



DEPARTMENT OF MATHEMATICS
A. M. Haghghi, Ph. D.
Professor and Head

QUALITY ENHANCEMENT PLAN
2004 - 2008

COLLEGE OF ARTS AND SCIENCES
PRAIRIE VIEW A&M UNIVERSITY
A part of the Texas A&M University System

Submitted July 15, 2003

Part One: *Vision and Mission*

IA. VISION

The department's vision is in line with the university and the college. It is committed "to educate for professional practice and for meaningful societal participation, students of diverse backgrounds, many of whom are first generation college students from educationally and economically unserved and underserved families. The department will use all of its resources to build a very strong unit in mathematics teaching and research.

IB. MISSION

The mission of the department of mathematics is summarized in the following two statements.

- Provide quality instruction, research and outreach programs in mathematics that produce independent learners equipped with approaches to problem solving and decision-making techniques necessary to meet the challenges of their chosen careers and function in the mainstream of the communities in which they live.
- Train competent mathematics teachers and prospective mathematicians, engineers, scientists, and other mathematics based and/or related professionals with the knowledge base necessary to perform successfully in graduate and professional schools and in the world of work.

The Department of Mathematics is an instructional unit within the College of Arts and Sciences. The Department is committed to offering comprehensive programs in mathematics that will foster knowledge, stimulate research and ultimately prepare and produce graduates capable of meeting the challenges of their educational and occupational goals. Recognizing its responsibility to provide the ideal environment, quality instruction and supervision for a rich and versatile learning experience, the Department designs, implements and evaluates its programs according to the following three major functions.

1. **Liberal Arts Function** to provide quality instructional, research and outreach programs in mathematics that will produce independent learners equipped with problem solving skills and decision-making techniques necessary to meet the challenges of their chosen careers and function effectively in the mainstream of the community in which they live.
2. **Professional Function** that has the following two components.
 - a. To train competent mathematics teachers to serve the public and private schools in the community and at the state, national and

international levels.

b. To provide prospective mathematicians, engineers, and scientist and other mathematics based professionals with the knowledge base necessary to perform successfully in graduate and professional schools and in the world of work.

3. Outreach/Service Function to provide positive interchange between the Department /University and the public and private sectors designed to strengthen the Department's pre-service programs while offering effective and innovative programs that will meet needs of the educational, cooperative educational and research institutions.

The Department with seventeen very experienced faculty members in pure and applied mathematics, mathematics teaching, and statistics, all holding doctoral degree, offers an innovative and comprehensive undergraduate, B.S., and graduate, M.S. (thesis & non-thesis options), degree programs in mathematics from which a major may select one of four emphasis options:

- statistics,
- pure mathematics,
- applied mathematics,
- mathematics teaching (the College of Education will identify certification requirements for teaching in the public schools)

The special emphasis options in mathematics allow students to select electives in specific areas of professional interest. Students are encouraged to be creative in putting together a course of study that will lead to the fulfillment of individual professional goals. The curricula are rigorous and demanding but flexible enough to allow students to sample several disciplines or to focus on a special interest within the major area. Faculty advisors assist each student on a continual basis to ensure proper course selection relative to career goals.

IC. Relationship of Department Mission to University Mission

The Department of Mathematics supports the University's commitment to provide equal opportunity access to a diverse student population. The Department offers quality programs and services that meet the needs and challenge students to persist at each entry point from developmental through advanced levels.

Part Two: *Assessment*

IIA. Assessment of Performance

Baseline: Fall 2002

To be in line with goals and objectives of the College of Arts and Sciences, the Department has set its specific goals as those of the College.

College Strategic Goal 1: Enhance the Quality of Instructional and Research Programs

Departmental Objective 1: Assess the Effectiveness of the Mathematics Degree Programs

Quantitative Outcomes	Effect of Strategies Employed
a. Development of a Plan of Action	Completed by 9/2002
b. The Plan will determine the areas of student activities and accomplishments in which quality will be judged	Completed by 9/2002
c. The plan will be discussed in a departmental meeting for revision and adoption	Completed by 9/2002
d. Obtaining necessary approvals	Completed by 9/2002
e. Standardized tests will be purchased	Ordered, but never received
f. Development of surveys and tests	Not completed. It was not clear what is to be done

In addition, both undergraduate and graduate degree programs were assessed and plans are ready to be implemented.

College Strategic Goal 1: Enhance the Quality of Instructional and Research Programs
Departmental Objective 2: Improve Mathematics Teaching, Learning and Research

Quantitative Outcomes	Effect of Strategies Employed
a. Continue reviewing and enhancing the curricula and obtain necessary approvals changes	Partially done, not enough time
b. Provide access to the Internet for all faculty members	Completed by 12/2002
c. Increase the number of undergraduate research	Completed by April 2003, students made presentation during the Mathematics Awareness Month (April)
d. Provide computer and research facilities for faculty and student instruction and research	Partially completed, more equipment have been ordered
e. Establish biweekly seminars and colloquia	Done, starting October 2002
f. Increase submission of the number of grant proposals to improve the quality interdisciplinary learning in mathematics, science and engineering	Done, compared with the year before
g. Assign a course coordinator for each multi-sectioned course to make sure all instructors of a course are on the same section and tests are uniform	Done, September 2002
h. Develop and proctor common midterm and final examinations for all multi-sectioned courses	Done, Fall 2002 and Spring 2003
i. Maintain a Course Folio for each course taught (built up continuously during the semester) to include: Gradebook, assignments & exams on file in Main Office	Done, Fall 2002 and Spring 2003
j. Increase the library holding of books and journals	Done, Fall 2002 and Spring 2003
k. Support faculty professional development such attending conferences, submission of papers and writing grant proposals	Done, Helped financially and by giving faculty release time
l. Complete departmental procedure for filling a forthcoming faculty vacancy	Done, The search is now in process

College Goal 2. Increase Recruitment and Retention

Department Objective 3: Increase the number of undergraduate and graduate majors

Quantitative Outcomes	Timelines
a. Update brochures and recruitment materials	Done by December 2002
b. Identify talented junior and senior undergraduates in mathematics across the state and the nation, using the Student SAT Search	Not completed
c. Contact selected talented high school rising seniors	Not completed
d. Visit some high schools in the neighboring area, across the state and the nation in classrooms, college night, and district recruitment conferences, using the list of students with expressed interest in the mathematics and/or science or engineering at PVAMU	Partially done
e. Submit a proposal to provide scholarships/assistantship for Majors	Partially done

College Strategic Goal 3: Integrate Technology in the Curriculum of every Degree Program

Department Objective 4: Enhance Technology Integration in Mathematics Curriculum

Quantitative Outcomes	Timelines
a. Train five students in the use of Maple Software to assist in Calculus Laboratory	Done, Spring 2003
b. Upgrade the departmental web site with faculty access to creating and updating web pages	Partially done, waiting to receive help from the College's IT person
c. Create Web Pages for each Faculty member to include at least one course syllabus, homework, homework solutions, practice exams, useful links etc.	Partially done
d. Secure Software for interactive online help such as NetTutor and Interwise	Not completed, waiting to see if the University College may provide it
e. Provide training of WebCT for one faculty member	Completed, December 2002
f. Prepare one course for online presentation	Done

Part Three: Azimuth Crosswalk Strengths and Weaknesses

Azimuth # 1 – Foster Collaboration Among System Institutions

A-1-1 What strengths does the unit possess that can foster attainment of the ideals expressed in the above azimuth?

- Current collaborative efforts: The department is engaged in a collaborated effort to a new teaching method of College Algebra. The program is part of the Contemporary College Algebra grant at West Point Military Academy, Dr. Don Small, PI. Other faculty members from other TAMU's System institutions are involved including one from the TAMU-Corpus Christi.
- The department hosts the TxCETP representative in the University.
- The departments' Undergraduates from the four-track Mathematics Program will be prepared to qualified for admission into our own graduate program as well as other graduate schools in mathematics, mathematics teaching, engineering, computer science, and biostatistics.
- The departments' Graduates from the four-track Mathematics Program will be prepared to qualified for admission into Ph. D. programs in mathematics, mathematics teaching, engineering, computer science, and biostatistics, including our university's newly established Electrical Engineering.

A-1-2 What weaknesses does the unit possess that could lessen its chances of contributing to the realization of the outcomes expected in the Azimuth?

- Lack of time and funding for faculty travel and professional development
- Heavy teaching loads (minimum of twelve hours with additional duties)
- Lack of funding for faculty exchanges among System institutions

A-1-3 List actions that the unit and/or the University can take to remediate any weakness(es) cited above.

- Provide funding for sabbaticals and faculty exchanges.
- Provide faculty exchange policy among the System institutions for research and proposal writing.
- Include inter-system collaborations, such as participation in the Regents' Initiative, a part of the faculty evaluations, and their promotion/tenure process.

Azimuth # 2 – Provide Educational Access and Excellence and Nurture Educational Success.

A-2-1 What strengths does the unit possess that can foster attainment of the ideals expressed in the above azimuth?

- Demonstrated success in educating and placing minorities and other underrepresented groups, especially African Americans.
- Established partnerships with selected high schools and community colleges resulting from participation in the Regents' Initiative (the Academic Roadmap Project)
- A graduate and an undergraduate four-track mathematics degree programs in the department offer more choices to students to pursue advanced degrees or professional careers.
- State-of-the-art mathematics research laboratory for faculty and student use is in process of completion.
- Web-assisted instruction and learning at the freshman and sophomore level mathematics courses
- Mathematics tutorial lab for under graduate students attended by the faculty throughout the working days
- Providing evening and Saturday classes for graduate students
- Providing graduate assistantship to attract students in the graduate program in mathematics

A-2-2 - What weaknesses does the unit possess that could lessen its chances of contributing to the realization of the outcomes expected in the azimuth?

- Inadequate fund for graduate assistantship
- Inadequate seed money for faculty research
- Lack of funding for student teaching assistants to assist in running and maintaining the math tutorial lab and math research lab.

A-2-3 - List actions that the unit and/or the University can take to remediate any weakness(es) cited above?

- Provide funding for student teaching assistants to assist in running and maintaining the labs.
- Provide opportunities for training of faculty and staff in improved instructional techniques and technology integration.
- Provide more funding for graduate assistantships.

Azimuth #3 – Increase the Value of Our Academic Programs

A-3-1 What strengths does the unit possess that can foster attainment of the ideals expressed in the above azimuth?

- Emphasizing on the statistics and applied tracks of the 4-track program in mathematics should enhance the entry of mathematics majors into professional degree programs as well as enhancing the workforce pool for Texas and the nation.
- The mathematics research lab should prepare the students on state-of-the-art technology tools.
- Inclusion of students in research.
- Web-integrated textbooks and other learning materials.

A-3-2 What weaknesses does the unit possess that could lessen its chances of contributing to the realization of the outcomes expected in the azimuth?

- Low number of mathematics undergraduate and graduate majors. However, this is a uniform trend across the US.
- Inadequate faculty training in new technologies and instructional techniques.
- Inability to offer variety of upper level and graduate courses.

A-3-3 List actions that the unit and/or the University can take to remediate any weakness(es) cited above.

- Provide funding and opportunities for enhanced student recruitment.
- Organize high school visits to the campus so that each department has a chance to publicize and market its program.
- Provide training to faculty so that they will begin to incorporate new instructional styles and technologies into their teaching.
- Encourage, recognize and reward faculty who promote and sustain this azimuth by incorporating new and emerging concepts into their teaching and mentoring, incorporate technology, etc.
- Allow those departments with low majors to offer classes with low enrollments. This will allow the departments to generate more revenue and eventually increase their RIICA.
- Create specific “pipelines” between specific programs among the System institutions. Example: Mathematics graduates with MS degree in Applied Mathematics Track from PVAMU pursuing doctoral programs in Engineering at TAMU.

Azimuth #4 – Increase the Value of Our Scholarship and Research.

A-4-1 What strengths does the unit possess that can foster attainment of the ideals expressed in the above azimuth?

- Demonstrated experience of faculty in publications.
- Demonstrated experience of faculty in submission of grant proposals.

→ Enhanced expertise in the department via newly hired faculty

A-4-2 What weaknesses does the unit possess that could lessen its chances of contributing to the realization of the outcomes expected in the azimuth.

→ Several faculty members are not active in research. Need training and development opportunities and enforcing the annual evaluation instrument.

→ Inadequate start-up research funding.

A-4-3 List actions that the unit and/or the University can take to remediate any weakness(es) cited above?

→ Enhance research capabilities for all faculty.

→ Provide leave/development time on rotating basis for faculty to develop these capabilities.

→ Develop and submit more proposals for funding.

→ Provide start-up initiatives to non-research-active faculty members.

Azimuth #5 – Serve Texas and Beyond: Anticipate and Solve Critical Problems.

A-5-1 What strengths does the unit possess that can foster attainment of the ideals expressed in the above azimuth?

→ Demonstrated experience in preparing teachers for Texas and the nation's high schools.

→ Demonstrated experience in preparing teachers for Texas and nation's two-year colleges.

A-5-2 What weaknesses does the unit possess that could lessen its chances of contributing to the realization of the outcomes expected in the azimuth.

- Lack of an integrated effort for research enhancement and curricular development
- Lack of awareness on part of most faculty of the need to change and adapt to the new millennium

A-5-3 List actions that the unit and/or the University can take to remediate any weakness(es) cited above?

- Design and develop research capabilities and inter-disciplinary curricula so as to address and provide solutions to real world problems facing Texas and the US.
- Expand on the Regents' Initiative, in particular the Academic Roadmap Project, to generate educational and research scholarship with partnerships among public and private institutions, corporate entities, communities, and government laboratories.

Azimuth #6 – Enhance Acquisition of Resources and Maximize Their Effective Use.

A-6-1 What strengths does the unit possess that can foster attainment of the ideals expressed in the above azimuth?

- Demonstrated expertise in proposal development and funding acquisition

A-6-2 What weaknesses does the unit possess that could lessen its chances of contributing to the realization of the outcomes expected in the azimuth.

- Not all faculty are active in research
- Lack of concerted effort towards external funds generation
- Lack of incentives towards writing proposals for external funds

A-6-3 List actions that the unit and/or the University can take to remediate any weakness(es) cited above?

- Make funds generation a major agenda for the department and the college

- Reduce personnel time waste on issues that can be handled with e-mail or shorter meetings.
- Explore new approaches to funding for higher education.

**PART IV. PRIORITY OBJECTIVES BY MAJOR UNIVERSITY GOALS
2004 - 2008**

GOAL AREA BY OBJECTIVES	Strategies
1. Participation (U/G enrollment, outreach scholarships, etc.)	
1.1. Increase the number of majors in mathematics by 25% by fall 2005.	1.1.a Enhance recruitment from the university's summer programs. 1.1.b Increase the number of scholarships for mathematics majors and minors.
1.2. Make the Mathematics degree program more attractive.	1.2.a Interact with parents to inform them of available opportunities in education, financial support and provide technical assistance. 1.2.b Expand on the outreach programs with more diverse brochures, multi-media, and web-based presentations. 1.2.c Conduct workshops for high school students and their teachers to increase the exposure to applications of mathematics.
1.3. Strengthen existing and establish new collaborative partnerships with schools and community colleges to increase the number of teachers adequately prepared in mathematics.	1.3.a Establish new and enhance existing academic pipelines for mathematics graduates students into Ph. D. programs at TAMUS member and other institutions. 1.3.b Build upon the Academic Roadmap Project to align the curricula and other such preparatory programs with schools and community colleges. 1.3.c Develop and submit proposals.

GOAL AREA BY OBJECTIVES	Strategies
2. Success (U/G SCH production, U/G degree production, educator certification, production, developmental education completers, leader/scholars produced, etc.)	
<p>2.1 Increase production of graduates with mathematics as their major or minor. Minimum three per year by fall 2007.</p> <p>2.2 Provide better preparation for majors in computer science, mathematics, engineering, technology, biology and architecture.</p> <p>2.3 Increase the production of mathematics teachers.</p> <p>2.4 Increase the production of SCHs in the Mathematics Department, in particular, increase RIICA.</p> <p>2.5 Increase number of mathematics majors well prepared for the workforce of Texas and the nation.</p>	<p>2.1.a Recruit more students into mathematics.</p> <p>2.1.b Assess the degree programs.</p> <p>2.1.c Enhance mathematics tutorial lab to provide state-of-the-art preparation for all students enrolled in mathematics courses.</p> <p>2.1.d Enhance mathematics research lab to provide state-of-the-art preparation for all mathematics majors.</p> <p>2.1.e Maintain mathematics Tutorial Lab.</p> <p>2.1.f Maintain mathematics Research Lab.</p> <p>2.2.a Enhance mathematics teaching by getting into more applications.</p> <p>2.3.a Work with high schools students and teachers to continually identify better student sin mathematic and enthusiastic about becoming teachers.</p> <p>2.4.a Offer more courses at the junior, senior, and graduate levels.</p> <p>2.5.a Establish an educational Mentor-Protégé Program between the department and business partners.</p>

GOAL AREA BY OBJECTIVES	Strategies
3. Excellence (e.g. licensure rates, graduate/professional school admits, program accreditation, benchmark rankings, placement of graduates, other measures of quality, etc.)	
3.2 Increase the number of mathematics majors entering graduate programs in mathematics and related fields – especially engineering and computer science.	3.1.a Increase the enrollment and graduation rates in the Applied mathematics Track.
4. Research (e.g. dollar amounts, number of grants, type/variety of research/scholarly/creative work, etc.)	
<p>4.1 Increase the research funding in the Mathematics Department by 20% by fall 2005.</p> <p>4.2 Increase the research activities in the department.</p> <p>4.3 Enhance the visibility of the department nationally.</p>	<p>4.1.a Identify potential opportunities and submit proposals to federal and corporate agencies.</p> <p>4.1.b Identify capabilities of faculty.</p> <p>4.1.c Establish, with external funding, a research center of excellence in applied mathematics.</p> <p>4.2.a. Provide developmental and “retooling” opportunities for faculty.</p> <p>4.2.b Recruit faculty members who are research active.</p> <p>4.3.a Increase the number of publications in refereed journals.</p>

GOAL AREA BY OBJECTIVES	Strategies
5. Service/Outreach (K-12 initiatives, summer enrichment programs, small farm projects, continuing education offerings, etc.)	
<p>5.1 Increase interactions with schools and community colleges.</p> <p>5.2 Continue outreach activities in the department.</p>	<p>5.1.a Continue visits to schools. 5.1.b Continue working with Regents' Initiative. 5.1.c Develop proposals such as the SMET. 5.1.d Strengthen existing and create new articulation agreements with community colleges and schools.</p> <p>5.2.a Obtain renewal for the Project SAIL. 5.2.b. Continue the SMET project.</p>
6. Engagement (outside class advising; mentoring; sharing, motivating, and nurturing students, colleagues, others served, etc.)	
<p>6.1 Install a faculty professional development program.</p> <p>6.2 Enhance student advisement and mentoring practices.</p>	<p>6.1.a Send faculty to workshops and conferences. 6.1.b Propose a sabbatical program. 6.1.c Provide faculty with released time basis to develop professional skills and write proposals.</p> <p>6.2.a Set in place a well-defined advisement framework. 6.2.b Collaborate with existing student honors and professional organizations to provide peer mentoring on an ongoing basis.</p>

GOAL AREA BY OBJECTIVES	Strategies
7. Technology (access, use, etc.)	
<p>7.1 Continue to incorporate technology in mathematics courses.</p> <p>7.2 Enhance the departmental web site and web capabilities.</p>	<p>7.1.a Assign textbooks which have web-based materials.</p> <p>7.1.b Initiate web-based and distance education courses for junior, senior, and graduate level mathematics courses.</p> <p>7.2.a Continually update faculty webpages and capabilities.</p> <p>7.2.b Use the web as a source of supplementary materials for every course.</p>
8. Planning (organization, operating procedures, scheduling, budgeting, etc.)	
<p>8.1 Incorporate technology into all of the department's operations and activities.</p> <p>8.2 Increase the effectiveness and efficiency of the department.</p> <p>8.3 Assess, on a periodic basis, the curriculum and the degree program to ensure their relevance to the needs of Texas and the nation.</p>	<p>8.1.a Conduct departmental business and assignments electronically.</p> <p>8.2.a Continually assess the processes and reduce waste by conducting business process reengineering (BPR).</p> <p>8.3.a Form an Assessment Committee from the university, the System and external environment (industry, the community and government laboratories).</p> <p>8.3.b Obtain feedback from this committee to continually improve the curriculum and the program.</p>

PART V. STRATEGIES BY NEW FUNDING REQUIREMENTS
2004 – 2008

Strategies by Priority Goals	Projected Funding Requirements				Funding Source
	2004-2005	2005-2006	2006-2007	2007-2008	
1.1.a Enhance recruitment from the university's summer programs.					
1.1.b Increase the number of scholarships for mathematics majors and minors.	\$30K	\$30K	\$30K	\$30K	NSF ED PVAMU
1.2.a Interact with parents to inform them of available opportunities in education, financial support and provide technical assistance.	\$2K	\$2K	\$2K	\$2K	Local
1.2.b Expand on the outreach programs with more diverse brochures, multi-media, and web-based presentations.	\$20K	\$5K	\$20K	\$5K	Local/ Private
1.2.c Conduct workshops for high school students and their teachers to increase the exposure to mathematics.	\$5K	\$5K	\$5K	\$5K	Local/ Private
1.3.a Establish new and enhance existing academic pipelines for mathematics undergraduates into graduate our programs and graduate students at TAMUS member and other institutions.					
1.3.b Build upon the Academic Roadmap Project to align the curricula and other such preparatory programs with schools and community colleges.					
1.3.c Develop and submit proposals					

NEW FUNDING REQUIREMENTS - 2004 – 2008 (continued)

2.1.a Recruit more students into mathematics.					
2.1.b Enhance the mathematics tutorial lab to provide state-of-the-art preparation for all students enrolled in mathematics courses.	\$30K	\$15K	\$15K	\$20K	NSF/ Local
2.1.c Enhance the mathematics research lab to provide state-of-the-art preparation for all mathematics students.		\$15K	\$15K	\$15K	NSF/DE
2.1.d Maintain mathematics tutorial lab	\$2K	\$2K	\$2K	\$2K	PVAMU
2.1.e Maintain mathematics research lab					
2.4.a Offer more courses at the junior and senior levels.					
2.5.a Establish an educational Mentor-Protégé Program between the department and business partners.					
3.1.a Increase the enrollment and graduation rates in the Applied mathematics Track and the Computational Physics Track.					
4.1.a Identify potential opportunities and submit proposals to federal and corporate agencies.					
4.1.b Identify capabilities of faculty.					
4.1.c Establish, with external funding, an applied mathematics center of excellence.	\$200K	\$50K	\$60K	\$50K	NASA NSF

NEW FUNDING REQUIREMENTS - 2004 – 2008 (continued)

4.2.a Provide developmental and “retooling” opportunities for faculty.	\$30K	\$30K	\$30K	\$30K	Local
4.2.b Recruit faculty with expertise in areas applied mathematics and statistics.					
4.3.a Increase the number of publications in refereed journals.					
5.1.a Continue visits to schools.					
5.1.b Continue working with Regents’ Initiative.					
5.1.c Develop proposals.					
5.1.d Strengthen existing and create new articulation agreements with community colleges and schools.					
5.2.a Obtain renewal for the Project SAIL	\$10K	\$10K	\$10K	\$10K	THECB
5.2.b Continue the summer mathematics program.					NSF

NEW FUNDING REQUIREMENTS - 2004 – 2008 (continued)

6.1.a Send faculty to workshops and conferences.	\$20K	\$20K	\$20K	\$20K	Local
6.1.b Propose a sabbatical program.					
6.1.c Provide faculty with released time basis to develop professional skills and write proposals.					
6.2.a Set in place a well-defined advisement framework.					
6.2.b Collaborate with existing student honors and professional organizations to provide peer mentoring on an ongoing basis.					
7.1.a Assign textbooks which have web-based materials.	\$30K	\$30K	\$30K	\$30K	NSF/Local
7.1.b Implement the Applied mathematics Center.					
7.1.c Initiate web-based and distance education courses for junior, senior, and graduate level mathematics courses.					
7.2.a Continually update faculty webpages and capabilities.					
7.2.b Use the web for supplementary materials for every course.					

NEW FUNDING REQUIREMENTS - 2004 – 2008 (continued)

8.1.a Conduct departmental business and assignments electronically.					
8.2.a Continually assess the processes and reduce waste by conducting business process reengineering (BPR).	\$20K	\$10K	\$10K	\$20K	Local Private
8.3.a Form an Assessment Committee consisting of faculty from the university, the System, the industry, the community and the government laboratories).					
8.3.b Obtain feedback from this committee to continually improve the curriculum and the program.					
TOTAL	\$399K	\$224K	\$249K	\$239K	