K-State 2025 Strategic Action and Alignment Plan
College or Major Unit: Arts & Sciences
Department: Mathematics

1. **What are your Department's mission and vision and how does your organization contribute to achieving the University's and your College's/Major Unit's vision for K-State 2025?**

Mission:

The Department of Mathematics serves as the University center for learning, instruction, and research in the Mathematical Sciences. The mission of the Department of Mathematics through all its programs is to help all students be successful in understanding mathematics in preparation for careers in industry, teaching, government, and research in Kansas, the United States, and abroad. The research of the Department advances mathematical knowledge worldwide. The undergraduate, graduate, and postdoctoral programs are an inseparable part of the research activities of our faculty; these research activities are a key component in the mission of the University. The Department also plays a fundamental role in the University's mission via the delivery of a variety of service courses which are an integral part of virtually every degree program on campus. The Department has several outreach programs designed for students and teachers in the schools including the Manhattan Mathematical Olympiad, the Math Circle Seminar, and the C^3 Academies run jointly with the College of Education. Departmental resources include the Center for the Integration of Undergraduate, Graduate and Postdoctoral Research, the Mirror Symmetry and Tropical Geometry Research Center, and the Center for Quantitative Education.

Vision and Contribution Statement:

The Department of Mathematics will be a highly ranked research center with clusters of undergraduate students, graduate students, postdoctoral fellows and internationally prominent faculty working on cutting edge problems in pure and applied mathematics as well as student learning. The Department will have a national reputation for quality and innovative instruction in a technologically rich environment, and excel at recruitment and the retention of all students across campus. To supplement institutional and extramural funding, the Department will obtain a robust endowment; this endowment will help provide and, to some degree stabilize, financial support for its research, instructional, recruitment, retention, and outreach programs. These achievements are in perfect congruence with the University's vision for K-State 2025.

2. **What are your Department's *key* strategic activities and outcomes?**

3. **Identify [in brackets] which of your Department's strategic outcomes are directly linked to your College's/Major Unit's outcomes.** ***(If your Department or similar unit is not in a College or Major Unit, skip this question.)***

Theme 1: Establish or further develop internationally recognized faculty research programs in algebra, applied mathematics, analysis, geometry, topology, number theory and mathematics education; hire outstanding faculty whose specialties complement these research strengths.

Key Activities	Short Term (2013 - 2015) *Key Outcomes*	Intermediate (2016 - 2020) *Key Outcomes*	Long Term (2021 - 2025) *Key Outcomes*
What we plan to do…	*What we expect to happen…*	*What we expect to happen…*	*What we expect to happen…*
1. Secure and retain a substantial number of additional tenure-track faculty and positions to establish Department as a top 50 research and instructional	A. Hire a min. of 4 to 5 additional tenure-track faculty to keep step with growth in graduate program; offer competitive salaries & private office	A. Hire a minimum of 2 additional tenure-track faculty. All Dept. Head requests for 2-body problem accommodations are met; all	A. Hire additional tenure-track faculty; faculty will be in the 42-45 range at a minimum. All Dept. Head requests for 2-body problem

program. Positions will be metered out in consonance with University initiatives; departmental goals and governance procedures; strengths; opportunities; etc.	space. All Dept. Head requests for 2-body problem accommodations are met; all retention requests for high performing faculty are met. Min. tenure-track faculty will be 40. [Ia, Ib, IIIa, IIIb, IXa]	retention requests for high performing faculty are met. [Ic, IIIb, IVc, VIe, IXf]	accommodations are met; all retention requests for high performing faculty are met. [Ic, Ie, IIIc, IVe]
2. Engage in recruitment of NAS member, or Mathematics prize winners, or equivalents.	B. Recruit Math Prize winners (or equivalent) as a member of Dept. with increase in 0-1 range. [Ia]	B. Continued recruitment of Prize winners (or equivalent) with increase in 0-1 range. [IXc]	B. Recruitment of Prize winners (or equivalent) with increase in the 1-2 range. [IIIc]
3. Nominate faculty for university, national, and international awards, including Sloan, Young Investigator, etc.	C. One Distinguished Professor award. One other university or national award. [Ia, IIb, IId]	C. Two more national or international awards by this time.	C. Two Distinguished Professors by 2025. Two more national or international awards.
4. Planning for interdisciplinary research in Math Modeling and Simulation will continue. Other interdisciplinary groups are planned	D. The number of interdisciplinary groups will be in the 0-1 range. Establish a publication record in the 7-10 range for the period. Obtain a seed grant from NSF/NIH. [IIa, IId, Xa, Xc]	D. The number of interdisciplinary groups will be in the 1-2 range. Publications in the 5-7 range per year. Obtain at least one major grant with at least $200K funding. Fund at least one postdoctoral position. [IIe]	D. The number of interdisciplinary groups will be in the 1-2 range. Publications in the 5-7 range per year and grants in the $300k- $500K range. Fund postdoctoral positions in the 1-3 range. [IIf]
5. Improve faculty productivity with respect to NRC quality factors such as individual and major group grants: REU, FRG, MCTP; publication, etc.	E. Increase number of faculty holding external grants from 12 to 15 per year. Continue REU grant. Major grants comparable to peer group. [IIa, IIb]	E. Increase number of faculty holding external grants to 17 per year. Continue REU grant. Major grants equal to peer group. [IIe]	E. Increase number of faculty holding external grants to 20 per year. Continue REU grant. Major grants exceeding peer group. [IIf]
6. Further the development of the M-Center as an internationally prominent research hub with collaborative research (CR) agreements.	F. Increase number of refereed publications from 1.5 to 2 per year. [IId]	F. Increase number of refereed publications to 2.25 per year. [IIc]	F. Increase number of refereed publications to 2.5 per year. [IIf]
7. Set up and foster collaborative agreements.	G. Among other achievements, including post doctoral fellows in the 1-2 range, M-Center will continue to have mega grants in the 1-2 range. CR agreements will be in the 1-2 range. Assessment by external advisory board due at end of period. [Xd]	G. Among other achievements, including post doctoral fellows in the 2-3 range, the M-Center will have mega grants in the 2-3 range. CR agreements will be in the 2-3 range. Assessment by external advisory board due at end of period.	G. Among other achievements, including post doctoral fellows in the 2-4 range, the M-Center will have mega grants in the 2-3 range. CR agreements will be in the 3-4 range. Assessment by external advisory board due at end of period. [IIf]
8. M-Center will organize Nat'l. and Int'l. Conferences and Workshops. Other research groups will organize conferences and workshops.	H. Two faculty (from KSU or collaborating institution) per year exchanged via collaborative agreements. M-Center will host Sabbatical leaves. [Xb, Xd]	H. Three faculty per year exchanged via collaborative agreements. M-Center will host Sabbatical leaves. [IIe]	H. Four faculty per year exchanged via collaborative agreements. M-Center will host Sabbatical leaves.
	I. One faculty member per year to institutes or focused research workshops. [IIc, Xb]	I. Two faculty members per year to institutes or focused research workshops.	I. Three faculty per year to institutes or focused research workshops.

	J. 1-2 Conferences or Workshops for the period funded externally. [Xd]	J. 2-3 Conferences or Workshops for the period funded externally.	J. 2-3 Conferences or Workshops for the period funded externally.

Theme 2: Establish a nationally recognized undergraduate research (UR) program in pure and applied mathematics.

Key Activities	Short Term (2013 - 2015) *Key Outcomes*	Intermediate (2016 - 2020) *Key Outcomes*	Long Term (2021 - 2025) *Key Outcomes*
What we plan to do…	*What we expect to happen…*	*What we expect to happen…*	*What we expect to happen…*
1. Secure a substantial number of undergraduate math majors and majors in other STEM disciplines in team research projects of high quality with mathematics faculty, postdoctoral fellows and graduate students. (I-Center undergraduate scholars). 2. Increase the number of mathematics faculty/postdocs involved in UR mentoring 3. Increase the number of I-Center postdoctoral positions. 4. Increase the number of graduate students involved in the UR mentoring process. 5. Increase stipends for I-Center scholars and financial support for research projects; provide travel funds for students to attend conferences to present their work. 6. Workshops for undergraduate students continues: Putnam seminar; GRE seminar; math modeling seminar; research training seminar. Create research venues such as undergraduate journals. 7. Recognition of undergraduate research accomplishments, and mentoring by faculty and graduate students.	A. Number of undergraduate math majors engaged in research as I-Center undergraduate scholars increases from 5% to 10%. [Iva, Vb, Vc, IXb] In conjunction with the increase in math majors engaged in meaningful research, a semester long UR system modeling the NSF summer REUs is put in place. [IXb, Xa]	A. Number of undergraduate math majors engaged in research as I-Center undergraduate scholars increases from 10% to 15%. [Ve]	A. Number of undergraduate math majors engaged in research as I-Center undergraduate scholars increases from 15% to 20%. All majors will have access to a funded study abroad experience. [Vf]
	B. Faculty/postdocs undergraduate research mentors increase from 15% to 30%. [Vb]	B. Faculty/postdocs undergraduate research mentors increase from 30% to 45%.	B. Faculty/postdocs undergraduate research mentors increase from 45% to 60%.
	C. I-Center postdoctoral positions increase from 3 to 4. [Vb]	C. I-Center postdoctoral positions increase from 4 to 5. [IVc]	C. I-Center postdoctoral positions increase from 5 to 6.
	D. Graduate students involved in UR mentoring increase from 4% to 8%. [Vb]	D. Graduate students involved in UR mentoring increase from 8% to 12%.	D. Graduate students involved in UR mentoring increase from 12% to 16%.
	E. Stipend for undergraduate and graduate scholars for funded research proposals to be comparable to top 50 universities.	E. All research proposals recommended by director of I-Center will be funded with stipends comparable to top 50 universities.	E. All research proposals recommended by I-Center director will be funded with stipends comparable to top 50 universities. All scientific travel proposals recommended by director of I-Center will be funded.
	F. 50% of I-Center scholars present their work at conferences or other venues.	F. 75% of I-Center scholars present their work at conferences or other venues.	F. All I-Center scholars present their work at conferences or other venues.
	G. Goldwater scholars increase. Putnam and mathematical modeling competition success rate increase. All I-Center Scholars present their work at a Math Department Seminar. Graduate School successful	G. Goldwater scholars increase. Putnam and mathematical modeling competition success rate increase. All I-Center Scholars present their work at a Math Department Seminar. Graduate School successful	G. Goldwater scholars increase. Putnam and mathematical modeling competition success rate increase. All I-Center Scholars present their work at a Math Department Seminar. Graduate School successful

8. I-Center Director and Development Committee will establish a plan for external funding of research and STEM activities. **9. I-Center will work with interdisciplinary groups, such as the Mathematical Modeling and Simulation group, in the training of undergraduate, graduate, and postdoctoral fellows in Applied Maths. Partnerships with local and regional businesses, along with Federal and State agencies will be sought.** **10. Develop an assessment and tracking plan for the I-Center that compares and evaluates its activities to the top 50 programs.**	**applications in top research universities increase. [Vc, IXb]**	**applications in top research universities increase.**	**applications in top research universities increase.**
	H. In this period an online undergraduate research journal, published each semester is established. All I-Center scholars publish their work in the online UR journal or in a peer-reviewed math journal. [Ia]	**H. All I-Center scholars publish their work in the online undergraduate research journal or in a peer-reviewed math journal.**	**H. All I-Center scholars publish their work in the online undergraduate research journal or in a peer-reviewed math journal.**
	I. A faculty member is nominated every year for the "University Distinguished Faculty Award for the Mentoring of Undergraduate Students in Research." Recipients in the 1-2 range. [Ia]	**I. A faculty member is nominated every year for the "University Distinguished Faculty Award for the Mentoring of Undergraduate Students in Research." Recipients in the 1-2 range.**	**I. A faculty member is nominated every year for the "University Distinguished Faculty Award for the Mentoring of Undergraduate Students in Research." Recipients in the 2-3 range.**
	J. I-Center Scholars are nominated every year for "University Award for Distinguished Undergraduate Student in Research." Recipients in the 1-2 range. Develop course numbers so that UR or mentoring can be noted on student transcripts. [Ia]	**J. I-Center Scholars are nominated every year for the "University Award for Distinguished Undergraduate Student in Research." Recipients in the 1-2 range.**	**J. I-Center Scholars are nominated every year for the "University Award for Distinguished Undergraduate Student in Research." Recipients in the 2-3 range.**
	K. At least one REU or workforce grant in place. [Ia, Va]	**K. At least one REU or workforce grant in place.**	**K. At least one REU or workforce grant in place. [IIf]**
	L. Have 3-4 graduate and undergraduate I-Center Scholars working with interdisciplinary groups. [Xa]	**L. Have 6-10 graduate and undergraduate I-Center scholars working with interdisciplinary groups.**	**L. Have 6-10 graduate and undergraduate I-Center scholars working with interdisciplinary groups. An interactive and interdisciplinary research course will be in place, in the spirit of UNL's "Math in the City", in which students receive hands-on training in the modeling and analysis of current problems arising from local or regional business concerns, or Federal agency initiatives.**
	M. An External Advisory Board will be in place by year 5.	**M. Advisory Board will issue first assessment with its recommendations.**	**M. Advisory Board will issue assessment with its recommendations. Program will be in the top 50.**

Note 1: The number of faculty/postdocs per year involved in undergraduate research mentoring from academic year 2006-2007 to academic year 2012-2013 were 3, 4, 2, 5, 5, 9, 8. This gives an average of about 5 faculty/postdocs over seven years (13.8% of the faculty/postdocs, counting 33 faculty members and 3 postdocs).

Note 2: The number of I-Center Graduate Scholars per year (some of them stayed for both semesters) during academic years 2010-2011, 2011-2012, and 2012-2013, were 2, 1, and 4, respectively. This gives an average of about 2 graduate scholars over three years (4% of the graduate student body, counting 48 graduate students).

Note 3: The number of I-Center Undergraduate Scholars per year (many scholars stay for both semesters) from academic year 2006-2007 to academic year 2012-2013 were 4, 4, 2, 4, 6, 12, 9. This is an average of about 6 undergraduate scholars over seven years (5% of math majors, counting 120 math mayors).

Theme 3: As an integral part of the research environment of the Department, the graduate program will expand simultaneously with the expansion of the number of faculty. Our goal is to become a top 50 graduate program.

Key Activities	Short Term (2013 - 2015) *Key Outcomes*	Intermediate (2016 - 2020) *Key Outcomes*	Long Term (2021 - 2025) *Key Outcomes*
What we plan to do…	***What we expect to happen…***	***What we expect to happen…***	***What we expect to happen…***
1. Increase the size of the graduate program. Assess program using NRC quality factors. **2. Increase the production of Ph.D.s, including domestic students, women, and those from underrepresented groups.** **3. Increase the number of Ph.D.s finding research postdoctoral positions. Develop a plan to assist graduate students in finding positions at National Labs or in Industry.** **4. Increase course offerings.** **5. Increase graduate student recruitment and subsequent involvement in interdisciplinary research, or M-Center research. Top tier international students as well as domestic students must be recruited.** **6. Increase the number of multidisciplinary students receiving the**	**A. Increase number of GTA positions by 17. GRA positions in 0-2 range; stipends meet or exceed peer average; tuition waiver for GRAs. Graduate program assessed every 5 years. [Ib, VIa, VIb, VId, IXa]**	**A. GTA positions sufficient to meet undergraduate course demands. GRA positions in the 2-3 range. [VIf]**	**A. GTA positions sufficient to meet undergraduate course demands. GRA positions in the 3-5 range. Program will rank in top 50. [VIg]**
	B. Average 5 Ph.D.s per year. Graduate, in the five year period, at least two from the categories of: domestic female or domestic student from an underrepresented group. [VIc, IXa]	**B. Average 6.5 Ph.D.s per year. Graduate at least one per year from the categories of: domestic woman or domestic student from an underrepresented group.**	**B. Doctorates awarded comparable to benchmark institutions. Graduate at least two per year from the categories of: domestic woman or domestic student from an underrepresented group. [VIh]**
	C. 2 per year in research postdoc positions. [VIc]	**C. 2.5 per year in research postdoc positions.**	**C. 3 per year in research postdoc positions.**
	D. Two courses each year in applied and computational mathematics, in addition to existing courses. [VIc]	**D. 10% increase in number of graduate courses.**	**D. Another 10% increase in number of graduate courses.**
	E. Reduce average time to Ph.D. to 6 years. [VIc]	**E. Reduce average time to Ph.D. to 5.5 years.**	**E. Reduce average time to Ph.D. to 5 years.**
	F. There will also be 0-2 summer research fellowships or GRAs for graduate students involved with Departments' interdisciplinary groups, or M-Center groups. [Va, Vc; Xa]	**F. There will be 2-3 GRAs associated with Departments' interdisciplinary groups, or M-Center groups.**	**F. There will be 2-3 GRAs associated with Departments' interdisciplinary groups, or M-Center groups.**

Graduate Certificate in Applied Mathematics. 7. Establish cooperative program agreements with international univ. 8. Increase activities associated with Academic sponsorship of MSRI, IMA. 9. Nominate graduate students for National or University Awards. 10. Organize Conferences and Workshops.	G. A total of 6 departments will offer elective courses for the certificate. [Xa]	G. A total of 7 departments will offer elective courses for the certificate.	G. A total of 9 departments will offer elective courses for the certificate.
	H. An average of 5 certificates per year will be awarded. [Xa]	H. An average of 7 certificates per year will be awarded.	H. An average of 12 certificates per year will be awarded.
	I. Three to five cooperative agreements in place. [Xd]	I. Exchange of two students per year via cooperative agreements.	I. Exchange of two students per year via cooperative agreements.
	J. Three students per summer to institutes or workshops.	J. Five students per summer to institutes or workshops.	J. Seven students per summer to institutes or workshops.
	K. The number of instructional or research awards to graduate students will be in the 1-2 range for the period.	K. The number of instructional or research awards to graduate students will be in the 2-3 range for the period.	K. The number of instructional or research awards to graduate students will be in the 2-3 range for the period.
	L. 1-2 Conferences or Workshops for Graduate Students funded externally during the period.	L. 1-2 Conferences or Workshops for Graduate Students funded externally during the period.	L. 1-2 Conferences or Workshops for Graduate Students funded externally during the period.

Theme 4: Excel at Instruction, Retention, Recruitment, Outreach.

Key Activities	Short Term (2013 - 2015) *Key Outcomes*	Intermediate (2016 - 2020) *Key Outcomes*	Long Term (2021 - 2025) *Key Outcomes*
What we plan to do…	*What we expect to happen…*	*What we expect to happen…*	*What we expect to happen…*
1. Increase support for students in service courses, especially the calculus sequence, to improve student success. Reduce recitation size to improve student/teacher interactions. Provide online review modules so students with gaps in their training (which is very common) can keep up. Improve tutoring quality. Improve grading and feedback to students. (Note: we already make heavy use of online homework and have TAs grade exams and quizzes. But we still need some homework hand graded by UTA's.) Assessment plan for Grader/Help Session Program is developed.	A. Reduce recitation size to 35 students. [IXc]	A. Reduce recitation size to 30 students. [IVd, VIIIc, IXc]	A. Recitation size is in accordance with best practices of peer group. [IVe, IXc]
	B. Develop at least 15 online algebra reviews for students in calculus with gaps in algebraic background. [VIIIb, IXb]	B. Develop 15 more (total of 30) online review modules. [IVd, IXc]	B. Number of online review modules is in accordance with best practices of peer group. [IXc]
	C. Have a tutor training program in place for undergraduate tutors. [VIIIb, IXa, IXb, IXc]	C. Have training mandated for university tutoring jobs. Training program should serve 10-12 tutors per year. [IXc]	C. Tutorial training program should serve 12-30 tutors per year. [IXc]
	D. Increase grading time in Calculus 1 and 2 from 3 minutes per student per week to 6 minutes per student per week, and pay for grades from $0.25 over min. wage to $1.25 over min. wage (with similar increases for other courses). [IXc]	D. Increase grading time in Calculus 1 and 2 to 10 minutes per student per week and pay for graders to $2.50 over minimum wage (with corresponding increases for other courses). [IXc]	D. Grading time and pay for graders is in accordance with best practices of peer group. [IXc]
	E. Increase percentage of students in calculus continuing in sequence to 55% (currently 45-50% Calc 1 to 2 and about 50% Calc 2 to advanced	E. Increase percentage of students in calculus continuing in sequence to 60%. Annual assessment report of Grading/Help Session Program	E. Increase percentage of students in calculus continuing in sequence to 65%. Assessment of Grading/Help Session Program continues; budget

2. Increase number of students studying mathematics, particularly interdisciplinary students. Support Arts & Sciences new double degree requirements for students trying to study math and other areas. Create a Minors program. Develop plan to increase enrollment in Advanced Math Courses. 3. Recognize faculty accomplishments in Teaching. 4. Q-Center director and associates will develop an assessment and tracking plan for the recruitment, instructional, retention and outreach efforts of the Department. Activities of Q-Center, the Math Circle Seminar, Manhattan Mathematical Olympiad (MMO) and C^3 Academies continues.	work). First Annual assessment report of Grading/Help Session Program is due. Provost makes permanent $20,000 per year allocation to the Dept. for Grading/Help Session Program. [IXc]	continues. Grading/Help Session budget increases by $20,000. [IXc]	exceeds or is comparable to peer group. [IXc]
	F. Increase majors to 140 (currently running 100-120). [IXd]	F. Increase majors to 170.	F. Increase majors to 200.
	G. Minors program in place and first students complete the program. [VIIIb]	G. Award 10 minors per year. [VIIId]	G. Award 20 minors per year.
	H. Increase enrollment in 500-600 level courses to 330 students per semester (currently averaging 300). [VIIIb]	H. Increase enrollment in 500-600 level courses to 360 students per semester.	H. Increase enrollment in 500-600 level courses to 400 students per semester.
	I. One Distinguished University Professorship in Scholarly Teaching or one National Award. [Ia, IIb]	I. Number of National or University Scholarly Teaching Awards in the 1-2 range.	I. Number of National or University Scholarly Teaching Awards in the 2-3 range.
	J. The Q-Center will hold or partner in at least one large grant. Q-Center postdoctoral fellows will be in the 2-3 range. Additional funding for MMO is identified. An external Advisory Board will be in place by year 5. [Ia, IIb]	J. The Q-Center will hold or partner in at least one large grant. Q-Center postdoctoral fellows will be in the 2-3 range. MMO becomes a state event. Advisory Board will issue first assessment with its recommendations.	J. The Q-Center will hold or partner in at least one large grant. Q-Center postdoctoral fellows will be in the 2-3 range. MMO becomes a regional event. Advisory Board will issue assessment with its recommendations. Program will be in the top 50. [IIf]

<u>Theme 5</u>: Compounding the Intellectual and Financial Capital of the Department via Federal, State and Foundation endowments or grants, Corporate Connections, Alumni, and Friends.

Key Activities	Short Term (2013 - 2015) *Key Outcomes*	Intermediate (2016 - 2020) *Key Outcomes*	Long Term (2021 - 2025) *Key Outcomes*
What we plan to do…	***What we expect to happen…***	***What we expect to happen…***	***What we expect to happen…***
1. Secure substantial graduate program support from endowments for recruitment and retention. 2. Improved financial support for programs spanning graduate and undergraduate curricula. 3. Establishment of funding for scholarships directed at students in the	A. Increase current allocation of $7,000 per year for graduate recruitment scholarships to $8,800 per year. [VIIc]	A. Increase allocation of $8,800 per year to $11,100 per year for graduate recruitment scholarships.	A. Increase allocation of $11,100 per year to $14,000 per year for graduate recruiting scholarships.
	B. Increase current $10,000 per year allocation for dissertation fellowships to $12,500 per year. [VIIc]	B. Increase $12,500 allocation to $15,700 per year for dissertation fellowships.	B. Increase allocation from $15,700 per year to $20,000 per year for dissertation fellowships.
	C. Increase I-Center Scholarships both Graduate and Undergraduate from present allocation of $6,000 per year to $7,500 per year. [VIIc]	C. Increase I-Center Scholarship allocation from $7,500 per year to $9,500 per year.	C. Increase I-Center scholarship allocation to be competitive with peer groups. Minimum allocation of $12,000. All math majors will have

Graduate Certificate in Applied Mathematics Program (GCAM). 4. Establishment of contacts and Liaisons with Corporate Donors. 5. Continue to establish connections with alumni, via Newsletter, Undergraduate Lectures, etc. 6. Development Committee, Alumni and Foundation plan for the acquisition of distinguished chair positions as an aid in recruitment and retention. Plans for targeted programs including an M-Center endowment supporting lecture series and other activities is initiated.			access to funded study abroad experiences. [Vf]
	D. GCAM allocation of $2,500 for scholarships. [VIIc]	D. GCAM allocation increases from $2,500 to $5,000 for scholarships.	D. GCAM allocation increased from $5,000 to $10,000 for scholarships.
	E. Establishment of 1 new scholarship directed at students in mathematics enrolled in concurrent BS/MS programs. [Vb, VIIb]	E. Establishment of a second scholarship directed at student in mathematics enrolled in concurrent BS/MS programs.	E. Sufficient resources in program to award at least one "full ride" scholarship annually, tenable for three years for students in concurrent BS/MS programs. Ongoing support of programs from corporate sources.
	F. Alumni Newsletter published annually. Alumni Advisory Board with Rotation in place. Increase Alumni Lecturers in the 1-2 range. [VIIb]	F. Newsletter published annually. Rotation of alumni Advisory Board with report due at end of period. Increase Alumni Lecturers in the 1-2 range.	F. Newsletter published annually. Rotation of alumni Advisory Board with report due at end of period. Increase Alumni Lecturers in the 2-3 range.
	G. Number of endowed chairs established is in 0-1 range. Endowment for M-Center lecture series is established. A Q-Center endowment is established; Surowski and Rosenberg endowments increase. [VIIa, VIIb, VIIc, Xd]	G. Endowed chairs established is in 0-1 range. M-Center, Q-Center and I-Center endowments increase; Surowski and Rosenberg endowments increase. Funding for the Manhattan Mathematical Olympiad as a state event is in place.	G. Endowed chairs is in 1-2 range. M-Center, I-Center and Q-Center endowment increase; Surowski and Rosenberg endowments increase. Funding for the Manhattan Mathematical Olympiad as a regional event is in place. [IIIc]

4a. What resources and/or opportunities exist for your Department to achieve its vision and outcomes?

The Department, assisted by its alphabet centers (I, M, Q) meets its objectives in instruction, research and service via its talented faculty, students, and staff. Faculty, staff, and students are the Department's chief resources.

4b. What resources and/or opportunities are needed for your Department to achieve its vision and outcomes?

We aspire to be a faculty of 42-45 by the long term to be competitive with the top group of peers in instruction, research, and service. Similarly, we aspire to have a graduate student body of at least 70 by the long term. To achieve our goals the Department will need additional faculty lines, i.e., a total of at least 7 lines in the short and intermediate term to become a faculty of 42, and probably another 3 in the long term. The Department will also require 17 additional GTA positions in the short term to be a body of 65, 5 GRAs by the long term, and possibly another 5 GTAs in the long term (depending upon enrollment pressures). Six additional Postdoctoral positions for our alphabet Centers will need funding and at least one staff position for the Centers is required; these Centers will serve as marquee models for the College and University as will our Certificate programs. Increased resources for our Grading/Help Session Program – a major tool in our undergraduate recruitment and retention efforts – will also be called for. Competitive salaries for faculty and staff, as well as GTA stipends meeting or exceeding peer average are a must. An infrastructure supporting all this, including office space is absolutely a given.

5. How do you propose to acquire the resources needed for your Department to accomplish its vision and outcomes?

We propose to acquire the resources we will need to become a top 50 Mathematics Department by requesting lines from the College of Arts and Sciences or Central Administration for additional faculty, instructors, and GTAs to meet burgeoning enrollment and bring relief to the thronging in the classrooms of Cardwell Hall. Currently, a meager corpus of GTA positions, recruited with noncompetitive stipends, has consequentially produced a conspicuous number of inappropriate faculty teaching assignments resulting in a truly impressive squandering of time and talent. Increases for the Grading/Help Session budget, GTA stipends, staff positions etc., will be provided Centrally or by the College.

In this connection, the Department fully supports the Graduate School's initiative to raise all GTA stipends to be competitive with the top 50 public universities. In the final analysis, resources must follow enrollment; this is especially true for Departments with high profile doctoral programs with aspirations and potential to be ranked in the top 50. We will also pursue grant opportunities to fund GRAs and postdoctoral fellows, and work via Foundation campaigns to develop our alumni and corporate connections. Providing office space and various supporting infrastructure is the responsibility of the University and College.

6. **How does your plan link to the K-State 2025 University Benchmark Metrics, Common Elements, and Thematic Goals, Outcomes, and Metrics?** ***(See below)***

6. Departmental Links to K-State 2025 University Benchmark Metrics, Common Elements, and Thematic Goals, Outcomes, and Metrics

Links to Benchmark Metrics
B-1 - Total research and development expenditures B-2 - Endowment pool B-3 - Number of national academy members B-4 - Number of faculty awards B-5 - Number of doctorates granted annually B-6 - Freshman-to-sophomore retention rate B-8 - Percent of undergraduate students involved in research

Links to Common Elements
CE-5 - Funding CE-6 - International CE-8 - Technology

Links to University Thematic Goals, Outcomes, and Metrics			
Links to 2025 Thematic Goals and Metrics	**Links to Short Term Outcomes (2011 – 2015)**	**Links to Intermediate Outcomes (2016 – 2020)**	**Links to Long Term Outcomes (2021 – 2025)**
T1 - Research, Scholarly and Creative Activities, and Discovery (RSCAD) **Theme 1 Metrics:** T1-1 - # of interdisciplinary research projects, institutes, and centers T1-2 - Total sponsored extramural funding expenditures T1-3 - # of juried, adjudicated, or externally vetted performances, shows and designs T1-5 - Total international research and development expenditures	T1-A - Increased intellectual and financial capital to support RSCAD T1-B - More clusters/centers of collaborative RSCAD focus T1-C - Increased funding for investigator-based research, research centers, and graduate training grants T1-E - Competitive compensation and support available to GRAs, GTAs, and GAs T1-F - Enhanced and systematic approach for UG research T1-G - Successful recruitment, retention, evaluation, compensation, and rewards strategies in place to support RSCAD needs T1-H - Enhanced visibility and appreciation for research, discovery, and scholarly and creative activities	T1-I - Intellectual and financial capital in place for expanded RSCAD efforts T1-J - Greater proportion of nationally and internationally recognized award-winning faculty in RSCAD programs T1-K - Nationally and internationally recognized research centers T1-M - Increased participation by undergraduates in expanded opportunities in research	T1-N - Fifty nationally recognized K-State researchers, a high proportion of which are members of their national academies T1-O - Extramural funding competitive with our benchmark institutions T1-P - Research and development expenditures competitive with benchmark institutions T1-Q - Competitive amongst our peers in the percentage of undergraduates involved in research

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T2 - Undergraduate Educational Experience (UEE) **Theme 2 Metrics:** T2-2 - # and % of undergraduate students completing an experiential learning experience T2-3 - Total funding awarded for undergraduate scholarship support T2-5 - # of students awarded national and international prestigious scholarships	T2-C - Increased participation by undergraduates in expanded opportunities for meaningful research T2-D - Successful integration of undergraduate education and meaningful research is standard practice T2-F - Effective system in place that supports and promotes teaching excellence T2-G - Successful recruitment and retention strategies that address our entire student population T2-H - Improved six-year graduation rates and retention ratios	T2-J - Excellent reputation for high quality teaching and advising that prepares students for their professional, community, social, and personal lives T2-K - Superior and diverse faculty recognized for teaching excellence T2-M - Increased undergraduate contributions in the creation of scholarship through research T2-N - Ongoing improvement of six-year graduation rates and retention ratios	T2-O - An undergraduate educational experience recognized as one of the best among the nation's Top 50 Public Research Universities T2-P - Faculty teaching and advising awards comparable to our benchmark institutions T2-Q - Freshman to Sophomore retention ratios comparable to benchmark institutions
T3 - Graduate Scholarly Experience **Theme 3 Metrics:** T3-1 - # and % of graduate students with assistantships, endowed scholarships, and fellowships T3-2 - Total funds awarded for graduate assistantships, endowed scholarships, and fellowships T3-3 - # and % of graduate programs offering competitive compensation and support packages T3-5 - # of graduate students participating in a unique high level learning and experiential training T3-6 - # of graduate terminal degrees awarded	T3-A - Competitive compensation and support available for GRAs, GTAs, and GAs T3-D - Outstanding mentoring for our graduate students T3-E - Expectation of excellence for the graduate scholarly experience T3-F - Increased capacity to secure funding for graduate research and teaching T3-G - Broader spectrum and greater overall number of courses offered at the graduate, and especially at the PhD level	T3-K - Increased funding for graduate research and teaching T3-L - Increased number of nationally and internationally recognized award-winning graduate faculty T3-M - Increased number of Doctorates Awarded	T3-N - National and international reputation for outstanding graduates with demonstrable career success T3-O - World-class reputation as a preferred destination for outstanding graduate students T3-P - Stable funding for graduate research and teaching competitive with benchmark institutions T3-Q - Doctorates Awarded comparable with benchmark institutions

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T5 - Faculty and Staff **Theme 5 Metrics:** T5-1 - # of national and international faculty awards T5-2 - # and % of faculty with endowed chairs, professorships, and fellowships T5-3 - Competitive compensation packages for faculty and staff	T5-A - Total compensation competitive with aspirant university and regional employers for faculty and staff in high priority areas	T5-E - Total compensation competitive with aspirant university and regional employers for all employees T5-G - Successful recruitment and retention of a talented and high performing, diverse workforce	T5-H - Talented and high performing, diverse workforce recognized for excellence and award-winning faculty and researchers T5-I - Stable funding available for recruitment and retention of top level faculty and staff T5-J - Optimal number of faculty and staff comparable with our benchmark institutions