

Narrative Report on UTC BS Mathematics

PART 1 – Learning Outcomes

How would you rank this program with similar ones in the state, region, and nation? Are the intended program and learning outcomes clearly identified?

- Top 25%.

This ranking is based on my judgement from serving as recent chair of the mathematics department at College of Charleston for 12 years, during this time attending the workshops associated with the annual meeting of the American Mathematical Society Committee on Education and my regular exposure to baccalaureate programs around the state and nation. Ranking a baccalaureate program into a quartile is as close as I feel comfortable in refining my ranking of any institution.

Are the intended program and learning outcome clearly identified?

- Has the department specified program mission, vision, and goal statements? Do these statements clearly identify intended program and student learning outcomes? Are they appropriate for the program level (undergraduate) and for UTC?
 - My ranking of *excellent* is based on my judgement from serving as department chair and past and current assessment coordinator for the department of mathematics at College of Charleston since its development and inception over the past decade. Also, as a member of the institutional committee that developed the QEP for our most recent SACSCOC review in 2017, and having attended two of the annual national meetings of SACSCOC.
- What goals should the department establish regarding its curriculum? In particular, what advice should be offered to the department developing goals regarding the following aspects.
 - Student performance on standardized exams.
 - Other than the NSSE, the ETS Proficiency Profile for General Education Outcomes Assessment, the five-year interval major field exam, and the Critical Thinking Assessment Test (CAT) (no longer given), standardized exams for all math majors are not given.
 - NSSE which is not a subject area exam. It is a National Survey of Student Engagement given to incoming and graduating students. The UTC math department analyzes these results and apparently takes them seriously. The department received “less favorable results” for questions relating to citizenship, personal code of values and citizenship,” and expressed concern about this, since in it may be to do with a “lapse in academic integrity.”

- The NSSE results also reflect on Rubric item 3.4 “The program seeks to include diverse perspectives and experiences through curricular and extracurricular activities,” addressed in the self-study in 1.2.4 page 18: “This reflects a recognized need for more diversity in students and faculty in the department, evidenced further by demographic tables in later parts of this self-study.”
- Institutional results on the CAT exam showed a decrease in scores since 2014-15 in all but one of the colleges. The UTC math department accepts as *it’s* challenge to work towards improving this component of student development. This reflects the seriousness which the math department embraces its service role to all students at UTC

-Student opportunities for research/involvement in faculty research.

- The UTC math department tenured and tenure track faculty are fully engaged in research. Research opportunities for undergraduate math majors abound.

- Student opportunities for practical/field experience

- Through an increasing effort to provide internship opportunities for students they are given ample opportunities for practical/field experiences. These are built into the program for students in the STEM Teaching concentration.

- Graduates’ admittance to/performance in graduate schools

- Student placement in occupational positions related to mathematics I would categorize as excellent based on Table 6.6 on page 84, since a graduate pursuing another degree is at least as good a reflection on the program as being employed full time in mathematics.

- What goals should the department establish regarding its teaching? Faculty qualifications? Faculty development?

- Concerning faculty qualifications, I can only say keep up the good work building upon an excellent group of faculty members. The quality of both senior and junior faculty tenured and tenure track faculty is enviable as well as the gifted group of lecturers. My comment here is that tenured and tenure-track faculty are down by 4 from where they should be based on all measures. This made more urgent considering that some of the senior extraordinary senior faculty could likely retire in the near future.
 - The Goal should be (including that of the entire institution) to increase the number of highly qualified exceptional tenure track faculty.
- The institution offers many opportunities through the Walker Center for faculty development for improving teaching.
- Continue with department goals for growth and improvement, including
 - Participation in multi-disciplinary discussion groups concerning pedagogical improvements.

- Collaborative efforts with UTC colleagues to strengthen connections with high schools and post-secondary institutions to better prepare students for the transition to college.
- Considering incorporating recommendations from the MAA National Study of College Calculus by David Bressoud, et al.
- May want to consider incorporating Dr. Tristan Denley's Corequisite Academic Support for students' as an approach to helping ensure gateway course success.
- Improve diversity among students and faculty.
 - There has been a noticeable increase in diversity among students over the past three years. To further minority enrollments, I'm passing along information that has made a difference in minority participation in STEM fields at College of Charleston, that begins with a very intensive summer course in pre-calculus.

The South Carolina Alliance for Minority Participation (SCAMP) is an academic four-year enrichment program at the College of Charleston for under-represented minorities planning to major in Astrophysics, Astronomy, Biochemistry, Biology, Chemistry, Computer Information Systems, Computer Science, Data Science, Geology, Marine Biology, Mathematics, Meteorology, or Physics.

Our program is designed to increase and retain under-represented minority students in STEM fields through mentoring, counseling, networking, tutoring, and special access to professional and community development opportunities.

SCAMP is an initiative of the National Science Foundation and is a part of the South Carolina division of Louis Stokes Alliance for Minority Participation program.

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What criteria does the department use to evaluate sufficient achievement of intended program outcomes? Are the criteria appropriate for such evaluation and/or for the program?

- DFW rates, CAT exam, student responses to course evaluations, exit surveys of graduating seniors and results of program assessment requirements of SACSCOC. These criteria are highly appropriate.

Does the department make use of evaluation information and/or information obtained from student, alumni, and employer surveys and/or data from institutional research to strengthen and improve the program?

- Considering the regular and extensive assessment reporting and evaluation required in the state of Tennessee for performance funding and quality

assurance funding that depend upon surveys and data collected by Institutional Research, as well as SACSCOC reporting, the department of mathematics is able to get a three dimensional perspective of its performance from which it can decide on actions to strengthen and improve both its undergraduate and graduate programs, as well as its contributions to general education.

PART 2 – Curriculum

Is the current curriculum appropriate to the level and purpose of the program? Is it adequate to enable students to develop the skills and attain the outcomes needed for graduates of the program? Does it reflect the current standards, practices, and issues in the discipline?

- The curriculum is excellent in its breadth and depth by disciplinary standards in mathematics.

Does the department regularly review and revise curriculum content and organization to ensure that it is appropriate and that it prepares students to meet the specified learning outcomes? Will the department need to update the curriculum and/or develop new or alternative offerings in the near future?

- Yes, there is ongoing review of the courses and concentration design, with introduce more upper level statistics courses
- May want to consider creating more 4000 level statistics courses to run with existing 5000 statistics courses to allow greater availability of statistics courses for undergraduate majors who are interested and capable, while making sure that there are different and appropriate expectations, assessments and further graduate-level content for graduate students in the mixed class, versus undergraduates.

Is the curriculum content appropriate for UTC? Are the core and advanced courses approximately balanced? Does the overall curriculum ensure the development of appropriate skills in the following areas: general education, critical thinking skills, research strategies and skills, written and oral communications, and computer and technology-related skills (in general and specific to the discipline)?

- The undergraduate mathematics program courses are excellent and exemplary. Mathematics courses are good courses for developing and improving critical thinking skills and research strategies. Proof based courses and courses with project requirements are excellent for enhancing writing skills and oral communication skill. Many mathematics statistics courses such as numerical analysis, courses that involving coding and statistics courses using the open source R are just a few ways technology related skills are used.

Are appropriate pedagogical and/or technological innovations included that enhance student learning? Are the department's instructional practices consistent with the standards of the discipline?

- A singular example that highlights the UTC Department of Mathematics' incorporation of ***appropriate pedagogical and/or technological innovations included that enhance student learning*** is the marked improvements (lowering) in DFW rates since the last external review in 2014-15. DFW rates for the courses listed in Table 1 on page 10 are notoriously high, since they are disturbingly high at colleges and universities across the country. I've witnessed first-hand the very considerable concern, attention and study that the learned societies in mathematics (The American Mathematical Society and the Mathematical Association of America) have devoted to this issue. No one seriously suggests making the courses easier, since we all have to drive over the bridges and fly in the airplanes designed by students who take our mathematics courses. From my years of dealing with and thinking about DFW rates in our gateway mathematics courses some things seem to clearly matter: effective placement, inspired pedagogy and good support. The results in Table 1 provide evidence to me that the math department is affecting a significant improvement in DFW rates through a determined effort in these things that clearly matter.
- Do the instructional practices provide adequate opportunities for student interactions with one another, faculty, and professionals?
 - It is my clear impression that this is the case based on conversations with students. My overall impression is that students think it is a great department.
- Does the department make adequate efforts to include students in the life of the program (e.g., seeking student advice in reviewing the curriculum/course schedules/teaching methods, etc.)?
 - Again, students think it is a great department. Regarding the program, one student in the Actuarial Sciences concentration did comment that he suggested there should be more courses dedicated to actuarial science.

Do students have adequate opportunities to participate in research, practical/field experiences/internships, or other experiences that allow them to apply learning outside the classroom and/or expose students to professional and career opportunities appropriate to the discipline?

- The UTC math department tenured and tenure track faculty are fully engaged in research. Research opportunities for undergraduate math majors abound.

- Through an increased and increasing effort to provide internship opportunities for students, they are given ample opportunities for practical/field experiences. These are built into the program for students in the STEM Teaching concentration.

Does the department clearly outline program requirements and offer courses regularly to ensure timely completion of the program?

- The Department of Mathematics *Clear Path Undergraduate Curriculum* lays out roadmaps to help ensure timely completing of their concentrations in the undergraduate mathematics program. This provides an excellent foundation for advising majors.

PART 3 – Student Experience

Does the program and curricula provide students with the opportunities to evaluate the curriculum and the faculty? What procedures are in place to ensure and document that the department provides students with regular opportunities to evaluate the quality and effectiveness of teaching? How well is this information used to improve the program?

- Student course evaluations are given for each course and the results analyzed. This is documented on pages 44 and 45 of the Self-Study.

Do students have adequate opportunities to participate in professional and career opportunities appropriate to the discipline and to opportunities to apply what they have learned outside of the classroom?

- Student enrichment professional development opportunities are described on pages 45 thru 49 of the Self-Study. These include departmental colloquia, joint Math Dept and SimCenter seminars including an Advanced Modeling and Simulation Seminar, presentations from local industries, participation in NSF funded Research Experience for Undergraduates (REUs) hosted at UTC (these are very competitive awards), the SEARCH Award Program supporting undergraduate and graduate research, and other undergraduate research opportunities and support.

What curricular and/or extracurricular activities does the department offer towards exposure to diversity? Do these activities provide adequate opportunities for students to be exposed to the perspective or underrepresented groups?

- With diversity among its faculty and majors by gender, ethnicity and race, there are opportunities for exposure to diversity in the classroom, while socializing and through colloquia and seminars. REUs are also great opportunities for exposure to perspectives of underrepresented groups. However, we must all do better at recruitment of underrepresented groups at the student, faculty and administrative level. As the self-study states on page 57, “There is a clear need to improve diversity with respect to both gender and race/ethnicity in the department.” I agree and in this performance category my rating was *Fair*.

Do the students have access to appropriate academic support services? Describe the academic support services and comment on their adequacy and appropriateness.

- UTC Center for Support and Advisement (CASA) provides tutoring and Supplemental Instruction for all students including math majors. This is highly appropriate and necessary, since tutoring and especially Supplemental Instruction are foundational for mathematics students at all levels of ability.
- The College of Arts and Sciences recently introduced a student center for success called the HUB providing advising support for CAS students in coordination with departmental advisors and CASA. Since effective advising is one of the keys to retention and success, this support is critical.

PART 4 – Faculty

Are faculty competencies/credentials appropriate to the level of the program, and do they at least meet the SACSCOC qualifications? Do faculty specialties correspond to the needs of the program? How might the program address needs for additional/different qualifications/expertise?

- Tenured, tenure-track and lecturers meet SACSCOC credentialing qualifications for the level taught:
 - *Faculty teaching general education courses at the undergraduate level: doctorate or master’s degree in the teaching discipline or master’s degree with a concentration in the teaching discipline and a minimum of 18 graduate semester hours in the teaching discipline.*
 - *Faculty teaching baccalaureate courses: doctorate or master’s degree in the teaching discipline or master’s degree with a concentration in the teaching discipline (minimum of 18 graduate semester hours in the teaching discipline).*
 - *Faculty teaching graduate and post-baccalaureate course work: earned doctorate/terminal degree in the teaching discipline or a related discipline.*
- Specialties align with program needs.

- Based on discussions with faculty, there is interest in seeking faculty with backgrounds in artificial intelligence, machine learning, and statistics.
- Concerning how the program might address needs for additional/different qualifications/expertise, SACSCOC credentialing standards need to be factored in, however SACSCOC sometimes allows for exceptions to their credentialing standards on a case by case basis depending upon the case made for the exception.

Is the faculty adequate in number to meet the needs of the program with reasonable and efficient teaching loads and/or credit hour productions? Are the regular-to-adjunct faculty ratios appropriate for the program?

- Considering servicing general education requirements for mathematics and statistics, the undergraduate and graduate programs, participation in the Computational Sciences doctoral program and the number of students taught and credit hours produced, the math department has too few regular faculty members. Based on information provided in the self-study, as of the 2020-2021 academic year, the math department is down four tenured or tenure track faculty. This can be corroborated by a comparison of student credit hours taught by tenured and tenure-track faculty: down by over 30% over the same period and during that time adjunct dependency in terms of student credit hours taught went from 0% to 16.7%. For these reasons, my rating on 4.2 is poor.

With respect to ethnicity, gender, and academic background, is faculty diversity appropriate for the program?

- As mentioned above under student experience, we must all do better at recruitment of underrepresented groups at the student, faculty and administrative level. As the self-study states on page 57, "There is a clear need to improve diversity with respect to both gender and race/ethnicity in the department." I agree and in this performance category too my rating was *Fair*. However, down four tenured, tenure-track faculty it may be possible to meet your desired specialty areas: artificial intelligence, machine learning, statistics, and get the administration's support to dedicate a fourth position exclusively for an underrepresented minority hire without the constraint of finding a candidate with a specific specialty.

Does the program use a faculty evaluation system to improve teaching, scholarly and creative activities, and service? Does the system include information from the teaching evaluations of student, alumni, and employer surveys? Are the faculty evaluation procedures adequate and successfully implemented and used?

- Annual evaluations are both summative and formative. Mathematics faculty are evaluated annually on their performance in the three main areas of instructional and advisement activities; research, scholarly and creative activities; and professional service activities; against their objectives in these areas from the previous year. Then performance objectives are determined for the next year. This is excellent.

Are faculty engaged in scholarly, creative, professional association, and service activities that enhance instructional expertise in their areas of specialty?

- Are the faculty involved in research, publication activities, conference presentations, or other scholarly and creative activities that are appropriate for the program?
 - Exemplary, exemplary, exemplary! Tenured and tenure track faculty are highly productive researchers.
- Does each faculty member have a professional development plan designed to enhance his or her role as a faculty member? Is there evidence of successful achievements within the plan?
 - There is ample evidence in every respect. One significant example is the external funding secured by the math department. External funding in mathematics is very challenging to secure for any department but especially one that does not have a doctoral program (although now it does participate in a doctoral program housed in a different college) and is competing with faculty with lower teaching loads at research universities. The competition is intense and success is slim. Another example is the very impressive research productivity of the math department. Extraordinary! Also, the successful REUs awarded.
- Are faculty services to UTC and the community adequate? In view of UTC's mission, as a metropolitan institution, does the program have adequate linkages with the community?
 - The mathematics department is a service department, serving general education mathematics and statistics requirements, and serving program requirements in majors across the institution. In a typical academic-year the math department teaches in excess of 6000 students in its classes. Math faculty are involved in interdisciplinary efforts "to strengthen connections with high schools and post-secondary institutions to help better prepare students for success in their college studies."
 - Internships for students in the local community serve both the student and community entity, providing the student with the opportunity to apply their knowledge and skills and providing the community entity with intellectual labor and perhaps a future employee.

Are faculty engaged in the planning, evaluation and improvement processes that measure and advance student success?

- Through the multiple assessments of programs via SACSCOC, performance funding, quality assurance funding, external reviews, attention to DFW rates, NSSE survey, course evaluations, etc., the spotlight is on measures of student success. Considering only the significant improvement of DFW rates since the last external review provides hard evidence that the math department considers the data, creatively plans for improvement and demonstrates successful outcomes.

PART 5 – Learning Resources

Does the program regularly evaluate its equipment and facilities and pursue necessary improvements?

- Has the program requested/encouraged necessary improvements of its equipment and facilities through appropriate internal mechanisms? Through appropriate external mechanisms?
 - The Department of Mathematics recently relocated, although some classes are still taught at the previous location. The new location, the third floor of Lupton Hall, is shared with several departments. For instance, the 22 graduate student workstations, and the conference room is shared with the larger Department of English, whereas in the previous location the conference room was not shared, enabling the math department to use it for seminars, research groups and committee meetings. Perhaps the Department of Mathematics was not adequately consulted in the planning phase for the new space.
- Does it appear that the program's resources are appropriate within the context of overall college resources?
 - The cost per student credit hour is \$135. That is one of the lowest that I've seen and indicates that the Department of Mathematics at UTC is considerably under resourced.
 - A concern expressed earlier that would seem to fall under the category of resources is the need for more tenure and tenure track faculty.
 - Another concern is that for a department with a profile like that of mathematics: a major service responsibility in providing mathematics/statistics courses for general education and other departments major requirements, over 6000 students taught in its courses during a typical

year, a highly productive research faculty, considerable grant funding, a graduate program and participation in a doctoral program, only one administrative assistant seems insufficient. Although their administrative assistant appears to be remarkable and manages to keep the balls behaving nicely in the air with the help of student assistants, from my perspective the very critical front office must be under some strain, even if it is not visibly apparent.

- How should needs of the program be prioritized? Could savings be realized from current program operations to fund any new budgetary needs?
 - Bring back up the number of tenure and tenure-track faculty
 - Hiring faculty from underrepresented groups.
 - Developing a placement tool for the gateway mathematics courses. (If it is a placement exam it may cost if it is provided through a vendor, and in either case for it to be useful, proctoring the exam is a necessity and will likely cost, although the cost can be passed along to the student as a placement fee.)
 - Continuing on the positive trends of increasing the number of majors.
 - Hiring a second administrative assistant.
 - Minor in statistics (should not cost any more, since it would use existing courses and there is available capacity.)
 - The math program is already creatively using lab fees to fund graduate students working in the Math Plaza in support of learning college algebra, which helps to improve the DFW rates.

Are library holdings and other learning and information resources current and adequate to support the teaching and learning needs of the discipline?

- There are no longer disciplinary standards for math program library resources, consequently I compared UTC library standards to those at College of Charleston, since we are considered peer institutions and have similar profiles. In every measure: number of print books, e-books, print journals, e-journals; holdings in QA, HA, GA, and Q; number of library faculty, number of library staff; the UTC library exceeded or far exceeded the Addlestone Library at College of Charleston. When the College of Charleston Dean of Libraries, Dr. John W. White, learned that I was looking at UTC, he had this to say about the library and its dean, Theresa Liedtka, *“For what it’s worth, that library and their director have really good reputations. We modeled some of our digital production services and support after what they are doing. I’m planning to contact her for a visit at some point so I can see first-hand what they are doing.”*

Part 6 – Support

Is the program's operating budget consistent with the needs of the program?

- Considering current budget constraints, what are the most pressing resource needs of the program?
 - Bring back up the number of tenure and tenure-track faculty
 - Hiring faculty from underrepresented groups.
 - Developing a placement tool for the gateway mathematics courses. (If it is a placement exam it may cost if it is provided through a vendor, and in either case for it to be useful, proctoring the exam is a necessity and will likely cost, although the cost can be passed along to the student as a placement fee.)
 - Continuing on the positive trends of increasing the number of majors.
 - Hiring a second administrative assistant.
 - Minor in statistics (should not cost any more, since it would use existing courses and there is available capacity.)

Does the program have a history of enrollment and graduation rates sufficient to sustain high quality and cost effectiveness?

- Yes, especially considering that the cost per student credit hour is a stunning \$135.
- The number of mathematics majors is in line with mathematics major numbers nationwide, which is approximately 1% of institutional undergraduate enrollment.
- Since the last external review in 2014-15 there has been over a 36% increase in the number of mathematics majors
- There was a significant decrease in retention between 2018 and 2019, although the retention rate between 2015 and 2019 has fluctuated. Negative trends in retention rates need to be looked for and if noticed then analyzed and remediated with all seriousness.

Is the program responsive to local, state, regional and national needs of the discipline?

- The design of the BS program in mathematics at UTC reflects its responsiveness to the local, state, region and national needs. It helps provide the local community, state, region and nations with teachers, actuaries and mathematicians and provides the mathematical tools for students to be successful in all STEM areas.
- Locally
 - Strengthening connections with high schools and post-secondary institutions to better prepare students for the transition to college.
 - Internships for students in the local community serves both the student and community entity, providing the student with the opportunity to apply their knowledge and skills and providing the community entity with intellectual labor and perhaps a future employee.

- State
 - Providing employees for state industries and secondary schools.
- Region
 - Providing employees for regional industries and secondary schools.
- Nation
 - The National Science Foundation funded REUs awarded to the UTC math department providing advanced research training available to students around the nation is significant.
 - The national economy and security rely heavily upon the product of STEM education for employees, research, innovation, invention. Science, technology and engineering depend upon mathematics. In this way mathematics is foundational to our economy and security. Mathematics education is what nurtures, grows and perpetuates the foundation of STEM. UTC with its exceptional faculty, programs and courses is central to this responsibility in Chattanooga, Tennessee, the Southeast and the United States.

PART 7 – Summary Recommendations

Overall, what are your impressions of the program?

- What are the major strengths of the program?
 - A distinguished faculty
 - Research opportunities for students
 - Internship opportunities for students
 - Good student support: Walker Center, Math Labs
 - Well-designed programs
 - Supported by rigorous courses covering the depth and breadth necessary.
 - New and exceptional dean and provost
 - An institution that is well supported by the state
 - A well organized, well run and thoughtful regulatory body.
- What are the major weaknesses of the program?
 - Too few tenure and tenure-track faculty, made more critical considering some senior faculty may retire in the near future.
 - Too few faculty from underrepresented groups.
 - Too few students from underrepresented groups.
 - Insufficient budget allocation based in part on the very low Cost per Student Credit Hour

What goals would you suggest the program set for the next five years? Please list goals in order of priority (i.e., the most important goal first, followed by the second most important goal, etc,

- Bring back up the number of tenure and tenure-track faculty
- Hiring more faculty from underrepresented groups.
- Recruit more students from underrepresented groups.
- Continue the good work on reducing DFW rates, Continuing on the positive trends of increasing the number of majors.
- Hiring a second administrative assistant.
- Minor in statistics (should not cost any more, since it would use existing courses and there is available capacity.)
- May want to consider creating more 4000 level statistics courses to run with existing 5000 statistics courses to allow give greater availability of statistics courses for undergraduate majors who are interested and capable

How can the program work to achieve these goals over the next five years?

- Considering current budget constraints, what are the most realistic strategies the program can use to achieve the highest priority goals?
 - Bring back up the number of tenure and tenure-track faculty
 - Persuading the administration that these are necessary replacements not new positions. Consider starting a 4+1 program with the BS and MS programs.
 - Hiring faculty from underrepresented groups.
 - down four tenured, tenure-track faculty it may be possible to meet your desired specialty areas: artificial intelligence, machine learning, statistics, and get the administration's support to dedicate a fourth position exclusively for an underrepresented minority hire without the constraint of finding a candidate with a specific specialty.
 - Recruiting more majors from underrepresented groups.
 - To further minority enrollments, I'm passing along information that has made a difference in minority participation in STEM fields at College of Charleston, that begins with a very intensive summer course in pre-calculus.
 - *The South Carolina Alliance for Minority Participation (SCAMP) is an academic four-year enrichment program at the College of Charleston for under-represented minorities planning to major in Astrophysics, Astronomy, Biochemistry, Biology, Chemistry, Computer Information Systems, Computer Science, Data Science, Geology, Marine Biology, Mathematics, Meteorology, or Physics. Our program is designed to increase and retain under-represented minority students in STEM fields through mentoring, counseling, networking, tutoring, and*

special access to professional and community development opportunities. SCAMP is an initiative of the National Science Foundation and is a part of the South Carolina division of Louis Stokes Alliance for Minority Participation program.

- Continue the good work on reducing DFW rates,
 - develop a placement tool for the gateway mathematics courses. (If it is a placement exam it may cost if it is provided through a vendor, and in either case for it to be useful, proctoring the exam is a necessity and will likely cost, although the cost can be passed along to the student as a placement fee.)
 - Investigate using Dr. Tristan Denley's Corequisite Academic Support for students' as an approach to ensuring gateway course success.
- Starting a minor in statistics and continuing on the positive trends of increasing the number of majors.
 - By continuing what has proven successful
- Hiring a second administrative assistant.
 - Persuading the administration that this are necessary
- What goals would require additional resources? What level of resources would these goals require? How might the program secure these resources?
 - Bring back up the number of tenure and tenure-track faculty
 - Persuading the administration that these are necessary replacements not new positions
 - Hiring faculty from underrepresented groups.
 - down four tenured, tenure-track faculty it may be possible to meet your desired specialty areas: artificial intelligence, machine learning, statistics, and get the administration's support to dedicate a fourth position exclusively for an underrepresented minority hire without the constraint of finding a candidate with a specific specialty.
 - Continue the good work on reducing DFW rates,
 - develop a placement tool for the gateway mathematics courses. (If it is a placement exam it may cost if it is provided through a vendor, and in either case for it to be useful, proctoring the exam is a necessity and will likely cost, although the cost can be passed along to the student as a placement fee.)
 - Hiring a second administrative assistant.
 - Persuading the administration that this is necessary