

Program Review Executive Summary Template

Based on the thorough program review addressing all criteria in policy, a comprehensive report should be possible within ten or fewer pages. This template is provided to assist institutions in providing a brief summary, which is to be presented to the institutional governing board prior to submission to the State Regents. Executive summaries should be possible within two pages using this template format.

Institution Name: <u>Rose State College</u> Program Name and State Regents Code: <u>Mathematics - 0082</u> List Any Options: <u>General 0082-01, Computer Science 0082-02, Education 0082-03</u> Date of Review: <u>Fall 2017</u> Recommended Date of Next Review: <u>Fall 2022</u>	
Centrality to Institutional Mission: The Rose State College Mathematics Program fulfills three central functions: 1. Support Mathematics and other STEM related disciplines with the Calculus Sequence (NOTE: there are eight Engineering courses and three Physics courses with Calculus prerequisites); 2. Support the general education requirements in Mathematics with MATH 1473 General College Math and MATH 1513 College Algebra; and 3. Support students who are not college-level ready with zero-level Mathematics courses.	
Program Objectives and Goals: The Associate in Science degree program provides students with the analytical skills and scientific knowledge to expand and apply critical thinking to all facets of learning. The expected program outcome is to provide a comprehensive lower division education for students who plan to transfer to a baccalaureate degree program in mathematics.	
Quality Indicators Such As: – Student Learning Outcomes – Effective Teaching – Effective Learning Environments – External Curricular Evaluation – Capacity to Meet Needs and Expectations of Constituencies	<ul style="list-style-type: none"> • MATH 2153 Calculus & Analytic Geometry IV (capstone course) has a five-year average ABC rate of 85% (193/288) with DFW rate 15% (35/288). • Full-time faculty Disa Beaty (2012), Rebecca Burkala (2013), and Andrea Xeriland (2016) were selected for the Excellence in Teaching Award. Adjunct faculty Marilyn Williams (2015) and Nancy Graham (2016) were selected for the Excellence in Teaching Award. • There are articulation agreements with the University of Oklahoma (Math—Education) and the University of Central Oklahoma (Math—Computer Science).
Productivity for Most Recent 5 Years	Number of Degrees: <u>36</u> Number of Majors: <u>188</u>
Other Quantitative Measures Such As: – Number of Courses for Major – Student Credit Hour in Major – If available, information about the success of students from this program who have transferred to another institution	<ul style="list-style-type: none"> • 94 courses taught exclusively for the Mathematics program with 1,790 total enrollment and 5,367 credit hours over the last five years. • 7 different courses generated 8,405 credits with 25,215 credit hours over the last five years supporting General Education, Education majors, and Business majors. • According to the National Student Clearinghouse, 29 percent of students declared as a Mathematics major at Rose State College graduated from their transfer institution from FY12 to FY16.

Duplication and Demand	<ul style="list-style-type: none"> • Duplication: Other community colleges in the state do offer Mathematics degrees. However, the Rose State College Mathematics degree is more readily available to students in eastern Oklahoma County. • Demand: The number of Rose State College Mathematics majors on average have increased 25% over the last five years. According to the Bureau of Labor Statistics, "Employment of math occupations is projected to grow 28 percent from 2016 to 2026...which will result in about 50,200 new jobs..." https://www.bls.gov/ooh/math/home.htm
Effective Use of Resources	<ul style="list-style-type: none"> • All instructors utilize the LMS, BrightSpace, to manage their courses including posting announcements and syllabi; grades are made available online as well. The office of Academic Innovation provides support with instructional design and use of technology as well as Faculty Development opportunities. • The Mathematics Department has 12 dedicated classrooms with whiteboards, instructor computers, and AV data projectors 3 having student computer stations. There is a dedicated room for storage of manipulatives used for instruction.
Strengths and Weaknesses	<p>Strengths:</p> <ul style="list-style-type: none"> • Highly qualified faculty with diverse backgrounds; Standardization of zero-level courses and College Algebra; Dedicated pathways for STEM and Non-STEM students; Three degree emphases: General, Computer Science, and Education; Articulation agreements; Reworked program degree sheet for greater clarity; Administration, at both the division and institution level, is supportive <p>Weaknesses:</p> <ul style="list-style-type: none"> • Lack of necessary full-time faculty to decrease the percentage of courses taught by part-time instructors; Lack of adequate classroom and computer lab space; Division among faculty members teaching upper-level and zero-level courses due to fundamental differences in methodology; Lack in consistency of proper advisement; Lack in consistency of prerequisite enforcement; Lack in consistency and quality of upper-level students to employ as tutors; Lack of step pay increases to accommodate COLA
Recommendations	<ul style="list-style-type: none"> • Increase productivity; Increase success rates in developmental courses; Hire full-time faculty with focus on Developmental Education; Hire full-time faculty with focus on the Calculus Sequence; Designate a Mathematics Program Coordinator AND a Developmental Mathematics Program Coordinator to allow for more focus on each area

Program Review Summary Template

3.7 Academic Program Review

Based on the thorough internal or external program review addressing all criteria in policy, a comprehensive report should be possible within ten or fewer pages. This program review template is provided to assist institutions in compiling the program review information, which is to be presented to the institutional governing board prior to submission to the State Regents. Executive Summaries should be possible within two pages using the provided template (Program Review Executive Summary Template).

Description of the program's connection to the institutional mission and goals:

The Rose State College Mathematics Program aligns with the mission and goals of the college in three key areas:

1. Preparing students to transfer to a four-year college or university to pursue a degree in Mathematics or other STEM related field;
2. Providing students of all majors with courses that fulfill the general education requirements in Mathematics for their specific program of interest; and
3. Providing zero-level Mathematics courses to prepare students for college-level course work.

3.7.5 Process (Internal/External Review):

Previous Reviews and Actions from those reviews:

Analysis and Assessment (including quantitative and qualitative measures) noting key findings from internal or external reviews and including developments since the last review:

The Mathematics faculty meet regularly to review and discuss the program (pre-semester 1.5 hour meeting, a mid-semester 3 hour meeting, and others as needed). Additionally, Lead Instructors and Teams have been identified to focus on particular courses. The Lead Instructor calls meetings of their subcommittee and communicates with Adjunct faculty. They also facilitate assessment of learning outcomes and identifying areas for improvement at the course level.

Major developments since the last review include standardizing College Algebra, improving advisement for Non-STEM students, creating Math Literacy as a direct prerequisite for Non-STEM students, overhauling the developmental algebra sequence, offering degree emphases in Computer Science and Education, and unifying the STEM Lab with the Tutoring Center.

A. Centrality of the Program to the Institution's Mission:

The Rose State College Mathematics Program fulfills three central functions:

1. Support Mathematics and other STEM related disciplines with the Calculus Sequence (NOTE: there are eight Engineering courses and three Physics courses with Calculus prerequisites);

2. Support the general education requirements in Mathematics with MATH 1473 General College Math and MATH 1513 College Algebra; and
3. Support students who are not college-level ready with zero-level Mathematics courses.

B. Vitality of the Program:**B.1. Program Objectives and Goals:****Mathematics Associate of Science Degree****Program Goals and Outcomes**

The Associate in Science degree program provides students with the analytical skills and scientific knowledge to expand and apply critical thinking to all facets of learning. The expected program outcome is to provide a comprehensive lower division education for students who plan to transfer to a baccalaureate degree program in mathematics.

General Emphasis

Upon completion, the graduate will be able to:

1. Demonstrate both procedural and conceptual understanding of mathematics in courses through the Calculus sequence.
2. Apply both procedural and conceptual knowledge of mathematics to critical thinking, logical reasoning, modeling, and quantitative analysis.
3. Apply both procedural and conceptual knowledge of mathematics to upper level courses and a career related to mathematical sciences.
4. Successfully transfer to a baccalaureate degree program that requires significant course work in mathematics.

Computer Science Emphasis

Upon completion the graduate will be prepared to:

1. Demonstrate both procedural and conceptual understanding of mathematics and the relation of these tenets to problem solving in the area of computer science.
2. Apply both procedural and conceptual knowledge of mathematics and computer science to critical thinking, logical reasoning, computer programming, modeling, and quantitative analysis.
3. Apply both procedural and conceptual knowledge in the areas of calculus and discrete mathematics to upper level courses and a career in Computer Science.
4. Successfully transfer to a baccalaureate degree program in Computer Science that aligns with Engineering and Mathematics.

Education Emphasis

Upon completion the graduate will be prepared to:

1. Demonstrate both procedural and conceptual understanding of mathematics in courses through the Calculus sequence.
2. Apply both procedural and conceptual knowledge of mathematics to critical thinking, logical reasoning, modeling, and quantitative analysis.
3. Apply both procedural and conceptual knowledge of mathematics to upper level courses and a career in secondary education.
4. Successfully transfer to a baccalaureate degree program that requires significant course work in mathematics.

B.2 Quality Indicators (including Higher Learning Commission issues):

Student Outcomes: MATH 2153 Calculus & Analytic Geometry IV (capstone course) has a five-year average ABC rate of 85% (193/288) with DFW rate 15% (35/288). Students are successfully completing the Calculus Sequence.

Effective Teaching: Full-time faculty Disa Beaty (2012), Rebecca Burkala (2013), and Andrea Xeriland (2016) were selected for the Rose State College Excellence in Teaching Award. Adjunct faculty Marilyn Williams (2015) and Nancy Graham (2016) were selected for the Rose State College Excellence in Teaching Award. In addition to standard student evaluations, faculty are allowed to perform a self-evaluation as well as being observed and evaluated by administrators and peers. All three evaluations consistently result in high performance and satisfaction ratings.

Effective Learning Environments: Students experience small class sizes which provide for individualized instruction. All classrooms are equipped with computers, AV data projectors, and access to the world-wide-web. Recent capital improvements updated lighting to LED, replaced flooring, and remodeled bathrooms to be more ADA compliant. Comfortable seating in classrooms promote student attention and contribute to a positive learning environment. Faculty maintain offices hours specifically to meet with students and tutoring is available for students over 60 hours per week.

External Curricular Evaluation: The Rose State College Mathematics Department participates with the Oklahoma Regents for Higher Education Course Equivalency Project to align courses and allow for ease of transfer credits. Additionally, there are articulation agreements with the University of Oklahoma and the University of Central Oklahoma.

Capacity to Meet Needs and Expectations of Constituencies: The college has developed statistically relevant student satisfaction questionnaires which are conducted periodically to determine student needs and expectations. Resources are then allocated based on the results of the questionnaires. An academic advisor for the Engineering and Science Division is assigned to address student academic questions and issues including those of the Mathematics Program. Mathematics faculty have partnered with Physics faculty to provide workshops to K-12 teachers on best practices for integrating math and physics lessons.

B.3. Minimum Productivity Indicators:

Time Frame	2013	2014	2015	2016	2017	Average
Head Count	24	28	33	44	59	37.6
Graduates	8	12	10	3	3	7.2

B.4. Other Quantitative Measures:

- a. Number of courses taught exclusively for the major program for each of the last five years and the size of classes:

Course	2013	2014	2015	2016	2017
MATH 2113	5 / 157	5 / 129	5 / 94	7 / 120	7 / 105
MATH 2123	5 / 112	5 / 110	5 / 90	7 / 96	7 / 104
MATH 2143	2 / 45	2 / 55	2 / 53	4 / 72	4 / 77
MATH 2153	1 / 18	2 / 51	2 / 41	4 / 52	4 / 70
MATH 2173	1 / 8	2 / 35	2 / 32	2 / 41	2 / 23
Totals	14 / 340	16 / 380	16 / 310	24 / 381	24 / 379

(number of courses taught / total enrollment)

b. Student credit hours by level generated in all major courses that make up the degree program for five years:

Course	2013	2014	2015	2016	2017
MATH 2113	471	387	282	360	315
MATH 2123	336	330	270	288	312
MATH 2143	135	165	159	216	231
MATH 2153	51	153	123	156	210
MATH 2173	24	105	96	123	69
Totals	1,017	1,140	930	1,143	1,137

c. Direct instructional costs for the program for the review period:

Direct Instructional Cost	Full-time salaries & benefits	Full-time overload pay & benefits	Adjunct salaries & benefits	Total
	\$771,488	\$91,302	\$170,341	\$1,033,131

(5-year average)

d. The number of credits and credit hours generated in the program that support the general education component and other major programs including certificates:

Support General Education with MATH 1473 and MATH 1513					
Course	2013	2014	2015	2016	2017
MATH 1473	487 / 1461	427 / 1281	500 / 1500	495 / 1485	472 / 1416
MATH 1513	989 / 2967	969 / 2907	826 / 2478	961 / 2883	1053 / 3159

Support Education Majors with MATH 2013, MATH 2023, and MATH 2033					
Course	2013	2014	2015	2016	2017
MATH 2013	34 / 102	53 / 159	45 / 135	45 / 135	33 / 99
MATH 2023	24 / 72	17 / 51	26 / 78	25 / 75	30 / 90
MATH 2033	NA	7 / 21	9 / 27	25 / 75	24 / 72
Support Business Majors with MATH 1743 and MATH 2133					
Course	2013	2014	2015	2016	2017
MATH 1743	198 / 594	171 / 513	157 / 471	151 / 453	128 / 384
MATH 2133	NA	NA	7 / 21	8 / 24	9 / 27
Totals	1,732 / 5,196	1,644 / 4,932	1,570 / 4,710	1,710 / 5,130	1,749 / 5,247

(number of credits / credit hours generated)

e. A roster of faculty members, faculty credentials and faculty credential institution(s). Also include the number of full time equivalent faculty in the specialized courses within the curriculum:

Faculty	Credential	Institution that granted degree
Disa Beaty	B.S. Mathematics M.S. Mathematics	Southwestern Oklahoma State University Baylor University
Rebecca Burkala	B.S. Mathematics Ed M.A. Mathematics	Missouri State University University of Montana
Dick Frost	B.A. Mathematics M.S. Mathematics	University of Oklahoma University of Oklahoma
Robert Hogue	B.S. Mathematics M.S. Applied Mathematics	University of Central Oklahoma University of Central Oklahoma
Jim Mayer	B.S. Meteorology M.S. Mathematics	University of Oklahoma University of Oklahoma
Jack Moeller	B.S. Mathematics M.S. Mathematics/Math Ed	Oklahoma State University Oklahoma State University
Chuang Shao	B.S. Mathematics M.S. Mathematics Ph.D. Mathematics	Southern Yangtze University University of North Texas University of North Texas
Ronnie Shocks	B.S. Mathematics M.A. Mathematics	Northeast Missouri State University Northeast Missouri State University
Ann Smith	B.S. Mathematics Ed M.A. Mathematics	University of Central Oklahoma University of Oklahoma
Linda Tucker	B.S. Mathematics M.S. Mathematics	Texas Woman's University Texas Woman's University

Bill Wilson	B.S. Mathematics M.A. Mathematics Ed	East Central Oklahoma University of Central Oklahoma
Andrea Xeriland	B.S. Mathematics M.S. Applied Mathematics M.S. Mathematics	University of Central Oklahoma University of Central Oklahoma Oklahoma State University

f. If available, information about employment or advanced studies of graduates of the program over the past five years:

g. If available, information about the success of students from this program who have transferred to another institution:

According to the National Student Clearinghouse, 29 percent of students declared as a Mathematics major at Rose State College graduated from their transfer institution from FY12 to FY16.

	Sent	Found	Transferred	Graduate from Transfer
Declared	117	75	62	18 (29%)
Undeclared	212	149	124	44 (35%)

B.5. Duplication and Demand:

In cases where program titles imply duplication, programs should be carefully compared to determine the extent of the duplication and the extent to which that duplication is unnecessary. An assessment of the demand for a program takes into account the aspirations and expectations of students, faculty, administration, and the various publics served by the program. Demand reflects the desire of people for what the program has to offer and the needs of individuals and society to be served by the program.

B.5. Duplication and Demand Issues:

Address Duplication:

Other community colleges in the state do offer Mathematics degrees. However, the Rose State College Mathematics degree is more readily available to students in eastern Oklahoma County.

Address Demand:

MATH 1473 General College Math and MATH 1513 College Algebra meet general education requirements. Furthermore, these courses, along with the Calculus Sequence and Differential Equations meet requirements for other degree programs (Physics and Engineering). The number of Rose State College Mathematics majors have increased 25% average over the last five years.

According to the Bureau of Labor Statistics,

Employment of math occupations is projected to grow 28 percent from 2016 to 2026, much faster than the average for all occupations, which will result in about 50,200 new jobs. Growth is anticipated as businesses and government agencies continue to emphasize the use of big data, which math occupations can analyze. Math occupations had a median annual wage of \$81,750 in May 2016, which was higher than the median annual wage for all occupations of \$37,040.

<https://www.bls.gov/ooh/math/home.htm>

B.5.a. Detail demand from students, taking into account the profiles of applicants, enrollment, completion data, and occupational data:

Rose State College provides students equitable access to a college education. With completion of an Associates in Arts or an Associates in Science degree, students are granted transfer of their general education core to state universities in Oklahoma. Moreover, there is great demand for Developmental Mathematics courses to prepare students for college-level work.

B.5.b. Detail demand for students produced by the program, taking into account employer demands, demands for skills of graduates, and job placement data:

The Mathematics Program at Rose State College offers three degree emphases: General, Computer Science, and Education. There is an articulation agreement with the University of Central Oklahoma for the Mathematics – Computer Science Emphasis and an articulation agreement with the University of Oklahoma for the Mathematics – Education Emphasis.

Additionally, the Bureau of Labor Statistics reports an expected steady demand for STEM graduates with "The STEM group that is projected to grow fastest from 2014 to 2024 is the mathematical science occupations group at 28.2 percent."

<https://www.bls.gov/spotlight/2017/science-technology-engineering-and-mathematics-stem-occupations-past-present-and-future/home.htm>

B.5.c. Detail demand for services or intellectual property of the program, including demands in the form of grants, contracts, or consulting:

Intellectual property is not a program outcome.

B.5.d. Detail indirect demands in the form of faculty and student contributions to the cultural life and well-being of the community:

Through completion of Mathematics courses at Rose State College, students will become "math literate" members of society enhancing the culture and well-being of the community at large.

B.5.c. The process of program review should address meeting demands for the program through alternative forms of delivery. Detail how the program has met these demands:

The Mathematics Program at Rose State College meets the demand for traditional and alternate methods of delivery of courses. There are face-to-face, online, and 8-week; day and evening courses in the Fall, Spring, and Summer terms. In addition, there are Interactive Television (ITV) courses available for high school students concurrently enrolled in the Fall and Spring terms as well as courses available at the Department of Corrections.

B.6. Effective Use of Resources:

Resources include financial support, (state funds, grants and contracts, private funds, student financial aid); library collections; facilities including laboratory and computer equipment; support services, appropriate use of technology in the instructional design and delivery processes, and the human resources of faculty and staff.

- With the \$22 million Capital Improvement project, there were campus wide enhancements to all buildings (lighting, flooring, bathrooms). Additionally, the Learning Resources Center (LRC) was completely renovated and the IT infrastructure was modernized.
- The LRC circulation desk provides access to current textbooks and calculator rentals for students. The LRC has multiple study areas, 3 computer classrooms available for reservation, 6 ITV classrooms serving area high school and incarcerated students.
- The Special Services office provides counseling and disability services to both students and staff; additional support services include the Testing Center, STEM Lab, Tutoring Center, tutor.com, Student Success Center including weekly workshops and Early Alert.
- All instructors utilize the LMS, BrightSpace, to manage their courses including posting announcements and syllabi; grades are made available online as well. The office of Academic Innovation provides support with instructional design and use of technology as well as Faculty Development opportunities.
- The Mathematics Department has 12 dedicated classrooms with whiteboards, instructor computers, and AV data projectors 3 of which also have student computer stations. There is a dedicated room for storage of manipulatives used for instruction.

*Low Producing Program Reviews follow a different format and template.

Institutional Program Recommendations: (describe detailed recommendations for the program as a result of this thorough review and how these recommendations will be implemented, as well as the timeline for key elements)

Recommendations	Implementation Plan	Target Date
Increase productivity	<ul style="list-style-type: none"> • Promote enrollment through proper advisement • Actively engage students to improve success and retention 	ongoing

	<ul style="list-style-type: none"> • Maintain close working relationship with 4-year institutions to ensure transferability of coursework 	
Increase success rates in developmental courses	<ul style="list-style-type: none"> • Provide Professional Development in Best Practices in Developmental Education for both full- and part-time faculty • Support Student Services by providing workshops on Math Anxiety and Growth Mindset • Expand the Foundations Summer Bridge Program 	ongoing
Hire full-time faculty with focus on Developmental Education	<ul style="list-style-type: none"> • As allowed by Rose State College budgets and employment availability 	Spring 2018
Hire full-time faculty with focus on the Calculus Sequence	<ul style="list-style-type: none"> • As allowed by Rose State College budgets and employment availability 	Spring 2018
Designate a Mathematics Program Coordinator AND a Developmental Mathematics Program Coordinator to allow for more focus on each area	<ul style="list-style-type: none"> • Identify faculty and budget monies 	Fall 2018

Summary of Recommendations:

	Department	School/College	Institutional
Possible Recommendations:	Mathematics	Engineering and Science Division	Rose State College
Expand program (# of students)	Expand from 59 to a minimum of 70 students		
Maintain program at current level			
Reduce program in size or scope			
Reorganize program			
Suspend program			
Delete program			

Department/
Program HeadA. Xeniland
(Signature)

Date

11/8/17

Dean

Wayne Jones
(Signature)

Date

11/8/17