DALTON STATE COLLEGE
COMPREHENSIVE PROGRAM REVIEW

Program/Subject Area: B.S. Mathematics
Review Period: 2009-2014

1. PROGRAM GOAL AND STUDENT LEARNING OUTCOMES

Program goal statement: The Mathematics BS program will effectively prepare graduates for their future careers and provide students with a full foundation of knowledge and skills in mathematics.

Program outcomes:
1. Graduates will express a high rate of satisfaction with the mathematics program.
2. Graduates will have high job or graduate program placement rates.
3. Graduates will have high employer satisfaction rates.

Student learning outcomes:
1. Students will demonstrate an understanding of and ability to construct mathematical proofs.
2. Students will demonstrate an ability to work with axiomatic mathematical structures.
3. Students will demonstrate the ability to communicate using proper mathematical language and notation verbally, graphically and in writing.

2. MEASURES OF EFFECTIVENESS

(a) Five-year enrollment summary by headcount, FTE, & full-time/part-time status

	2009-10	2010-11	2011-12	2012-13	2013-14	% Change
Headcount	64	82	73	56	48	-25%
FTE	69.9	87.4	79.2	57.8	49.8	-28.76%
Full-time	55	67	62	43	35	-36.36%
Part-time	9	15	11	13	13	44.44%

Analysis and comments:

Two factors should be considered when looking at the decline in enrollment for the program. The overall enrollment in all programs at the college has declined since 2010, and initial higher enrollments in this program may be due to filling a backlog of demand for the program. While full-time enrollment is down somewhat, part-time enrollment has increased.

(b) Five-year enrollment summary by gender & race/ethnicity

	2009-10	2010-11	2011-12	2012-13	2013-14	% Change
Gender						
Female	22	37	30	23	14	-36.36%
Male	42	45	43	33	34	-19.05%
Race/Ethnicity						
American Indian	0	1	1	0	0	N/A
Asian	1	1	0	1	0	N/A
African-American	1	0	1	1	2	100%
Hispanic	3	4	2	9	8	166.67%
White	50	66	59	42	34	-32%
Multiracial	2	1	0	0	1	-50%
Undeclared	7	9	10	3	3	-57.14%

Analysis and comments:

While some of the percentages are down over the five year evaluation period, this is a direct result from an overall drop in enrollment in all programs since 2010. By gender, enrollment has remained much the same. There has been a substantial increase in the percentage of Hispanic students in the mathematics program indicating much improvement in student diversity with the program.

(c) Average class size and credit hours

	2009-10	2010-11	2011-12	2012-13	2013-14
Average class size	30.2	28.4	24.5	22.8	23.3
Student credit hours	10046	10419	9239	7808	7350

Analysis and comments:

The average class size has been dropping and can be explained by two factors. First, the overall enrollment in all programs at the college has declined since 2010, and secondly, the class sizes of upper-level mathematics courses are significantly smaller than 1000 and 2000 level general education mathematics courses.

(d) Faculty teaching in program

	2009-10	2010-11	2011-12	2012-13	2013-14
Total Faculty	34	34	32	26	26
Full-time Faculty	16	21	21	20	18
Part-time Faculty	18	13	11	6	8
Gender					
Male	25	26	25	19	17
Female	9	8	7	7	9
Race/Ethnicity					
American Indian/Pacific	0	0	0	0	0
Asian	1	1	1	1	2
African-American	1	1	1	0	0
Hispanic	2	0	0	0	1
White	29	30	28	22	22
Multiracial	0	0	0	0	0
Other	2	2	2	2	1
Tenure Status (full-time)					
Tenured	5	5	6	8	8
On-tenure track	9	10	12	8	8
Non-tenure track	2	3	3	3	2
Rank (full-time)					
Professor	3	3	3	3	4
Associate Professor	3	3	4	4	4
Assistant Professor	7	8	9	8	7
Instructor/Lecturer	2	3	4	3	3
Highest Degree (full-time)					
Doctorate	10	11	13	13	14
Specialist	1	1	0	0	0
Master's	3	4	6	4	2
Bachelor's	1	1	1	1	2
Associate's/Other	0	0	0	0	0

Analysis and comments:

The decline in the total number of mathematics faculty during the review period can be explained with the increase in the number of full-time faculty. Obviously, as the number of full-time faculty (who teach a heavier load than part-time faculty) increased, the number of part-time faculty decreased, thereby bringing down the total number of faculty. During the five-year evaluation period, the percentage of full-time faculty versus part-time faculty has gone from almost 50/50 in 2009-10 to 69% full-time and 31% part-time in 2013-14. This is due to having all upper-level mathematics courses taught only by full-time faculty. While there is currently little gender or racial/ethnic diversity among the faculty, 89% of full-time faculty are either tenured or tenure track, and 78% hold terminal degrees. As the department grows, it should strive to improve diversity within the faculty.

(e) Percent of classes taught by full-time faculty

2009-10	2010-11	2011-12	2012-13	2013-14
77.2%	79%	89.9%	93%	91%

Analysis and comments:

The percentage of mathematics classes being taught by full-time faculty has increased since the inception of the program and has remained steady. All upper-level mathematics courses are taught by full-time faculty which should be considered a strength of the program since full-time faculty are likely to be more invested in the program, and all hold terminal degrees in the discipline.

(f) Number of degrees conferred

2009-10	2010-11	2011-12	2012-13	2013-14
2	6	6	1	3

Analysis and comments:

These graduation numbers are reasonable for a new program and should increase as the program becomes more established.

(g) Placement rates: Five-year summary of job placement rates, if applicable

2009-10	2010-11	2011-12	2012-13	2013-14
			67%	100%

Analysis and comments:

In 2014, one hundred percent of students responding to a graduate survey were currently employed. 50% were employed in a field related to their degree. In 2013, sixty-seven percent were employed in their field and one was not employed. We do not have data on employment rates prior to 2012-2013.

Gathering this data is problematic, and it is difficult to obtain accurate and complete information from these former students.

(h) Summary and evidence of achievement of program outcomes

Describe the extent to which students have achieved current program outcomes

Program Outcome 1: Graduates will express a high rate of satisfaction with the mathematics program.
The results of a graduate survey indicated the following:
One hundred percent of those surveyed were satisfied or extremely satisfied with the mathematics program and their understanding and knowledge of mathematics and related fields.

Program Outcome 2: Graduates will have high job or graduate program placement rates.
Results from a graduate survey also indicated that 100% of those responding were enrolled in a graduate program and were employed. 50% of those employed were employed in their field.

Program Outcome 3: Graduates will have high employer satisfaction rates.
Obtaining employer satisfaction rates is extremely problematic. A method for measuring job placement and employer satisfaction is needed.

(i) Summary and evidence of achievement of student learning outcomes

Describe the extent to which students have achieved current student learning outcomes in Area F and/or upper-division courses, if applicable. (current year)

Student Learning Outcome 1: Students will demonstrate an understanding of and ability to construct mathematical proofs.
Math 3101
An average of 71% of students correctly performed proof by induction.
An average of 71% of students successfully proved an *if and only if* statement.
An average of 77% of students successfully proved a statement about divisibility.
Math 3201
75% of students demonstrated logical reasoning to prove mathematical properties.
75% of students demonstrated the ability to prove or disprove geometric theorems.
92% of students demonstrated the ability to prove theorems or measurements for coordinate geometry.

Student Learning Outcome 2: Students will demonstrate an ability to work with axiomatic mathematical structures.
Math 4101
82% of students demonstrated mastery of the definition of a group on an assignment.
78% of students demonstrated understanding of subgroup and normal subgroup structure.
77% of students successfully generated permutation groups and cyclic groups.
81% of students successfully worked with group isomorphisms and homomorphisms.
75% of students successfully worked with symmetry from an algebraic perspective.
Math 4201
95% of students demonstrated an understanding of integers and their properties.
70% of students demonstrated an understanding of prime numbers.
85% of students demonstrated an understanding of congruences and their related theorems.
80% of students demonstrated an understanding of representations of integers.
85% of students demonstrated an understanding of number theoretic functions.
95% of students demonstrated an understanding of Diophantine equations and their solutions.

Student Learning Outcome 3: Students will demonstrate the ability to communicate using proper mathematical language and notation verbally, graphically and in writing.
Math 3101
An average of 96% of students correctly answered logic questions.
An average of 71% of students correctly performed proof by induction.
Math 4101
72% of students applied group theory to solve problems arising in various branches of mathematics.
Math 4301
73% of students demonstrated an ability to use graph theory in real-life applications.

Student Learning Outcomes 1, 2, 3:
The results of a graduate survey indicated the following:
100% of those surveyed were satisfied or extremely satisfied with the mathematics program, their understanding of and ability to construct mathematical proofs, their ability to apply mathematics to real world problems using technology when appropriate, their ability to work with axiomatic mathematical structures, and their ability to communicate using proper mathematical language

and notation verbally, graphically and in writing.

(j) Evidence of program viability

Based on enrollment history, retention rates, degree completion/graduation rates, and other program outcomes, comment on whether continued resources should be devoted to this program. Your comments should consider external factors such as the following: Are your students getting jobs? What is the job outlook for graduates? Are students prepared for the jobs they get? How is the field changing? Are the program faculty members in touch with employers and getting feedback on our students' performance? Do employers see a need for changes in the program?

The B.S. Mathematics program is a viable program at Dalton State College. One hundred percent of those responding to a survey were enrolled in a graduate program and were employed. Fifty percent of those employed were employed in their field. The continued job outlook for graduates of the program is good, but obtaining accurate and complete job placement information and graduate school acceptance rates is problematic.

3. USE OF ASSESSMENT RESULTS FOR PROGRAM IMPROVEMENT

What improvements have occurred since the last program review or assessment?

This program has not previously been reviewed.

4. REVIEW OF CURRICULUM

What changes or revisions have been made to the program, its curriculum, or its student learning outcomes since the last program review or assessment?

This program has not previously been reviewed, but some curriculum changes in the program during the current review period include the following.

Two new courses, MATH 4102 Abstract Algebra II and MATH 4001 History of Mathematics, have been approved.

The Area A requirement for MATH 1113 was revised to read, "Math 2253 may be substituted if the student meets the prerequisites for MATH 2253."

The prerequisite for MATH 3101 was changed from MATH 2255 to MATH 2254.

5. PROGRAM STRENGTHS AND WEAKNESSES

Strengths:

The math content in the program is very strong and prepares students extremely well for graduate school or employment. The results of a graduate survey indicated that 100% of those surveyed were satisfied or extremely satisfied with the mathematics program, their understanding of and ability to construct mathematical proofs, their ability to apply mathematics to real world problems using technology when appropriate, their ability to work with axiomatic mathematical structures, and their ability to communicate using proper mathematical language and notation verbally, graphically and in writing. Survey results also indicated that one hundred percent of those responding were enrolled in a graduate program and were employed. Fifty percent of those employed were employed in their field.

Opportunities for undergraduate research are now becoming available for students in the Mathematics program. Additionally, the program has a dedicated group of high quality faculty members.

Weaknesses and concerns:

The number of graduates was low and inconsistent during this review period. As the number of students in the program increases in the future, we would expect the number of graduates to increase also.

6. RECOMMENDATIONS FOR FOLLOW-UP AND/OR ACTION PLANS (if needed)

Issue/concern:

Obtaining employment placement and satisfaction rates along with graduate school acceptance rates is problematic. Determining the needs of local industry and aligning these needs with the program also needs to be addressed.

Specific action(s):

Establish a STEM Advisory Committee made up of local industry leaders and DSC faculty members. Agenda items for the meetings will address methods for obtaining employment rates and employer satisfaction rates from business as well as industry needs. In addition, the Office of Counseling and Career Services will begin surveying graduates of the program which will provide data on graduate school acceptance.

Expected outcomes:

It will open a line of communication between local industry and the School of Science, Technology, and Mathematics. Feedback from the committee should provide information about the job outlook for graduates, placement and satisfaction rates, and changes for the program based on industry needs.

Time frame:

Assemble the committee and have the first meeting Spring 2015.

Person(s) responsible:

Dean, School of Science, Technology, and Mathematics
Chair, Department of Natural Sciences
Chair, Department of Technology and Mathematics

Resources needed:

None

Prepared by:

Randall Griffus
Dean, School of Science, Technology and Mathematics

_____ **Date** 8/17/16

Lee Ann Nimmons
Chair, Department of Technology and Mathematics

Lee Ann Nimmons **Date** 8-17-16

Reviewed by Chair of Program Review Subcommittee

Dr. Marie M. Helms **Date** 7/21/2016

Reviewed/Approved by Vice President for Academic Affairs

Pat Chute **Date** 8/16/2016