

## **DEPARTMENT OF MATHEMATICS AND STATISTICS STRATEGIC PLAN**

### **Mission Statement**

The faculty, graduate students, and staff in the Department of Mathematics and Statistics are committed to excellence in teaching, research and service. We provide a foundation of mathematics for all undergraduate students as well as specialized programs for mathematics majors and graduate students. We discover, develop, apply and disseminate mathematics and statistics.

### **Vision Statement**

The Department of Mathematics and Statistics aspires to the highest standards of excellence in all aspects of teaching, research and service. The department will build and maintain nationally and internationally recognized expertise in core, as well as emerging, areas of mathematics and statistics. We will actively promote multidisciplinary scientific activity and partnerships as we develop our national and international reputation as a leader in interdisciplinary research and outreach.

### **Department of Mathematics and Statistics Core Values**

- Excellence in Mathematical and Statistical Skills
  - Basic competency in core areas
  - Enthusiasm for creative thinking
- Application Skills
  - Professional and Scientific Breadth
  - Modeling ability
  - Computational competency
- Communication Skills
  - Oral
  - Written
  - Interpersonal
- Excellent Work Place Environment
  - Collegiality
  - Mutual respect
  - Appreciation of diversity
  - High ethical standards

## **GOALS, CRITICAL SUCCESS FACTORS, and OBJECTIVES (including Strategies and Assessments)**

**Goal 1. Access and Diversity: Recruit, retain, and graduate a larger, more academically prepared, and diverse student body.**

**Critical Success Factors** (*measures of the degree of success over the next five years*):

- Increase the number of undergraduate majors to 250 students.
- Maintain a mathematics and statistics graduate enrollment of 100 students.
- Maintain the proportion of Ph.D. students among graduate students at 50%.
- Maintain the proportion of female and minority students among graduate students at 50%.

**Objectives:**

***Objective 1.1: Compete for the best and brightest mathematics and statistics undergraduate and graduate students.***

Strategies:

- Maintain a regular schedule of mathematics courses offered as part of the Honors program and actively recruit mathematics majors from these courses.
- Contact regional high schools and colleges for names of top students in mathematics and statistics and have faculty personally contact those students.
- Utilize University Interscholastic League Events as a means of recruiting mathematics majors for our undergraduate program.
- Increase faculty participation in the Clark and McNair Scholars programs.
- Distribute our graduate program flyer to 2,000 colleges and universities, emphasizing contact with all state and regional institutions.
- Initiate faculty visits to state and regional colleges for the purpose of recruiting graduate students.
- Increase the number of prospective graduate students brought to campus while emphasizing regional recruitment.
- Monitor graduate applications and arrange personal calls from our faculty to prospective graduate students who express interest in their fields.

Assessments:

- Number of mathematics undergraduate majors.

- Number of mathematics majors on the Dean's and President's lists.
- Number of faculty serving as Clark and McNair scholars mentors.
- Number of Clark and McNair scholars in mathematics and statistics.
- Number of mathematics and statistics majors in the graduate and undergraduate programs.

***Objective 1.2: Increase the number of Masters and Ph.D. degrees awarded in mathematics and statistics.***

Strategies:

- Increase funding available from research grants for supporting students as research assistants.
- Reduce the teaching load of graduate assistants.
- Encourage our best masters students to continue their Ph.D. studies in our program.
- Actively monitor the number of graduate hours accumulated by a student in order to expedite the classification of graduate students as Ph.D. students.

Assessments:

- Graduate enrollment at the Ph.D. and Masters level.
- Retention of masters students into the Ph.D. program.
- Number of Ph.D. and Masters student credit hours taught.

Number of Masters and Ph.D.'s awarded in mathematics and statistics.

***Objective 1.3: Create support systems that enhance retention and graduation rates among undergraduate mathematics majors and graduate students.***

Strategies:

- Establish a program of faculty mentors for undergraduate and graduate students.
- Support the undergraduate student MAA organization by providing space, active faculty sponsorship.

Assessments.

- Retention and graduation rates among undergraduate mathematics majors and graduate students.
- Success rates of students enrolled in mathematics and statistics courses.

***Objective 1.4: Initiate strategies to increase diversity.***

Strategies:

- Increase diversity in faculty hiring to obtain role models for undergraduate and graduate students.
- Increase the number of campus visits by prospective graduate students from underrepresented groups.
- Utilize our high proportion of women graduate students in recruiting more female students.
- Take advantage of the TexPrep program to establish connections with potential students from underrepresented groups.
- Develop closer ties with universities with high enrollments of Hispanic and African/American students, such as Texas Southern, Prairie View A&M, Eastern New Mexico, and New Mexico Highlands.

Assessments:

- Number of contacts, enrollment and retention of students from underrepresented groups.
- Diversity among students in our graduate and undergraduate programs.

**Goal 2. Excellence: Achieve excellence in the teaching, research, and service missions of the Department of Mathematics and Statistics.**

**Critical Success Factors** (*measures of the degree of success over the next 5 years*):

- Attain a ranking among the top 75 mathematics and statistics departments as rated by the National Research Council.
- Be among the top three mathematics and statistics departments at public institutions in Texas in terms of numbers of Ph.D.s produced.
- Be among the top three mathematics and statistics departments at public institutions in Texas in terms of papers published per faculty and citations per faculty.
- Increase external funding.
- Enhance quality of programs for undergraduate and graduate majors.
- Enhance the mathematics experience for students enrolled in service courses.
- Provide excellent teaching across all levels of courses taught.
- Maintain a strong record of professional activities and service.

**Objectives:**

**Objective 2.1: Expand and strengthen the undergraduate mathematics programs.**

Strategies:

- Conduct a comparative study of the content and breadth of our curriculum with recognized, high quality undergraduate mathematics and statistics programs and carry out a review of our undergraduate curriculum.
- Expand undergraduate research and internship activities.
- Seek external support for research experiences for undergraduates by submission of proposals to the NSF Division of Undergraduate Education and in particular, the Research Enhancement for Undergraduates Program.
- Support Undergraduate Research projects by providing stipends to match Honors Research Program and encouraging faculty to serve as mentors.

Assessments:

- Number of mathematics and statistics majors.
- Number of mathematics and statistics majors on the Dean's and President's lists.
- Postgraduate employment of our mathematics and statistics majors.
- Performance of graduates on GRE exams.
- Number of undergraduates participating in faculty supervised research projects.

- Number of undergraduates supported by research grants.

***Objective 2.2: Strengthen mathematics and statistics graduate programs.***

Strategies:

- Increase the number of graduate students supported by external funding.
- Continue to support student participation in National Science Foundation Industrial Mathematics Experience and encourage internships at national laboratories.
- Plan and implement processes to ensure timely completion of degrees at all levels.
- Seek a level of net TA compensation that places our department among the top one-third of the Big 12 mathematics and statistics departments.

Assessments:

- Number of graduate degrees awarded.
- Monitor retention rates in graduate programs
- Numbers of research publications authored by graduate students.
- Number of university and national awards to our graduate students.
- Amount of graduate student support provided by research funding.
- Number of students participating in national workshops and laboratory experiences.

***Objective 2.3: Promote research productivity.***

Strategies:

- Maintain the strength and breadth of disciplines in the department by recruiting strong faculty in the areas of applied and pure mathematics and statistics.
- Encourage faculty publications in quality outlets.
- Encourage an increased number of quality research proposal submissions.
- Provide reduced teaching loads for faculty with high levels of research productivity and graduate student direction.
- Support travel to external funding agencies and to conferences where program directors will be present to increase contacts and determine criteria and expectations of granting agencies.
- Hire new faculty with proven records or excellent promise in areas with future expectations of higher funding.
- Encourage faculty participation in multidisciplinary and interdisciplinary activities.

Assessments:

- Number of university awards for research.
- Number of proposal submissions.
- Number of papers published and citations.
- Number of conference presentations and invited talks.
- Number of faculty serving as editors or as members on editorial boards.
- Percentage of faculty involved in proposal submission activity.
- Number of grant awards and amount of funding.

***Objective 2.4: Support and maintain quality faculty and graduate students in the pure areas of mathematics***

Strategies:

- Hire Ph.D.s in areas of pure mathematics that have high promise of collaboration with other groups and areas in the department, other units at Texas Tech and with other universities.
- Maintain a critical mass of faculty in the pure areas of mathematics.
- Ensure that research assistantships are provided for students in the pure areas.

Assessments:

- Amount of funding secured by faculty in pure areas
- Number of papers published by faculty in pure areas.
- Number of invited national and international talks given by faculty in pure area
- Number of faculty in pure areas serving on editorial boards.
- Number of graduate degrees awarded in pure areas.

***Objective 2.5: Develop nationally recognized applied and professional programs.***

Strategies:

- Develop a program that allows for an emphasis in Mathematics Education for the Ph.D.
- Expand our contacts with industry and business by instituting a Business and Industrial Consulting Board made up of professionals meeting regularly to discuss their needs and opportunities for our programs.
- Maintain our programs in biomathematics, control theory and statistics to take advantage of the student and professional interests in these areas.
- Maintain a sufficient core of faculty expertise in computational areas and expand graduate student training and course offerings in these research areas.

Assessments:

- Amount of funding secured by faculty in applied areas.
- Number of papers published by faculty in applied areas.
- Number of invited national and international talks given by faculty in applied areas.
- Number of faculty in applied areas serving on editorial boards.
- Number of graduate degrees awarded in applied and professional areas.

***Objective 2.6: Promote teaching excellence.***

Strategies:

- Establish departmental excellence in teaching awards.
- Strengthen the Graduate Teaching Mentoring Program.
- Require all GTA to enroll in pedagogy course.

Assessments:

- Number of university awards for research and teaching.
- Student Teaching Evaluations.
- Number of participants in Graduate Teaching Mentoring Program.
- Teaching performance of students who have completed pedagogy course.

***Objective 2.7: Provide excellent teaching of service courses and resources that support student learning.***

Strategies:

- Maintain and expand the role of the Missouri Club in tutoring undergraduate students.
- Develop an assessment tool to measure satisfaction of client departments with mathematics service courses.
- Improve success rate in service courses.

Assessments:

- Use and survey of student satisfaction with Missouri Club.
- Survey client departments regarding satisfaction with service courses.
- Monitor success rate in service courses.

***Objective 2.8: Promote professional and community service that enhances the reputation of the department and the profession and promotes student learning.***

Strategies:



- Support faculty participation at professional meetings.
- Encourage professional service that includes reviewing, conference organization, and panel service
- Acknowledge and reward outreach and service activities.

Assessments:

- Number of faculty serving as reviewers.
- Number of faculty serving on editorial boards.
- Monitor faculty involvement in outreach and community activities.

**Goal 3. Partnership and Engagement: Develop collaborations with other academic, government, corporate, and private entities and develop connections with K-12 schools that enhance the educational, research and service mission of the department and strengthen community connections.**

**Critical Success Factors** (*measures of the degree of success over the next five years*):

- Maintain an active program of community outreach activities.
- Increase involvement in service learning.
- Maintain ongoing and create new alliances with other academic and nonacademic entities.
- Develop internship programs for undergraduate and graduate students with government and corporate entities.

**Objectives:**

**Objective 3.1: Continue and expand support for the Lubbock TexPrep program.**

Strategies:

- Seek a permanent basis of funding for the program administrator.
- Seek support for a fourth year of participation by TexPrep students.
- Conduct an annual review of the financial needs of the program.

Assessments:

- Amount of external funding awarded to the program.
- Number of TexPrep participants who enroll at Texas Tech University.

**Objective 3.2: Establish partnerships that represent strong ties between Texas Tech and EC-12 education.**

Strategies:

- Initiate an on-campus summer experience for pre-Tex Prep students.
- Enhance the Summer Mathematics Academy.
- Aggressively recruit greater participation of in-service teachers for MA program.

Assessment:

- Level of enrollment in the MA program.
- Number of on-campus mathematics events for EC-12 students.

- Participation in Summer Math Academy.

***Objective 3.3: Increase partnerships with state and federal agencies, national research laboratories, and national and international institutes and universities.***

Strategies:

- Encourage faculty participation in summer research fellowship programs at national laboratories.
- Initiate activities with regional national laboratories such as Los Alamos and Sandia.
- Maintain contacts and collaborations with national and international universities and institutes such as Universidad Nacional Autonoma de Mexico, Benemerita Universidad Autonoma de Puebla, the Center for BioCybernetics and Intelligent Systems at Washington University, St. Louis, the Royal Institute of Technology, Stockholm and the University of Tokyo, Denki.

Assessments:

- Number of faculty engaged in joint research with personnel at laboratories and other universities.
- Number of joint publications and proposal submissions with personnel at laboratories and other universities.

***Objective 3.4: Continue ongoing and expand partnerships with the colleges, departments, institutes, schools, and centers of Texas Tech University and other area colleges.***

Strategies:

- Provide online courses that facilitate the assimilation of students at area colleges into our undergraduate and graduate programs.
- Invite faculty from other units and area colleges to speak at departmental colloquia.
- Encourage joint research proposals with other units at Texas Tech.

Assessments:

- Level of enrollment of students from area colleges in departmental on-line courses.
- Number of students from area colleges enrolled in mathematics and statistics degree programs.
- Number of joint publications and proposal submissions involving our faculty and those from other units and area colleges.

***Objective 3.5: Provide increased accessibility to distance courses and programs for rural communities, especially in West Texas.***

Strategies:

- Develop online courses.

- Expand informal consultant services in mathematics and statistics for the surrounding communities.

Assessments:

- Number of new online or distance learning courses.
- Online or distance learning course survey.

**Objective 3.6: Enhance the teacher preparation program and professional developmental activities that support in-service teachers.**

Strategies:

- Develop distance delivery of courses for the Master of Arts program.
- Develop mathematics offerings for the Multidisciplinary Master of Science program that can be delivered online.
- Provide professional development workshop for area teachers

Assessments:

- Enrollment in Master of Arts program.
- Level of student credit hours associated with electronic, online courses.
- Number of teachers participating in professional development opportunities provided by the department.

***Objective 3.7: Increase partnerships with state and federal agencies, national research laboratories, and national and international institutes and universities.***

Strategies:

- Encourage faculty participation in summer research fellowship programs at national laboratories.
- Initiate activities with regional national laboratories such as Los Alamos and Sandia.
- Maintain contacts and collaborations with national and international universities and institutes such as Universidad Nacional Autonoma de Mexico, Benemerita Universidad Autonoma de Puebla, the Center for BioCybernetics and Intelligent Systems at Washington University, St. Louis, the Royal Institute of Technology, Stockholm and the University of Tokyo, Denki.

Assessments:

- Number of faculty engaged in joint research with personnel at laboratories and other universities.
- Number of joint publications and proposal submissions with personnel at laboratories and other universities.

**Goal 4. Information Technology: Optimize the use of information technology in the delivery of instruction, in advancing research, and in enhancing the efficiency of departmental administration.**

**Critical Success Factors** (*measures of the degree of success over the next five years*):

- Maintain and update Information Technology (IT) resources within the department.
- Achieve 100% faculty competency in utilization of IT that enhances productivity in teaching and research.
- Train all mathematics and statistics graduates in the effective use of appropriate IT.

**Objectives:**

***Objective 4.1: Increase student, faculty and staff access to technology and computing.***

Strategies:

- Initiate a three-year replacement strategy for replacing departmental software and hardware.
- Annually poll faculty and graduate students to measure their satisfaction with IT facilities and support.

Assessments:

- Faculty and graduate student equipment and software inventory.
- Faculty and graduate student survey of IT equipment and support.

***Objective 4.2: Increase the use of effective technology in research and learning.***

Strategies:

- Undertake a critical evaluation of the use of technology in the classroom.
- Develop and maintain a bank of technology resource materials that is readily available to all faculty and students for utilization in the classroom.
- Provide regularly scheduled workshops or seminars for students and faculty devoted to the training in the use of technology.
- Expand and maintain licensing arrangements for software critical for faculty research.
- Monitor the effectiveness of technology in the classroom via faculty and student input.

Assessments:

- Amount of funding associated with research projects that utilize technology.
- Number of courses taught that utilize instructional technology.

***Objective 4.3: Provide increased accessibility to distance courses and programs for rural communities, especially in West Texas.***

Strategies:

- Develop online courses.
- Expand informal consultant and tutorial services in mathematics and statistics for the surrounding communities.

Assessments:

- Number of new online or distance learning courses.
- Online or distance learning course survey.

**Goal 5. Human Resources: Enhance the quality of the work experience for faculty and staff in Mathematics and Statistics.**

**Critical Success Factors** (*measures of the degree of success over the next 5 years*):

- Develop and promote excellent faculty.
- Maintain and increase excellent staff and faculty morale.
- Improve physical facilities for staff and faculty.

**Objectives:**

***Objective 5.1: Enhance and support activities that promote the recruitment and retention of excellent and diverse faculty and staff.***

Strategies:

- Aggressively pursue diversity among new hires by utilizing support provided by professional organizations and appropriate resources at Texas Tech University.
- Utilize personal contacts with faculty at other universities to identify diversity candidates.
- Increase the student work staff in administrative offices that support faculty and staff activities.
- Increase compensation for staff.
- Maintain competitive faculty salaries as measured by data provided in the annual American Mathematical Society (AMS) Employment Report.

Assessments:

- Staff salaries versus allowable compensation as dictated by classification rank.
- Faculty salaries versus comparably rated mathematics departments as provided by AMS.
- Diversity among faculty and staff.

***Objective 5.2: Support the professional development of faculty and staff.***

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Strategies:

- Support faculty participation in the Faculty Development Program.
- Support faculty participation in professional developmental activities such as the American Mathematical Association Project Next Program and summer research fellowships at national laboratories.
- Support staff participation in professional and technical training activities such as Service Plus and information technology training courses provided at Texas Tech.

Assessments:

- Number of developmental leaves awarded to faculty.
- Level of faculty involvement in professional developmental activities.
- Level of staff participation in professional and technical training activities.

***Objective 5.3: Improve physical facilities.***

Strategies:

- Pursue existing capital improvement projects submitted by the department.
- Establish a schedule of periodic reviews of equipment in the classroom computer laboratories.

Assessments:

- Level of funding for departmental capital improvement projects.
- Amount of expenditures for classroom computer equipment.



**Goal 6. Tradition and Pride: Promote a strong positive image for Mathematics and Statistics locally, regionally, and nationally.**

**Critical Success Factors** (*measures of the degree of success over the next five years*):

- Increase the number of faculty and students who receive local, regional, and national recognition and awards.
- Hold the graduate and undergraduate reunion every five years.
- Enhance procedures for communicating departmental activities and successes to the media.

**Objectives:**

***Objective 6.1: Strengthen the pride and prestige associated with Texas Tech Department of Mathematics and Statistics.***

Strategies:

- Encourage participation of faculty and students in state, regional, national, and international professional meetings by providing adequate travel funds.
- Develop strong student teams for the Putnam Undergraduate Competition.
- Continue to secure leadership roles of faculty in the Texas Section of the Mathematical Association of America and in national professional societies.
- Nominate top students for National Science Foundation fellowships and other national awards.
- Showcase the department by bringing internationally renowned mathematicians and statisticians to campus for lectures.
- Maintain and expand those features on the departmental web page that highlight departmental and faculty accomplishments.

Assessments:

- National Research Council rankings of mathematics departments.
- Number of faculty designated as Fellows in professional societies.
- Student teams in national competitions.
- Number of student and faculty awards.

***Objective 6.2: Continue to advertise and highlight the department's achievements and those of outstanding faculty, students, and alumni through the publication of the departmental newsletter.***

Strategies:

- Maintain an up-to-date database of departmental alumni and friends.

- Solicit information for future newsletters from alumni in each newsletter.
- Include administrators, regents, and local legislators in the newsletter mailings.
- Solicit comments on the newsletter during the annual phone-a-thon.
- Utilize newsletters that are returned with incorrect addresses to update our alumni database.

Assessments:

- Number of records in alumni database.
- Number of donors contributing to annual Student Phone-a-Thon.

***Objective 6.3: Advertise and educate the department, the university and the public about the value of mathematics.***

Strategies:

- Regularly submit articles to the A&S Electronic Newsletter.
- Regularly submit articles to the local media that brings to the attention of the public the importance and relevance of mathematics and statistics education and research.

Assessment:

- Number of events in print or electronic media that highlight the activities of the department.
- Number of events in the A&S Electronic Newsletter

**Goal 7. Accountability: Strengthen the department's fiscal stability while enhancing performance, assessment, and public accountability.**

**Critical Success Factors** (*measures of the degree of success over the next five years*):

- Increase amount of departmental scholarship endowments to \$ 2,000,000.
- Maintain status as a profit-generating department in terms of formula funding.
- Develop and maintain a systematic approach to assessment of student learning outcomes.

**Objectives:**

***Objective 7.1: Increase departmental endowments.***

Strategies:

- Increase the number of alumni and supporters contacted through the annual Student Phon-a-Thon.
- Advertise our fund raising goals through the annual newsletter.

Assessments:

- Amount of contributions to annual Student Phone-a-Thon.
- Amount of annual giving to scholarship endowments.
- Level of accumulated funds in departmental scholarship endowments.
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***Objective 7.2: Increase formula funding generated by the department.***

Strategies:

- Increase student credit hours taught by changing the calculus sequence to a 4-hour format.
- Actively pursue appropriate CIP reclassification of graduate and undergraduate courses.
- Increase formula funding by emphasizing greater enrollment of Ph.D. students.
- When possible, increase class size for high enrollment courses such as M1330, M1331, and M2300.

Assessments:

- Level of formula funding generation versus departmental expenditures.
- Student Credit Hours Taught