

# MATHEMATICS TEACHING LICENSURE OPTION SINGLE SUBJECT ENDORSEMENT BACHELOR OF SCIENCE DEGREE

## Program Learning Outcomes

Upon successful completion of this program, students will be able to:

- Use mathematical concepts to solve problems.
- Critique and construct mathematical arguments and proofs.
- Use technology such as (but not limited to) computer algebra systems, statistical software, and calculators to solve, analyze, or explore problems in mathematics.
- Demonstrate how students learn mathematics and the pedagogical knowledge specific to mathematics teaching and learning by demonstrating how learners develop mathematical proficiency through the interdependent processes of integrating conceptual understanding, procedural fluency, strategic competence, adaptive reasoning, and productive disposition.
- Demonstrate how students learn mathematics and the pedagogical knowledge specific to mathematics teaching and learning by demonstrating an understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments in mathematics and ensure high standards of mathematical work for all students.
- Demonstrate how students learn mathematics and the pedagogical knowledge specific to mathematics teaching and learning by demonstrating an understanding of learning environments that promote mathematical learning, including individual and collaborative learning, positive social interaction about mathematics, active engagement in mathematics learning, and promote self-motivation among mathematical learners.
- Demonstrate how students learn mathematics and the pedagogical knowledge specific to mathematics teaching and learning by demonstrating an understanding of multiple methods of assessment of mathematical learner growth, progress, and decision making.
- Demonstrate how students learn mathematics and the pedagogical knowledge specific to mathematics teaching and learning by demonstrating an understanding of a variety of instructional strategies that encourage learners to develop deep understanding of mathematics.
- Demonstrate how students learn mathematics and the pedagogical knowledge specific to mathematics teaching and learning by demonstrating an understanding of grades 5-12 mathematics curriculum as specified by the State of Montana Content Standards and of the assessment process as specified by the Montana statewide assessment.

All students desiring licensure to teach are required to file an Application for Admission to the Educator Preparation Program (<https://catalog.msubillings.edu/undergraduate/college-education/>).

## Required Courses

Code	Title	Credits
General Education Requirements ( <a href="https://catalog.msubillings.edu/undergraduate/general-education-requirements/">https://catalog.msubillings.edu/undergraduate/general-education-requirements/</a> ) <sup>1</sup>		31

Students should consult with their advisor to determine other specific courses necessary in order to satisfy the General Education requirements within this major.

**Professional Core (see below) 47**

**Included in this core, students must take:**

EDSP 410	Sprrtng Div Lrnrs thru Collab
EDU 366	Math Practicum
EDU 383	Assessment in Education
EDU 497B	Methods: 5-12 Mathematics

**Required Courses**

M 171	Calculus I *	4
M 172	Calculus II	4
M 242	Methods of Proof	3
M 273	Multivariable Calculus	4
M 305	Discrete Structures I	4
M 329	Modern Geometry	3
M 333	Linear Algebra	4
M 431	Abstract Algebra I	3
M 471	Mathematical Analysis	3
STAT 216	Introduction to Statistics *	4
STAT 341	Intro Probability & Statistics	4
Subtotal		40

**Concentration Electives**

Select 6-8 credits from below. Other courses may be chosen in consultation with 6-8 an advisor.<sup>2</sup>

CSCI 100	Intro to Programming
CSCI 116	Python Programming
M 130	Math for Elementary Teachers I *
M 131	Math for Elementary Teacher II
PHSX 220	Physics I
PHSX 221	Physics I Lab
PHSX 232	Physics II & Thermo
PHSX 233	Physics II & Thermo Lab

Subtotal 6-8

**Electives 1-3**

**Total Minimum Credits 120**

\* May satisfy General Education requirements.

<sup>1</sup> M 171 or STAT 216 count in both General Education and program requirements. EDU 105 counts in both General Education and the Professional Core.

<sup>2</sup> Students should contact the Math Department to confirm the eligibility of any course with an adequate computer science, math, or statistics component to count in this group.

*Certain courses in this program have prerequisites; students should check the course descriptions for required prerequisites.*

## Professional Core Requirements

The Professional Core at Montana State University Billings combines the intellectual foundations of education and the professional knowledge and skills required of all teachers into a coherent sequence of courses. The core provides the basis for understanding the philosophical, historical, cultural, and sociopolitical means by which society attempts cultural transmission and it provides the opportunity to acquire the knowledge and skills that are essential for effective instruction. It includes the range of human development and learning as they affect instructional

planning, evaluation, curriculum design and implementation, performance skills, management of classrooms, direction of students, professional responsibilities, and ethical issues affecting teacher effectiveness.

At different points in its sequence of courses, the Professional Core engages students in supervised practice applying their developing knowledge and skills. By having faculty who hold diverse disciplinary perspectives teach throughout its sequence, the Professional Core encourages students to develop a professionally responsible understanding of the diversity that defines learners and teachers. The student teaching experience completes the sequence and includes both a final look at classroom skills and a capstone seminar.

The Professional Core presents a balanced approach to epistemology from philosophical, psychological, and sociological perspectives. The core is predicated on the evidential nature of knowledge required for the professional practice of education. While the professional practice of education is also informed by belief and intuition, it is ultimately defensible only to the extent that it has evidential support. The Professional Core engages students in both the processes and products of human knowing as such knowing is central to all aspects of education. The Professional Core involves the

1. creation,
2. facilitation of change,
3. transmission, and
4. application of human knowledge across the diversity of ways in which individuals understand human knowledge.

**Secondary and K-12**

Code	Title	Credits
EDSP 204	Intro to Tchng Exceptnl Lnrs	3
EDU 105	Education and Democracy *	3
EDU 220	Human Growth & Development	3
EDU 221	Educ Psyc & Measurement	3
EDU 333	Rd & Wrtng Across Curriculum	3
EDU 343	Strat for Mnging Div Learners	2
EDU 354	Secondary Junior Field	2
EDU 381	Curriculum Theory & Design	3
EDU 406	Phil, Legal & Ethical Issues	3
EDU 495A	Student Teaching: K-12	9
or EDU 495C	Student Teaching: 5-12	
HTH 412	Drugs and Alcohol	1
Content Area Methods Course		2-3
<b>Total Minimum Credits</b>		<b>37-38</b>

\* May satisfy General Education requirements.

## Suggested Plan of Study

Students should talk with their faculty advisors prior to registration for classes. It is a good practice to visit with the faculty advisor each semester. The following suggested schedule provides a general overview of courses and work that will enable the student to progress through the degree in an orderly and timely manner.

Code	Title	Credits
First Year		
Fall		
M 171	Calculus I	4
STAT 216	Introduction to Statistics	4

EDU 105	Education and Democracy	3
NASX 105	Intro Native American Studies	3
or NASX 205	Native Americans in Contmp Soc	
WRIT 101	College Writing I	3
Total		17
Spring		
M 172	Calculus II	4
M 242	Methods of Proof	3
COMX 115	Intro to Interpersonal Comm	3
or COMX 111	Intro to Public Speaking	
EDU 220 & 220L	Human Growth & Development and Human Growth & Development Lab	3
General Education		5
Total		18
Second Year		
Fall		
M 273	Multivariable Calculus	4
M 305	Discrete Structures I	4
EDSP 204	Intro to Tchng Exceptnl Lnrs	3
HTH 412	Drugs and Alcohol	1
HSTA 101	American History I	3
or HSTA 102	American History II	
General Education		3
Total		18
Spring		
M 333	Linear Algebra	4
STAT 341	Intro Probability & Statistics	4
EDU 221	Educ Psyc & Measurement	3
General Education		6
Total		17
Apply for Admission to Educator Preparation Program Spring Semester		
Third Year		
Fall		
M 329	Modern Geometry	3
Concentration Electives		4
EDU 381	Curriculum Theory & Design	3
EDU 383	Assessment in Education	3
General Education		5
Total		18
Spring		
M 471	Mathematical Analysis	3
Concentration Electives		3
EDU 333	Rd & Wrtng Across Curriculum	3
EDU 366	Math Practicum	3
Elective		2
Total		14
Fourth Year		
Fall		
M 431	Abstract Algebra I	3
EDSP 410	Sprrtng Div Lnrs thru Collab	3
EDU 343	Strat for Mnging Div Learners	2
EDU 354	Secondary Junior Field	2

EDU 497B	Methods: 5-12 Mathematics	3
Total		13
Spring		
EDU 406	Phil, Legal & Ethical Issues	3
EDU 495C	Student Teaching: 5-12	9
Total		12
Apply to Student Teach Fall Semester		
Apply to Graduate Fall Semester		
Apply for Licensure Spring Semester		