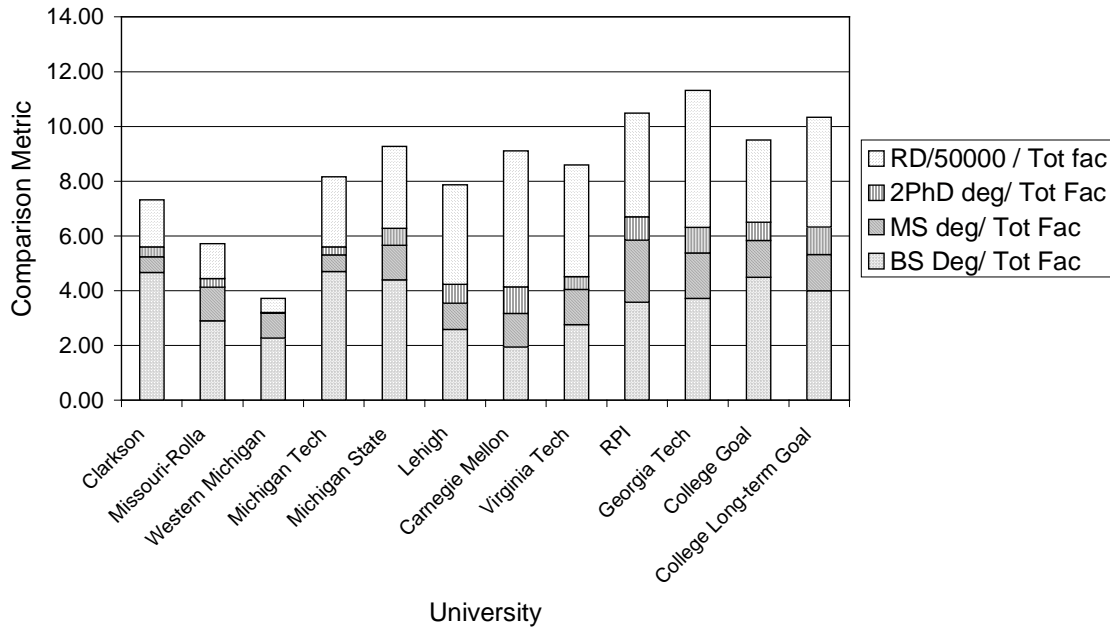


Figure 2. Comparison of Degree and Research Productivity of Selected Colleges of Engineering – 1998-99

a.



b.

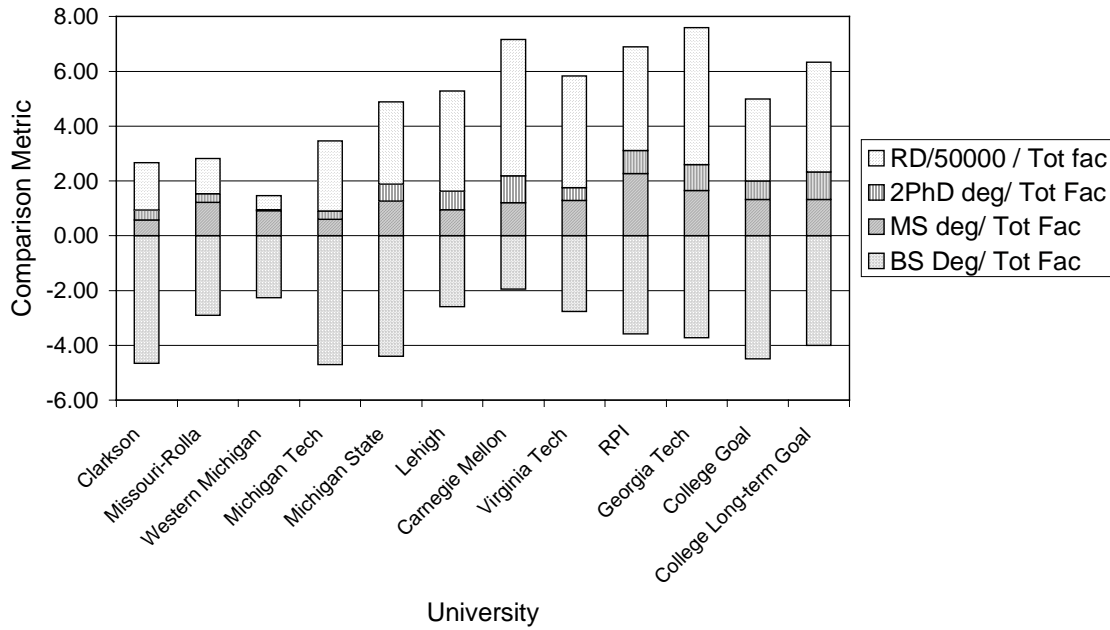


Table 2. Comparison of Undergraduate to Faculty Ratio and BS Degrees per Faculty for Michigan Tech and Research Universities.

University	1998-99 ASEE Data				UG Enroll per Teaching Fac.	BS Deg. per Teaching Fac.	UG Enroll per Total Faculty	BS Deg. per Total Faculty
	# Teaching Fac	Total Faculty	UG Enrollment	BS Degrees				
MTU	140.75	144.75	3397	662	24.13	4.70	23.47	4.57
LA State	124.17	127.37	2853	350	22.98	2.82	22.40	2.75
Mich. State	143	187.4	3264	628	22.83	4.39	17.42	3.35
Auburn	135	141	3029	527	22.44	3.90	21.48	3.74
UC-San Diego	139.98	226.91	3136	477	22.40	3.41	13.82	2.10
Cal. Poly St.	203.54	203.54	4216	1304	20.71	6.41	20.71	6.41
Purdue	293.28	293.28	5833	1138	19.89	3.88	19.89	3.88
Wisc. - Madison	177	177	3472	526	19.62	2.97	19.62	2.97
Texas A&M	351.75	456.15	6888	1108	19.58	3.15	15.10	2.43
NC State	274.36	337.81	4964	843	18.09	3.07	14.69	2.50
Virginia Tech	302.65	376.92	5104	835	16.86	2.76	13.54	2.22
Clemson	156.43	165.11	2596	441	16.60	2.82	15.72	2.67
Arizona State	182.2	207.68	2956	493	16.22	2.71	14.23	2.37
Iowa State	280.17	296.17	4494	694	16.04	2.48	15.17	2.34
Univ. Maryland	231	396	3539	633	15.32	2.74	8.94	1.60
Georgia Tech	347.69	454.89	5317	1293	15.29	3.72	11.69	2.84
Texas- Austin	272.55	396.76	4154	730	15.24	2.68	10.47	1.84
Penn State	391.1	545.6	5607	1168	14.34	2.99	10.28	2.14
Univ. of Florida	282.8	308.8	4051	739	14.32	2.61	13.12	2.39
Univ. of MI	331.15	405.9	4678	926	14.13	2.80	11.53	2.28
Univ. Illinois	407.49	573.19	5208	1193	12.78	2.93	9.09	2.08
UC-Berkeley	240	240	3058	753	12.74	3.14	12.74	3.14
Ohio State	287	360.9	3493	694	12.17	2.42	9.68	1.92
Cornell	238.13	274.32	2696	722	11.32	3.03	9.83	2.63
RPI	293.28	293.28	2618	535	8.93	1.82	8.93	1.82

Top 25 Engineering Program by Enrollment (not including University of Puerto Rico, Mayaguez)

Over time we can bring the student to faculty ratios into line with our benchmarks by decreasing the size of the undergraduate student body or by increasing the size of the faculty. The demographics, demand, and state/national need indicate that we should do the latter. Attachment A. makes a case for an engineering fee (presented to the upper administration earlier) that would generate enough revenue to hire the faculty and staff needed to ensure the quality educational programs that we want for all of our students. If the fee were applied to only sophomores through graduate students then it would affect less than half the student body at Michigan Tech and the state would not consider it as part of our tuition increase. Without the additional revenue, an enrollment management plan will have to be implemented to reduce the student faculty ratio. Attachment B is the plan that is currently being considered, however, in either case an effective enrollment management plan needs to be implemented in order to maintain quality educational programs.

Table 2 outlines the current statistics in the College and Table 3 presents a possible picture of college status in 2005 without adding faculty lines. New faculty lines will allow for an increase in the quality of our undergraduate programs without reducing the number of degrees awarded. New lines will also allow us to grow our new programs, develop new programs, and develop critical mass in our strategic research platforms. The quantity and quality of our scholarship and graduate degrees will consequently grow. If the faculty size increases by twenty-five we could maintain our current student numbers (500 more than table 3), increase our research dollars by 5 million dollars, and add 100 graduate students – 50 of whom would be Ph.D. students.

Table 2. Current Status -- College of Engineering

Department	UG	MS	PhD	Faculty	Staff	GF	Research	SCH
	Fall 2000	Fall 2000	Fall 2000	(ten-track) Fall 2000	Fall 2000	(thou \$) 1999-2000	(thou \$) 1999-2000	All faculty 1999-2000
Biomedical	192			5	1.3	198	407	781
Chemical	404	13	16	15	5.2	1,235	985	7,289
Civil & Environmental	522	53	24	24.8	6	1,937	4,963	12,122
Electrical & Computer	621	33	13	23.2	6.3	1,747	1,199	13,671
Engrg Fundamentals	217	0	0	1	7.3	231		2,061
Geological Engrg and Sci	72	13	9	10.9	2.6	890	1,777	4,528
Mech Engrg - Engrg Mech	1,125	100	36	42	14.5	3,567	2,196	29,590
Material Sci & Engrg	100	13	19	12.3	8.8	1,633	1,218	5,671
Mining & Matl Process	36	3	10	7.3	1.8	346	573	712
College Total	3,289	228	127	141.5	53.8	11,784	13,318	76,425

Table 3. Projections for 2005 (based on current lines reduction in undergraduate student to faculty ratio)

	BioM	CM	CEE	ECE	EngF	GES	MEEM	MSE	MMP	COE	Current Status
TTF (GF)	7	15	23.8	22	1	11.5	42.5	12.3	7.3	142.4	142
nTF (GF)	0	0	1	2	5	0	1	0	0	9	9
staff (GF)	1.5	5	7	6	2.5	2.5	10	8	1	43.5	44.8
BS enrolled	140	300	496	480	200	173	870	185	110	2953	3289
MS/MEng enrolled	14	30	74	64	0	31	116	15	19	363	228
PhD enrolled	12	25	50	40	0	23	72	31	12	263	127
Total enrollment	166	355	620	583	200	226	1057	230	141	3578	3644
RD(M\$)	1.05	1.65	4.96	2.64	0.3	2.3	6.525	2.46	1.46	23.3	13.3
BS/TotF	20.0	20.0	20.0	20.0	30.0	15.0	20.0	15.0	15.0	20.7	23.2
BS deg/TotF/yr	4.0	4.0	4.0	4.0	0	3.0	4.0	3.0	3.0	3.9	4.9
MS/MEng deg/TotF/yr	1	1.0	1.5	1.3	0	1.33	1.3	0.6	1.33	1.3	0.62
PhD deg/TotF/yr	0.33	0.33	0.4	0.33	0	0.4	0.33	0.5	0.33	0.37	0.15
RD/TotF/yr	150	110	200	110	50	200	150	200	200	164	88
BS deg/yr	28	60	99	96	0	35	174	37	22	551	662
MS deg/yr	7	15	37	32	0	15	58	7	10	181	85
PhD deg/yr	2	5	10	8	0	5	14	6	2	53	21
Journal Pubs/TTF	3	3	3	3	2	3	3	2	3		
Comparison Metric	8.7	7.9	10.3	8.2		9.1	9.0	8.6	9.0		

III. OUR GOALS AND STRATEGIES

The goal of the College of Engineering is “.. **to become a college of choice nationally...**”. We show only this one goal and we feel that it completely encompasses the six goals outlined for the University. At the center of a college with a national reputation are excellent faculty, students, staff, and facilities, with the human resource being paramount. The College of Engineering has listed specific strategies to be employed in making progress towards these goals. These strategies have been prioritized from a larger list that has been developed within each of the departments. The next step will be for the chairs/faculty to edit the document, and complete the strategic planning template - refining resource requirements, timelines and milestones.

To meet the College of Engineering goal of becoming a school of choice nationally, the following factors have or will be monitored and compared against our benchmark universities. Suggested targets are listed under the Goals and Strategies section in this unabridged document.

Quantitative Factors

- BS Degrees/faculty
- MS Degrees/faculty
- Ph.D. Degrees/faculty

Research \$'s/faculty
SCH/faculty member (internal)
WSCH/faculty member (internal)
Contact hours/faculty (internal)

Quality and Visibility Factors

Journal Publications/faculty
Citations/faculty
Alumni Ratings of Teaching (0,2, and 5 years out)
Student Ratings of Teaching
Graduate Success (e.g., fraction of graduates in high-level positions, PhD grads at other universities)
Other publications (e.g., textbooks, proceedings, etc.)
Faculty Awards (NAE, society fellows)
Outreach programs (distance learning, short courses, special service)
National Service (professional committees, etc.)

Special Initiatives

Fraction of students and faculty who are women
Fraction of students and faculty from minority groups
Fraction of research in interdisciplinary centers
Number of enterprises supported
Support of senior interdisciplinary design activities
Sharing of courses and facilities across department lines
Development of core engineering curriculum

Although a number of measures could be used to determine when we have reached our goals, the following have been selected based on comparisons to our benchmarks and knowledge of what we can do.

Nearer Term Goals:

4.5 BS Degrees/faculty
1.33 MS Degrees/faculty
0.33 Ph.D. Degrees/faculty
\$150,000 Research /faculty (1999 dollars)

Longer Term Goals:

4.0 BS Degrees/faculty
1.33 MS Degrees/faculty
0.5 Ph.D. Degrees/faculty
\$200,000 Research/faculty (1999 dollars)

30% of students and 20% of faculty women,
5% of students and 3% of faculty minorities
50 % of research in interdisciplinary centers
Number of enterprises
3 Refereed publications/faculty
10% of faculty with national recognition (NAE, fellows, etc.)
10% of graduates in leadership positions

	Improve the research environment on campus and seek more funding for opportunities such as REU	Engage students at all levels in research activities	Faculty researchers in all dept.	# of Grad. Students, # of UG	X					
		Seek additional resources to support UG and G research	Adv. Off., Faculty	New \$ generated	X					
		Develop/promote professional growth for students thru field trips, prof. mtgs, speakers, etc.	Adv. Off., Faculty							
		Recruit outstanding graduate students, esp. domestic and underrepresented groups	Deans, Chairs, Fac., Marketing	Number of Grad. Students % dom./min.						
	Increase the # of internships available to our students, particularly international	Support/promote internships, co-ops, international studies, enterprise and graduate school, especially to 1 st year students	All faculty and advisors, especially ENG faculty	# or % of students participating in programs						
	Increase the participation in the Enterprise Program to include more disciplines and enterprises, and accomplish more multidisciplinary participation in senior design	Identify new enterprises along with potential funding sources, and coordinate senior design projects between depts.	Assoc. Dean, Industrial Proj. Coord., Adv. Officer	# of Ent., Disc. make-up, # of students, support \$,						
		Introduce Engr. Fee to be used to add faculty/staff	Deans and Chairs	# of additional faculty	4	8	12	20	25	
		Include ENG faculty for advising enterprises and sr. proj.	Deans, Chairs ENG Fac.	% of ENG faculty	20%	40%	60%	100%	100%	
	Develop multiple paths for our students that stress active and discovery-based learning experiences	Implement discovery-based learning processes into all fundamental engr. courses	Appropriate faculty	# of courses, assessment of outcomes						
	Develop fast track and/or honors programs leading toward an early master's degree	Promote MEng and graduate school to 1 st year students	Faculty and advisors	% of students choosing path	X					
Strategic Objective 1.3: Offer programs in new and emerging areas, particularly interdisciplinary areas (e.g. bio-informatics, information technology)										
	Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010	
	Seek new state support for emerging areas	Work with state legislature and	Deans,	New \$\$						

	beyond general fund revenues and pursue all existing state funding opportunities	VP Government Relations	Chairs, State Rep., VPGR	generated						
	Network with all of our stakeholders, e.g. advisory boards, alumni, industry, to identify emerging areas									
	Structure a system in which cooperation between units is rewarded	Coordinate/promote interdisc. Projects and courses								
	Maintain and obtain accreditation and develop new UG and graduate degree programs	Obtain accreditation in BE, Computer Engr.	Deans, BE ECE Fac.							
		Refine and Expand BSE degree to include certifications in: Secondary Education, International Business, and others	Assoc. Dean, Director of ENG, Faculty, Dept of Ed.							
		New BS degrees in: Software Engr., Systems Engr.	Appropriate Engr and CS. faculty							
		New Graduate degrees: MS in Applied Science Ed, MS Earth Science, PhD in Geophysics, PhD in BE, PhD in Natural Res.	Appropriate Chairs and Faculty							
		Develop relevant minors in emerging technical areas	Chairs and faculty							
	Provide outstanding education and research experiences that fully engage all of our students and educational path flexibility that meets their needs and the needs of their employers	Ensure the inclusion of synergistic educational components to research proposals	PI's and the Faculty in ENG							
		Offer flexible degree programs	Deans, Chairs, and curriculum cmtes.							
Strategic Objective 1.4: Repackage programs to keep current with the trends in science and technologies										

Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010
Continue to monitor technological and educational trends, and examine our curricula in that context	Benchmark with external competitors	Assoc. Deans, Chairs or Directors						
	Look at overall quality, visibility, critical need and future demand	Assoc. Deans, Chairs or Directors						
	Use baseline statistics to identify new programs and establish criteria for rightsizing	Assoc. Deans, Chairs or Directors						
	Investigate development of a BSE with certification in network administration	Faculty in ENG, Assoc. Dean						
	Integrate departmental and non-departmental courses to optimize efficiency for each engineering degree program	Dept. curriculum & assessment cmtes.						
Strategic Objective 1.5: Strengthen our international programs								
Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010
Increase the number of international experience available to our students	Actively encourage students to participate in international internships and exchanges	Academic advisors, 1 st year instr.	% of students participating					
	Integrate international experiences into all engr curricula	Assoc. Dean, Dept. Curric. Cmtes.	Curricular Flow diagrams in Catalog					
	Establish meaningful partnerships with universities and companies abroad	COE Dean, Ctr for Internat'l Ed	# of good international relationships					
Ensure a strong international cultural enrichment program	Support faculty in establishing international contacts and in teaching courses in venues outside the US	Deans, Chairs or Directors	# of Faculty participating in international programs					
Strategic Objective 1.6: Develop unparalleled classrooms, learning laboratories and centers that make the best use of information technology, with anywhere, anytime computing and communication								

Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010
Make high-tech instructional technologies available in all classrooms and laboratories and provide instructional support for its implementation	Develop state-of-the-art multimedia instructional facilities and laboratories	Deans, Chairs, Adv. Officers	# of such classrooms or laboratories					
	Develop/implement lab. Management plan	Deans, Chairs or Directors	Efficiency of laboratory usage					
Explore comprehensive laptop environment	Optimize mix of centralized and decentralized computing infrastructure	System Admin, Deans, Chairs or Directors						
	Implement wireless network connectivity in University commons areas	IT, Deans, Chairs, Comp. Cmte						
MTU Goal #2 – Expand our scholarship and research activities, sustaining successful existing programs while pursuing new endeavors in carefully targeted areas.								
Strategic Objective 2.1 – Increase the Number of interdisciplinary efforts in a few, well-focused platforms that will lead to world-class Recognition.								
Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010
Obtain endowed chairs in key areas in all departments.	Identify Key areas where faculty are needed	chairs, dean, advancement officers	number of chairs	2	4	6	10	20
	Identify Potential Donors – Ind./Alum	Chairs, Deans, MTF	3 Potential donors/key areas	1	3			
	Secure Endowment	Chairs, Deans	10 Chairs by 2010	1	2	4		
Ensure that interdisciplinary work is properly recognized and rewarded.	Develop procedures/policies to eliminate dept./college barriers	Deans, MTU Admin	Adopt policy with fac./admin buy-in	Start	Finish	-		
	Incorporate Interdisciplinary	Deans,	Adopt and	X	X	X		

		activities into P&T, Merit considerations	Chairs	implement plan					
	Form cross-departmental, cross-college/schools faculty teams in our areas of focus and promote the development of research centers.	Identify potential sponsors of research centers.	associate dean for research & graduate programs						
		Form teams.	associate dean						
		Submit proposals to sponsors	research faculty	number of research centers					
	Make faculty hires in strategic thrust areas in research and hire only the best candidates in all areas.	Recruit/Retain at least 3 faculty in each thrust area (1 senior and 2 junior)	Faculty, Chairs, Deans	Obtain critical # of faculty in 5 areas by 2005	1	2	3		
		Develop/justify plan to MTU Admin	Deans	Secure 15 new fac. Positions	3	6	9		
Strategic Objective 2.2 – Increase the number of faculty actively engaged in research and graduate education									
	Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010
	Use an “engineering fee” to provide revenue to hire an additional 25 to 40 faculty members into the College.	submit proposal to Board of Control	dean, associate deans, engineering council	increase in number of tenure-track faculty					
	Promote and reward scholarship and graduate education:	Clearly identify to new faculty what scholarship means	Deans	Hold multiple workshops per year	2	2	2		
		Promote publishing of work in archival/refereed journals	Faculty	3 pubs/year in 2 journals	1	2	3		
		Establish annual COE recognition in teaching and research	Deans	Establish a Hall of Fame (visible)	X	X	X		

	Increase the number of research faculty:	Facilitate Research Appointments with full Faculty benefits and standing	Chairs, Deans, ER	Adopt/implement new policies	5% of fac.	10% of fac.	15% of fac.		
		Reward Depts that support soft money faculty positions	Deans	X% increase in SSE	X	X	X		
	Create a climate and reward structure that values scholarship and innovation in teaching and research:	Clearly define to faculty what constitutes scholarship/innovation in teaching and research	Faculty, Chairs, Deans	Adopt/Implement explicit policies – Disseminate to faculty	Start	Finish	-		
		Meaningful incorporation into PT and merit decisions	Deans, Chairs		X	X	X		
		Develop/Enhance faculty mentor program	Chairs, Sr. Faculty	Each dept. has a formal faculty mentoring program	X	X	X		
	Choose new faculty with strong research and graduate education interests:	Develop network with industry and universities to identify potential new Faculty	Chairs, Deans	# of Fellow, NAE and societal awards – 1 per dept per yr	2	4	6		
		Actively recruit successful faculty with established research programs	Chairs, Deans	Bring to MTU	1	2	4		
Strategic Objective 2.3 Increase the percentage and number of graduate students, particularly who are supported externally.									
	Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010
	Aggressively recruit U.S. and international	Identify and visit key regional	associate	number and					

	graduate students in conjunction with the Graduate School.	schools.	dean for research and graduate programs	blend of graduate students					
		Advertise in key publications.							
		Develop materials for faculty to use in visits to other universities.							
	Provide competitive compensation and benefit packages to attract and retain quality graduate students.	Form task force to benchmark Michigan Tech's compensation and benefits with other schools.	departments, faculty researchers, graduate school)	stipend amount, health benefits					
		Make recommendations to grad school and Provost.							
	Reward faculty who supports graduate students and interdisciplinary research.	Incorporate into P&T, Merit considerations	Deans, Chairs	Adopt and implement plan	X	X	X		
	Strive to have graduate programs ranked in the second quartile or higher in the NRC Rankings.	Make all faculty aware of the activities measure in the NRC rankings.	associate dean for research and graduate programs, department chairs, faculty researchers	NRC Rankings of each program.					
		Align with the Strategic Plan.							
		Ensure that Michigan Tech reports complete data							

Strategic Objective 2.4. Others									
	Increase the number of faculty inducted into the National Academy of Engineers	?	?	number of faculty members in NAE					
MTU Goal #3: Identify the best size and blend for out education programs, which have a diverse student body, faculty, and staff									
Strategic Objective 3.1 – Determine the right mix of graduate/undergraduate students for the benefit of all of our stakeholders									
	Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010
	Reduce the undergraduate student-to-faculty ratio (increase quality); Control UG enrollments with the COE, especially over-subscribed programs	Implement enrollment management, i.e. COE Student Success Model	COE Deans, Chairs, Admissions	Balanced Student-to-Faculty near 20:1	23:1	22:1	21:1	20:1	15:1
		Add additional faculty through increased revenue; introduce a engineering supplemental fee	COE Deans, Chairs, Univ. Admin.	Number of new faculty/staff	4	8	12	20	30
		Limit Section sizes in all core courses	Dept. Teach. Coordinator		#?	#?	#?	#?	Goal
		Increase number of Engr. Faculty to distribute workload for senior project and enterprise advising	Univ. Admin, COE Dean, Chairs, Adv. Officers	Average # of student projects per faculty	1	0.9	0.8	0.75	0.75
		Grow distance learning programs	COE Deans, Director of DL	Number of DL students and DL courses, Revenue \$s	200	300	400	500	1000
	Increase the percentage of graduate students	Increase support, recruiting, marketing, etc.	COE Deans, Chairs, Faculty,	% Masters % Ph.D.	6.6% 4.4%	7.1% 4.9%	7.5% 5.5%	8% 7%	10% 10%

			Graduate School						
Strategic Objective 3.2 – Aggressively support and implement strategies to increase the diversity of our student body									
	Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010
	Implement COE Diversity Framework	See Diversity Framework for specific actions	COE Deans, Chairs or Directors, Faculty	% Female % minorities in UG COE programs	24% 5%	26% 6%	28% 7%	30% 10%	40% 15%
			COE Deans, Chairs or Directors, Faculty	% Female % minorities in Graduate COE programs	24% 5%	26% 6%	28% 7%	30% 10%	40% 15%
Strategic Objective 3.3 – Manage and optimize enrollments within disciplines, schools and colleges for the benefit of all of our stakeholders									
	Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010
	See Strategic Objective 3.1								
Strategic Objective 3.4 – Pursue aggressive targeted marketing for programs with potential and need									
	Strategy	Specific Action	Responsible Units	Performance Measure	2001	2002	2003	2005	2010
	Better market the college’s undergraduate programs	Improve website	COE Deans, Dept, faculty and chairs	Increase in # of inquiries and applicants	10% incr.	20% incr.	33% incr.	50% incr.	75% incr.
		Advertise unique and innovative education programs, e.g. 1 st year program, enterprise, international opportunities	COE Deans, Dept, faculty and chairs	Lower acceptance rate from 95% to 75%	93%	90%	85%	75%	<75%
	Better market the college’s graduate programs	Improve website	COE Deans, Dept, faculty and chairs	Reach 20% graduate enrollment	11%	12%	13%	15%	20%
		Better promotional material	COE Deans, Dept, faculty	Reach 20% graduate					

Goals 5 and 6 have not yet been prioritized by the College of Engineering

GOAL 5: Provide an optimized administrative framework, with sound physical, technological, and financial bases, consistent with a national university of choice

Strategic Objectives:

- Look at optimizing departments with respect to space, staff, faculty, and students
- Set up a problem-solving team who will make a self-improvement do-list for administration and continuously work across units to make procedural improvements
- Implement efficient, cost-saving practices
- Develop a university resource model that can explore the financial consequences of curriculum, staffing, workload, average class size, scholarship, research, and both undergraduate and graduate enrollment decisions in terms of their short- and long-term impact
- Develop a budget model that combines positive feedback, internal quantitative productivity measures, quality measures, and benchmarking, in order to allocate resources based on unit contributions to the strategic plan
- Link the capital campaign to the strategic plan
- Increase number of endowed chairs
- Institute an “engineering fee” recognizing that engineering programs are more expensive. Revenue would be used to hire new faculty and staff in support of educational mission Improve Michigan Tech's response to state and federal opportunities for funding
- Move Michigan Tech into the first tier of Michigan’s university funding structure
- Provide the resources for faculty development in the use and adaptation of these technologies in their teaching
- Create critical mass of faculty aligned with strategic thrust areas in research
- Renovate and build high tech classrooms and labs for active, discovery-based learning
- Improve the space allocation process for more effective utilization
- Implement the ubiquitous sharing of resources, laboratories, and equipment
- Make better use of existing resources for the benefit of the entire university
- Enhance sharing of facilities in COE and strengthen the core engineering program

- Link the campus master-plan to the strategic plan
- Evaluate and redesign physical facilities to be more efficient, technologically up-to-date, and customer-oriented

GOAL 6: Support economic development, public sector outreach, and distance education appropriate for a technological university

Strategic Objectives:

- Make sure our on-campus students benefit from these same high technology class offerings
- Extend the boundaries of the campus through the development of distance learning programs, K-12 outreach programs, and other initiatives
- Establish a comprehensive technology transfer program that provides incentives to all stakeholders
- Develop new partnerships with non-traditional, emerging companies and businesses
- Establish a technology park
- Develop a strategic plan for distance education within the College

ATTACHMENT A.

Implementation of an Engineering Credit Fee

College of Engineering Vision:

The College of Engineering will develop nationally prominent educational programs and research thrusts that will benefit all of our constituencies and, in doing so, we will become a school of choice nationally.

Obstacles to the Realization of this Vision:

The College of Engineering is committed providing our students with a quality educational experience at both the undergraduate and graduate levels. We recognize that we must develop and maintain quality graduate programs that complement our undergraduate programs. Universities we would consider to be schools of choice nationally typically have the following attributes:

- strong undergraduate programs
- undergraduate student to faculty ratio less than or equal to 20:1
- undergraduate student to graduate student ratio of greater than or equal to 4:1
- strong graduate programs
- quality research efforts with a significant federal and industrial funding base

The college of engineering at MTU has one of these characteristics, that of strong undergraduate programs, and has been striving to reach the remaining attributes for the past 15 years. However, these remaining characteristics will continue to be unattainable unless additional resources are made available to support our efforts to become a school of choice nationally.

College of Engineering Needs:

The College of Engineering is fortunate to have excellent facilities and equipment that are comparable to the most prestigious institutions in the nation. However, an adequate number of faculty and staff is an even more important ingredient to becoming a quality institution, and this is where we fall short. In order for MTU to deliver challenging and innovative undergraduate programs, there will be a need for more and more hands-on and active learning experiences incorporated into the curricula, such as the **Enterprise Program** and **Multi-disciplinary Design** projects presently under development. This requires more faculty time and effort. Similarly, in order to develop quality research programs and the funding base to support the graduate programs in these thrust areas the faculty in the college need to have sufficient time to perform research, develop appropriate industrial and governmental contacts, write proposals and advise graduate students. Therefore, to attain the attributes of a national school of choice the college of engineering needs 500 fewer undergraduate students or 25 more faculty. The obvious problem associated with this need is the detrimental impact it would have on the University's general fund.

Proposed Solution:

The College of Engineering recommends the implementation of an Engineering Credit Fee to offset the higher cost of delivering an engineering education. An added per credit cost of \$20, \$40 and \$60 per engineering credit would be phased in over the next 3 years, respectively. (Another option would be to implement an Engineering Supplemental Fee for engineering students in the amount of ~\$450 per semester or \$900 per year). This fee would be phased in over 3 years beginning in the fall of 2000. When fully implemented (AY2002) the revenue generated for the college would be approximately \$3M per year. It is proposed that **all** of the revenue generated by the fee be **returned to the College of Engineering** to be used to hire faculty and support staff in an effort to reduce our UG student to faculty ratio to ~20. The

Engineering Credit Fee would enable us to provide our students with a higher quality education and help us realize our vision.

Advantages to the Engineering Credit Fee:

There are several important advantages to the implementation of the Engineering Credit Fee.

- It affects only engineering students as opposed to a comparable 15-20 % tuition hike for students in other programs at MTU.
- The Engineering Credit Fee can be included in students' financial aid packages where specific course fees cannot.
- It brings the cost for an engineering degree from MTU more in line with the cost of an engineering education from the more prestigious institutions in the State of Michigan and elsewhere.
- It enables the college of engineering, and thus MTU, to move toward becoming a school of choice nationally by providing the requisite resources to enhance undergraduate education at MTU.

Comparison of the Cost of an Engineering Education with In-state and Peer Universities:

The attached table indicates the relative cost to students seeking engineering degrees from various institutions in Michigan, as well as the University of Missouri, Rolla and a number of other institutions in other states. Three important observations should be made based on this information.

- The absolute revenue generated per student is one of the least in the state of Michigan and is far less than those schools we should try to emulate, namely the University of Michigan and Michigan State University.
- Two of the universities listed in the table have specific additional fees required for the engineering students. These schools include Michigan State University and the University of Missouri at Rolla.
- Inclusion of the Engineering Credit Fee at MTU would make the actual tuition and fee cost to MTU engineering students comparable to that of Wayne State University.

Table 1. Comparison of Tuition and Fees at Michigan Universities with Engineering Programs and Peer Institutions

	Annual Tuition for AY99-00 (30 credits/year) ¹	Additional Fees ³	Special Engr. Fee ⁴	Annual Cost to Students (AY99-00)	Approx. Discounted Rate from General Fund ⁵	Actual Average Annual Cost to Students (AY99-00) ⁶	General Fund Dollars per Student (AY99-00)		Average Endowment per Student (AY99-00) ⁷
							Univ.	COE	
University of Michigan									
Average Lower/Upper Div.	\$7656 ²	\$773	None	\$8429	18.1%	\$7043	\$9,764		\$72,725
Michigan State University									
Average Lower/Upper Div.	\$4670	\$586	\$484	\$5740	11.1%	\$5222	\$6,964		\$8,200
Wayne State University									
Average Lower/Upper Div.	\$4128	\$390	None	\$4518	15.0%	\$3899	~\$9,000 ⁸		\$7,600
Michigan Technological University									
Average Lower/Upper Div.	\$4469	\$426	None	\$4895	31.6%	\$3483	\$8,180	\$3,494	\$6,249
Western Michigan University									
Average Lower/Upper Div.	\$3425	\$602	None	\$4127	17.6%	\$3424			\$4,700
Colorado School of Mines			None						\$43,750
Georgia Tech	\$2414	\$694	None	\$3108			\$13,783 ⁹		\$67,913
University of Missouri, Rolla	\$3978	\$698	\$552	\$5228			\$8,520		\$9,984
North Dakota State University	\$2480	\$451	\$300	\$3231					

1. Based on 15 credits per semester or 30 credits per year.
2. At the University of Michigan the Upper Division Full-time Tuition in Engineering is \$1,000 to \$1,600 more per year than in other university programs. This in effect translates into a Special Engineering Fee.
3. Additional fees include items such as matriculation fees, computing fees, student activity fees, health service fees and the like.
4. For MSU and NDSt the Engineering fee is \$242 and \$150 per semester, respectively, for full-time students. For the University of Missouri, Rolla the Engineering Fee is \$36.80 per engineering credit; most engineering programs have ~ 60 engineering credits which translates to ~ \$552 per year.
5. From the November 20, 1998 MTU Board of Control meeting. It has been assumed that these percentages have not noticeably changed in 14 months.
6. Averaged between Lower and Upper Division Costs.
7. University Endowment divided by the total number of students enrolled at the university.
8. Estimate based on an estimated 24,000 students.
9. Georgia Tech General Fund dollars per student is for FY98.

ATTACHMENT B.

Program Quality Management Part I: Selection of Major and Enrollment Management (DRAFT)

The following admittance guidelines will be implemented for entering student in the fall of 2001.

First Year Student Admissions:

1. Entering first-year students having an ACT Composite score greater than or equal to 21 **AND** who have graduated in the top 50% of their high school class **AND** a high school GPA of 2.5 will be immediately accepted into the College of Engineering.
 - a. Direct admission into a specific engineering program will be allowed only for students in the top 25% of their high school graduating class **AND** a high school GPA of 3.0 **AND** ACT composite scores greater than or equal to 25.
 - b. The First-Year Engineering program is designed to help each student better determine which of the engineering disciplines best fit her/his interests. **We should use this as a marketing tool.** It should be very attractive to today's 18 year olds.
 - c. Each engineering program will specify a minimum First-year GPA required for acceptance into their program. In addition, each program will set a number of students that can be properly managed within their program.
 - d. Upon completion of the First-Year Engineering program students will indicate their preference for an engineering major. Students meeting the Minimum Program GPA will be immediately accepted into the program. Those students not meeting the Minimum Program GPA may be admitted into their preferred major at the discretion of the department chair and the availability of positions within the program. If not accepted into a student's preferred major, each student will be advised to consider an alternate engineering program for which the Minimum Program GPA is met or in which there is availability of positions.
 - e. Students with a first-year engineering GPA less than 2.00 will be dismissed from the COE, but not necessarily the university. If they continue at MTU and demonstrate the necessary improvement, they can be considered for readmittance into the COE and/or a specific engineering program. They will be treated as if they were an internal transfer (see below).
2. Students who have expressed an interest in engineering and have been accepted by the university with ACT Composite of less than or equal to 20 **OR** who have graduated in the lower 50% of their highschool class **OR** have a highschool GPA less than 2.5 will be admitted into a Pre-engineering curriculum, but not the COE.
 - a. These students are likely not prepared for the rigor of an engineering program of study.
 - b. The COE, in conjunction with the departments of Mathematical Sciences, Chemistry, and the Directors of the University First-Year Programs and Educational Opportunity, will develop a preparatory or 'University Bridging' curriculum designed to prepare these students for an engineering curriculum, as well as other programs, and will help direct them into other university programs, such as Business, Technology, Forestry, etc.
 - c. Students successfully completing the Pre-engineering program (i.e., GPA of 3.00 or greater) will be allowed to enroll in the First-Year Engineering Program.

- d. In selecting an engineering major these students will be subject to the similar constraints outlined in 1c above.

Transfer Student Admissions:

3. Similar guidelines will be established for students transferring from within the university or from some other college or university.
 - a. For students transferring from another institution the GPA established at that school will be used to determine whether a student is accepted into their program of choice. That is, for adequately prepared students there should be direct admission into their preferred engineering program.
 - b. If an MTU GPA of 2.00 is not maintained the student will be dismissed from the College of Engineering and their engineering program. If they continue at MTU and demonstrate the necessary improvement, they can be considered for readmittance into the COE and/or a specific engineering program.
 - c. For students transferring into the COE from within MTU acceptance into a given program will be based on the GPA established in the courses constituting the MTU First-year Engineering Program. Internal and external transfers will be subject to the same guidelines of maintaining a minimum GPA while in the COE as defined in Section 1-e.