MUS Math Pathways 2.0 Executive Summary

The MUS Math Pathways Taskforce 2.0 was formally charged by the Office of the Commissioner of Higher Education (OCHE) to evaluate, redesign, and implement aligned mathematics pathways across the Montana University System. This report presents the Taskforce's process, the evidence gathered, and the resulting recommendations for system-wide mathematics pathway alignment.

This work builds on the 2015 Math Pathways initiative, which documented the barrier that a universal College Algebra requirement posed to non-STEM students and formalized the concept of multiple, purpose-built mathematics pathways. In the years since, the national landscape of mathematics education has shifted substantially: co-requisite models have replaced traditional developmental sequences, data literacy has become a nearly universal requirement across professional fields, and campuses have responded to evolving academic program needs by creating new courses. Without a coordinating framework, however, those campus-level responses have produced inconsistencies in course numbers, prerequisites, and program requirements that create real barriers for transfer and dual enrollment students, particularly as dual enrollment course taking continues to rise. Without common gateway level math courses in the same academic programs across MUS campuses, transfer students and dual enrollment students would have to take additional math courses, which increases time and cost to degree.

The Taskforce conducted a comprehensive analysis of the mathematics courses required by each meta-major across the MUS, at the AA, AS, AAS, BA, BS, and BSN levels, cataloguing mathematics requirements at every institution. This analysis revealed meaningful inconsistencies in gateway math courses in five primary areas: Business, Social Sciences, Nursing and Allied Health, Industrial Technology, and the prerequisite structure for STAT 216. Following the program mapping, the Taskforce surveyed faculty experts in each partner discipline, asking directly what mathematical skills and competencies their students need for success in their programs and careers. Survey results were analyzed, draft recommendations developed, and discipline faculty were invited into direct dialogue to refine those drafts.

This work was faculty-driven, evidence-based, and conducted in close partnership with discipline experts across the system. At every step, the Taskforce was guided by two complementary commitments: the responsibility of participating in a unified university system and the equally important obligation to honor the autonomy of each campus and its faculty. These are not competing values; they are both essential to sustainable, meaningful reform.

The recommendations in this report are targeted adjustments, not wholesale redesigns. Most existing courses and structures remain unchanged. The STEM pathway through M121 (College Algebra) requires no changes at any institution. M105 retains its role as the quantitative literacy course for humanities and liberal arts. STAT 216 remains the gateway statistics course. M140 continues in its current role. Campus autonomy over course delivery, pedagogy, and local implementation is fully preserved. What changes is the alignment across institutions: which courses serve which programs and which prerequisites reflect actual student needs. The goal is

that students moving across the Montana University System do not lose academic ground because of inconsistencies that exist for historical rather than pedagogical reasons. Students stacking credentials from certificates through associate and bachelor's degrees should have a coherent mathematics pathway from start to finish.

Summary of Recommendations

The following table summarizes the changes recommended across each meta-major area. These are targeted alignments, not system-wide overhauls.

Meta-Major Area	Current State (Varies by Campus)	Recommended Pathway	Key Change
Social Sciences	M105, M115, or M121 depending on institution, plus STAT 216 or discipline-specific statistics	STAT 216 as sole math requirement; M105 as prerequisite if needed based on placement	Eliminate misaligned algebra requirements; STAT 216 covers all 21 top-priority outcomes at 100% faculty agreement (see Table 1 in Social Sciences section for representative outcomes)
Nursing (4-year)	M140 or M121 (inconsistent system-wide)	M140 preferred; M121 accepted as alternative	M140 covers the top 4 nursing-identified outcomes. Campuses not currently offering M140 may continue with M121, which provides sufficient mathematical preparation for nursing students.
Nursing (2-year)	M115, M140, M121, or M120 for LPN	M140 preferred; M121 accepted as alternative; M120 accepted for LPN	M140 allows stackability from 2-year to 4-year pathways. M140 with co-requisite support is preferred for LPN; M120 is an option where M140 co-req is not feasible and the credential is terminal.
Allied Health	Inconsistent; varies by program and campus	M105 or M140, based on program certification needs	M140 for calculation-intensive programs (radiologic technology, paramedicine); M105 for programs needing general quantitative literacy (surgical technology).
Business	M105, M115, M121, M141, or M143 depending on institution, plus STAT 216	New unified course: "Modeling with Functions and Data" (M1XX) + STAT 216	Replace the current patchwork of math courses for Business at different MUS institutions with one purpose-built unified course (M1XX) covering financial math and functions; serves as prerequisite for M161/M162 for students needing calculus.

Industrial Technology (Trades)	M111, M114 (no gen-ed credit); M105 where used; inconsistent learning outcomes across campuses	Revamped M111 with aligned CCN outcomes, general-education credit, and asynchronous online version for dual enrollment	Align M111 across MUS to match the content trades faculty identified (high faculty agreement, 75–100%, on applied measurement, geometry, trigonometry, and dimensional analysis); add gen-ed credit; build online DE version for rural access.
STAT 216 Prerequisite	M115 at UM, MC, and FVCC; M105 or none everywhere else	M105 as maximum allowable prerequisite; students may place directly into STAT 216 through appropriate placement	Align all MUS institutions. With M115 shifting to serve the business pathway, it is no longer appropriate as a statistics prerequisite.
STEM Pathway	M121 (College Algebra)	No change required	The STEM pathway through M121 remains unchanged at all institutions.