Executive Summary for the Mathematics Department

Bachelor of Arts, Bachelor of Science in Mathematics and Secondary Education, Bachelor of Science in Mathematics, and Bachelor of Science - Applied Mathematics Concentration

Major Findings of the Program's Quality and Productivity

The detailed self-study of the Mathematics programs provides assessments of key indicators of program quality and productivity, as specified in the institution's Comprehensive Program Review procedures. Possible rating categories for each indicator include Very Strong, Above Average, Satisfactory, Below Average, and Very Weak. Indicators rated as very strong or above average are listed below as program strengths; indicators rated as below average or very weak are listed as program weaknesses.

The Mathematics program is taught by a highly qualified faculty in a very cost effective manner. Program enrollment is somewhat small and has declined recently but, so far, graduation rates have held consistent with typical USG numbers for State Universities. Some concerns have been raised about program quality and retention of subgroups of students.

Program Strengths with Respect to Quality

1. Faculty credentials

Program Strengths with Respect to Productivity

1. Cost effectiveness

Program Weaknesses with Respect to Quality

1. Diversity of faculty
2. Departmental reward system
3. Use of part time faculty
4. Opportunities for student research projects
5. Incorporation of technology
6. Utilization of Multidisciplinary Approaches
7. Utilization of Multicultural Perspectives

Program Weaknesses with Respect to Productivity

1. Program enrollment
2. Degrees awarded
3. Student retention

List of Recommendations for Improving Program Quality

Key recommendations for improving program quality include the following:

1. Increase instructional capacity by hiring more full time faculty and address faculty diversity
2. Implement high impact instructional practices – adopt engaging classroom pedagogies, involve more students in research experiences, promote multidisciplinary and multicultural experiences for our students
3. Identify program outcomes that distinguish the goals of the different mathematics tracks and reduce the number of available tracks.

List of Recommendations for Improving Program Productivity

Key recommendations for improving program productivity include the following:

1. Recruit more students by increasing research opportunities.
2. Adapt program outcomes to better align with students' post-graduate aspirations.

3. Increase student retention by increasing instructional capacity and emphasizing high impact instructional practices.

Conclusion about the Program's Viability at CSU

Available evidence indicates that the Mathematics program is viable, but needs some adjustments. Our previous Comprehensive Program Review was completed in 2007-2008. Since then, total program enrollment (a leading indicator) has declined and the number of program graduates (a lagging indicator) has risen slightly, while the cost per credit hour produced has been reduced. Our number of graduates is comparable to the numbers at other State Universities in the USG, and the Mathematics program is vital to sustain a supply of qualified high school math teachers for our region. Moreover, since approximately 85% of the credit hours produced in the Mathematics Department are in 1000-level courses that serve the General Education program, the incremental cost of operating the major program is minimal, and justified.

2015-2016 Department of Mathematics Detailed Self-Study

I. Brief Program Overview

Description of the Program

CSU offers the following degrees in mathematics: Bachelor of Arts, Bachelor of Science in Mathematics and Secondary Education, Bachelor of Science in Mathematics, and Bachelor of Science - Applied Mathematics Concentration (with tracks in Actuarial Mathematics and Applied Statistics).

Program Mission and Its Relation to the CSU Mission

The program mission directly relates to the following statement of institutional mission:

> We empower people to contribute to the advancement of our local and global communities through an emphasis on excellence in teaching and research, life-long learning, cultural enrichment, public-private partnerships, and service to others.

The Mathematics faculty teaches courses in the four mathematics baccalaureate programs, general education mathematics and statistics courses, and courses that serve major programs in Biology, Chemistry, Computer Science, Early Childhood Education, Earth and Space Science, Information technology, Health Science, Middle Grades Math Education (undergraduate and graduate programs), Nursing, Political Science, Pre-engineering, Psychology, and Secondary Education (undergraduate and graduate). Approximately eighty five percent of the credit hours generated in the department during 2010-2015 are in 1000-level courses, with 6% in 2000-level courses, 6% in 5000-level courses, and 3% in 3000-level courses. In fall 2015 the department added Learning Support in mathematics to its mission.

The Mathematics faculty serves teacher education programs and the community by offering specialized content support in cooperation with the Columbus Regional Mathematics Collaborative, UTeach Columbus, and the Woodrow Wilson Program. We promote interest in mathematics in the community through an annual calculus contest open to high school students, a regional high school math tournament, and programming for a summer STEM Camp.

Stakeholders' Satisfaction with the Program

The primary stakeholders include employers of our graduates, graduates from our programs, the UTeach program (since secondary education is the program that enrolls the most students), and our current students. We do not have employer satisfaction data to review; available sources data on stakeholder satisfaction include a survey of post-2007 alumni, feedback from the UTeach program, and a survey of current senior mathematics majors. Full reports on each of these are includes as Appendices I-III, respectively. We summarize each in the next paragraphs.

The **Alumni Survey** (Appendix I) targeted 72 individuals who graduated since 2007, and generated 9 responses (12.5%). Four indicated that the mathematics program met or exceeded their expectations for career preparation, while a majority expressed some degree of dissatisfaction (4 met most but not all, 1 far below expectations), so it seems there is a disconnect between the program and students' career aspirations. Most regard the instruction and curriculum as good or better, although there are a couple of comments expressing concern about program rigor.

The **UTeach Program** (Appendix II) considers students to get a strong content preparation for teaching but expressed some concerns about inconsistencies in faculty expectations, emphasis on direct instruction, limited use of technology within the program, and students' capability to transfer theoretical concepts into

applications and to grades 6-12 classroom knowledge. They also expressed a concern that the overall Mathematics faculty does not seem supportive of Secondary Education as a worthwhile pursuit for our students.

The **Senior Math Majors Survey** (Appendix III) was sent to 25 currently enrolled students who are listed as seniors majoring in mathematics; 7 students responded (28%). This 26-question survey includes 8 questions addressing the 8 program outcomes, 10 questions on the quality of instruction in the program[1], and 8 questions probing other qualitative aspects of the program. Most seniors are satisfied that the program is addressing 6/8 program outcomes. A majority was neutral or dissatisfied with two of the outcomes:

- *Knowledge of appropriate mathematical models* (6 neutral, 1 satisfied)
- *Understand mathematical arguments and construct mathematical proofs* (3 neutral, 1 dissatisfied, 3 satisfied)

It should be noted that 2 students expressed dissatisfaction with the outcome *Knowledge of and the ability to apply probability density functions*; this could be related to UTeach program comments about inconsistencies in faculty expectations. Quality of instruction is addressed in another section of this self-study.

Two seniors cite the level of availability of classes as a factor in delaying graduation (1 actuary student, and 1 planning on teaching) – most upper division courses are available at most once a year and require pre-requisite coursework. Two say they feel somewhat like they do not belong in the program. Three mention struggle as a factor that influences students' sense of belonging in the program – one mentions it in a positive remark about understanding faculty, while two describe their struggles as sources of doubt about their belonging.

Relationship of Program to Needs of Students and Societal Demands

Mathematics degree programs reflect a commitment to the preparation of secondary mathematics teachers and professionals conducting research in mathematics or applying mathematics in science or business, all supporting needs of the community, region, and state.

The Bachelor of Science in Mathematics and Secondary Education addresses the community's persistent need for middle school and high school math teachers. The curriculum is aligned with the University of Texas' UTeach program design, and also influenced by recommendations by the Conference Board on the Mathematical Sciences for the mathematical preparation of teachers. Since the implementation of the UTeach model, 100% of the students who completed this program have found employment as teachers.

The Bachelor of Science aims for an exposure to mathematics that is broad enough and deep enough to prepare students for graduate study in mathematics.

The Bachelor of Arts program provides students with a broad exposure to mathematics, including coursework recommended by the Conference Board on the Mathematical Sciences for the mathematical preparation of secondary Mathematics teachers. Transfer students and students who change their major to mathematics after their freshman year often consider this program because it tends to take less time to complete than the BS. It occasionally serves as a stepping stone to enrolling in Master of Arts in Teaching (for initial certification to teach high school).

The Applied Mathematics program – which features tracks in actuarial mathematics and statistics – aims to provide a balance of theoretical and applied coursework sufficient to prepare skilled problem solvers for work in industry or graduate studies in math/statistics. Twenty students completed the actuarial track since spring 2008; three are known to work as actuaries, three entered MBA programs, one went to graduate

[1] Teaching related questions are based on characterizations of good teaching found in the MAA National Studies of College Calculus (Chapter 7). See http://www.maa.org/sites/default/files/pdf/cspcc/InsightsandRecommendations.pdf.

studies in biostatistics, and three took jobs in industry. We do not have data on the career paths of 10 of them. The statistics track was suspended several years ago after the required courses failed to generate sufficient enrollments.

There appears to be a slight disconnect between career aspirations and preparation. Four out of nine alumni who responded to our survey (Appendix I) said the program met most, but not all, expectations for preparing for their career goals, while one said the program fell far below expectations (that individual was not decided on a career plan when she/he decided to major in mathematics). Two out of seven seniors who responded to a survey (Appendix III) said they intend to pursue graduate studies in mathematics or statistics and do not believe their experiences in the mathematics program are preparing them for graduate school. One alumnus expressed a desire to see more focus on options other than teaching.

II. Indicators of Program Quality

II A. Quality of Faculty

Appropriateness of Faculty Credentials

Assessment of Indicator: *Very Strong*

Fourteen of the seventeen full-time faculty members have terminal degrees in applied mathematics, mathematics, or mathematics education and three hold master's degrees.

1. **Dr. Carlos Almada, Professor of Mathematics.** Ph.D. Mathematical Physics, University of Colorado at Boulder. Professional interests: Differential Geometry, Mathematical Physics, and hyperbolic partial differential equations.
2. **Dr. Madhusudan Bhandary, Professor of Mathematics.** Ph.D. Statistics, University of Pittsburgh. Professional interests: Multivariate analysis, statistical signal processing, outlier detection, robust estimation, familial data analysis, Bayes estimation.
3. **Mr. Randall Casleton, Assistant Professor of Basic Studies.** M.Ed. Secondary Mathematics Education, Columbus State University. He teaches Learning Support Mathematics and courses in the General Education core. Professional interests: Areas that promote success and retention in foundation and core level mathematics.
4. **Dr. Baiqiao Deng, Professor of Mathematics and Associate Department Chair.** Ph.D. Mathematics, University of South Carolina. Professional interests: Harmonic analysis, especially wavelets, time-frequency analysis, frames, density of bases, subdivision, nonstationary subdivision, wavelets on finite domains, approximation, and their application to image processing.
5. **Dr. Guihong Fan, Assistant Professor of Mathematics.** Ph.D. Applied Mathematics, McMaster University. Professional interests: Differential equations, dynamical systems, bifurcation and stability, mathematical biology, population dynamics, mathematical modelling in ecology and epidemiology, infectious diseases including west nile virus and lyme disease.
6. **Dr. Houbin Fang, Assistant Professor of Mathematics Education.** Ph.D. Mathematics Education, University of Southern Mississippi. Professional interests: mathematics education, early childhood and elementary mathematics education, technology in mathematics teaching and learning, and comparison studies.
7. **Mr. Hassan Hassani, Assistant Professor of Basic Studies.** Master of Education, Troy State University. He teaches Learning Support Mathematics and courses in the General Education core. Professional interests: Areas that promote success and retention in foundation and core level mathematics.
8. **Dr. Tim Howard, Professor of Mathematics and Department Chair.** Ph.D. Mathematics, Georgia Institute of Technology. Professional interests: student success and retention, math education, and the mathematical preparation of teachers.
9. **Dr. Eugen Ionascu, Professor of Mathematics.** Ph.D. Mathematics, Texas A&M. Professional interests: number theory, domination in graphs, wavelets/harmonic analysis and operator theory.

10. **Dr. Ben Kamau, Associate Professor of Mathematics.** Ph.D. Mathematics, Delaware State University. Professional interests: multivariate splines spaces, computational geometry & image processing, visualization of mathematics, and mathematics education.
11. **Dr. Ron Linton, Professor of Mathematics.** (Medical leave 2015-2016). Ph.D. Mathematics, Vanderbilt University. Professional interests: history of development of wreath products and their applications.
12. **Ms. Elizabeth McInnis, Temporary Lecturer of Mathematics.** M.S. Mathematics, Auburn University. Professional interests: teaching with a creative problem-solving approach to best prepare students for life outside of academics, and dedicated to actively engaging students.
13. **Dr. Brian Muse, Professor of Mathematics. Ph.D. Mathematics, Auburn University.** Professional interests: combinatorics and statistics.
14. **Dr. Nehal Shukla, Assistant Professor of Basic Studies.** Ph.D. Mathematics, Gujarat University. Professional interests: mathematical modeling and mathematics education.
15. **Dr. Alin Stancu, Associate Professor of Mathematics.** Ph.D. Mathematics, State University of New York at Buffalo. Professional interests: Algebra and working with his students on problems from undergraduate journals.
16. **Dr. Richard Stephens, Professor of Mathematics.** Ph.D. Mathematics, University of South Florida. Professional interests: pure and applied mathematics.

Use of Part Time Faculty

Assessment of Indicator: *Below average.*

The program currently relies heavily on part time instructors to meet student needs, even as course enrollment caps for quantitative skills and reasoning, math modeling, college algebra and pre-calculus have risen to 40 in most cases. From fall 2010 through fall 2015, about 30% of all credit hours generated in Learning Support and 1000-level math/statistics courses were generated by part time instructors. Current part time instructors and their ranges of teaching responsibilities follow below.

1. **Mr. Garrich Church**, Ed.S. Secondary Mathematics Education. Teaches learning support mathematics.
2. **Mr. Justin Evilsizer**, M.A. Mathematics, Auburn University. Teaches math modeling, college algebra, applied calculus, and calculus.
3. **Dr. John Gillis**, Ph.D. Mathematics Education, Auburn University. Teaches general education math courses, as well as math content courses for students majoring in Early Childhood and Middle Grades Education.
4. **Dr. Kitt Lumley,** Ph.D. Mathematics, Auburn University. Teaches math modeling, college algebra, and pre-calculus. (Retired from CSU)
5. **Dr. Minh Nguyen,** Ph.D. Mathematics, National University of Vietnam-Hanoi. Teaches pre-calculus.
6. **Ms. Rebertha Perkins**, Master of Education, Columbus State University. Teaches college algebra and pre-calculus.
7. **Dr. Daniel Savu**, Ph.D. Mathematics, University of South Carolina. Teaches college algebra, pre-calculus, and calculus.
8. **Ms. Karen Waters**, Master of Education, University of Georgia. Teaches math modeling, college algebra, pre-calculus, and introductory statistics.
9. **Ms. Sarah Winchester,** Master of Education, Columbus State University. Teaches college algebra.
10. **Ms. Jungmin Yun**, Master of Education, Columbus State University. Teaches college algebra and introductory statistics.

Diversity of Faculty

Assessment of indicator: *Very weak*

The mathematics faculty is a tremendously diverse group with respect to disciplinary expertise areas and international backgrounds. We have experts in algebra, analysis, applied mathematics, discrete mathematics, mathematics education, and statistics. However, blacks and females are underrepresented (the CSU undergraduate population was 60% female and 36% black in fall 2014).

Full-time Math and Basic Studies Math Faculty (*Excludes FT faculty with administrative release*)						
	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16
Female	2	4	5	4	2	3
Male	13	12	10	11	11	10
Asian ancestry	3	3	3	4	4	4
Black or African American	1	1	1	1	1	1
Hispanic	1	1	1	1	1	1
White	10	11	10	9	7	7
Non-native U.S. citiz.	8	9	9	10	9	9
Total	15	16	15[2]	15[3]	13	13[4]

Opportunities for Faculty Development

Assessment of indicator: *Satisfactory*

From fall 2013 through fall 2015, six faculty members had their teaching responsibilities reduced from 12 contact hours per semester to 9 hours per semester to conduct research. In FY2016, the Math Department has $11,690 budgeted for faculty development for twelve full time faculty and two faculty with administrative (chair and associate chair), for an average of $835 per faculty member. The department spent a total of about $43,651 on travel and registrations in the past five fiscal years. In addition, support from the UTeach program has supported two trips to the UTeach Institute national conference, two faculty members' participation in the UTeach Institute's Functions and Modeling Training Workshop in Austin, and one faculty member's participation in the annual meeting of the Georgia Council of Teachers of Mathematics. Funds from the NSF-awarded Robert Noyce Teacher Scholars Program (1136356) have supported three faculty trips to the annual Noyce Program PI Conference in Washington, DC. One faculty member has served as an assistant editor of the Problems section of Mathematics Magazine for several years. Finally, four of our faculty members have collaborated on Improving Teacher Quality state grants to improve the mathematical content knowledge of K-12 teachers.

Program Improvement Plans

1. Increase full time instructional capacity by hiring new faculty.
2. Prioritize the employment of new faculty who are representative of our student body.

II B. Quality of the Teaching

Indicators of Good Teaching

Assessment of indicator: *Satisfactory*

Available indications of teaching quality include an Alumni Survey (Appendix I), UTeach program feedback (Appendix II), and a Seniors Satisfaction Survey (Appendix III).

[2] Institutional Research number is 16
[3] Institutional Research number is 14
[4] Total includes a temporary full time lecturer

All 9 alumni who responded to the survey (72 invited) rated instruction in the program as good or better (6 very good, 2 good, 1 excellent). Five identified the faculty as one of the primary strengths of the CSU mathematics program.

The UTeach program offered a somewhat mixed assessment. Our secondary education students have performed well on GACE content tests, but there appears to be some inconsistency in course expectations depending on the instructor, especially in MATH 3175 Probability and MATH 5175 Mathematical Statistics. They urged more use of alternatives to direct instruction. It was remarked that many students in the mathematics program don't seem ready to transfer the theory to applications.

Senior math majors gave mostly good ratings, with a few notable exceptions. Items 9-17 on the Seniors Satisfaction Survey (Appendix III) involve participant ratings of various traits of good teaching. Statements with which a majority agreed or strongly agreed are the following statements about CSU math instructors:

9. Prepare well for the math/statistics courses they teach
10. Provide understandable explanations
11. Listen carefully to my questions and comments
13. Make me feel comfortable asking questions during class
14. Make class interesting
15. Ask questions in class to determine whether I understand what is being discussed
16. Course exams and other graded assessments were good assessments of what I learned in the courses

A majority of students neither agreed nor strongly agreed with two of the statements:

12. Instructors allow enough time for me to understand difficult ideas.
17. Instructors effectively prepared me to meet expectations for my performance in the courses.

Since a majority of the seniors (6/7) agreed or strongly agreed that their instructors provide understandable explanations in class (Item 10), Item 17 appears to indicate that some students believe there is too large a gap between in-class instruction and what is expected of student performance.

<u>Indicators of Good Advising</u>

Assessment of indicator: *Satisfactory*

In fall 2015 an online survey was sent to all 91 students who were listed as math majors in spring 2015, asking them to rate the academic advising they had received. Eleven students (12%) responded to the survey (Appendix VI). Most seem satisfied with the advising they received, but there are some exceptions. Two disagreed with the statement "Overall, my advisor(s) have been able to accurately answer all of my questions or refer me to the appropriate person who could." Three disagreed with the statement "The time I have spent with my advisor(s) has been sufficient to discuss all of my questions and concerns". Three disagreed with the statement "As a result of my advising sessions, I understand what I need to do in order to make progress in my program of study, and what decisions I need to make." All of the negative responses come from students with more than 30 hours of credit.

In September 2015, the Math Department partnered with the Academic Center for Excellence for student advising. All freshmen and sophomores will now be advised by a single advisor from ACE, and department faculty will share advising of juniors and seniors in our program. ACE advisors practice an aggressive form of advising that includes five intentional contacts each semester. The ACE advisor helps the Math chair monitor course capacity and scheduling needs; she also reports on changes of major.

Departmental Reward System

Assessment of indicator: *Very Weak*

Each faculty member's performance is reviewed annually by the department chair. In principle, the chair considers performance in teaching, scholarship, and service when recommending merit raises and in decisions for promotion and tenure. Effective teaching and advising form the largest component in raises allocated. However, from 2008 through 2014 faculty saw no merit based increases. An extremely limited amount of funding was available in increments of $450 or $900 for raises going into the 2015-2016 academic year. There have been a few salary adjustments made based on the university's faculty salary initiative, but it was not clear that teaching performance was taken into account in these decisions.

Program Improvement Plans

1. Faculty who teach Probability and Mathematical Statistics will be asked to review course expectations and agree on a consistent set of expectations.
2. As merit raises become available, we will reward faculty who incorporate high impact instructional practices.
3. Faculty will be encouraged to participate in upcoming initiatives to provide meaningful engagement of our students. First, there is the new Quality Enhancement Plan, We Fix It, which aspires to involve our students in creative real-world problem solving, and includes resources for changing instructional pedagogy. Second, there is the recently proposed NSF Improving Undergraduate STEM Education project "Understanding Our Students, Understanding Their World", which aims to refine advising, teaching and learning experiences based upon a rigorous understanding of our students and facilitate the dismantling of a deficit oriented instructional model. If funded, this program will provide funding for faculty to participate in annual local STEM Institutes, transform gateway math courses, establish a summer bridge program, and create a STEM related first year learning community.

II C. Quality of Research and Scholarship

Opportunity for Student Research Projects

Assessment of indicator: *Below average*

Students in Mathematics have opportunities to conduct research with faculty, but they tend to be sporadic and rely on individual efforts, rather than programmatic design. Appendix IV documents research experiences mentored by five mathematics faculty at CSU with 8 students, including 7 undergraduates and 1 graduate student, since 2012. A total of 36 students graduated during this time.

Student research has occurred through students' participation in the Honors Program, enrollment in a course in which an individual faculty member has incorporated problem solving as a part of the requirements, and through interactions in a Mathematical Biology seminar. Students in the Honors Program find early encouragement to engage in research with faculty, as they take ITDS 1779H Scholarship Across the Disciplines to meet their First Year Experience requirement. This encouragement continues in the 2-4 Honors designated courses they are required to take, and through Honors Contracts completed in 2-4 upper division courses. Fulfillment of the Honors Program requires the completion of a thesis. Honors contracts and theses provide opportunities for Honors Program students to interact with faculty on research projects.

All students are encouraged to engage in research and creative activities through the university's Student Research And Creative Endeavors (SRACE) program. The SRACE program provides up to $300 for student travel and/or research materials on a competitive basis. Departments are encouraged to supplement these funds. Two student proposals were submitted in fall 2015, but neither has been awarded. One was submitted in spring 2016, and the decision is pending.

Faculty Publications, Presentations, and Grants

Assessment of indicator: *Satisfactory*

Appendix V summarizes faculty publications, presentations, grants awarded, and grants proposed since 2012. During that time 13 Mathematics faculty members published 42 refereed journal articles, 7 faculty members gave at least 37 conference presentations, 5 faculty members in the department participated in 11 grants awarded for over $1.6 million, and 3 department faculty members participated in 5 other proposals for $6 million.

Program Improvement Plans

1. Adapt the program curriculum to promote engagement in research projects by students not necessarily in the Honors Program.
2. Create department policies that incentivize faculty to engage students in their research.

II D. Quality of Service

Assessment of indicator: *Satisfactory*

Activities to Enhance Program, Department, College, Institution, Community and/or Region

During the past five academic years, members of the Mathematics faculty have engaged in service at multiple levels in a variety of capacities. All tenured and tenure track faculty serve on the departmental curriculum committee. All tenured faculty members, except the department chair, serve on the department personnel committee (making promotion and tenure recommendations). More widespread involvement in program assessment and program modification is needed; the annual Program Review and Improvement report has been prepared by one or two individuals with little discussion of the data or our response to it. Service outside the department is summarized in the table below[5].

Faculty Member	**Partial Service List**
Almada, Carlos	1. Ad Hoc committee reviewing college algebra and pre-calculus, member 2. COLS Personnel Committee 3. COLS Post-tenure Review Committee 4. Comprehensive Program Review 5. Discovery Day volunteer 6. Math Tournament event volunteer 7. Math Tournament Test coordinator and reviewer
Bhandary, Madhusudan	1. Calculus Contest volunteer 2. COLS Personnel Committee 3. COLS Post-tenure Review Committee 4. COLS University Grants Screening Committee 5. Math Tournament event volunteer 6. Sexual Assault Review Panel 7. Statistical assistance with Science Fair project
Casleton, Randall	1. Academic Decathlon volunteer 2. CSU Salary Study Committee member 3. Facilities and Safety Committee 4. Information Technology Utilization Committee 5. Learning Support Ad Hoc Committee member
Deng, Baiqiao	1. Associate Department Chair 2. COLS Personnel Committee Chair

[5] These reflect only faculty who were in the Department of Mathematics and Philosophy at the time of service during fall 2010-spring 2015

Faculty Member	Partial Service List
	3. COLS Post-tenure Review Committee 4. Department General Education Assessment chair 5. Information Technology Utilization Committee 6. Library Committee 7. Math Tournament event volunteer 8. Math Tournament Test reviewer 9. Mathematics Learning Support Committee member 10. Pre-tenure review committee member
Fan, Guihong	1. Calculus Contest volunteer 2. Math Club faculty sponsor 3. Math Tournament event volunteer 4. Math Tournament Test reviewer 5. Readmission Appeals Committee 6. Referee for professional journals: a. Analysis and Applications b. Journal of Nonlinear Science c. Journal of Theoretical Biology d. SIAM Journal on Applied Mathematics 7. Mathematical Biosciences and Engineering 8. STEM Honors Camp presenter
Fang, Houbin	1. COLS University Grants Screening Committee member 2. CSU Readmission Committee member 3. Department General Education Assessment member 4. Department liaison with Dept. of Teacher Education 5. Learning Support Ad Hoc Committee member 6. Math Dept. Standards of Excellence Review Committee member 7. Math Department website maintenance 8. Math Masters Contest volunteer 9. Math Tournament event volunteer 10. Math Tournament Chair 11. Math Tournament Test reviewer 12. Science Olympiad 13. STEM Honors Camp 14. Teaching Seminar coordinator 15. Woodrow Wilson Program Planning Committee
Hassani, Hassan	1. Arnold Hall Renovation Committee member 2. COLS post-tenure review committee member 3. CSU Academic Advising Committee member 4. Facilities and Safety Committee 5. Learning Support Ad Hoc Committee member 6. Math Tournament Test reviewer 7. Pre-tenure review committee chair 8. Produced videos for the CSU Adult Learner Program 9. Retention, Progression, and Graduation Committee
Howard, Tim	1. COLS Curriculum Committee 2. CSU Complete College Georgia Council, Faculty Book Group: “Talking About Leaving: Why Students Leave the Sciences” 3. Faculty Senate, 4. General Education Committee 5. International Education and Exchange Committee 6. Learning Support Ad Hoc Committee chair 7. Ledger Enquirer Page One Judge 8. Math Tournament event volunteer 9. Mathematics Education Program Advisory Committee 10. President Search Committee

Faculty Member	Partial Service List
	11. Referee for scholarly journals: PRIMUS 12. Science Fair 13. Science Olympiad 14. STEM Honors Camp 15. Strategic Planning Commission 16. USG Ad Hoc Committee to Transform Remediation in Mathematics 17. USG Task Force for Transforming College Mathematics 18. UTeach Steering Committee 19. Woodrow Wilson Program Planning Committee
Ionascu, Eugen	1. Assistant Problem Section Editor for Mathematics Magazine 2. Associate Editor, Mathematics Magazine Problems Section 3. Calculus Contest 4. COLS Personnel Committee, 5. COLS University Grants Screening Committee 6. International Education & Exchange Committee 7. International Education Scholarships Subcommittee member 8. Math Tournament event volunteer 9. Math Tournament Test review 10. Referee for professional journals: a. Integers b. International Journal of Geometry c. International Journal of Wavelets d. Multiresolution and Information Processing e. College Mathematics Journal f. Integral Equations and Operator Theory 11. Reviewer for MathSciNet
Kamau, Ben	1. Calculus Contest chair 2. COLS Curriculum Committee 3. Math Tournament event volunteer 4. STEM Honors Camp 5. Woodrow Wilson Program Planning Committee
Levi, Inessa	1. COLS Personnel Committee 2. Math Tournament event volunteer 3. Women's Issues Advisory Committee
Linton, Ron	1. Math Dept. Comprehensive Program Review Committee member 2. Math Tournament event help 3. Pre-tenure review committee member
Muse, Brian	1. Auxiliary Enterprises Committee 2. Calculus Contest volunteer 3. COLS Post-tenure Review Committee 4. Math Tournament event help 5. Math Tournament Chair 6. Science Olympiad event supervisor
Shukla, Nehal	1. Distance Learning, 2. Faculty Senate member 3. Faculty Senate Committee on Committees member 4. Learning Support Ad Hoc Committee member 5. Library Committee member 6. Math Dept. Comprehensive Program Review Committee member 7. Math Dept. Standards of Excellence Review Committee member 8. Math Learning Support Committee member 9. Science Olympiad volunteer
Stancu, Alin	1. AMS session organizer 2. Calculus Contest

Faculty Member	Partial Service List
	3. COLS Personnel Committee, 4. COLS Post-tenure Review Committee 5. Math Dept. Standards of Excellence Review Committee member 6. Math Tournament event help 7. Math Tournament Planning and Preparation
Stephens, Richard	1. Discovery Day volunteer 2. Library Committee 3. MAA-SE session organizer 4. Math Dept. Standards of Excellence Review Committee chair 5. Math Graduate Program Committee chair 6. Math Tournament event help 7. Math Tournament Planning and Preparation

Program Improvement Plans

1. Incentivize broader faculty participation in program review and assessment

II E. Quality of Faculty and Student Achievements

Assessment of indicator: *Satisfactory*

Faculty Honors – Honors earned by Mathematics Department Faculty include the following:

2014 Selection to Participate in National Institute for Mathematical and Biology Synthesis tutorial, "Parameter Estimation for Dynamic Biological Models" – Guihong Fan
2014 CSU Educator of the Year Nominee – Brian Muse
2012 CSU Faculty Writing Fellow – Ben Kamau
2011 CSU "Outstanding Teacher" award recipient from the CSU women's soccer team – Tim Howard

Student Honors – Honors earned by Mathematics students include the following:

2015 CRAFT-STEM Internship – Suriyana Mahadeo
2015 CRAFT-STEM Internship – Haley Pavlis
2014 Robert Noyce Teacher Scholarship – Tysherrica Walker
2014 Robert Noyce Teacher Scholarship – Kevin Klida
2014 Robert Noyce Teacher Scholarship – Heather Hauck
2014 Robert Noyce Teacher Scholarship – Andrea Nelson
2014 NIMBioS Summer Research Experience for Undergraduates – Michael Rohly
2014 CRAFT-STEM Internship – Tysherrica Walker
2014 CRAFT-STEM Internship – Mohammed Momin
2014 CRAFT-STEM Internship – Kayla Parsons
2013 Robert Noyce Teacher Scholarship – Kerri Edgar
2013 Robert Noyce Teacher Scholarship – Jacob Hand
2012 Robert Noyce Teacher Scholarship – Stevan Rodney Parks
2012 CRAFT-STEM Internship – Kerri Edgar
2012 CRAFT-STEM Internship – Harrison Sharitt

Students recognized at the Honors Convocation as Outstanding Student in Mathematics were the following:
2015 Heather Hauck
2014 Kevin Klida
2013 Brianne Moody
2012 Brianne Moody
2011 Keith Roop-Eckart

Graduate Achievements (Licensure, Certification, Admission to Graduate School, Job Offers, etc.)

During 2010-2015 a total of 45 students graduated from the CSU Mathematics Program. We have information on the subsequent activities of 32:

Path	**Number of Graduates**
Teaching	9
Graduate studies, mathematics	3
Graduate studies, MBA	3
Accounting	2
Graduate studies, initial teaching certification	2
Military service	2
Tutor	2
Accounts receivable specialist	1
Actuary	1
Business analyst	1
Customer service representative	1
Data analyst	1
Engineering design	1
Graduate studies, computer science	1
Information technology administration	1
Post baccalaureate studies, accounting	1
Youth coordinator for a non-profit organization	1

II F. Quality of Curriculum

Relationship Between Program's Curriculum and Its Outcomes

Assessment of indicator: *Satisfactory*

All four mathematics degree programs list the same nine program outcomes. These outcomes and the courses in which they are directly addressed appear in the following table. Prior to fall 2013 the BS Mathematics required two semesters in abstract algebra and two semesters in real analysis; requirements for these courses were dropped in the 2013-2014 catalog.

Program Outcome	**Manner Addressed**
1. Understanding of calculus and an ability to use calculus in applications	Math 1131 Calculus 1 Math 1132 Calculus 2 Math 2135 Calculus 3 Math 3107 Differential Equations[6]
2. Knowledge of algebraic structures	Math 2115 Linear Algebra Math 5111 Abstract Algebra[7]
3. Knowledge of the real numbers, functions, the topological properties of R, differentiation, and integration	Math 5151 Real Analysis
4. Knowledge of and the ability to apply probability density functions	Math 3175 Probability Math 5175 Mathematical Statistics
5. Knowledge of appropriate mathematical models	Math 1131 Calculus 1 Math 1132 Calculus 2 Math 3106 Mathematical Theory of Interest[8]

[6] Required in the BS Mathematics

[7] Required in BA Mathematics, BS Mathematics, BS Mathematics & Secondary Education (not in Applied Mathematics)

[8] Required in the BS Applied Math Concentration, Actuarial Science Track

Program Outcome	Manner Addressed
	Math 3107 Differential Equations[6] Math 3108 Intro to Actuarial Science[8] Math 5126 Actuarial Regression & Time Series[8] STAT 1127 Introductory Statistics
6. Ability to think critically	All mathematics courses
7. Understand mathematical arguments and construct mathematical proofs	Math 2125 Intro to Discrete Math Math 3155 Foundations of Adv. Math Math 5111 Abstract Algebra[7] Math 5151 Real Analysis
8. Use computational devices and software in problem solving situations	CPSC 1301 Computer Science 1 CPSC 1301L Computer Science 1 Lab UTCH 3115 Functions and Modeling[9]
9. Communication skills to acquire, develop, and convey mathematical knowledge	Math 3155 Foundations of Adv. Math Math 4795 Senior Seminar in Mathematics Math 5111 Abstract Algebra[7] Math 5151 Real Analysis

Incorporation of Technology

Assessment of indicator: *Below Average*

In most courses in the Mathematics programs, technology use is optional, and according to instructor discretion. UTCH 3115 Functions and Modeling and CPSC 1301 Computer Science 1 are the only courses in the Mathematics program that are designed to consistently incorporate the use of technological tools. At a minimum, students in the Functions and Modeling course use Geogebra, graphing calculators, and motion detectors. Some instructors elect to use technology in other courses (e.g. Excel, Geogebra, graphing calculator, Maple, Sketchpad). The limited role of technological tools has been noted with concern by the UTeach program. One alumnus suggested using software such as Matlab as a way to improve the program.

Utilization of Multidisciplinary Approaches

Assessment of indicator: *Below Average*

Multidisciplinary approaches are not commonly used in the Mathematics program, except in the Actuarial Science track; actuarial science students take accounting, economics, and finance courses. However, one faculty member is an expert in mathematical biology and has organized seminars and student research projects in that area.

Utilization of Multicultural Perspectives

Assessment of indicator: *Below Average*

Multicultural perspectives are not normally part of a mathematics student's experience at CSU. The university has a strong study abroad program and offers opportunities to study at Oxford University, which several of our students have done. Students in the Secondary Education program take History of Mathematics, along with others who elect to take the course as a program elective. This course addresses some mathematical contributions of non-Western cultures.

Program Improvement Plans

1. Encourage the faculty to develop a departmental plan to include suitable uses of technology by all students in the program.

[9] Required in BS Mathematics and Secondary Education

2. Incentivize faculty to work through the new Quality Enhancement Plan to incorporate more interdisciplinary experiences for our students.
3. Encourage program faculty to teach in the summer Study Abroad Program and encourage our students to participate.
4. Identify program outcomes that distinguish the goals of the different mathematics tracks and reduce the number of available tracks.

II G. Quality of Facilities and Equipment

Availability of Classroom and Laboratory Space

Assessment of indicator: *Satisfactory*

Classrooms and laboratory space are adequate, although there is room to improve. Classrooms are normally assigned through an automated process that aims to optimize space utilization. Most of the classrooms usually assigned for mathematics courses – University Hall 200, 235, 248, 024, 025; Commerce and Technology 205, 207, 208, 307, 308, 309, 406 – are not conducive to collaborative learning; the desks are bulky and packed tightly into rows. Howard Hall has some classrooms that would be more suitable, but their seating capacities are 32 or fewer, smaller than our regular enrollment cap of 40 for 1000-level and 2000-level courses.

Room 024 University Hall has a column in the middle of the room and a configuration that makes it difficult for students to see what the instructor is writing on the board. Room 200 University Hall is dimly lit and occasionally noisy. Room 024 was used for 5 classes in fall 2015, and room 200 was used in 14 classes in fall 2015.

There is only one computer lab on campus that seats more than 30 students. This limitation tends to diminish reliance on technology as a regular component of instruction in lower level courses (which are usually capped at 40).

Availability of Equipment

Assessment of indicator: *Satisfactory*

The program has adequate access to equipment needed, with the exception of computer lab space noted in the previous section.

Program Improvement Plans

1. If we are going to be in a position to encourage collaborative learning environments in core courses, we might have to reduce enrollments caps to 32 in order to accommodate.
2. Investigate lighting improvements and noise insulation in room 200 University Hall.
3. University Hall 024 should be taken out of the list of classrooms available in the optimizing software and used only as a last resort.
4. Courses in which computer use is deemed to be a priority, we may need to cap enrollments at 30.

Section Three - Indicators of Program Productivity

III A. Enrollment in Program for Past 5 Years

Assessment of indicator: *Below Average*

Although institutional data displayed below describe a mean enrollment of approximately 74 majors per year for the past 5 years, the data include an average of 19 part-time majors per year. Therefore, our program has supported approximately 55 full-time majors annually over the given time period and that number seems to be declining.

Measure	2010-11	2011-12	2012-13	2013-14	2014-15	5-Year Avg
Number of Declared Majors - Fall Semester						
BA Mathematics						
Full-Time	5	5	10	6	6	6
Part-Time	4	3	2	3	2	3
Total	*9*	*8*	*12*	*9*	*8*	*9*
BS Mathematics						
Full-Time	52	48	60	44	39	49
Part-Time	21	11	14	18	15	16
Total	*73*	*59*	*74*	*62*	*54*	*64*
Combined Undergraduate Programs						
Full-Time	57	53	70	50	45	55
Part-Time	25	14	16	21	17	19
Total	*82*	*67*	*86*	*71*	*62*	*74*

Measure	2010-11	2011-12	2012-13	2013-14	2014-15	5-Year Avg
Number of Declared Majors - Fall Semester						
BA Mathematics	5	5	10	6	6	6
BS Mathematics	52	48	60	44	39	49
Total Full Time	57	53	70	50	45	55

Even assuming a uniform distribution of those 55 over the four student classifications (i.e., freshman, sophomore, junior, and senior), we should expect that a senior-level cohort size of 14 would produce low enrollments in senior courses for majors. Indeed, enrollments for the required MATH 5151 Introduction to Real Analysis 1, offered only in Fall semesters, have been 15, 9, 17, 12, 8, and 18 for Fall semesters 2010 – 2015, respectively. At the same time, these few senior majors are distributed over four academic entities, each requiring a common mathematics core, and each with its own collection of mathematics electives:

- BA in Mathematics
- BS in Mathematics
- BS in Mathematics – Applied Mathematics Concentration (including the Actuarial and Applied Statistics Tracks)
- BS in Mathematics – Secondary Education Concentration (including the UTeach Teaching Option)

An analysis of enrollments in elective courses from fall 2010 through fall 2015 finds some strain in this regard (see Appendix VII). If we exclude 19 course sections taken through independent study arrangements, taken as part of a Study Abroad program, taught on a pro-bono basis, or taught by a visiting Fulbright Professor (at no cost to the program), we are left with 34 course sections offered for undergraduates; 16 of these sections had single-digit enrollments (average of 6.125 students each).

Because of low enrollment in these programs, it is very difficult to offer program electives that will have the expected minimum enrollments. For that reason, for the most part, the only mathematics electives available to students in any one of these four areas are mathematics courses that are required of students in the other programs, i.e., there are really very few real electives available for our students.

Program Improvement Plans

1. As mentioned in Section II.C, we will discuss program modifications that make research experiences accessible to more students. This will be used as an explicit selling point to recruit prospective high school students.

III B. Degrees Awarded Over Past 5 Years

Assessment of indicator: *Below Average*

The data show that our program has begun to graduate more students, particularly in the last two years of the study period.

CSU Mathematics Graduates 2010-2015						
Program	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**5-Year Avg**
BA Mathematics	2	1	2	1	1	1
BS Mathematics	7	7	4	10	10	8
Combined Undergraduate Programs	*9*	*8*	*6*	*11*	*11*	9

It is worth noting that this increase in numbers masks a growing tendency for students in the program to repeat mathematics courses. This is illustrated in the next table. The table shows graduates' mean GPA among math courses taken at CSU, including all attempts, and the mean number of distinct CSU math courses repeated (counted by course numbers, not total attempts). Two 2014-2015 graduates repeated 6 and 4 MATH courses during their matriculation; the first those students had 11 wasted attempts in addition to the 6 successful attempts. Three 2013-14 graduates repeated 10, 9, and 4 MATH courses.

	Number of Program Graduates	Mean CSU MATH GPA*	Mean Number of MATH Courses Repeated
2010-11	9	3.12	1.00
2011-12	8	3.09	1.88
2012-13	6	2.74	2.17
2013-14	11	2.75	2.91
2014-15	11	2.59	1.55

* CSU MATH GPA computed by including only and all MATH courses taken at CSU, including all repeated courses.

III C. Comparison with CSU & University System of Ga. Programs

Assessment of indicator: *Satisfactory*

The CSU Mathematics programs awarded an average of 9 degrees per year over the last five years. During this time the mean and median numbers of degrees awarded annually by USG state universities have been 15.5 and 11, respectively. If we exclude the figures for Kennesaw State University and the University of West Georgia, which the USG classifies as Comprehensive Universities, then the mean number of graduates is 11 per year, and the median is 10 graduates per year. The data show that our program has begun to graduate more students, particularly in the last two years of the study period, nearly matching the graduation rate among peer institutions in the last three years.

Baccalaureate Degrees Awarded in Mathematics Programs at USG State Universities						
USG Institution	**2010-11**	**2011-12**	**2012-13**	**2013-14**	**2014-15**	**5-Year Avg**
Kennesaw State University	59	69	71	67	49	63
University of North Georgia	18	24	22	19	16	20
Georgia College & State University	25	16	19	23	14	19
State University of West Georgia	16	14	19	14	18	16
Fort Valley State university	10	11	16	18	11	13
Savannah State University	15	17	9	11	13	13
Armstrong Atlantic State University	17	14	8	9	8	11
Southern Polytechnic State University	9	10	9	10	10	10
Columbus State University	9	8	6	11	11	9
Albany State University	9	8	7	7	12	9
Clayton College & State University	7	9	8	4	4	6
Georgia Southwestern State University	7	9	8	4	4	6
Georgia Regents Univiversity (Augusta)	5	4	5	10	7	6
Total	*206*	*213*	*207*	*207*	*177*	*202*

III D. Retention Rates

Assessment of indicator: *Satisfactory*

Overall program retention rates are satisfactory, in the sense that they are comparable to CSU retention rates. However, there are subpopulations we must consider with concern. Rates at which first time full time students have been retained in Mathematics programs since fall 2009 have oscillated around overall CSU retention rates – with two cohorts outpacing overall CSU retention rates, two below, and one essentially the same – as indicated in the following table[10]. An examination of the low retention of Fall 2012 FTF (36.4%) uncovered no significant factors that differentiate this cohort with others in the study period. There is some volatility in our retention rates due to the relatively small numbers of students involved in each cohort.

Retention Rates by Baccalaureate Program (*)															
* The cohorts below are first-time full-time undergraduate students enrolled fall semester who entered CSU in the fall or the preceding summer term.															
Major Program	**Number in Fall 2009 Cohort**	**Fall 2009 Cohort Returning Fall 2010**		**Number in Fall 2010 Cohort**	**Fall 2010 Cohort Returning Fall 2011**		**Number in Fall 2011 Cohort**	**Fall 2011 Cohort Returning Fall 2012**		**Number in Fall 2012 Cohort**	**Fall 2012 Cohort Returning Fall 2013**		**Number in Fall 2013 Cohort**	**Fall 2013 Cohort Returning Fall 2014**	
		Number	Rate		Number	Rate		Number	Rate		Number	Rate		Number	Rate
Mathematics	17	13	76.5%	6	4	66.7%	9	7	77.8%	11	4	36.4%	4	3	75.0%
Total Baccalaureate	*790*	*574*	*72.7%*	*745*	*527*	*70.7%*	*813*	*550*	*67.7%*	*819*	*563*	*68.7%*	*773*	*582*	*75.3%*

Disaggregating our First Time Full Time freshmen (Fall 2010 through Fall 2014 cohorts[11]) into subgroups according to gender, race/ethnicity, high school GPA, SAT scores, and SAT Math Readiness Scores highlights some areas that warrant attention (see the next table). Subpopulations that make up at least a fourth of all FTFT freshmen math majors and whose retention rates fall at least 5% below the group average include males, black or African American students, students with high school grade point averages between 3.0 and 3.5, students with SAT math scores between 500 and 550, and students whose SAT Math Readiness Scores qualify them for MATH 1111L College Algebra Recitation (a co-requisite course taken with College Algebra).

[10] Source: CSU Office of Institutional Research CPR data provided 7/20/2015
[11] Source: CSU Office of Institutional Research data provided 6/1/2015

Retention of FTFT Freshmen Math Majors, Fall 2010-Fall 2014				
Count	**Description**	**Retained**	**% Ret**	**% of Whole**
40	FT FT freshmen entered fall semesters 2010-2014	27	68%	100%
18	Males	11	**61%**	45%
22	Females	16	73%	55%
19	White	14	74%	48%
16	Black or African American	10	**63%**	40%
3	Asian	1	33%	8%
2	Hispanic or Latino	2	100%	5%
17	HSgpa at least 3.5	15	88%	43%
15	had 3.0 ≤ HSgpa < 3.5	8	**53%**	38%
7	had 2.5 ≤ HSgpa < 3.0	3	43%	18%
1	had Hsgpa = 2.0	1	100%	3%
12	SATM above 550	9	75%	30%
10	SATM in [500,550]	5	**50%**	25%
8	SATM in [450,500)	6	75%	20%
2	SATM below 450	1	50%	5%
8	No SATM reported			20%
3	MRS placement 0195	2	67%	8%
15	MRS placement 1111L	7	**47%**	38%
9	MRS placement 1111	7	78%	23%
13	MRS placement 1113	11	85%	33%

Program Improvement Plans

1. As mentioned in Section II.B, faculty will be encouraged to participate in upcoming initiatives to provide meaningful engagement of our students. The adoption of high impact instructional practices is expected to address student retention, as well as program quality.

III E. Student Learning Indicators

Assessment of indicator: *Satisfactory*

Indicators of student learning include student survey responses (Appendix III), student performance on the Major Field Test in Mathematics, student performance on the Georgia Assessments for the Certification of Educators (GACE) tests in mathematics, and feedback from the UTeach program.

Senior mathematics majors surveyed (Appendix III) were asked to indicate their satisfaction with the extent to which the program addresses each outcome. A majority indicated they are satisfied or very satisfied with the following outcomes:

- Understanding of calculus and an ability to use calculus in applications
- Knowledge of algebraic structures
- Knowledge of the real numbers, functions, the topological properties of R, differentiation, and integration
- Knowledge of and the ability to apply probability density functions
- Ability to think critically
- Develop communication skills to acquire, develop, and convey mathematical knowledge

However, a majority of seniors did not express satisfaction with two program outcomes:

- Knowledge of appropriate mathematical models

- Ability to understand mathematical arguments and to construct mathematical proofs

Students' performance on the Major Field Test in mathematics provides another indicator of student learning in the CSU mathematics program. Results from the past five years appear in the following table. In four out of five of these years, the CSU institutional mean lies substantially below the 50th percentile, as do the area sub-scores. When comparing CSU students' performance with other institutions, it helps to be aware that the Major Field Test includes several areas that are not required in some tracks in our major: number theory, complex analysis, differential equations, graph theory, combinatorics, and point-set topology. Further, in 2013-2014 we stopped offering Abstract Algebra 2 and Real Analysis 2; this means it is unlikely our students will have seen rings and fields.

Year	Number Tested	Percentile Institutional Mean	Percentile Calculus	Percentile Algebra	Percentile Routine Problems	Percentile Non-routine Problems	Percentile Applied
2010-2011	14[12]	35	35	15	35	25	35
2011-2012	7[13]	96	90	97	95	85	98
2012-2013	7[13]	17	4	7	4	68	18
2013-2014	7	25	9	16	13	25	6
2014-2015	17[14]	23	28	33	32	15	26

Pass rates on GACE mathematics tests suggest that students in Secondary Education are doing well in the content areas tested. Pass rates for the past three years have been 100% (10/10) on Test 1 and on Test2 in 2012-2013, 100% (1/1) on Test 1 and 50% (1/2) on Test 2 in 2013-2014, and 88% (7/8) on each test in 2014-2015.

Feedback from UTeach program personnel (Appendix II) indicates that our students are knowledgeable in the content area but struggle to transfer mathematical theory to applications.

III F. Graduation Rate of Program

Assessment of indicator: *Satisfactory*

Six year graduation rates among CSU Mathematics students have fluctuated within the range of 27.3% to 63.6%, exceeding CSU graduation rates in most years. Math students' graduation rates exceed the institutional rates in the 2005, 2006, and 2009 cohorts, while the 2007 and 2008 cohorts had lower graduation rates. Due to the low numbers in our cohorts, there is some volatility from cohort to cohort.

Six-Year Graduation Rates by Baccaureate Program (*)

* The cohorts below are first-time full-time undergraduate students enrolled in a baccalaureate program fall semester who entered CSU in the fall or the preceding summer term.

Major Program	Number in Fall 2005 Cohort	Fall 2005 Cohort duating by 2011 Number	Rate	Number in Fall 2006 Cohort	Fall 2006 Cohort Graduating by 2012 Number	Rate	Number in Fall 2007 Cohort	Fall 2007 Cohort Graduating by 2013 Number	Rate	Number in Fall 2008 Cohort	Fall 2008 Cohort Graduating by 2014 Number	Rate	Number in Fall 2009 Cohort	Fall 2009 Cohort Graduating by 2015 Number	Rate
Mathematics	11	7	63.6%	14	6	42.9%	11	3	27.3%	16	5	31.3%	17	7	41.2%
Total Baccalaureate	*758*	*296*	*39.1%*	*641*	*256*	*39.9%*	*668*	*252*	*37.7%*	*714*	*284*	*39.8%*	*790*	*299*	*37.8%*

[12] MFT given to students taking Real Analysis
[13] MFT given to students taking Senior Seminar
[14] Includes results for 7 students from Spring 2014 (recorded separately for 2013-2014) and 10 students from Fall 2014

III G. Cost Effectiveness of Instructional Delivery

Assessment of indicator: *Very Strong*

	Fiscal Year			
	2013	2014	2015	3-Year Avg.
Total Costs	$1,774,074	$1,880,355	$1,921,110	$1,858,513
Total Cost Per Major (Total Costs / Number of Declared Majors)	$20,629	$26,484	$30,986	$26,033
Credit Hours Taught Fall and Spring Semesters	10,846	11,414	11,931	11,397
Cost Per Credit Hour – Total Expenditures	$164	$165	$161	$163
Institutional Cost Per Credit Hour	$233	$242	$254	$232
Mathematics cost per credit hour as a percent of the institutional cost per credit hour	70%	68%	63%	70%

The cost of the Mathematics Program per credit hour is significantly less than the institutional cost per credit hour. Program cost per credit hour as a percentage of institutional cost per credit hour has also decreased significantly as a result of recent program and course scheduling changes. These changes include dropping Real Analysis 2 and Abstract Algebra 2 from the list of required courses in the B.S. Mathematics (which resulted in their not being available), toughening requirements for offering low enrollment courses, and faculty teaching independent study and pro-bono courses generating 126 credit hours in three years. The cost per major appears high due to the relatively small (and declining) number of students listing Mathematics as their major. (Recall that 85% of our credit hour generation has been at the 1000-level).

Section Four - Program Viability

IV A. Summary of Program's Viability

Available evidence indicates that the Mathematics program is viable, but needs some adjustments. Our previous Comprehensive Program Review was completed in 2007-2008. Since then, total program enrollments have declined (a leading indicator), the number of program graduates (a lagging indicator) has risen slightly, and the cost per credit hour produced has been reduced. Overall student retention in the Mathematics program is satisfactory. However, subpopulations that constitute significant proportions of our overall program enrollment have not been faring as well. – black or African American students, males, students with high school grade point averages between 3.0 and 3.5, students with SAT math scores between 500 and 550, and students whose initial math placement qualifies them for MATH 1111L.

Since approximately 85% of the credit hours produced in the Mathematics Department are in 1000-level courses that serve the General Education program, the incremental cost of operating the major program is minimal, and justified. Mathematics also fills a vital need by the community for the mathematical preparation of K-12 teachers.

<u>Summary of recommendations for the future of the program:</u>

1. Clearly differentiate tracks through distinct program outcomes and reduce the number of degree tracks.
2. Encourage faculty participation in the Quality Enhancement Plan and Understanding Our Students, Understanding Their World (if funded) to better retain our students and address their aspirations.
3. Promote faculty research that engages undergraduates in research experience and draws new recruits into the program and motivates the students we have. This will be addressed in a proposed faculty workload policy.

<u>Include timetable for program changes</u>

1. Initiate a discussion of curriculum changes in August 2016, with the hope of implementing changes in fall 2017, and in time to be reflected in new faculty hiring priorities.
2. Submit a faculty workload policy by September 1, 2016.

IV B. Summary of Program Improvement Plan

Summary of recommendations previously made in this report and the timeline for change:

Action	Timetable
1. Increase full time instructional capacity by hiring new faculty.	Search during 2016-2017 for positions starting in August 2017.
2. As merit raises become available, we will reward faculty who incorporate high impact instructional practices.	Begin in spring 2016, or as soon as funds are available.
3. Prioritize the employment of new faculty who are representative of our student body.	Search during 2016-2017 for positions starting in August 2017.
4. Faculty who teach Probability and Mathematical Statistics will be asked to review course expectations and agree on a consistent set of expectations.	Discuss in fall 2016 for implementation by fall 2017.
5. Encourage faculty to participate in upcoming initiatives to provide meaningful engagement of our students. (QEP and Understanding Our Students, Understanding Their World).	Communicate this priority in spring 2016 and begin recognition as a "plus factor" in reviews of faculty performance for 2016.
6. Adapt the program curriculum to promote engagement in research projects by students not necessarily in the Honors Program.	Discuss in fall 2016 for implementation by fall 2017.
7. Create department policies that incentivize faculty to engage students in their research.	Discuss curriculum changes in fall 2016 for implementation in fall 2017. Propose a suitable department workload policy by January 2017.
8. Incentivize broader faculty participation in program review and assessment.	Address through department workload policy and Standards of Excellence adjustments by January 2017.
9. Encourage the faculty to develop a departmental plan to include suitable uses of technology by all students in the program.	Discuss in fall 2016.
10. Incentivize faculty to work through the new Quality Enhancement Plan to incorporate more interdisciplinary experiences for our students.	Communicate this priority in spring 2016 and begin recognition as a "plus factor" in reviews of faculty performance for 2016.
11. Encourage program faculty to teach in the summer Study Abroad Program and encourage our students to participate.	Encourage faculty to apply for the Oxford Faculty Development Workshop in May 2016 (if it is available), anticipating a summer 2017 course offering.
12. Identify program outcomes that distinguish the goals of the different mathematics tracks and reduce the number of available tracks.	Discuss in fall 2016.
13. To encourage collaborative learning environments in core courses, reduce enrollments caps to 32.	To be phased in starting in 2016-2017, if approved, and broadened as resources allow.
14. Investigate lighting improvements and noise insulation in room 200 University Hall.	Summer 2016, or when funding approved.
15. University Hall 024 should be taken out of	Effective fall 2016, or as soon as

Action	Timetable
the list of classrooms available in the optimizing software and used only as a last resort.	approved.
16. Courses in which computer use is deemed to be a priority, we may need to cap enrollments at 30.	To be phased in starting in 2016-2017, if approved, and broadened as resources allow.

Address any new or reallocated resources required to implement improvement plan:

Seven of the above-listed actions (1, 2, 11, 13, 14, 15, and 16) have resource implications. Hiring additional faculty will be essential to reduce our reliance on part time faculty and foster collaborative learning environments through lower enrollment caps in core courses; these will pay dividends through improved retention rates – not just for Mathematics, but for all undergraduate programs. The Mathematics faculty is a hard-working, dedicated group of people that works very hard for its students because we care about them. However, it has often been said that you get the kind of behavior you incent. If we want faculty to take on new pedagogies and initiatives, it will help to identify resources that reward them for their efforts. Finally, the modifications proposed for room 200 University Hall won't cost a great deal but they will do a lot to improve the learning environment in a heavily utilized room.

Appendix I. Alumni Survey Results

1. In which year did you graduate?

#	Answer		Response	%
1	2008		1	11%
2	2009		0	0%
3	2010		1	11%
4	2011		2	22%
5	2012		2	22%
6	2013		1	11%
7	2014		1	11%
8	2015		1	11%
	Total		9	100%

Statistic	Value
Min Value	1
Max Value	8
Mean	4.78
Variance	4.44
Standard Deviation	2.11
Total Responses	9

2. Which degree did you complete at CSU?

#	Answer		Response	%
1	B.A. Mathematics		0	0%
2	B.S. Mathematics		4	44%
3	B.S. Mathematics and Secondary Education		2	22%
4	B.S. Mathematics - Applied Math Concentration		3	33%
	Total		9	100%

Statistic	Value
Min Value	2
Max Value	4
Mean	2.89
Variance	0.86
Standard Deviation	0.93
Total Responses	9

3. When you decided on a math major at CSU, what was your career goal?

Text Response
Complete my degree
High school math teacher
Actuary
Not sure
To become an Actuary
engineering
I transferred in as a math major
At the time, I selected mathematics because it was my strongest core subject. I added in the education portion because education seemed a safe, guaranteed job after school until I could figure out what else to do with my life.
job

Statistic	Value
Total Responses	9

4. How well did the CSU mathematics program meet your expectation for preparing for your career goal?

#	Answer		Response	%
1	Exceeded my expectations		1	11%
2	Met my expectations fully		3	33%
3	Met most, but not all, of my expectations		4	44%
4	Fell somewhat short of my expectations		0	0%
5	Far below my expectations		1	11%
6	I had no expectation that the program would prepare me to meet my career goals		0	0%
	Total		9	100%

Statistic	Value
Min Value	1
Max Value	5
Mean	2.67
Variance	1.25
Standard Deviation	1.12
Total Responses	9

5. What do you consider to be the primary strengths of the CSU mathematics program?

Text Response
The professors
Faculty
Faculty interaction with the students.
Diverse classes that make up a well rounded degree
Small classes and engaging professors
the small class sizes allows more personalized help if needed
The professors are extremely knowledgeable in their content knowledge. I felt confident in learning from them as they clearly knew more in the content than as needed.
Good Faculty

Statistic	Value
Total Responses	8

6. What changes would you suggest to improve the mathematics program at CSU?

Text Response
Add graduate degrees in mathematics
More classes
The faculty needs to push the students who have a given goal. This requires the faculty to be up to date on the professional world as well as take time to invest in students' lives. This is difficult, and it doesn't need to be for each student but I think it would be helpful to some. Additionally, they should find ways to encourage social activities amongst the students and have more challenging curriculum. I believe the two (enhanced camaraderie and more difficulty) will work together.
More statistics and quantitative analytics! I would love to see a masters program in statistics include softwares such as matlab
As of late rumors have been swirling among alumni that to program is easing up in terms of difficulty. I firmly believe the difficulty level should stay where it was at during my time. I don't feel that undergraduates should be given an easier pass just because they didn't put the same amount of effort into the program. College should not be a "everyone gets a trophy" experience. Instead, everyone should be putting forth the effort and proving their worth of the degrees that they attempt to achieve. Society can only achieve greatness through productive struggle toward goals, and if we as an education system continue to allow "slack" and cave in to those who complain about it "being too hard" then we are destroying ourselves internally. No, again I insist that the programs remain true to design. Instead of making things easier, perhaps change how instruction is implemented. Educators on all levels focus a lot on direct instruction. I fully understand that there is a time and place. I also understand that sometimes certain content just has no other way than direct instruction. But we should strive to implement other teaching strategies than the standard "Here's the notes, go study three hours, then Thursday we have a quiz. Have a good day." Not that it happens exactly like that at CSU (again, I enjoyed my time in the program and learned a lot) but we unfortunately have to redesign instruction to meet the needs of the current generation, without "dumbing down" the content. This is not an easy task and I won't pretend to have the solution. I merely am stating (probably the obivious) that if change is coming, we (as educators, college and others) need to be ready for it without watering down the expectations of undergraduates (and graduates!).
Need To Stress Job Opportunities More

Statistic	Value
Total Responses	7

7. Please rate your overall impression of the quality of instruction in the CSU mathematics program.

#	Answer		Response	%
1	Excellent		1	11%
2	Very Good		6	67%
3	Good		2	22%
4	Fair		0	0%
5	Poor		0	0%
	Total		9	100%

Statistic	Value
Min Value	1
Max Value	3
Mean	2.11
Variance	0.36
Standard Deviation	0.60
Total Responses	9

8. Please rate your overall impression of the mathematics curriculum at CSU.

#	Answer		Response	%
1	Excellent		1	11%
2	Very Good		5	56%
3	Good		2	22%
4	Fair		1	11%
5	Poor		0	0%
	Total		9	100%

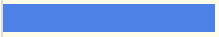
Statistic	Value
Min Value	1
Max Value	4
Mean	2.33
Variance	0.75
Standard Deviation	0.87
Total Responses	9

9. Please rate your satisfaction with the extra curricular activities available to you as a student at CSU.

#	Answer		Response	%
1	5 Extremely satisifed		1	11%
2	4 Satisfied		5	56%
3	3 Somewhat satisfied		2	22%
4	2 Somewhat dissatisfied		0	0%
5	1 Very dissatisfied		0	0%
6	0 No opinion		1	11%
	Total		9	100%

Statistic	Value
Min Value	1
Max Value	6
Mean	2.56
Variance	2.03
Standard Deviation	1.42
Total Responses	9

10. Please rate your feelings about maintaining connections with the CSU mathematics program now that you have graduated.

#	Answer		Response	%
1	Extremely interested		4	44%
2	Interested		4	44%
3	Not interested		1	11%
	Total		9	100%

Statistic	Value
Min Value	1
Max Value	3
Mean	1.67
Variance	0.50
Standard Deviation	0.71
Total Responses	9

11. Please share any additional comments to share about the CSU mathematics program.

Text Response
It would be nice if there were more emphasis on the math program outside of just teaching or the education tract and more classes offered in statistical analysis
To the department, I hope all of you have been well!

Statistic	Value
Total Responses	2

Appendix II. UTeach Program Feedback

UTeach Columbus provides Columbus State University's undergraduates a program leading to secondary teaching certification in STEM subject areas (biology, chemistry, earth and space science, and mathematics). Since Secondary Education majors comprise the single largest concentration among all mathematics majors, the UTeach Columbus Program is a primary stakeholder in the mathematics program. On November 5, 2015 Dr. Howard interviewed program directors and faculty and posed the following questions. Responses follow each item.

How well is the Mathematics Program preparing students with the content knowledge they need to be effective high school teachers?

- Cooperating teachers who work with our student teachers report that our students are very knowledgeable about the content.
- To complete certification requirements in secondary mathematics, candidates must pass two mathematics content tests, the Georgia Assessments for the Certification of Educators (GACE) Mathematics Test I and Mathematics Test II. Averages among CSU test takers have exceeded state averages in all content areas for the past two years, 2013-2014 and 2014-2015.

What do you consider to be the primary strengths of the CSU mathematics program?

- The inclusion of a course with an inquiry based emphasis – Functions and Modeling.
- The program is good to work with on course scheduling matters. They are proactive about handling issues and looking for potential solutions.

What changes would you suggest to improve the mathematics program at CSU?

- There is a strong culture of direct instruction in K-12 schools that our student teachers and future teachers need to overcome. This culture is very difficult to change due to the dominance of direct instruction approaches in the coursework they encounter at the university. Currently their exposure to engaged and inquiry driven instruction is likely to be limited to a handful of courses (e.g. UTCH 3115, UTCH 3205, and UTCH 4205); adopting alternative teaching approaches in some MATH courses would be helpful in changing the culture.
- Include open ended problem solving, inquiry based learning, technology, and projects in more mathematics courses. High school teachers are expected to use 21st Century tools and approaches in problem solving. Technology use is expected in high school and often not allowed in the university. (There is a disconnect between the high school expectations and university expectations).
- Find more ways to help pre-service teachers see connections between their upper level mathematics courses and the high school content they are expected to know and teach.

Please rate your overall impression of the mathematics curriculum at CSU.

- Many of the students in the program don't seem ready to transfer the mathematical theory to applications.

Please share any additional comments to share about the CSU mathematics program.

- The Muscogee County School District is constantly requesting our graduates.
- All current student teachers already have job offers.
- There seems to be some inconsistency in course expectations depending on the instructor (e.g. probability and mathematical statistics).
- Would like to see more active interest by mathematics faculty in math education. Some math faculty members appear to be actively discouraging students from secondary education, telling them "you're better than this".
- It appears that some math advisors have been giving inaccurate information to advisees, telling them it takes longer to complete the UTeach program than it takes to complete a math major.

Appendix III. Senior Math Majors Survey

1. How satisfied are you that your mathematics coursework at CSU led you to develop an understanding of calculus and an ability to use calculus in applications?

#	Answer		Response	%
1	Very Dissatisfied		0	0%
2	Dissatisfied		0	0%
3	Neutral		2	29%
4	Satisfied		4	57%
5	Very Satisfied		1	14%
	Total		7	100%

Statistic	Value
Min Value	3
Max Value	5
Mean	3.86
Variance	0.48
Standard Deviation	0.69
Total Responses	7

2. How satisfied are you that your mathematics coursework at CSU led you to develop knowledge of algebraic structures?

#	Answer		Response	%
1	Very Dissatisfied		0	0%
2	Dissatisfied		0	0%
3	Neutral		2	29%
4	Satisfied		4	57%
5	Very Satisfied		1	14%
	Total		7	100%

Statistic	Value
Min Value	3
Max Value	5
Mean	3.86
Variance	0.48
Standard Deviation	0.69
Total Responses	7

3. How satisfied are you that your mathematics coursework at CSU led you to develop knowledge of the real numbers, functions, the topological properties of R, differentiation, and integration?

#	Answer		Response	%
1	Very Dissatisfied		0	0%
2	Dissatisfied		0	0%
3	Neutral		2	29%
4	Satisfied		4	57%
5	Very Satisfied		1	14%
	Total		7	100%

Statistic	Value
Min Value	3
Max Value	5
Mean	3.86
Variance	0.48
Standard Deviation	0.69
Total Responses	7

4. How satisfied are you that your mathematics coursework at CSU led you to develop knowledge of and the ability to apply probability density functions?

#	Answer		Response	%
1	Very Dissatisfied		1	14%
2	Dissatisfied		1	14%
3	Neutral		1	14%
4	Satisfied		3	43%
5	Very Satisfied		1	14%
	Total		7	100%

Statistic	Value
Min Value	1
Max Value	5
Mean	3.29
Variance	1.90
Standard Deviation	1.38
Total Responses	7

5. How satisfied are you that your mathematics coursework at CSU led you to develop knowledge of appropriate mathematical models?

#	Answer		Response	%
1	Very Dissatisfied		0	0%
2	Dissatisfied		0	0%
3	Neutral		6	86%
4	Satisfied		1	14%
5	Very Satisfied		0	0%
	Total		7	100%

Statistic	Value
Min Value	3
Max Value	4
Mean	3.14
Variance	0.14
Standard Deviation	0.38
Total Responses	7

6. How satisfied are you that your mathematics coursework at CSU led you to develop the ability to think critically?

#	Answer		Response	%
1	Very Dissatisfied		0	0%
2	Dissatisfied		0	0%
3	Neutral		2	29%
4	Satisfied		2	29%
5	Very Satisfied		3	43%
	Total		7	100%

Statistic	Value
Min Value	3
Max Value	5
Mean	4.14
Variance	0.81
Standard Deviation	0.90
Total Responses	7

7. How satisfied are you that your mathematics coursework at CSU led you to develop the ability to understand mathematical arguments and to construct mathematical proofs?

#	Answer		Response	%
1	Very Dissatisfied		0	0%
2	Dissatisfied		1	14%
3	Neutral		3	43%
4	Satisfied		3	43%
5	Very Satisfied		0	0%
	Total		7	100%

Statistic	Value
Min Value	2
Max Value	4
Mean	3.29
Variance	0.57
Standard Deviation	0.76
Total Responses	7

8. How satisfied are you that your mathematics coursework at CSU led you to develop communication skills to acquire, develop, and convey mathematical knowledge?

#	Answer		Response	%
1	Very Dissatisfied		0	0%
2	Dissatisfied		0	0%
3	Neutral		3	43%
4	Satisfied		4	57%
5	Very Satisfied		0	0%
	Total		7	100%

Statistic	Value
Min Value	3
Max Value	4
Mean	3.57
Variance	0.29
Standard Deviation	0.53
Total Responses	7

9. The instructors at CSU prepare well for the math/statistics courses they teach.

#	Answer		Response	%
1	Strongly disagree		0	0%
2	Disagree		0	0%
3	Neither Agree nor Disagree		0	0%
4	Agree		4	57%
5	Strongly Agree		3	43%
	Total		7	100%

Statistic	Value
Min Value	4
Max Value	5
Mean	4.43
Variance	0.29
Standard Deviation	0.53
Total Responses	7

10. CSU math/statistics instructors provide understandable explanations in class.

#	Answer		Response	%
1	Strongly disagree		0	0%
2	Disagree		1	14%
4	Neither Agree nor Disagree		0	0%
5	Agree		5	71%
6	Strongly Agree		1	14%
	Total		7	100%

Statistic	Value
Min Value	2
Max Value	6
Mean	4.71
Variance	1.57
Standard Deviation	1.25
Total Responses	7

11. CSU math/statistics instructors listen carefully to my questions and comments.

#	Answer		Response	%
1	Strongly disagree		0	0%
2	Disagree		0	0%
3	Neither Agree nor Disagree		2	29%
4	Agree		3	43%
5	Strongly Agree		2	29%
	Total		7	100%

Statistic	Value
Min Value	3
Max Value	5
Mean	4.00
Variance	0.67
Standard Deviation	0.82
Total Responses	7

12. CSU math/statistics instructors allow enough time for me to understand difficult ideas.

#	Answer		Response	%
1	Strongly disagree		0	0%
2	Disagree		2	29%
3	Neither Agree nor Disagree		4	57%
4	Agree		0	0%
5	Strongly Agree		1	14%
	Total		7	100%

Statistic	Value
Min Value	2
Max Value	5
Mean	3.00
Variance	1.00
Standard Deviation	1.00
Total Responses	7

13. CSU math/statistics instructors make me feel comfortable asking questions during class.

#	Answer		Response	%
1	Strongly disagree		0	0%
2	Disagree		1	14%
3	Neither Agree nor Disagree		1	14%
4	Agree		4	57%
5	Strongly Agree		1	14%
	Total		7	100%

Statistic	Value
Min Value	2
Max Value	5
Mean	3.71
Variance	0.90
Standard Deviation	0.95
Total Responses	7

14. CSU math/statistics instructors make class interesting.

#	Answer		Response	%
1	Strongly disagree		0	0%
2	Disagree		0	0%
3	Neither Agree nor Disagree		1	14%
4	Agree		5	71%
5	Strongly Agree		1	14%
	Total		7	100%

Statistic	Value
Min Value	3
Max Value	5
Mean	4.00
Variance	0.33
Standard Deviation	0.58
Total Responses	7

15. CSU math/statistics instructors ask questions in class to determine whether I understand what is being discussed.

#	Answer		Response	%
1	Strongly disagree		0	0%
2	Disagree		0	0%
3	Neither Agree nor Disagree		0	0%
4	Agree		7	100%
5	Strongly Agree		0	0%
	Total		7	100%

Statistic	Value
Min Value	4
Max Value	4
Mean	4.00
Variance	0.00
Standard Deviation	0.00
Total Responses	7

16. CSU math/statistics course exams and other graded assessments were good assessments of what I learned in the courses.

#	Answer		Response	%
1	Strongly disagree		0	0%
2	Disagree		0	0%
3	Neither Agree nor Disagree		1	14%
4	Agree		5	71%
5	Strongly Agree		1	14%
	Total		7	100%

Statistic	Value
Min Value	3
Max Value	5
Mean	4.00
Variance	0.33
Standard Deviation	0.58
Total Responses	7

17. My math/statistics instructors at CSU effectively prepared me to meet expectations for my performance in the courses.

#	Answer		Response	%
1	Strongly disagree		0	0%
2	Disagree		1	14%
3	Neither Agree nor Disagree		3	43%
4	Agree		2	29%
5	Strongly Agree		1	14%
	Total		7	100%

Statistic	Value
Min Value	2
Max Value	5
Mean	3.43
Variance	0.95
Standard Deviation	0.98
Total Responses	7

18. Please use the space below to elaborate on the previous responses or share any additional comments regarding the quality of instruction you received in your math and statistics courses at CSU.

Text Response
some instructors have been very helpful and others have not. Stevens and Linton were by far the best for my upper level math courses and Stancu was a great teacher for Calc III.
I have only taken a few classes at CSU. That's why most answers were neutural
I know that during a class session, I can't use up the time to have the professor answer confusions I have. However, some of my professors made it comfortable for me to go to their office to discuss my issues that I have. I feel that should be with all my professors and hope that I can succeed in this program. Math is a struggle for me to get at first, so a comfortable and good relationship with my professors is very important to me.
Most Instructors are good at explaining a concept and then asking on a quiz or test whether we can repeat what we have learned. other instructors,possibly just 1 or 2, think that since they've explained the concept we should know every twist and turn that the concept can bring up. They'll throw broad questions that sometimes don't make it clear what formula or concept im supposed to be using. I need to see on the test or quiz that i fully understand the basic concept. if you only teach me 1 + 1 = 2, on the test i don't want to see, whats -5+ 200/5 =? let me make sure i understand the basics before you throw twists and turns into it. im not as smart as you. just because i learned the concept yesterday doesn't mean i know every possible way to describe it.

Statistic	Value
Total Responses	4

19. Please describe any aspects of the CSU mathematics program that have been especially strong or positive.

Text Response
Stevens does a great job of teaching Statistics and the Calc classes did a great job of giving me a solid foundation
All the professors I have had go beyond by offering office hours. If I have ever needed extra help, I know I could get it outside the classroom.
I really gain confidence when I work out difficult problems in class. I feel that should be encouraged in all math classes.
good instructors lead to good results.

Statistic	Value
Total Responses	4

20. Please describe any aspects of the CSU mathematics program that have disappointed you.

Text Response
Not offering classes consistently enough. I have been having to delay my graduation because I did not come in on the 2 year track
I really wish there were more statistics options. I feel as if I have had to take many pure math courses in which I have almost no interest, which makes it hard to stay motivated and make good grades.
Sometimes a book is helpful, especially in calculus. If my professor gave us extra practice after teaching me something new, I expect extra practice. I had an issue with that in one of my math classes. Even though I passes the course, the struggle was that my professor didn't give enough practice. I seeked out practice on my own, however, at the end, I was disappointed.
I have been lazy in my work and many classes i have no excuse for having to retake. but due to some instructors it wouldnt have mattered if i studied 24/7 i would still have failed. and its interesting how i can take the same class with a different instructor and do perfectly fine.

Statistic	Value
Total Responses	4

21. Please rate the extent to which you have come to feel like you "belong" in the mathematics program.

#	Answer		Response	%
1	Very strong sense of belonging		0	0%
2	Feel somewhat like I belong		4	57%
3	Feel somewhat like I do not belong		2	29%
4	Feel very much like I do not belong		0	0%
5	No opinion		1	14%
	Total		7	100%

Statistic	Value
Min Value	2
Max Value	5
Mean	2.71
Variance	1.24
Standard Deviation	1.11
Total Responses	7

22. Please describe what has made you feel like you do, or do not belong, and offer any suggestions that could improve that sense of belonging.

Text Response
The professors' kindness and reassurance definitely has helped my sense of belonging. Even when I'm struggling with a topic, the professors are understanding and instead of making me feel dumb, they help me grasp the content better. To improve belonging, I think something could be done where juniors and seniors in the program could meet up with the underclassmen in the program. It would be beneficial for freshmen to see students that have studied what they are studying/are about to study. It would also get the two connected. In my case, I may know one or two underclassmen in the math program. I know there is a math club, but perhaps some kind of social gatherings could be held where math people get together and just have a good time. Perhaps like a meetup for dinner or a board game night.
Struggle through calculus 2
I hated math. So trying to learn to love it is still a challenge. I joined math club, and that sparked my interest more. I still feel average within the program because it's a struggle for me to learn new things. I think once I start tutoring math, I think I'll get more better.
I Love MAth.

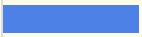
Statistic	Value
Total Responses	4

23. Please describe any reasons of which you are aware that have caused students majoring in math to switch to a non-math major or to leave CSU altogether.

Text Response
i am not aware of any, why would you leave Math???
Struggle of passing math classes. Not enough classes offered in spring and fall to result in a fast pace study plan.
Again, math is a challenge and a student may get discouraged and even receiving help still may not get the concepts, so they can't get the problem. I felt that way many times. And a student don't want to fall behind and fail, so the student may leave and try something new. Switching to math, for me, was a hard decision I faced. I hope that I excell and be able to encourage those that struggle so I can say I understand the struggle.
certain instructors.

Statistic	Value
Total Responses	4

24. Which of the following best describes what you wish to do immediately after graduating with a bachelor's degree in mathematics?

#	Answer		Response	%
1	Attend graduate school in math or statistics		2	29%
2	Attend graduate school in another area (please specify)		0	0%
3	Teach math in middle school or high school		1	14%
4	Become an actuary		3	43%
5	Other (please specify)		1	14%
6	None of these is applicable for me because I am changing my major		0	0%
	Total		7	100%

Attend graduate school in another area (please specify)	Other (please specify)

Statistic	Value
Min Value	1
Max Value	5
Mean	3.14
Variance	2.48
Standard Deviation	1.57
Total Responses	7

25. Do you feel that your experiences with the CSU mathematics program are preparing you for your chosen career / graduate studies? (Use the text space to add any comments to clarify).

#	Answer		Response	%
1	Yes		5	71%
2	No		2	29%
	Total		7	100%

Yes	No
I am recieving teaching experience that will benefit me.	I knew I wanted to do something with statistics after graduating. I feel as if there are gaps missing in my statistics knowledge and am worried that this will show when attending graduate school.
Learning all the different carriers is rewarding	

Statistic	Value
Min Value	1
Max Value	2
Mean	1.29
Variance	0.24
Standard Deviation	0.49
Total Responses	7

26. Please share any additional comments you have about the mathematics programs at CSU.

Text Response
Its been great but I am ready to graduate!
Na

Statistic	Value
Total Responses	2

Appendix IV. Student Research in Mathematics

Mathematics Student Research, Fall 2012-Spring 2016

Department Faculty Member(s)	Student(s)	Dates	Description
Howard, Tim	Sharitt, Harrison	2015-2016	Honors thesis advisor for Harrison Sharitt - An analysis of the impact of the 2014-2015 peer leader program on student performance. Committee members Kimberly Shaw and Cindy Ticknor.
Fan, Guihong	Rohly, Michael	2015	Mentored Michael Rohly in math/bio research. Helped him get a summer REU.
Howard, Tim	Mathis, Leigh Ann (graduate student)	2015	Cindy Ticknor, Debbie Gober, and Kim Shaw collaborated in a research project that related in the submission of the article "The Influence of the CSU Robert Noyce Teacher Scholarship Program on Undergraduates' Teaching Plans" to Journal of Science Teacher Education
Ionascu, Eugen	Parsons, Kayla	2015	Honors contract in College Geometry
Ionascu, Eugen	Apple, Kimberly	2015	Honors contract in College Geometry
Linton, Ron	Corning, Cherie	2015	Honors thesis involving programming and cryptography
Stancu, Alin	Hernandez, Aurelio	2014	"A note on some Pi Mu Epsilon Problems" published in Pi Mu Epsilon Journal
Fan, Guihong	Pitts, Jamirian	2013-2014	Mentored Jamirian Pitts on a project "The Effects of Type II Diabetes on Prostate Cancer: Data Analysis and Modeling Study"

Appendix V. Faculty Publications, Presentations, Grants Awarded, and Grants Proposed

Faculty Publications Since 2012

1. Bhandary, Madhusudan and Gupta, Arjun K. (2015) "Test for the Equality of Partial Correlation Coefficients for Two Populations," Journal of Modern Applied Statistical Methods: Vol. 14: Iss. 1, Article 10.
2. Almada, Carlos. (2013) "Decay Rates for the Shifted Wave Equation on a Symmetric Space of Noncompact Type". Journal of Hyperbolic Differential Equations, Vol. 10 No. 4, 677-701.
3. Andrica, D., & Ionascu, E. J. (2014). On the number of polynomials with coefficients in [n]. Analele Universitatii" Ovidius" Constanta-Seria Matematica, 22(1), 13-23.
4. Andrica, D., & Ionascu, E. J. (2014). Some Unexpected Connections Between Analysis and Combinatorics. In Mathematics Without Boundaries (pp. 1-19). Springer New York.
5. Bansal, N. K., Bhandary, M., & Fujiwara, K. (2013). Bayes estimation of intraclass correlation coefficients under unequal family sizes. Communications in Statistics-Simulation and Computation, 42(2), 294-302.
6. Barnes, G., Levi, I. (2014). Labeling Hamiltonian Cycles of the Johnson Graph. Journal of Combinatorial Mathematics and Combinatorial Computing, 90, 223-246.
7. Bhandary, M., & Dai, H. (2013). An alternative test for the equality of variances for several populations in randomised complete block design. Statistical Methodology, 11, 22-35.
8. Bhandary, M., & Fujiwara, K. (2013). Test for Intraclass Correlation Coefficient under Unequal Family Sizes. Journal of Modern Applied Statistical Methods, 12(2), 9.
9. Bhandary, M., & Fujiwara, K. (2014). An Alternative Test for the Equality of Intraclass Correlation Coefficients under Unequal Family Sizes for Several Populations. Journal of Modern Applied Statistical Methods, 13(1), 4.
10. Catarino, P., Higgins, P., & Levi, I. (2015). On inverse subsemigroups of the semigroup of orientation-preserving or orientation-reversing transformations. Algebra and Discrete Mathematics, 19 (2), 162-171.
11. Dai, H., Bhandary, M., Becker, M., Leeder, J. S., Gaedigk, R., & Motsinger-Reif, A. A. (2012). Global tests of p-values for multifactor dimensionality reduction models in selection of optimal number of target genes. BioData mining, 5(1), 1-17.
12. Dai, H., Charnigo, R., Vyhlidal, C. A., Jones, B. L., & Bhandary, M. (2013). Mixed modeling and sample size calculations for identifying housekeeping genes. Statistics in medicine, 32(18), 3115-3125.
13. Deliu, A., & Deng, B. (2015). On progressive functions. Journal of Mathematical Analysis and Applications, 423(1), 336-357.
14. Dieu, B. X., Siegmund, S., & Van Minh, N. (2015). A Katznelson–Tzafriri Type Theorem for Almost Periodic Linear Evolution Equations. Vietnam Journal of Mathematics, 43(2), 403-415.
15. Fan, G., Lou, Y., Thieme, H. R., & Wu, J. (2014). Stability and persistence in ODE models for populations with many stages. Math Biosci Engin (to appear).
16. Fan, G., Thieme, H. R., & Zhu, H. (2014). Delay differential systems for tick population dynamics. Journal of mathematical biology, 1-32.
17. Fan, G., Thieme, H. R., & Zhu, H. (2015). Delay differential systems for tick population dynamics. Journal of mathematical biology, 71(5), 1017-1048.
18. Garrett, L., Levi, I., Chahine, I. (2014). The Technology Dichotomy: Computer Aided Instruction versus Conceptual Development Technology. MathAMATYC Educator, 5 (2), p.18-25.
19. Hernandez, A. & Stancu,A. (2014). A note on some Pi Mu Epsilon Problems. Pi Mu Epsilon Journal.
20. Ionascu, E. I. (2012). Regular octahedra in {0, 1,..., n}^3. Fasciculi Mathematici, (48), 49-59.

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30. Linton, K. A., & Linton, R. C. (2015). Unions of Dominant Chains of Pairwise Disjoint, Completely Isolated Subsemigroups. Palestine Journal of Mathematics. (40, Spec. 1), 490-495.
31. Matsunaga, H., Murakami, S., Nagabuchi, Y., & Van Minh, N. (2015). Center Manifold Theorem and Stability for Integral Equations with Infinite Delay. Funkcialaj Ekvacioj, 58(1), 87-134.
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34. Shaw, K. A., Ticknor, C., & Howard, T. (2013). The Effect of Peer Leader Instruction on Introductory University Science and Mathematics Course Performance: Preliminary Results. Perspectives in Learning, 14(1), 20-27.
35. Staic, M. D., & Stancu, A. (2015). Operations on the Secondary Hochschild Cohomology. Homology, Homotopy & Applications, 17(1).
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38. Stephens, R. & Ionascu, E.J. (2013). Estimations of the Rate of Interest for an Annuity Certain. Journal of Financial and Economic Practice, 13, 84-97.
39. Ticknor, C. S., Shaw, K. A., & Howard, T. (2014). Assessing the Impact of Tutorial Services. Journal of College Reading and Learning, 45(1), 52-66.
40. Trivedi, N. D., Shukla, N. J., & Shah, N. H. (2014) Inventory Model for Deteriorating Items with Fixed Life under Quadratic Demand and Nonlinear Holding Cost. International Journal of Engineering and Innovative Technology.
41. Xiao, Y., Liu, J., & Bhandary, M. (2012). Resampling approaches for common intraclass correlation coefficients. Journal of Statistical Computation and Simulation, 82(9), 1357-1366.
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Faculty Presentations Since 2012

1. Bhandary, M. Poisson Regression and Application in Biology and Medicine. Columbus State University, Math Department Seminar. Nov. 2013.
2. Bhandary, M. Journey into Academics. Columbus State University Rite of Passage Lecture, Columbus, GA.Nov. 2012.
3. Fan, G. Oscillation and driving mechanism in a model of West Nile Virus with time delay. AMS sectional meeting in Univ. of Alabama, Huntsville, AL. Mar. 2015.
4. Fan, G. Persistence and Stability in Population Dynamics of Ticks Transmitting Lyme Disease. SIAM Conference on the Life Sciences, Charlotte, NC. Aug. 2014.
5. Fan, G. Predator-prey models with time delay in the conversion. 10th AIMS Conference on Dynamical Systems, Differential Equations and Applications, Madrid, Spain. July 2014.
6. Fan, G. The Bifurcation Study of 1:2 Resonance in a Delayed System of Two Coupled Neurons. 2014 CMS Winter Meeting, Hamilton, Ontario. Dec. 2014.
7. Fan, G. A differential delay model for ticks. 2013 CMS Winter meeting, Ottawa, ON. Dec. 2013.
8. Fan, G. Oscillation and driving mechanism in vector-borne disease models with time delay. Mini-Symposium on Models and Methods in ecology and epidemiology, Nanjing, China. June 2013.
9. Fan, G. Persistence and global stability in population dynamics of ticks. The Fourth Conference on Computational and Mathematical Population Dynamics (CMPD4), Taiyuan, China. May 2013.
10. Fan, G. Modeling the transmission dynamics of vector-borne diseases. Everything disperse to Miami: The role of movement and dispersal in spatial ecology, epiodemiology and environmental science, University of Miami, Miami. Dec. 2012.
11. Fan, G. Modeling vector-borne diseases with discrete time delay. 2012 Annual Meeting of the Canadian Applied and Industrial Mathematics Society, Fields Institute, Toronto. June 2012.
12. Hassani., H. & Shoemaker, M. The Factors and Results of a Mathematical Learning Community for First-Year Seminar Students. SoTL Commons Conference, Savannah, GA. Mar. 2014.
13. Howard, T., Shaw, K., Gober, D., & Ticknor, C. Examining the Influence of Internships on Teacher Recruitment. Poster presented at the Georgia Scholarship of STEM Teaching & Learning Conference, Statesboro, GA. Mar. 2015.
14. Shaw, K., Howard, T., & Ticknor, C. Comparison of Success Rates for Peer Instruction and Drop In Tutoring. Poster presented at the Georgia Scholarship of STEM Teaching & Learning Conference, Statesboro, GA. Mar. 2015.
15. Mathis, L., Ticknor, C., Gober, D., Howard, T., & Shaw, K. Investigating the Influence of the CSU Robert Noyce Teacher Scholarship Program on College Students' Teaching Plans. Poster presented at the Georgia Scholarship of STEM Teaching & Learning Conference, Statesboro, GA. Mar. 2015.
16. Howard, T. & Jones, K.Deepening Understanding of Functions. Featured Presentation, Georgia Mathematics Conference, Rock Eagle, GA. Oct. 2014.
17. Howard, T. & Shaw, K. CSU STEM-II Initiative Update. Georgia Scholarship of STEM Teaching & Learning Conference, Statesboro, GA. Mar. 2012.
18. Howard, T., & Edgar, K. STEM Honors Summer Camp: Recruiting Scholars, Stoking High Schoolers' Enthusiasm. Workshop presented at the NSF Robert Noyce Teacher Scholarship Program Conference, Washington, D.C. June 2014.
19. Howard, T., Gober, D., Shaw, K. & Ticknor, C. Columbus Region Academy of Future Teachers of STEM (CRAFT-STEM), Year 3 Update. Poster presented at the NSF Robert Noyce Teacher Scholarship Program Conference, Washington, D.C. June 2014.
20. Gober, D., Howard, T., Shaw, K. & Ticknor, C. Leveraging Summer Internships to Recruit Teachers, Mentoring for Confidence and Success. Poster presented at the Southeast Regional Noyce Conference, Greenville, South Carolina. Mar. 2014.

21. Howard, T., Shaw, K., & Ticknor, C. Outgrowths of USG STEM Initiatives: Service Learning Courses and a STEM Honors Camp. Poster presented at the Georgia Scholarship of STEM Teaching and Learning Conference, Statesboro, Georgia. Mar. 2014.
22. Howard, T., Gober, D., Shaw, K. & Ticknor, C. Columbus Region Academy of Future Teachers of STEM. Poster presented at the Joint Mathematics Meetings, Baltimore, Maryland. Jan. 2014.
23. Howard, T., Gober, D., Shaw, K. & Ticknor, C. Columbus Region Academy of Future Teachers of STEM (CRAFT-STEM). Poster presented at the NSF Robert Noyce Teacher Scholarship Program Conference, Washington, D.C. May 2013.
24. Howard, T., Shaw, K., & Ticknor, C. STEM and Branches: Update on the Columbus State University STEM-II Initiative. Poster presented at the Georgia Scholarship of STEM Teaching and Learning Conference, Statesboro, Georgia. Mar. 2013.
25. Howard, T., Ticknor, C., Gober, D. & Shaw, K. Columbus Region Academy of Future Teachers of STEM (CRAFT-STEM). Poster presented at the NSF Robert Noyce Teacher Scholarship Program Conference, Washington, D.C. May 2012.
26. Howard, T., Shaw, K., & Ticknor, C. Assessing the Impact of Tutorial Services. Paper presented at the Georgia Scholarship of STEM Teaching and Learning Conference, Statesboro, Georgia. Mar. 2012.
27. Howard, T., & Shaw, K. CSU STEM-II Initiative Update. Poster presented at the Georgia Scholarship of STEM Teaching and Learning Conference, Statesboro, Georgia. Mar. 2012.
28. Howard, T. & Ticknor, C.The needs and expectations of teacher education majors. CSU Mathematics & Philosophy Department Seminar on Teaching and RPG, Columbus, Georgia. Oct. 2012.
29. Ionascu, E. Characterization of equidistant points in Z^4. Integers Conference, University of West GA. Oct. 2013.
30. Ionascu, E. Half domination arrangements in regular and semi-regular tessellation type graphs. 2012 Seventeenth Annual Mathematics Tech. Conference, Valdosta State University. Apr. 2012.
31. Shukla, N. A Comparison of Delivery Methods for Distance Learning Courses. SoTL Commons Conference, Savannah, GA. Mar. 2014.
32. Shukla, N. A Comparison of Delivery Methods for Distance Learning Mathematics Courses. SoTL Commons Conference, Savannah, GA. Mar. 2014.
33. Shukla, N. Redesigning Learning Support for Success, "Is Online Math Remediation Possible?" Learning Support Conference. Macon State University, Macon, GA. Jan. 2013.
34. Stephens, R. Estimating the Rate of Interest for an Ordinary Annuity Certain. Columbus State University, Math Department Seminar. Spring 2014.
35. Fancher, L., Flynn, M., Stephens, R., Watson, E., & Smith, C.T. Next Generation "Textbooks": OERs and Affordable Learning. USG Teaching and Learning Conference on the Best Practices for Promoting Engaged Student Learning. Apr. 2014.
36. Stephens, R. Estimating the Rate of Interest for an Ordinary Annuity Certain, Special Session on Mathematics and Statistics for Economics, and Finance. MAA Southeastern Section 92th Annual Meeting, Winthrop University, Rock Hill, SC. Mar. 2013.
37. Stephens, R. Problem, Solutions, Students and other Anecdotes, Special Session on Teaching and Learning via Problems Sections in Journal. MAA Southeaster Section 92th Annual Meeting, Winthrop University, Rock Hill, NC. Mar. 2013.

Grants Awarded Since 2012

1. Fang, H. & Peppers, D. $46,336. Developing Algebra Readiness. Improving Teacher Quality state grant (middle grades).
2. Fang, H. & Peppers, D. $48,132. Enhancing Mathematics Teaching Practices in Number & Operations. Improving Teacher Quality state grant (elementary).
3. Fang, H. & Peppers, D. $???. Title unavailable. Improving Teacher Quality state grant (elementary).

4. Howard T., Hendricks M., Jones K., Mims N., Peppers D.$51,920. Developing Conceptual Understanding of High School Mathematics. Improving Teacher Quality state grant (secondary).
5. Shaw, K., Howard, T., & Thornton, A. $25,000. Building a Faculty Learning Community to Support Flipped Classroom Pedagogies and Improve Student Learning Outcomes in STEM Classrooms. USG Innovation and Incubator Grant.
6. Howard T., Jones K., Mims N., & Peppers D. $49,688. Functions and Modeling for the GPS. Improving Teacher Quality state grant (secondary).
7. Howad, T., Jones, K., Phillips, H., & Peppers, D. $48,225. Title unavailable. Improving Teacher Quality state grant (middle grades).
8. Howard, T., Gober, D., Shaw, K., & Ticknor, C. $1,196,000. Columbus Region Academy of Future Teachers of STEM. National Science Foundation, Robert Noyce Teacher Scholarship Program.
9. Muse, W., Bentley, Miller, S., E., Peppers, D., Phillips, H., & Wan, A.$49,359. Developing Mathematical Literacy. Improving Teacher Quality state grant (middle grades).
10. Muse, W. $92,000. External proj evaluator for a $1,750,000 DoDEA grant to Muscogee County School District.
11. Stephens, R. & Stancu, A.$10,800. Affordable Learning Georgia Textbook Transformation Grant: Introductory Statistics. USG Affordable Learning Grant.

Other Grants Proposed Since 2012

1. Ticknor, C., Frazier, A., Howard, T., & Shaw, K.$2,800,000. Understanding Our Students, Understanding Their World. National Science Foundation Improving Undergraduate STEM Education. 2016.
2. Ticknor, C., Frazier, A., Howard, T., & Shaw, K.$2,100,000. Project Fusion. National Science Foundation Improving Undergraduate STEM Education. 2015.
3. Ticknor, C., Frazier, A., Howard, T., & Shaw, K.$1,100,000. Project Fusion. National Science Foundation Improving Undergraduate STEM Education. 2014.
4. Stancu, A., & Stephens, R. $10,800. Identifying open resources for calculus. USG Affordable Learning Grant. 2014.
5. Howard, T., Jones, K., Peppers, D., & Phillips, H. $50,217. Title unavailable. 2014-2015 Improving Teacher Quality state grant (middle school). 2013.

Appendix VI. Advising Assessment Survey Results

1. Overall, my advisor(s) have been able to accurately answer all of my questions or refer me to the appropriate person who could.

#	Answer		Response	%
1	Agree		7	64%
2	No opinion		2	18%
3	Disagree		2	18%
	Total		11	100%

Statistic	Value
Min Value	1
Max Value	3
Mean	1.55
Variance	0.67
Standard Deviation	0.82
Total Responses	11

2. The time I have spent with my advisor(s) has been sufficient to discuss all of my questions and concerns.

#	Answer		Response	%
1	Agree		6	55%
2	No Opnion		2	18%
3	Disagree		3	27%
	Total		11	100%

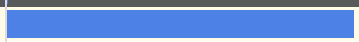
Statistic	Value
Min Value	1
Max Value	3
Mean	1.73
Variance	0.82
Standard Deviation	0.90
Total Responses	11

3. As a result of my advising sessions, I understand what I need to do in order to make progress in my program of study, and what decisions I need to make.

#	Answer		Response	%
1	Agree		6	55%
2	No Opionion		2	18%
3	Disagree		3	27%
	Total		11	100%

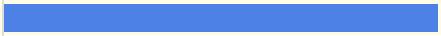
Statistic	Value
Min Value	1
Max Value	3
Mean	1.73
Variance	0.82
Standard Deviation	0.90
Total Responses	11

4. I understand the requirements for completing my degree.

#	Answer		Response	%
1	Agree		8	73%
2	No Opinion		2	18%
3	Disagree		1	9%
	Total		11	100%

Statistic	Value
Min Value	1
Max Value	3
Mean	1.36
Variance	0.45
Standard Deviation	0.67
Total Responses	11

5. I understand that advising is a shared responsibility between the advisor and me.

#	Answer		Response	%
1	Agree		10	91%
2	No Opinion		1	9%
3	Disagree		0	0%
	Total		11	100%

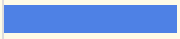
Statistic	Value
Min Value	1
Max Value	2
Mean	1.09
Variance	0.09
Standard Deviation	0.30
Total Responses	11

6. Which of the following best describes your current academic status?

#	Answer		Response	%
1	15 or fewer earned credit hours		2	18%
2	16-30 earned credit hours		1	9%
3	More than 30 earned credit hours		8	73%
	Total		11	100%

Statistic	Value
Min Value	1
Max Value	3
Mean	2.55
Variance	0.67
Standard Deviation	0.82
Total Responses	11

7. Indicate your current major or status below. If you are planning to change your major, please check the last box instead of your current major.

#	Answer		Response	%
1	B.A. Mathematics		1	9%
2	B.S. Mathematics		2	18%
3	B.S. Math - Applied Math Concentration, Actuarial Track		4	36%
4	B.S. Math - Applied Math Concentration, Applied Statistics Track		0	0%
5	B.S. Math and Secondary Education		4	36%
6	I was majoring in math but have changed to another major		0	0%
7	I am currently listed as a math major but I intend to change my major		0	0%
	Total		11	100%

Statistic	Value
Min Value	1
Max Value	5
Mean	3.36
Variance	2.05
Standard Deviation	1.43
Total Responses	11

8. Please add any comments about advising for math programs at CSU.

Text Response
I also had another adivsor that is no longer with CSU. He basically told me it was my responsibility to figure out what classes I was to take and tell him so he could remove my hold. Therefore by the time that I got Dr. I and Mrs. Whitt as my advisors I already had my classes planned out and did not need their guidance.

Statistic	Value
Total Responses	1

Appendix VII. Enrollments in Elective Math Courses, Fall 2010 – Fall 2015

Elective Courses Taught		
Term	**Course**	**Enrolled**
Fall 2010	MATH 5135 College Geometry	7
Fall 2010	MATH 5125 Discrete Mathematics	11
Spring 2011	MATH 5152 Real Analysis 2	4
Spring 2011	MATH 5185 History of Math	6
Spring 2011	MATH 5111 Abstract Algebra 1	12
Spring 2011	MATH 3107 Differential Equations	17
Fall 2011	MATH 5112 Abstract Algebra 2	4
Fall 2011	MATH 5125 Discrete Mathematics	10
Fall 2011	MATH 5135 College Geometry	17
Spring 2012	MATH 5152 Real Analysis 2	2
Spring 2012	MATH 5185 History of Math	10
Spring 2012	MATH 3107 Differential Equations	29
Fall 2012	MATH 5112 Abstract Algebra 2	3
Fall 2012	MATH 5125 Discrete Mathematics	11
Fall 2012	MATH 5135 College Geometry	17
Spring 2013	MATH 5185 History of Math	7
Spring 2013	MATH 5152 Real Analysis 2	8
Spring 2013	MATH 3106 Math Theory of Interest	9
Spring 2013	MATH 3107 Differential Equations	21
Fall 2013	MATH 3108 Intro to Actuarial Sci	10
Fall 2013	MATH 5135 College Geometry	12
Spring 2014	MATH 5126 Actuarial Time Series	6
Spring 2014	MATH 5185 History of Math	7
Spring 2014	MATH 3107 Differential Equations	16
Fall 2014	MATH 5116 Number Theory	5
Fall 2014	MATH 3106 Math Theory of Interest	6
Fall 2014	MATH 5135 College Geometry	7
Fall 2014	MATH 5125 Discrete Mathematics	16
Spring 2015	MATH 5185 History of Math	9
Spring 2015	MATH 3107 Differential Equations	28
Fall 2015	MATH 5114 Set Theory	8
Fall 2015	MATH 5126 Actuarial Time Series	10
Fall 2015	MATH 5135 College Geometry	15
Fall 2015	MATH 5125 Discrete Mathematics	17

Elective Courses Taught at No Cost			
Term	**Course**	**Enrolled**	**Description**
Spring 2011	MATH 5555 Sel Top: Spline An	1	Indep study - Almada
Fall 2011	MATH 5555 Sel Top: Intro Func An	1	Indep study - Almada
Fall 2010	MATH 4195 Undergr Res: Egyptian Frac	1	Indep study - Ionascu
Fall 2010	MATH 4195 Undergr Res: Geom Prob	1	Indep study - Ionascu
Spring 2012	MATH 5555 Sel Top: Complex An	1	Indep study - Ionascu
Fall 2013	MATH 4715 Putnam Exam Prep	2	Indep study - Ionascu
Fall 2014	MATH 3108 Intro to Actuarial Sci	1	Indep study - Linton
Fall 2013	MATH 3556 Sel Top: Math Mod Biol	1	Indep study - Nguyen
Fall 2010	MATH 3556 Sel Top: Complex An	1	Indep study - Stancu
Spring 2015	MATH 5126 Actuarial Time Series	1	Indep study - Stephens
Fall 2015	MATH 3108 Intro to Actuarial Sci	1	Indep study - Stephens
Fall 2014	MATH 3556 Sel Top: Math Mod Biol	1	Indp study - Fan
Spring 2015	MATH 3556 Sel Top: Data Mining	18	Linton taught pro-bono
Fall 2014	MATH 5165 Num An	1	Oxford Study Abroad credit
Spring 2015	MATH 5166 Game Theory	1	Oxford Study Abroad credit
Spring 2015	MATH 5555 Sel Top: Optimisation	1	Oxford Study Abroad credit
Spring 2015	MATH 5555 Sel Top: Optimisation	1	Oxford Study Abroad credit
Fall 2013	MATH 5116 Number Theory	4	Taught by Andrica, Fulbright Schol
Fall 2013	MATH 5125 Discrete Mathematics	8	Taught by Andrica, Fulbright Schol