

BOARD OF TRUSTEES OF THE NEBRASKA STATE COLLEGES
ITEMS FOR DISCUSSION AND ACTION\ACADEMIC AND PERSONNEL

ACTION: **Approve Continuation of the Mathematics Program at Peru State College with Annual Monitoring**

Per Policy 4200, existing academic programs shall be reviewed every seven (7) years by each College to determine the quality and effectiveness of each program, the efficiency with which each is delivered, and to avoid unnecessary duplication. Each program is evaluated based on the minimum threshold requirements established by the Coordinating Commission for Postsecondary Education (CCPE). Should a program not meet the established thresholds, Nebraska Statute 85-1414 establishes the expectation for the institution and its governing board to complete an in-depth review. Programs continued by the governing board shall be further monitored by the governing board which shall report the status and process of the monitoring to the CCPE.

During its last review, the Mathematics Program at Peru State College did not meet the required minimum 5-year mean threshold for number of graduates for baccalaureate programs, which is seven (7). The program has completed an in-depth review and has recommended continuation of the program. The findings of that review are provided to the Board in the attached report for approval and subsequent submission to the CCPE for consideration for continuation of the program.

The System Office and Peru State College support the findings of the in-depth review and the recommendation for continuation of the program. The program has outlined strategies/approaches for continuing to improve enrollments and graduate production in the future, which warrants ongoing assessment and evaluation by the Board. An annual review of enrollment and graduate numbers will be shared with the Board each Spring term to monitor progress of the program's growth related to these recruitment efforts.

The System Office and Peru State College recommend approval of the Continuation of Mathematics Program at Peru State College with Annual Monitoring.

ATTACHMENTS:

- PSC 2023 Mathematics Program Review with In-Depth Review NSCS Final (PDF)

**PSC Academic Program Review Report 2023
 Mathematics**

1. Section One: Overview of Program Offerings

Major	Option, Concentration, Focus Area or Endorsement	Minor	Undergraduate	Credit Hours
Mathematics	Mathematics		BA, BS	49
Mathematics	Mathematics field endorsement		BA, BS	39
Mathematics		Mathematics		19

2. Section Two: Analysis of Program, Including Adequacy of Resources and Related Concerns

Analysis of Program

The Mathematics program at Peru State provides support to the general education program through coursework in mathematics and statistics, coursework for underprepared student in mathematics and majors in mathematics and mathematics education. The Mathematics program recently modified several of the courses to better align with mathematics programs at other institutions and mathematical standards. This will allow for a more seamless transition to graduate school, as well as a more transparent overview of the content of our courses. The program still struggles with low enrollment numbers; however, recruitment efforts are at the top of our action goals. Because the program is small, it has the added benefit of a faculty that is trained across the discipline. The broad skills of the faculty in the department allow students to receive assistance and mentoring from any faculty member within the program. This nurturing gives the students the attention they expect and deserve from our institution. For program efficiency, upper-division courses are offered on an every-other year rotation.

One of the program’s previous review goals was to increase the visibility of the Mathematics program. We have done this by breathing life back into Alpha Mu Omega, our Mathematics Club. We host a high school mathematics competition, which brings around one hundred motivated, regional high school students to our campus. This club currently has members from the Schools of Education, Arts and Sciences, and Professional Studies.

The Mathematics program at Peru State College is smaller than the Mathematics and Statistics programs at our sister institutions. The core courses in our program closely align with the core courses at our peer colleges. Both the mathematics education and the mathematics majors are required to complete the Mathematics core. Mathematics education majors then complete education courses and the math field endorsement required courses which overlap heavily with the electives available to the non-teaching mathematics students. The Mathematics majors complete the math core, mathematics electives, additional program requirements, and have an option between two semesters of physics or chemistry. Our program differs from peer institutions because of the science requirements in our program. Due to the program’s small size and limited faculty, it is not feasible to offer more mathematics courses without requiring the science courses. The science

courses that are options for that requirement are mathematics heavy courses which allow students to apply their mathematical skills.

During the past 5 years faculty have worked on creating formal student learning goals, outcomes, measures, and targets for the Mathematics program. Due to low numbers in the program, evaluation of the program's student learning goals has been postponed until there are enough data points for a beneficial qualitative analysis. From the data that have been gathered, we can see some trends that need to be addressed. Writing skills are below our program standards. Our campus has recently implemented a Writing Center, and we will require our students to utilize their services in the future, before submitting assignments.

We have also discovered that our students are consistently falling short regarding retention of lower-level mathematics concepts as evidenced on our comprehensive exit exam. While these scores are below our program's standards, they do equate to a passing score on the subject matter PRAXIS exam, which is required to obtain a teaching certificate. Our library has access to several study guides, practice exams, and other preparatory materials. We will require students to use these resources to prepare for comprehensive exams related to their fields.

To address this shortfall in retaining fundamental mathematical concepts, we have begun to advise our students to take both College Algebra and Trigonometry during their Junior and Senior years. We look forward to seeing how this change will be reflected in data in the next two to four years.

We were seeing a steady rise in enrollment leading up to COVID year, 2020. In Fall of 2019 we had 20 students enrolled in our program; we currently have 14 students enrolled, 7 in Mathematics and 7 in Mathematics Teaching. We have developed goals to increase both program enrollment and course enrollment.

Adequacy of Resources and Related Concerns

Faculty and faculty-related resources

Due to many of our upper-level courses having low enrollment numbers, our full-time faculty often have directed study courses, and then take on additional duties, such as online courses. Therefore, we do not have an over-reliance on adjunct faculty, averaging two courses per semester that employ adjunct faculty. In order to increase enrollment in upper-level courses, we will analyze our course rotations and possibly adjust this in the future.

Informational resources (library, technology, data services, etc.)

Library resources are sufficient for our program. Membership in professional associations and organizations provides ample resources and access to current journals and research. The library has ample resources for our education students, providing practice exams and study materials. Classroom technology and campus connectivity are sufficient for teaching and studying mathematics.

Physical facilities and instructional equipment

Most of our 100 level courses use computer labs, and with proper class schedules these are readily available. The room used has significant HVAC issues but a plan is in place to correct those in the coming year. Other classrooms that are used regularly are equipped with Apple TV's, projectors, and other teaching implements that make visual learning a reality. The math program is not in need of any further equipment.

Fiscal resources

The college provides funding for institutional membership to regional and national organizations and associations are paid for through the Mathematics Program’s budget, as well as paper copies, and student conference participation. The budgetary needs of the department are met adequately.

3. Evidence of Demand and Efficiency (per established CCPE standards for 5-year means)

Number of Degrees/Awards in Program		SCH/FTE
Baccalaureate	7	300
Masters	5	300
Specialist	4	300

		17-18	18-19	19-20	20-21	21-22	5 yr avg
Student Credit Hours (SCH)		2521	2352	2400	3175	2032	2496
Faculty Full-time Equivalency (FTE)		4.00	5.00	4.71	4.03	5.42	4.63
SCH/Faculty FTE		630.3	470.4	509.6	787.8	374.9	539.1
Number of Degrees and Awards <i>(list degrees/awards separately)</i>	Mathematics	1	2	2	1	3	1.8
	Mathematics Teaching	1	1	0	2	1	1
	Total	2	3	2	3	4	2.8

4. Section 4: Justification and Evidence of Need

There is a growing demand for individuals with strong mathematical skills in fields such as finance, data analysis, computer science, engineering, and education. By offering a Mathematics major, Peru State College can provide students with the education and training they need to pursue these careers. The Bureau of Labor Statistics reports that mathematics will experience a 29% increase in job growth by 2031. The mathematics teaching profession is expected to experience a retirement phase as well, indicating a need for the mathematics teaching option.

Program is critical to the role and mission of the institution

The mission of Peru State College is to provide students of all backgrounds access to engaging educational experiences to strengthen and enrich communities, Nebraska and the world. Mathematics is a fundamental subject in education that provides a strong foundation for many fields, including science, engineering, economics, and finance. A strong understanding of mathematics is essential for success in these fields and many other careers. Studying mathematics helps students develop critical thinking, problem-solving, and analytical skills that are valuable in any field.

Small programs like mathematics provide unique opportunities and experiences that larger programs may not offer. The small program fosters a sense of community among students and faculty, promoting close-knit relationships and collaboration. Our program differs from peer institutions because of the science requirements in our program. Due to our program's small size and limited faculty, offering more mathematics courses without requiring science courses is not feasible. The science courses that are options for that requirement are mathematics-heavy courses that allow students to apply their mathematical skills. The mathematics program is one of the smallest subject majors offered at Peru State and is very efficient by offering its upper-division courses on a two-year rotation. Many of those upper-division classes are taught through directed studies and are not part of the faculty load.

Program contains courses supporting general education or other programs

The mathematics program contains a large number of courses in support of general education. The program has three full-time faculty, and the remainder of the FTE in the table above are adjuncts. The entire load of the adjuncts and over 90% of the load of the full-time faculty are in support of general education, developmental education, and required courses for other programs (calculated using teaching loads for the past two years).

Courses in mathematics are required for our pre-health programs and our science degrees. The courses in this group include mathematics courses up to and including the second course in the calculus sequence.

The courses that are exclusively for the mathematics major make up only 10% of the load of our three full-time faculty members.

Overall contribution of the program to the College in relation to required program resources

The tuition, fee, and room and board revenue from Math majors exceeds any savings that would be achieved by eliminating adjunct or overload sections to teach courses taken exclusively by majors. Thus, the program has a net positive effect on the finances for the College.

Graduate success and workforce demand

Of graduates over the past five years, 75% are employed as college, high school, or elementary math teachers or are in graduate school. Most of the teachers are serving rural areas of the state. Another 18% are employed in positions such as a data analyst, operations team lead, or office coordinator.

Mathematics continues to be listed in the 2022 teacher shortage list for Nebraska. The Fall 2022 survey listed 46.93 Mathematics positions that were filled by someone other than a fully qualified teacher. There were 18.6 positions left vacant last year. Peru State graduates can help fill those positions.

Strategic plan to grow the program and/or increase its success:

The program will aim to increase the number of schools participating in our math competition by 10% for each year. This will increase visibility of the mathematics program and therefore increase enrollment. Each year, the College hosts a math competition day that draws around 13 schools

and nearly 150 students. Additional outreach to schools that don't attend will help to spread the word about the event and increase attendance. The program faculty will work with Admissions to arrange for campus tours and other recruiting aspects for the day. Faculty will also hold workshops for teachers who attend, to further expand the event.

Program faculty will also increase the number of recruitment events per academic year. The goal is to have three recruiting events each year. The goal will be to increase the number of recruitment events we can increase enrollment in our program. Potential events include:

- Mathematics competition on campus
- ESU quiz bowl competition on campus
- Presence at high school college fairs
- Tutoring at regional schools
- Participation in after-school programs
- Increased visibility on campus for math club

Program faculty will also consistently review schedules and rotations for current degree seekers. This will maintain faculty and infrastructure sufficient to maintain a 4-year timeline for all degree-seeking majors. A 4-year timeline will encourage students to enroll and complete degrees in the math program at this institution and will minimize the number of directed studies by maximizing enrollment in higher level courses.