North Dakota Education Standards and Practices Board
Initial Program Report
Preparation of Mathematics Teachers
(05-17)

COVER SHEET

1. **Institution's Name:** Mayville State University
2. **Date Submitted:** December 31, 2025
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5. **Name of Institution's program:** Mathematics Education BSEd
6. **Grade levels for which candidates are being prepared:** 5th - 12th Grade
7. **Degree or award level (select one)**
   a. **Initial**
      i. **_X_ Baccalaureate**
      ii. **___ Post Baccalaureate**
8. **Is this program offered at more than one site?**
   a. **___ Yes**
   b. **_X_ No**
9. **If your answer is yes to the above question, list the sites at which the program is offered:**
10. **Program report status (check one):**
    a. **___ Initial Review**
    b. **_X_ Continuing Review**
    c. **___ Focused Visit**

All course syllabi and aligned assessments can be found here: **Mathematics Education BSEd**

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SECTION I: CONTEXTUAL INFORMATION

1. Candidate Information

Directions: Provide three cycles of data on candidates enrolled* in the program and completing** the program, beginning with the most recent academic year for which numbers have been tabulated. Please report the data separately for the levels/tracks (e.g., baccalaureate, post-baccalaureate, alternate routes, master's, doctorate) being addressed in this report.

Program: Mathematics Education BSEd

Academic Year	# of Candidates Enrolled in the Program	# of Program Completers
2022 – 2023	9	4
2023 – 2024	4	1
2024 – 2025	4	1

* Enrolled candidates are those formally admitted to the program as of the institution's official fall reporting date or as of October 15 of each academic year.

** Program completers are those candidates for whom a degree is conferred within the selected academic year. The academic year begins in the fall and concludes in the spring or summer of the following year depending upon whether candidates are granted degrees in the summer.

2. Curriculum Exhibit (Select 1)

a. X **Option 1:** Complete the Curriculum Exhibit Form below. **Include an electronic link to each syllabus for courses listed under the Teaching Specialty and the Professional Education columns.**

Curriculum Exhibit Form SFN 14381. *Provides the opportunity for institutions to document the entire program including general studies, teaching specialty, and professional education.*

- *Curriculum exhibit forms are to be prepared for every basic and advanced program being brought forward for either initial or continuing approval by the Education Standards and Practices Board (ESPB).*
- *A separate sheet is to be completed for **each** program for which approval is requested. If more than one program is offered within an approval category, a separate sheet must be completed for each of those programs. For example, if both instrumental and vocal/choral music majors are offered, complete a separate sheet for each. Also, for example, a separate sheet must be completed for each of the science and social science majors.*

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CURRICULUM EXHIBIT FORM BASIC PROGRAM
EDUCATION STANDARDS AND PRACTICES BOARD
SFN 14381 (05-17)

Institution: Mayville State University	**Major:** Mathematics Education BSEd
Total credits required for degree: 110 credits (candidates need additional electives to earn the 120-credit minimum)	

General Studies	Teaching Specialty	Professional Education
Credits Required: **36 credits**	Credits Required: **33 credits**	Credits Required: **41 credits**
Communication: 9 credits • COMM 110 Fund of Public Speaking (3) • ENGL 110 College Composition I (3) • ENGL 120 College Composition II (3) OR • ENGL 125 Business & Tech Writing (3) **Computer Information System: 1 credit** • CIS 175 Information Literacy (1) **Humanities: 6 credits** • Selected by teacher candidate (6) **Social Science: 9 credits** • GEOG 103 Multicltrl Wrld, Glbl Issues (3) • PSYC 111 Intro to Psychology (3) • Selected by teacher candidate (3) **Mathematics: 3 credits** • MATH 103 College Algebra (3) **Science: 8 credits** • Two content courses (6) • Two lab courses (2)	• MATH 105 Trigonometry (2) • MATH 165 Calculus I (4) • MATH 166 Calculus II (4) • MATH 265 Calculus III (4) • MATH 323 Probability & Statistics (3) • MATH 389 Modern Geometry (3) • MATH 412 Differential Equations (3) • MATH 420 Hist/Philosophy Of Math (3) • MATH 435 Theory Of Numbers (3) • MATH 443 Alg Struct w Prgming (3) • MATH 480 Mathematics Comp. (1)	• EDUC 250 Introduction to Education (3) • EDUC 272 Educational Technology (2) • EDUC 290 Theories of Learning & Mgmt (2) • EDUC 380 Teach English Lang Learners (2) • EDUC 381 Human Relations/Cult Diversity (2) • EDUC 390 Special Needs in Inclusive Env (3) • EDUC 400 Student Teaching (10) • EDUC 401 Elctrnc Portfolio/Assess/Semin (2) • EDUC 401S Pre-Student Teach Seminars (1) • EDUC 422 Educational Assessment (2) • EDUC 426 Reading in the Content Area (2) • EDUC 480 General Methods Sec Educators (3) • EDUC 480L General Methods Field Exp (1) • EDUC 483 Secondary Methods Mathematics (3) • PSYC 255 Child & Adolescent Psychology (3)
Total: 36 credits	**Total: 33 credits**	**Total: 41 credits**

ESPB does not advocate, permit, nor practice discrimination on the basis of sex, race, color, national origin, religion, age or disability as required by various state and federal laws.

3. **Descriptive Information about the Program:** Provide a one to two paragraph description to help reviewers understand your program (include information that describes how a student typically moves through the program from entry to exit).

Mayville State University's Teacher Education Program is built on the Reflective Experiential Teacher Model, which emphasizes the integration of theory and practice through critical reflection and experiential learning. Accredited by the Council for the Accreditation of Educator Preparation (CAEP) and aligned with InTASC standards, the Mathematics Education BSEd program prepares candidates to demonstrate professional knowledge, skills, and dispositions necessary to positively impact 5–12 learners. Mathematics Education BSEd candidates typically begin the admission process during EDUC 250: Introduction to Education or upon transfer to Mayville State University. Admission requirements include successful completion of foundational coursework (as outlined in the Teacher Education handbook, with minimum grades of "C" or higher), a minimum cumulative GPA of 2.75, competency in basic skills through the Praxis Core Exam, ACT scores, course grades as outlined on the competency menu (currently in pilot phase) or a combination of all three. A course grade of "B" or higher in EDUC 250 is required to be admitted into the Teacher Education program. Mathematics Education BSEd candidates also complete an admission interview, disposition evaluations, submit student liability insurance, and a cleared background check to ensure readiness for clinical experiences that occur through the remainder of the program.

Once admitted, Mathematics Education BSEd candidates progress through a sequence of professional education and methods courses that embed clinical field experiences in diverse settings. These experiences are designed to help candidates apply research-based instructional strategies, develop cultural competence, and integrate technology into teaching. Throughout the program, candidates develop an electronic capstone portfolio aligned to program Student Learning Outcomes (SLOs) and InTASC standards to demonstrate their growth in areas such as learner development, content, instructional practice, and professional responsibility. Professional development seminars and reflective exercises are infused across coursework to support continuous improvement and adaptability in evolving classroom settings.

Admission to the Mayville State Teacher Education Program does not guarantee continuance. Mathematics Education BSEd candidates must maintain a 2.75 GPA, uphold professional dispositions, and receive satisfactory evaluations from faculty and field supervisors throughout their time in the program. They must also earn grades of "C" or higher in all methods and professional education courses. If concerns arise, the Teacher Education Committee may implement a Student Success Plan, probation, or other interventions to support and guide candidates. These measures ensure accountability while supporting candidates' growth within the framework of the Reflective Experiential Teacher Model.

The Mathematics Education BSEd program culminates with the completion of EDUC 400: Student Teaching, a 15-week full-time clinical experience in an accredited school, paired with EDUC 401: Electronic Portfolio and Seminar. In these courses, candidates demonstrate mastery of program outcomes through lesson planning, classroom management, and reflective practice under the guidance of cooperating teachers and university supervisors. Successful completion of student teaching, portfolio presentation, and required Praxis Subject Area and Principles of Learning and Teaching exams ensures candidates are prepared for licensure and entry into the teaching profession. This progression from foundational coursework to integrated clinical practice reflects Mayville State's mission to prepare educators who are reflective, competent, and committed to lifelong learning.

4. **Changes in the Program since the Last Review:** Please describe any changes since the last review and include rationale for those changes. The following changes have occurred in the program since the last comprehensive review in 2018. A rationale for each decision is provided.
   - Removed minor requirement. This was done to provide more flexibility in coursework for students. There was also an effort to have students complete their degrees more quickly so they could begin teaching in the field sooner. Removing the minor requirement reduced the number of credits needed to graduate.
   - Core requirements changed from 29 hours to 33 hours. This was due to adding Calculus I back into the core requirements. Calculus I is required to earn a Math Education degree, so it belongs on the list.
   - Professional Education Course requirements changed from 42 to 41 due to the following listed below:
     - EDUC 483 Secondary Math Methods (2 credits) and EDUC 398 Field Experience (1 credit) were merged into a single 3-credit EDUC 483 Secondary Math Methods course to create a more integrated learning experience that combines pedagogical theory with practical classroom application. This restructuring eliminates redundancy and allows students to apply methods of instruction directly within their field experience component in a cohesive course structure with the same instructor/mentor.:
     - EDUC 401S Pre-Student Teaching Seminar was changed from 0 credits to 1 credit to accurately reflect the preparatory work students complete as they transition into student teaching, ensuring they receive appropriate academic recognition for their efforts.
     - EDUC 381 Human Relations and Cultural Diversity was reduced from 3 credits to 2 credits to align with state licensure requirements while recognizing that diversity content is now intentionally embedded throughout multiple courses in the teacher education program, eliminating unnecessary redundancy.

- EDUC 480 General Methods was reduced from 4 credits to 3 credits in response to university administration's directive to move toward a 120-credit minimum for all programs, promoting greater efficiency in program delivery while maintaining essential content coverage.

5. **Field & Clinical Experiences:** Briefly describe the required field & clinical experiences that are specific to your program including the number of hours for early field experiences and the number of hours/weeks for student teaching or internships.

Several professional education courses provide Mathematics Education BSEd candidates with school-based practicum experiences under the dual supervision of the responsible University Mentor and selected competent and qualified Field Mentors in 5-12 schools. Clinical Experiences and Student Teaching Experiences are an integral part of the professional education program as they are designed to help our candidates understand the relationship between classroom theory and application to practice. The Director of Student Placement monitors experiences, making sure Mathematics Education BSEd candidates are assigned to multiple settings, which increases the amount and types of diverse 5-12th grade students with which candidates interact. Information on experiences is managed through the Field Placement database to assist in making informed decisions about where to place candidates. It is not likely candidates will be placed in schools in which they have attended to ensure diverse perspectives. Selection for experiences are made balancing factors such as diversity of school, recommendations from district administrators, travel time and distance, school schedule, course schedule, and personal considerations (e.g., disability, socioeconomic status, transportation, family). The table below indicates the early and final clinical experiences our Mathematics Education BSEd candidates participate in and the total number of hours:

Program On campus = (OC) Online = (OL)	**Early Field Experiences** Observation = (O) Practicum = (P)	**Final Clinical Experience** (Student Teaching)	**Total Hours**
Secondary Math (OC and OL)	EDUC 250 – 25 virtual hours (O) EDUC 480L – 30 hours (P) EDUC 483 – 30 hours (P)	EDUC 400 – 15 weeks full time student teaching in grades 5-12; 600 hours	685

SECTION II: RESPONSE TO STANDARDS

1. **Areas of Weakness from Prior Review:** How has the program addressed and resolved the weaknesses targeted in the previous program review and not previously resolved? Describe actions taken to address the weakness and provide evidence that the weakness has been resolved.

During the previous review in 2019, content reviewers indicated the Mathematics Education program met the following standard with weakness: 11010.6 Instructional Tools. The EPP addressed the identified weakness related to this standard by clarifying and strengthening alignment of standards to course objectives, assignments, and evaluations. During this program review cycle, the EPP confirmed that instructional tool competencies are taught across multiple Mathematics content courses, including MATH 323 (Probability and Statistics), MATH 389 (Modern Geometry), MATH 412 (Differential Equations), and professional education courses, including EDUC 272 (Educational Technology), EDUC 380 (Teaching ELL), EDUC 400 (Student Teaching), EDUC 401 (Electronic Portfolio/Assessment/Seminar), EDUC 480 (General Methods), and EDUC 480L (General Methods Field Experience).

To provide clear evidence, this program review includes a narrative that explains how each course allows candidates to learn and/or apply appropriate use of instructional tool as well as alignment to program evaluations including the Praxis Principles of Learning and Teaching Exam, the EDUC 480L General Methods Field Experience: STOT (InTASC) Evaluation, and the EDUC 400 Student Teaching-STOT (InTASC) Evaluation. Additionally, the program incorporated another measure by using data from the Capstone Portfolio to ensure alignment with accreditation requirements. The program also resolved curriculum inconsistencies noted in the prior review. It clarified that EDUC 398 (Secondary Field Experience is no longer offered and a credit was added into the EDUC 483 Secondary Methods Mathematics course to the theory and practice could be more closely aligned. EDUC 480L (General Methods Field Experience) was confirmed as the required 30-hour clinical experience designed to increase classroom exposure prior to student teaching. Furthermore, the course numbering error for MATH 389 (Modern Geometry) from the previous program review was corrected in program documentation.

Finally, the program implemented actions to improve candidate performance on the Praxis II Math Content Exam (5161), which had shown inconsistent results. Of note, Mathematics Education BSEd candidates are required to take a different test during this program review cycle (Mathematics: Content Knowledge-5165). Actions to improve inconsistent scores include aligning course content and comprehensive exams with the ETS curriculum crosswalk, revising syllabi where gaps exist, encouraging candidates to take the exam during their content methods course,

and integrating Praxis sample questions and study plans into EDUC 480 (Mathematics Comprehensive) and EDUC 483 (Secondary Methods of Math). EDUC 483 (Secondary Methods of Math) is now offered online to better support distance students. These steps, combined with ongoing review processes and supplemental evidence, demonstrate that the program has taken significant measures to resolve prior weaknesses and strengthen candidate preparation.

2. Course/Assessment Matrix:

- Complete the matrix below.
  - List courses that address each of the ESPB standards for your program. (All courses listed should be linked to an electronic syllabus.)
  - List the assessments that most clearly align with each standard. (Choose from among those listed in Section IV: Evidence of Meeting the Standard.)
- Provide a short narrative describing how the program addresses the standard. (For example, identify course objectives, activities and related experiences.)

All course syllabi and aligned assessments can be found here: **Mathematics Education BSEd**

SECTION III: ADDRESSING THE STANDARDS

State Standard	Course Prefix and Title	Assessment
11010.1 Mathematical Practices and Processes The program requires the candidate to demonstrate the following: a. makes sense of problems and persevere in solving them b. reasons abstractly and quantitatively c. constructs viable arguments and proofs d. critiques the reasoning of others e. uses mathematical models f. attends to precision g. identifies elements of structure h. engages in mathematical communication	MATH 105 Trigonometry MATH 165 Calculus I MATH 166 Calculus II MATH 265 Calculus III MATH 323 Probability & Statistics MATH 389 Modern Geometry MATH 412 Differential Equations MATH 435 Theory of Numbers MATH 443 Algebra Struct with Programming EDUC 480 General Methods Sec Educators EDUC 480L General Methods Field Exp EDUC 483 Secondary Methods Mathematics PSYC 255 Child & Adolescent Psychology	• Praxis Content Knowledge Exam • GPA • MATH 480 Mathematics Comprehensive Final Grade • MATH 443 Final Exam Score • EDUC 483 Secondary Math Methods: STOT (InTASC) Evaluation • EDUC 480L General Methods Field Experience: STOT (InTASC) Evaluation • EDUC 400 Student Teaching-STOT (InTASC) Evaluation

Narrative: Our Mathematics education program has been strategically designed to ensure candidates thoroughly develop the mathematical practices and processes outlined in standard 11010.1. Through a progressive sequence of mathematical content courses and complementary education coursework, our program develops teachers who possess this essential knowledge.

The calculus sequence (MATH 165 Calculus I, 166 Calculus II, and 265 Calculus III) establishes a strong foundation in making sense of problems and persevering in solving them. Beginning with MATH 105 Trigonometry, students encounter complex mathematical relationships and develop systematic approaches to problem-solving. As they progress through Calculus I, II, and III, students face increasingly sophisticated challenges requiring sustained effort and strategic thinking. from analyzing limits and continuity to master multiple integration techniques and vector calculus applications. This progression directly supports standard element 11010.1.a, as students learn to analyze givens, constraints, and pathways to solutions.

The ability to construct viable arguments and proofs (11010.1.c) and critique the reasoning of others (11010.1.d) is developed extensively in MATH 389 Modern Geometry. This course explicitly incorporates effective research-based teaching strategies to use geometry to model mathematical ideas and methods for mathematical proofs. Students learn to build logical progressions of statements, justify conclusions, and evaluate the validity of arguments. These skills are further reinforced in MATH 435 Theory of Numbers, where students engage with theorems, conjectures, and proofs, developing the critical thinking needed to analyze mathematical reasoning. MATH 443 Algebraic Structures with Programming also requires students to construct math induction proofs and other proofs as they work with groups, rings, and fields.

MATH 323 Probability & Statistics and MATH 412 Differential Equations specifically address mathematical modeling (11010.1.e) and precision (11010.1.f). In Probability & Statistics, students work with various probability distributions and statistical methods, learning to model real-world phenomena mathematically. Differential Equations extends this capacity by having students gain "experience modeling with differential equations" and applying these models to solve practical problems. Throughout these courses, students learn to be precise in their calculations, definitions, and communication, whether calculating confidence intervals or solving differential equations through various methods.

MATH 323 Probability & Statistics and MATH 412 Differential Equations specifically address mathematical modeling (11010.1.e) and precision (11010.1.f). In Probability & Statistics, students work with various probability distributions and statistical methods, learning to model real-world phenomena mathematically. Differential Equations extends this capacity by having students gain experience modeling with differential equations and applying these models to solve practical problems. Throughout these courses, students learn to attend to precision in their calculations, definitions, and communication, whether calculating confidence intervals or solving differential equations through various methods.

The identification of elements of structure (11010.1.g) is particularly emphasized in MATH 443 Algebraic Structures, where students analyze the structural components of mathematical systems. MATH 389 Modern Geometry further develops this skill through the examination of geometric principles across different mathematical contexts. Mathematical communication (11010.1.h) is integrated throughout the curriculum but receives special attention when students present their research in MATH 435 and when they design and experiment with instruction in EDUC 480. The General Methods course requires candidates to craft effective lessons and design varied instruction, necessitating clear and precise mathematical communication adapted to diverse learners.

EDUC 480 General Methods for Secondary Educators and its companion field experience (EDUC 480L) bridge mathematical content knowledge with pedagogical application. These courses enable candidates to translate their mastery of mathematical practices into effective instruction through conceptual approaches such as understanding by design and differentiated instruction. The 30-hour field placement provides authentic opportunities to observe, practice, and reflect on mathematical communication in classroom settings. PSYC 255 Child and Adolescent Psychology complements these courses by providing insights into cognitive development, helping candidates understand how students learn mathematical concepts at different developmental stages. This knowledge is crucial for effectively implementing all eight mathematical practices in age-appropriate ways.

Candidates' proficiency of mathematical practices and processes (Standard 11010.1) is verified through multiple measures. The Praxis Content Knowledge Exam assesses standards-relevant knowledge and abilities necessary for competent mathematics teaching practice, ensuring candidates can apply mathematical practices across diverse contexts. Throughout their coursework, candidates maintain a cumulative GPA reflecting consistent achievement in developing problem-solving, reasoning, argumentation, modeling, precision, structural understanding, and communication skills. The MATH 480 Mathematics Comprehensive Final Grade provides a capstone assessment requiring candidates to demonstrate mastery across 11 mathematical content areas through examination and a research

paper on a mathematical topic, directly measuring their ability to construct arguments, attend to precision, and engage in mathematical communication. The MATH 443 Final Exam Score evaluates candidates' proficiency in constructing mathematical proofs, including math induction proofs, while working with abstract algebraic structures, comprehensively assessing their ability to reason abstractly, construct viable arguments, critique reasoning, and identify elements of mathematical structure as specified in the standard.

The Skills of Teaching Observation Tool (STOT)/InTASC evaluations administered in EDUC 480L General Methods Field Experience, EDUC 483 Secondary Math Methods, and EDUC 400 Student Teaching measure candidates' ability to translate mathematical practices into effective classroom instruction at the beginning, middle, and end of the program. These evaluations, completed by the candidate, mentor teacher, and course instructor, assess core teaching skills necessary to ensure students reach their learning goals while monitoring candidates' skill development and growth from program admission through completion. Through these STOT evaluations, candidates demonstrate their capacity to effectively communicate mathematical ideas, engage students in problem-solving and reasoning, and create learning experiences that develop all eight mathematical practices in their future students.

Through this comprehensive sequence of mathematics and education courses and assessments, our Mathematics BSEd program ensures that candidates not only master mathematical practices and processes themselves but also develop the capability to foster these practices in their future students. Graduates are prepared to make mathematics meaningful and accessible through problem-solving, reasoning, argumentation, modeling, precision, structural understanding, and effective communication.

11010.2 Mathematical Connections The program requires the teacher candidate to demonstrate the interconnectedness of mathematical ideas and how they build on one another. The candidate recognizes and applies connections among mathematical ideas and across various content areas as well as real-world contexts, using the language of mathematics to express ideas precisely, both orally and in writing to multiple audiences.	MATH 105 Trigonometry MATH 323 Probability & Statistics MATH 389 Modern Geometry MATH 412 Differential Equations MATH 420 Hist/Philosophy Of Math MATH 435 Theory Of Numbers EDUC 400 Student Teaching EDUC 480L General Methods Field Exp EDUC 483 Secondary Methods Math	• Praxis Content Knowledge Exam • EDUC 480L General Methods Field Experience: STOT (InTASC) Evaluation • EDUC 483 Secondary Math Methods: STOT (InTASC) Evaluation

Narrative: Our Mathematics education program intentionally develops teacher candidates' ability to recognize and demonstrate the connectedness of mathematical ideas as required by standard 11010.2. Through a strategic sequence of content and methods courses, candidates learn to express mathematical ideas precisely and apply connections across content areas and real-world contexts. MATH 105 Trigonometry establishes foundation skills in connecting algebraic and geometric representations through trigonometric functions, identities, and polar coordinates. These connections provide candidates with essential language and concepts to express precise mathematical relationships that bridge multiple domains. MATH 389 Modern Geometry explicitly focuses on connections between K-12 and advanced geometric concepts. By studying transformations alongside axiomatic Euclidean geometry and non-Euclidean geometries, candidates develop the ability to connect fundamental geometric ideas to more sophisticated mathematical structures. The course's emphasis on using geometry to model mathematical ideas directly addresses the standard's focus on recognizing how mathematical ideas build upon one another. MATH 412 Differential Equations strengthens candidates' capacity to connect calculus concepts with real-world applications. As students gain "experience modeling with differential equations" and explore applications of second-order differential equations, they develop proficiency in using mathematical language to describe dynamic systems across various contexts. This directly supports the standard's emphasis on applying connections to real-world contexts. MATH 323 Probability & Statistics develops candidates' ability to connect data analysis with inferential reasoning. The course bridges descriptive statistics with probability theory and inferential techniques, demonstrating how mathematical ideas build sequentially. These connections enable candidates to express statistical concepts precisely and apply them to real-world scenarios involving uncertainty and data interpretation.

MATH 420 History and Philosophy of Mathematics uniquely addresses the standard by examining mathematics from a conceptual as well as a chronological point of view. This perspective helps candidates understand how mathematical ideas have evolved and built upon one another throughout history. By studying mathematics as both a science and an art, candidates develop appreciation for connections between mathematics and broader intellectual disciplines, supporting their ability to express these connections to multiple audiences. MATH 435 Theory of Numbers strengthens candidates' understanding of connections between theoretical number concepts and their applications. The research component, where students "research real-life applications of Number Theory," directly addresses the standard's focus on connecting mathematical ideas to real-world contexts. The writing requirement develops candidates' ability to express mathematical ideas precisely in written form for multiple audiences.

EDUC 483 Secondary Methods for Mathematics prepares candidates to translate their understanding of mathematical connections into effective instruction. By designing lessons that support student learning in a college and career ready classroom, candidates learn to facilitate students' recognition of connections between mathematical ideas. The required philosophy paper develops candidates' ability to articulate these connections precisely in writing. EDUC 480L General Methods Field Experience provides opportunities for candidates to observe and practice expressing mathematical connections orally in authentic classroom settings. This experience develops candidates' skill in communicating mathematical ideas precisely to the specific audience of secondary students. EDUC 400 Student Teaching serves as the culminating experience where candidates demonstrate their ability to recognize and express mathematical connections across a full semester of instruction. The requirement to collect and analyze data on student learning develops candidates' ability to assess how effectively they have communicated these connections to multiple student audiences.

Multiple assessments measure candidates' ability to recognize and express mathematical interconnections (Standard 11010.2). The Praxis Content Knowledge Exam evaluates candidates' understanding of mathematical concepts and their relationships across domains, ensuring they possess foundational knowledge of how mathematical ideas build upon one another. As candidates progress through field experiences, STOT (InTASC) Evaluations during EDUC 480L General Methods Field Experience (beginning of program) and EDUC 483 Secondary Math Methods (middle of program) track their developing ability to communicate mathematical connections orally and in writing to diverse student audiences in authentic classroom settings. These performance-based evaluations, completed by candidates, mentor teachers, and course instructors, assess candidates' skill in applying mathematical connections across content areas and real-world contexts while using precise mathematical language, demonstrating their readiness to help secondary students recognize the interconnectedness of mathematical ideas.

Through this sequence of mathematics and education courses, with aligned assessments, our Mathematics BSEd program ensures that candidates develop the capacity to recognize mathematical interconnections, apply them across various contexts, and express mathematical ideas precisely to the diverse audiences they will encounter as secondary mathematics educators.

11010.3 Secondary School Content Knowledge The program requires the teacher candidate to demonstrate and applies knowledge of secondary mathematics concepts, algorithms, procedures, applications in varied contexts, and connections within and among mathematical domains (Number, Algebra, Geometry, Trigonometry, Statistics, Probability, Calculus, and Discrete Mathematics)	MATH 105 Trigonometry MATH 165 Calculus I MATH 323 Probability & Statistics MATH 389 Modern Geometry MATH 435 Theory Of Numbers MATH 443 Algebraic Struct with Prgming EDUC 480 General Methods Sec Educators EDUC 480L General Methods Field Exp	• Praxis Principles of Learning and Teaching Exam • MATH 443 Final Exam Score • MATH 480 Mathematics Comprehensive Final Grade • EDUC 480L General Methods Field Experience: STOT (InTASC) Evaluation

Narrative: Our Mathematics BSEd program systematically develops teacher candidates' knowledge across mathematical domains as required by standard 11010.3 through specialized content courses and field experiences. Trigonometric concepts form a cornerstone of secondary mathematics preparation through MATH 105. This foundational course equips candidates with knowledge of angle measures, trigonometric and inverse functions, identities, equations, and polar coordinates, essential content that bridges algebra and geometry domains while providing applications across multiple mathematical contexts. Developing advanced mathematical reasoning, MATH 165 Calculus I builds candidates' proficiency with limits, continuity, differentiation, and integration. The course's emphasis on the Mean Value Theorem and Fundamental Theorem of Calculus ensures candidates understand pivotal mathematical concepts that connect algebraic and geometric representations while establishing foundational calculus knowledge.

Statistical literacy and probabilistic reasoning are comprehensively addressed in MATH 323 Probability and Statistics. Through exploration of discrete probability distributions, normal distribution, the Central Limit Theorem, and inferential statistical techniques, candidates develop proficiency in two critical domains increasingly emphasized in secondary mathematics curricula. Geometric understanding spans elementary through advanced concepts in MATH 389 Modern Geometry. By progressing from K-12 topics like polygons and transformations to undergraduate-level topics including non-Euclidean geometries, candidates build content knowledge that prepares them to make geometric concepts accessible to secondary students while appreciating deeper mathematical structures. Number theory exploration provides candidates with insight into fundamental mathematical structures through MATH 435 Theory of Numbers. The study of theorems, conjectures, and proofs, along with research into real-life applications, ensures candidates can connect abstract number concepts to concrete contexts and applications, strengthening their ability to make mathematics accessible to secondary students.

Within the EDUC 480 General Methods course, candidates learn to translate mathematical content knowledge into effective instruction. This preparation focuses on designing lessons that support diverse learners through research-based approaches, developing candidates' ability to make mathematical concepts meaningful and accessible across secondary contexts. Direct classroom experience through EDUC 480L General Methods Field Experience provides candidates with opportunities to apply mathematical content knowledge in authentic settings. This 30-hour field placement allows candidates to practice teaching mathematical concepts to secondary students, receiving feedback that refines their ability to communicate mathematical ideas effectively. The culminating experience in EDUC 400 Student Teaching requires comprehensive demonstration of mathematical content knowledge across 15 weeks of instruction. During this extended

placement, candidates collect and analyze data on student learning while receiving guidance from cooperating teachers and university supervisors, providing evidence of their capacity to teach secondary mathematics content effectively.

Candidates' proficiency across secondary mathematics domains is assessed through theoretical and practical measures. The Praxis Principles of Learning and Teaching Exam evaluates foundational understanding of instructional processes, diverse learners, and educational psychology necessary for effectively teaching secondary mathematics content. The MATH 443 Final Exam Score verifies candidates' mastery of linear algebra and abstract algebra concepts through problems on matrices, determinants, groups, rings, fields, proofs, and vector spaces to directly measure candidates' knowledge in algebra and discrete mathematics domains. The MATH 480 Mathematics Comprehensive Final Grade serves as a capstone assessment of candidates' integrated understanding across all secondary mathematics domains including trigonometry, calculus, statistics, probability, geometry, and number theory through an 11-section comprehensive examination requiring mastery of at least 3 of 5 questions per section. STOT (InTASC) Evaluations during EDUC 480L General Methods Field Experience (beginning) provide evidence of candidates' ability to apply their secondary mathematics content knowledge in authentic teaching contexts, demonstrating their readiness to make mathematical concepts accessible to diverse learners across all specified domains.

Through this intentional sequence of mathematics content, education courses, and assessments, our Math Education BSEd program ensures graduates demonstrate proficiency across all mathematical domains specified in standard 11010.3. This comprehensive preparation enables candidates to make mathematics accessible and meaningful to secondary students while illuminating connections within and among mathematical domains.

11010.4 Undergraduate Mathematics Content Knowledge The program requires the teacher candidate to demonstrate and apply knowledge of the core mathematics content including calculus, axiomatic geometry, linear and abstract algebra, statistics, probability, and computer programming.	MATH 165 Calculus I MATH 323 Probability & Statistics MATH 389 Modern Geometry MATH 443 Algebraic Struct with Prgming EDUC 380 Teach English Lang Learners EDUC 400 Student Teaching EDUC 480L General Methods Field Exp	• Praxis Content Knowledge Exam • MATH 443 Final Exam Score • EDUC 400 Student Teaching-STOT (InTASC) Evaluation • EDUC 480L General Methods Field Experience: STOT (InTASC) Evaluation

Narrative: Standard 11010.4 requires teacher candidates to demonstrate and apply knowledge of core mathematics content including calculus, axiomatic geometry, linear and abstract algebra, statistics, probability, and computer programming. The program curriculum addresses these requirements through a comprehensive sequence of courses designed to develop deep content knowledge alongside pedagogical skills. MATH 165: Calculus I directly addresses the calculus requirement by covering foundational concepts including limits, continuity, differentiation, the Mean Value Theorem, integration, and the Fundamental Theorem of Calculus. This course provides teacher candidates with essential calculus knowledge and applications that form the basis for advanced mathematical thinking and analysis. The conceptual understanding developed in this course enables candidates to effectively communicate mathematical ideas and relationships to future students.

MATH 389: Modern Geometry fulfills the axiomatic geometry requirement through its comprehensive approach to both K-12 and undergraduate geometry topics. Candidates develop understanding of axiomatic Euclidean geometry while exploring finite geometries, fractals, projective geometry, and non-Euclidean geometries. The course integrates research-based teaching strategies, enabling candidates to use geometry to model mathematical ideas and develop methods for mathematical proofs. This dual focus on content knowledge and pedagogical application ensures candidates can effectively teach geometric concepts at various levels. MATH 443: Algebraic Structures with Programming for Majors addresses both the linear algebra and abstract algebra components of the standard. Through studying matrix operations, determinants, systems of linear equations, linear transformations, eigenvectors, and vector spaces, candidates develop comprehensive linear algebra knowledge. The abstract algebra component includes modular arithmetic, groups, isomorphisms, fields, rings, and integral domains, all explored through practical applications with real numbers, integers, rational numbers, polynomials, and complex numbers. Additionally, this course incorporates computer programming elements through the use of software to solve matrices and determinants, addressing the programming aspect of the standard. MATH 323: Probability & Statistics thoroughly covers the statistics and probability requirements of the standard. Candidates study discrete probability distributions (binomial, geometric, hypergeometric, and Poisson) as well as continuous distributions (normal), developing a strong foundation in probability theory. The statistics component includes data summarization, sample size determination, population confidence intervals, and hypothesis testing. This comprehensive approach ensures candidates can analyze data and make evidence-based decisions, essential skills for effective mathematics instruction.

Beyond content knowledge acquisition, the program ensures candidates can apply these mathematical concepts in diverse educational settings. EDUC 380: Teaching English Language Learners enables candidates to adapt their mathematics instruction for diverse language learners. By understanding language

proficiency levels and developing strategies to assist ELL students in learning mathematical content, candidates ensure their strong content knowledge is accessible to all students, regardless of language background. EDUC 480L: General Methods Field Experience provides candidates with 30 hours of classroom experience where they observe, reflect, and begin applying their mathematical knowledge in instructional settings. This field experience allows candidates to bridge theoretical understanding with practical application under the guidance of experienced educators. EDUC 400: Student Teaching represents the culminating experience where candidates fully demonstrate and apply their mathematical content knowledge in authentic classroom environments over 15 weeks. During this experience, candidates collect and analyze data on student learning and engagement, demonstrating their ability to translate deep content knowledge into effective instruction.

Core undergraduate mathematics content knowledge is verified through multiple assessments. The Praxis Content Knowledge Exam measures candidates' proficiency in calculus, geometry, algebra, statistics, probability, and related mathematical concepts essential for competent teaching practice. The MATH 443 Final Exam Score comprehensively assesses candidates' mastery of linear algebra, abstract algebra, and programming applications through problems on matrix operations, determinants, groups, rings, fields, eigenvectors, and computational methods, directly evaluating their knowledge in three required content areas specified by the standard. Progressive STOT (InTASC) Evaluations during EDUC 480L General Methods Field Experience (beginning) and EDUC 400 Student Teaching (final semester) measure candidates' ability to apply their undergraduate mathematics content knowledge in authentic instructional settings, tracking their developing skill in translating deep mathematical understanding into effective teaching that makes calculus, geometry, algebra, statistics, probability, and programming concepts accessible to diverse secondary learners.

In conclusion, this program comprehensively addresses and assesses Standard 11010.4 through a carefully designed sequence of content courses covering all required mathematical domains, complemented by field experiences and evaluations that develop candidates' ability to effectively apply and communicate this knowledge in diverse instructional settings.

11010.5 Historical Perspective The program requires the teacher candidate to demonstrate knowledge of the historical development and perspective of mathematics including contributions of significant figures and diverse cultures.	MATH 389 Modern Geometry MATH 420 Hist/Philosophy Of Math EDUC 290 Theories of Learning & Mgmt EDUC 400 Student Teaching	• Praxis Content Knowledge Exam • EDUC 400 Student Teaching-STOT (InTASC) Evaluation

Narrative: Standard 11010.5 requires teacher candidates to demonstrate knowledge of the historical development and perspective of mathematics, including contributions of significant figures and diverse cultures. The program curriculum addresses this requirement through strategically designed courses that explore mathematical history alongside content knowledge and pedagogical application. MATH 420: History and Philosophy of Mathematics serves as the cornerstone course addressing this standard. This course provides a comprehensive exploration of mathematical history from both conceptual and chronological perspectives. By studying mathematics as both a science and an art, candidates develop a multifaceted understanding of how mathematical ideas have evolved across time and cultures. The course examines various philosophical perspectives on mathematics, encouraging candidates to consider different ways of understanding and approaching mathematical concepts. Through writing assignments and presentations utilizing computer software and internet research, candidates demonstrate their knowledge of historical developments and diverse contributions to the field. This course directly fulfills the standard's requirement for understanding the historical development of mathematics and the contributions of significant figures and diverse cultures. MATH 389: Modern Geometry complements the historical perspective by contextualizing geometric concepts within their historical development. While focusing on K-12 and undergraduate geometry topics, the course inherently addresses the historical progression from Euclidean to non-Euclidean geometries, representing a fundamental shift in mathematical thinking. By studying axiomatic Euclidean geometry alongside finite geometries, fractals, projective geometry, and non-Euclidean geometries, candidates gain insight into how geometric understanding has evolved over time. This historical context helps candidates appreciate how mathematical concepts develop and change, often influenced by cultural and philosophical perspectives. The course's emphasis on mathematical proofs also connects to the historical traditions of mathematical reasoning and verification across different cultures and time periods.

EDUC 290: Theories of Learning and Management enhances candidates' understanding of how mathematical knowledge has been conceptualized and transmitted across different historical and cultural contexts. By examining varied theoretical perspectives on learning and cognition, candidates develop awareness of how mathematical education has evolved over time. The course focuses on understanding how learning occurs and how individuals construct knowledge and provides context for appreciating diverse approaches to mathematical understanding throughout history. The emphasis on respecting individual strengths and needs of 21st Century learners encourage candidates to value diverse mathematical traditions and perspectives, complementing the standard's focus on contributions from diverse cultures. EDUC 400: Student Teaching provides candidates with the opportunity to apply their knowledge of mathematical history and diverse cultural contributions in authentic classroom settings. During this 15-week experience, candidates can incorporate historical perspectives when teaching mathematical concepts, helping students understand mathematics as a human endeavor that has developed across cultures and time periods. The requirement to

collect and analyze data on student learning and engagement allows candidates to reflect on how historical context enriches mathematical understanding. Additionally, the service-learning project component offers candidates the opportunity to develop culturally responsive mathematics instruction that acknowledges and celebrates diverse mathematical traditions.

Candidates' understanding of mathematical history and diverse cultural contributions is assessed through content knowledge and practical application measures. The Praxis Content Knowledge Exam evaluates candidates' foundational understanding of mathematics including historical developments and perspectives that inform contemporary mathematics education. During their culminating field experience, the EDUC 400 Student Teaching STOT (InTASC) Evaluation measures candidates' ability to incorporate historical perspectives and diverse cultural contributions into their mathematics instruction across 15 weeks of authentic teaching. This performance-based evaluation, completed by candidates, cooperating teachers, and university supervisors, assesses candidates' skill in presenting mathematics as a dynamic, culturally influenced discipline with rich historical traditions demonstrating their readiness to help secondary students appreciate mathematics as a human endeavor shaped by significant figures and diverse cultures throughout history.

Overall, the Math Education BSEd program addresses Standard 11010.5 through coursework that directly explores and assesses mathematical history and philosophy, combined with opportunities to apply this knowledge in educational settings. The curriculum ensures candidates develop appreciation for mathematics as a dynamic, culturally influenced discipline with rich historical traditions and diverse contributors. This historical perspective enables candidates to present mathematics not just as abstract concepts but as a living subject shaped by human ingenuity across different cultures and time periods.

11010.6 Instructional Tools The program requires the teacher candidate to select and use appropriate instructional tools such as manipulatives and physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies (e.g., graphing tools, interactive geometry software, computer algebra systems, and statistical packages); and makes appropriate decisions about when such tools enhance teaching and learning, recognizing both the insights to be gained and possible limitations of such tools.	MATH 323 Probability & Statistics MATH 389 Modern Geometry MATH 412 Differential Equations EDUC 272 Educational Technology EDUC 380 Teach English Lang Learners EDUC 400 Student Teaching EDUC 401 Elctrnc Portfolio/Assess/Semin EDUC 480 General Methods Sec Educators EDUC 480L General Methods Field Exp	• Praxis Principles of Learning and Teaching Exam • EDUC 400 Student Teaching-STOT (InTASC) Evaluation • EDUC 480L General Methods Field Experience: STOT (InTASC) Evaluation • EDUC 401 Capstone Portfolio: Checkpoint 3 (SLO 2)

Narrative: Standard 11010.6 requires teacher candidates to select and use appropriate instructional tools such as manipulatives, physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies. Candidates must also make appropriate decisions about when these tools enhance teaching and learning, recognizing both their benefits and limitations. The program curriculum addresses this requirement through multiple courses that incorporate various instructional tools while developing candidates' critical decision-making abilities regarding their use. Within the EDUC 272 Educational Technology course, candidates develop essential background knowledge and skills for utilizing educational technologies in mathematics instruction. Focusing on instructional methods that leverage technologies to support student learning and achievement, this course guides candidates in creating interactive teaching and learning activities. By aligning with International Society for Technology in Education Standards (ISTE) and InTASC principles, the course ensures candidates develop proficiency in selecting and implementing appropriate technological tools for mathematics instruction.

Practical application of geometric modeling tools occurs throughout the MATH 389 Modern Geometry course. The course integrates research-based teaching strategies that use geometry to model mathematical ideas, requiring candidates to utilize various instructional tools including physical models, drawings, and interactive geometry software. By exploring topics such as polygons, platonic solids, tessellations, and transformations, candidates gain experience with multiple representational tools and learn to select appropriate ones for different geometric concepts. Throughout the MATH 323 Probability & Statistics course, candidates engage with statistical packages and spreadsheets to analyze data, create visual representations, and perform statistical tests. Working with discrete probability distributions and the normal continuous probability distribution requires candidates to utilize graphing tools and statistical software to visualize complex concepts. This practical experience develops candidates' ability to evaluate when technology enhances statistical understanding and when physical models or other approaches might better serve instructional purposes. Computational modeling tools feature prominently in the MATH 412 Differential Equations course. Experience with direction fields, Euler's method, and applications of differential equations requires candidates to utilize mathematics-specific technologies to visualize and solve complex problems. By applying these tools to real-world situations, candidates develop the critical judgment needed to determine when computational approaches enhance understanding and when they might obscure important mathematical insights.

Inclusive technology use is emphasized in EDUC 380 Teaching English Language Learners. Candidates learn to select instructional tools that support the needs of language learners in mathematics classrooms. By practicing strategies that assist ELL students in learning mathematical content, candidates develop awareness of how various tools can bridge language barriers and make abstract concepts more accessible through visual and interactive representations. Methodological frameworks for tool selection are developed in EDUC 480 General Methods for Secondary Educators. Through conceptual approaches such as understanding by design, differentiated instruction, and universal design for learning, candidates learn to evaluate which instructional tools best support diverse learning needs and content objectives. The course's emphasis on crafting effective lessons and designing varied instruction guides candidates in making appropriate decisions about instructional tool integration. Field-based application occurs during the EDUC 480L General Methods Field Experience where candidates observe experienced educators using various instructional tools and have opportunities to implement these tools in their own teaching. The 30-hour field placement allows candidates to teach lessons, incorporating appropriate instructional tools and receive feedback on their effectiveness. This practical experience helps candidates recognize both the insights gained and possible limitations of different tools in authentic classroom settings.

Candidates' proficiency in selecting and using appropriate instructional tools is measured through theoretical knowledge and field-based application. The Praxis Principles of Learning and Teaching Exam assesses candidates' foundational understanding of instructional processes and diverse learners necessary for making informed decisions about tool selection that enhances mathematics teaching and learning. Progressive STOT (InTASC) Evaluations during EDUC 480L General Methods Field Experience (beginning) and EDUC 400 Student Teaching (final semester) track candidates' developing ability to implement manipulatives, physical models, drawings, virtual environments, spreadsheets, presentation tools, and mathematics-specific technologies in authentic classroom settings. Use of instructional tools continues to be assessed in EDUC 401 Electronic Portfolio, Assessment, and Seminar where candidates select artifacts for their capstone portfolio that demonstrate their ability to use appropriate instructional tools. These performance-based evaluations assess candidates' skill in selecting appropriate tools for specific mathematical concepts, recognizing both the insights gained and possible limitations of various instructional tools, comprehensively demonstrating their readiness to make critical decisions about when technology and other tools enhance conceptual understanding and procedural proficiency for diverse secondary mathematics learners.

This program comprehensively addresses Standard 11010.6 through coursework that both introduces candidates to a wide range of instructional tools and develops their ability to make informed decisions about their use. By progressing from theoretical understanding to practical application in diverse contexts, candidates develop the expertise needed to select appropriate tools that enhance mathematics teaching and learning while recognizing their benefits and limitations.

11010.7 Content Pedagogy The program requires that the teacher candidate is able to successfully implement a variety of instructional strategies. The candidate demonstrates the following: a) Applies knowledge of curriculum standards for secondary mathematics and their relationship to student learning within and across mathematical domains. b) Analyzes and considers research in planning for and leading students in rich mathematical learning experiences. c) Plans lessons and units that incorporate a variety of strategies and mathematics-specific instructional tools to promote conceptual understanding and procedural proficiency. d) Provides students with opportunities to communicate about mathematics and make connections among mathematics, other content areas, everyday life, and the workplace. e) Implements techniques related to student engagement and communication including selecting high quality tasks, guiding mathematical discussions, identifying key mathematical ideas, identifying and addressing student misconceptions, and employing a range of questioning strategies.	MATH 480 Mathematics Comprehensive EDUC 250 Introduction to Education EDUC 380 Teach English Lang Learners EDUC 400 Student Teaching EDUC 401 Elctrnc Portfolio/Assess/Semin EDUC 480L General Methods Field Exp EDUC 483 Secondary Methods Math	• MATH 480 Mathematics Comprehensive Final Grade • EDUC 401 Capstone Portfolio: Checkpoint 3 (SLO 2) • EDUC 480L General Methods Field Experience: STOT (InTASC) Evaluation • EDUC 483 Secondary Math Methods: STOT (InTASC) Evaluation

Narrative: Standard 11010.7 requires teacher candidates to successfully implement a variety of instructional strategies across five key areas of mathematics content pedagogy. The program curriculum addresses these requirements through a comprehensive sequence of courses that progressively develop candidates' pedagogical expertise.

A) A strong foundation in curriculum standards begins in EDUC 250 Introduction to Education, where future mathematics educators explore historical, philosophical, social, and psychological foundations that inform curriculum development. Structured field experiences in this course allow candidates to observe how mathematics standards are implemented in K-12 classrooms, providing context for understanding the relationship between standards and student learning

across mathematical domains. Building upon this foundation, EDUC 483 Secondary Methods for Mathematics focuses specifically on discipline structures and key concepts in mathematics education. This specialized methods course guides candidates in designing and implementing lessons that support student learning in college and career ready classrooms. Through creating content-specific instructional units, candidates demonstrate their ability to apply knowledge of curriculum standards while developing their personal philosophy of mathematics education.

B) Research-based instructional approaches are central to MATH 480 Mathematics Comprehensive, where candidates engage with advanced mathematical content while researching how mathematical ideas have developed across diverse cultures and historical periods. The course's emphasis on critical thinking and mastery of mathematical principles prepares candidates to design rich learning experiences that connect research to classroom practice. Professional research application continues in EDUC 401 Electronic Portfolio, Assessment, and Seminar where candidates document their progress toward proficiency in state and national standards. Regular checkpoints throughout the program ensure candidates systematically analyze research on effective mathematics instruction and incorporate findings into their developing practice. The professional development seminars provide opportunities for collegial sharing of research-based strategies that enhance mathematics instruction.

C) Comprehensive lesson and unit planning skills develop through EDUC 483 Secondary Methods for Mathematics, where candidates create instructional units that incorporate research-based practices specific to mathematics education. This course emphasizes the integration of various instructional strategies and mathematics-specific tools to promote both conceptual understanding and procedural proficiency. Practical application of planning skills occurs during EDUC 480L General Methods Field Experience, where candidates observe cooperating teachers, examine professional teaching practices, and teach mathematics lessons that incorporate varied strategies. The required pre- and post-conferences provide valuable feedback on candidates' instructional planning and implementation, supporting their growth in selecting appropriate strategies and tools for specific mathematical concepts.

D) Developing students' ability to communicate mathematically and make connections receives particular attention in EDUC 380 Teaching English Language Learners. This course equips candidates with strategies to help all students, particularly language learners, communicate about mathematical concepts. By practicing strategies based on language proficiency levels, candidates learn to facilitate mathematical discussions that connect content to diverse student experiences. The culminating EDUC 400 Student Teaching experience provides extensive opportunities for candidates to implement techniques that foster mathematical communication. During this 15-week supervised experience, candidates collect and analyze data on student learning and engagement, allowing them to assess how effectively their instruction promotes mathematical communication and connections across content areas and to everyday contexts.

E) Engagement strategies focusing on questioning and discussion techniques are emphasized in EDUC 483 Secondary Methods for Mathematics. Through designing and implementing lessons that support student learning, candidates develop skills in selecting high-quality mathematical tasks, guiding discussions,

identifying key mathematical ideas, and addressing misconceptions. Full implementation of these techniques occurs during EDUC 400 Student Teaching, where candidates apply their knowledge of engagement strategies in authentic classroom settings. Working with qualified cooperating teachers and university supervisors, candidates refine their ability to employ various questioning strategies, identify and address student misconceptions, and facilitate mathematical discussions that promote deep understanding.

Content pedagogy is assessed through multiple measures evaluating candidates' implementation of effective instructional strategies. The MATH 480 Mathematics Comprehensive Final Grade verifies candidates' mastery of mathematical content essential for pedagogical application through an 11-section examination and research paper demonstrating their ability to connect mathematical concepts, communicate precisely, and analyze diverse cultural contributions to mathematics. Throughout their program, the EDUC 401 Capstone Portfolio Checkpoint 3 (SLO 2) documents candidates' developing pedagogical expertise through artifacts and written rationales demonstrating their ability to apply curriculum standards, plan research-based lessons, incorporate varied instructional strategies and tools, facilitate mathematical communication, and implement engagement techniques. STOT (InTASC) Evaluations during EDUC 480L General Methods Field Experience (beginning) and EDUC 483 Secondary Math Methods (middle) track candidates' progressive skill in implementing the five specified areas of mathematics content pedagogy in authentic teaching contexts, providing evidence from candidates, mentor teachers, and course instructors about their readiness to successfully implement varied instructional strategies that promote both conceptual understanding and procedural proficiency for diverse secondary mathematics learners.

Ultimately, the Mathematics BSEd program comprehensively addresses Standard 11010.7 through coursework that progressively develops candidates' ability to implement effective instructional strategies across all five specified areas of mathematics content pedagogy. The curriculum balances theoretical understanding with extensive practical application, ensuring candidates develop the pedagogical expertise needed for successful mathematics instruction in secondary classrooms.

SECTION IV: EVIDENCE OF MEETING THE STANDARDS

It is expected that your program makes use of multiple assessments to ensure that all standards are met. If the program is offered in more than one site or in more than one method (e.g. online as well as face-to-face) provide aggregated (program level) AND disaggregated (site or method specific) data. Complete tables **1.A-1.D** described below and provide information requested related to the two-four additional assessments you selected in **2**.

1. Required Assessments:

1. A Praxis II: Content Test: Complete Table 1.A

Praxis Subject Assessment: Mathematics Content Knowledge					
Year	**Content Area Test Name and Number**	**ND Passing Score**	**Total # of Test Takers**	**Average Score**	**Percent Passing**
2022 – 2023	5165	159	4	168	75%
2023 – 2024	5165	159	1	186	100%
2024 – 2025	5165	159	1	183	100%

1. B Praxis II: PLT (Principles of Learning and Teaching): Complete Table 1.B

Praxis II: Principles of Learning & Teaching: Grades 7-12					
Year	**Content Area Test Name and Number**	**ND Passing Score**	**Total # of Test Takers**	**Average Score**	**Percent Passing**
2022 – 2023	Secondary PLT (5624)	157	4	179	100%
2023 – 2024	Secondary PLT (5624)	157	1	183	100%
2024 – 2025	K12 PLT (5625)	157	1	171	100%

1. C Cumulative GPA at the point of completion: Complete Table 1.C

Cumulative GPA at Completion			
Year	**N (number of candidates)**	**Overall Average GPA**	**Range of GPA**
2022 – 2023	4	3.63	3.51 - 3.81
2023 – 2024	1	3.93	NA
2024 – 2025	1	3.86	NA

1. D a. Student Teaching Performance (Clinical Experience) Evaluation

EDUC 400 Student Teaching-STOT (InTASC) Evaluation (SLO 2)

Description: The purpose of the Skills of Teaching Observation Tool (STOT)/InTASC evaluation is to measure the core skills teachers should be able to do in today's learning context to ensure students reach their learning goals. The evaluation is used to monitor skill development and growth from the time of admission through completion. This particular iteration was administered during the final semester of the teacher candidates' program, student teaching. The STOT evaluation is completed by the candidate, their student teaching university supervisor, and their cooperating teacher.
Proficiency Scale: Distinguished (4), Proficient (3), Basic (2), Unsatisfactory (1)
Target: 3.0 or higher

Year	N (number of candidates)	Evaluator	Average Score	Target Score
2022 – 2023	4	University Supervisor	2.95	3.0
		Cooperating Teacher	2.80	3.0
		Self	2.95	3.0
2023 – 2024	1	University Supervisor	3.0	3.0
		Cooperating Teacher	3.14	3.0
		Self	3.5	3.0
2024 – 2025	1	University Supervisor	2.93	3.0
		Cooperating Teacher	3.07	3.0
		Self	3.64	3.0

2. Additional Assessments

2a. Pre-student Teaching Practicum Evaluations

EDUC 480L General Methods Field Experience: STOT (InTASC) Evaluation

Description: The purpose of the Skills of Teaching Observation Tool (STOT)/InTASC evaluation is to measure the core skills teachers should be able to do in today's learning context to ensure students reach their learning goals. The evaluation is used to monitor skill development and growth from the time of admission through completion. This particular iteration was administered at the beginning of the teacher candidates' program. The STOT evaluation is completed by the candidate, their mentor teacher, and their course instructor.
Proficiency Scale: Distinguished (4), Proficient (3), Basic (2), Unsatisfactory (1)
Target: 2.5 or higher

Year	N (number of candidates)	Evaluator	Average Score	Target Score
2022 – 2023	3	Instructor	2.83	2.5
		Field Mentor	3.5	2.5
		Self	2.17	2.5
2023 – 2024	1	Instructor	2.0	2.5
		Field Mentor	3.0	2.5
		Self	2.0	2.5
2024 – 2025	2	Instructor	3.28	2.5
	2	Field Mentor	4.0	2.5
	2	Self	3.7	2.5

2b. Pre-student Teaching Practicum Evaluations

EDUC 483 Secondary Math Methods: STOT (InTASC) Evaluation

Description: The purpose of the Skills of Teaching Observation Tool (STOT)/InTASC evaluation is to measure the core skills teachers should be able to do in today's learning context to ensure students reach their learning goals. The evaluation is used to monitor skill development and growth from the time of admission through completion. This particular iteration was administered during the middle of the teacher candidates' program. The STOT evaluation is completed by the candidate, their mentor teacher, and their course instructor.

Proficiency Scale: Distinguished (4), Proficient (3), Basic (2), Unsatisfactory (1)

Target: 2.5 or higher

Year	N (number of candidates)	Evaluator	Average Score	Target Score
2022 – 2023	3	Instructor	3.0	2.5
		Field Mentor	3.61	2.5
		Self	3.0	2.5
2023 – 2024	3	Instructor	2.94	2.5
		Field Mentor	3.33	2.5
		Self	3.28	2.5
2024 – 2025	2	Instructor	2.59	2.5
	1	Field Mentor	2.65	2.5
	1	Self	2.67	2.5

2c. Key Performance Task

MATH 480 Mathematics Comprehensive Final Grade

Description: Students are required to demonstrate master on each of the 11 sections of the mathematics comprehensive exam. They must answer at least 3 of 5 multiple choice questions correctly to demonstrate mastery on each section of the exam (based on courses required for a mathematics or mathematics education required courses (college algebra, trigonometry, calculus I, II, and III, probability and statistics, geometry, differential equations, history and philosophy of mathematics, theory of numbers, and algebraic structures, . If the student fails to score at least 3 of 5 on any section, the instructor meets with the student in person or on zoom and reviews similar questions and gives the student sample questions to do. When the student is ready to demonstrate mastery after completing similar problems, the student is given an opportunity to retake the failed portion(s) of the exam. If the student fails to complete one or more of the sections of the exam, the student does not pass the course. Students must also write a paper on a mathematical topic. They are evaluated by the attached rubric. If a student earns at least 40/45 on the paper and passes each section of the comprehensive exam, the student will earn an A in the course. If the paper earns 36 – 39.9 on the paper, the student earns a B in the course. If the student earns at least 31.5/45 on the paper and passes all of the sections on the comprehensive exam, the student will earn a C in the course. No student who has passed the comprehensive final exam has earned less than a C in the Math 480 course, but if the paper was not at least 27/45, the student would fail the course, and if the paper grade was between 27 and 31.4, the student would earn a D in the course.

Proficiency Scale: An A, B, C, D, F grading scale is used for this course. A =90-100%, B= 80 – 89.9%, C= 70 – 79.9%, D= 60 – 69.9%, F < 60 %.

Target: C or better in the course

Year	N (number of candidates)	Final Grades	Target Grade
2022 – 2023	6	A = 5 B = 1 C = 0 D = 0 F = 0	C or better
2023 – 2024	2* *1 candidate did not submit paper or take final exam	A = 1 B = 0 C = 0 D = 0 F =1*	C or better
2024 – 2025	2	A = 1 B = 1 C = 0 D = 0 F = 0	C or better

2d. Capstone Project

EDUC 401 – Capstone Portfolio: Checkpoint 3 (SLO 2)

Description: The purpose of the Capstone Portfolio is for teacher candidates to demonstrate their ability to meet the knowledge, skills, and dispositions identified in the four program SLOs, as aligned to InTASC Standards (1: Learner and Learning, 2: Content, 3: Instructional Practices, and 4: Professionalism). Teacher candidates integrate technology and experiences with diversity through artifact selection, written rationale, and professional presentation. The portfolio development and presentation support teacher candidates' understanding and application of the Educator Preparation Program's (EPP) conceptual framework, the Reflective Experiential Model. As a requirement for graduation, teacher candidates will create this professional portfolio throughout their teacher education program within their TaskStream account. The final capstone portfolio presentation occurs during the semester teacher candidates are enrolled in EDUC 401-Electronic Portfolio Assessment and Seminar.

Proficiency Scale: Distinguished (4), Proficient (3), Basic (2), Unsatisfactory (1)

Target: 3.0 or higher

Year	N (number of candidates)	Evaluator	Scores	Target Score
2022 – 2023	4	Reconciled	3.56	3.0
2023 – 2024	1	Reconciled	3.25	3.0
		Self	4.0	
2024 – 2025	1	Reconciled	4.0	3.0
		Self	4.0	

2e. Employer survey results related to content knowledge

Supervisor Survey

Description: The Supervisor Survey asks those who supervise first-year teachers, their employers, to assess the novices' readiness for the teaching profession. The survey asks supervisors to assess the quality of completers' instructional practices, abilities to work with diverse learners, abilities to establish positive classroom environments, and levels of professionalism. The survey is administered to direct supervisors of teacher education graduates employed in schools as teachers approximately one year after the completers completed their preparation programs.

Proficiency Scale: Strongly Agree (4), Agree (3), Tend to Disagree (2), Disagree (1)

Target: 3.0 or higher

Year	Supervisor Survey Item (Content)	N = # number of candidates	Average Max= 4 points
2022 – 2023	Effectively teach the subject matter in my licensure area.	1	4
2023 – 2024		3	3.67
2024 - 2025		1	3
2021 – 2022	Design activities where students engage with subject matter from a variety of perspectives.	1	4
2022 – 2023		3	3.5
2023 – 2024		1	3
2021 – 2022	Help students develop critical thinking processes.	1	3
2022 – 2023		3	3.67
2023 – 2024		Question removed	
2021 – 2022	Help students develop skills to solve complex problems.	1	3
2022 – 2023		3	3
2023 – 2024		1	3
2021 – 2022	Make interdisciplinary connections among core subjects.	1	3
2022 – 2023		3	3
2023 – 2024		Question removed	
2021 – 2022	Know where and how to access resources to build global awareness and understanding.	1	3
2022 – 2023		3	4
2023 – 2024		1	3
2021 – 2022	Effectively teach students from culturally and ethnically diverse backgrounds and communities.	1	4
2022 – 2023		3	4
2023 – 2024		1	4
2021 – 2022	Connect core content to students' real-life experiences.	1	3
2022 – 2023		3	3.67
2023 – 2024		1	3
		Overall Item Average	**3.39**

2f. Graduate survey results related to content knowledge

Transition to Teaching Survey

Description: The Transition to Teaching Survey captures the experiences and perspectives of early-career educators as they navigate their initial years in the profession, providing valuable data on the effectiveness of their preparation programs. This instrument measures new teachers' self-assessment of their preparedness across various teaching competencies, identifying both strengths and gaps in their preparation related to instructional practices, ability to work with diverse learners, ability to establish positive classroom environments, and levels of professionalism.

Proficiency Scale: Strongly Agree (4), Agree (3), Tend to Disagree (2), Disagree (1)

Target: 3.0 or higher

Year	Transition to Teaching Survey Item (Content)	N = # number of candidates	Average Max= 4 points
2022 – 2023	Effectively teach the subject matter in my licensure area.	0	N/A
2023 – 2024		2	4
2024 - 2025		1	4
2022 – 2023	Design activities where students engage with subject matter from a variety of perspectives.	0	N/A
2023 – 2024		2	4
2024 - 2025		1	2
2022 – 2023	Help students develop critical thinking processes.	0	N/A
2023 – 2024		2	4
2024 - 2025		Question removed	
2022 – 2023	Help students develop skills to solve complex problems.	0	N/A
2023 – 2024		2	3
2024 - 2025		1	3
2022 – 2023	Make interdisciplinary connections among core subjects.	0	N/A
2023 – 2024		2	3.5
2024 - 2025		Question removed	
2022 – 2023	Know where and how to access resources to build global awareness and understanding.	0	N/A
2023 – 2024		2	3.5
2024 - 2025		1	3
2022 – 2023	Effectively teach students from culturally and ethnically diverse backgrounds and communities.	0	N/A
2023 – 2024		2	4
2024 - 2025		1	4
2022 – 2023	Connect core content to students' real-life experiences.	0	N/A
2023 – 2024		2	4
2024 - 2025		1	3
		Overall Item Average	**3.50**

2g. Additional assessment of choice

MATH 443 Final Exam Score

Description: Students in Math 443 must complete two of three options for the final exam. They may take a proctored final exam (worth 100 points with problems on determinants and inverses of 2 x 2 and 3 x 3 matrices, determining whether sets are groups, rings, or fields, closed for addition or multiplication, prove or disprove statements by math induction, determine if functions are injective, surjective or bijective (with explanations), determine if vectors are orthogonal, find the characteristic polynomial of a matrix, determine if a vector is an eigenvector and find an eigen value, perform row operations on matrices, add subtract and multiply matrices, and rewrite matrix equations as vector equations and matrix equations. a take home final exam covering problems similar to the proctored final exam with more challenging (and time-consuming problems) (worth 100 points) or complete a presentation demonstrating the student has shown mastery on a section of the course the student struggled to do on a unit exam such as math induction, abstract algebra concepts, or linear algebra.

Proficiency Scale: A =90-100%, B= 80 – 89.9%, C= 70 – 79.9%, D= 60 – 69.9%, F < 60 %.

Target: 80% or higher

Year	N (number of candidates)	Average Scores	Target Score
2022-2023	1	94%	80%
2023-2024	7* *1 student stopped attending after exam 2	93% (without student who stopped attending)	80%
2024-2025	9	99.8%	80%

3. Respond to the following questions:

a. Analysis of findings: Describe how the data provided above demonstrate that candidates in the program meet the standards.

Performance on the Praxis Mathematics Content Knowledge (5165) assessment provides strong evidence that program candidates meet the standards related to mathematical practices, content knowledge, connections, and pedagogy. Across the past three academic years, candidate performance has consistently exceeded the North Dakota passing score of 159, demonstrating both content mastery and readiness to teach secondary mathematics. These results indicate that program completers possess strong content knowledge and are well prepared to integrate mathematical practices, use instructional tools effectively, and implement research-based pedagogical strategies in alignment with Standards 11010.6 and 11010.7.

Performance on the Praxis Principles of Learning and Teaching (PLT) assessment demonstrates that candidates in the Mathematics Education program meet the standards related to instructional practice, pedagogy, and professional application of content knowledge. Program data over the past three

academic years show that all candidates exceeded the North Dakota passing score of 157, with consistent 100% pass rates and average scores well above the state benchmark. These results indicate that candidates are not only proficient in pedagogical knowledge but also prepared to design and deliver high-quality mathematics instruction aligned with state and national standards. The strong PLT performance supports evidence that graduates can plan effective lessons, use a variety of instructional tools and technologies, guide mathematical discourse, address student misconceptions, and make meaningful connections between mathematics, other disciplines, and real-world contexts

Cumulative GPA at program completion provides evidence that candidates in the Mathematics Education program consistently demonstrate high levels of achievement across both mathematics content and pedagogy. Over the past three academic years, program completers have maintained strong academic performance, with overall average GPAs ranging from 3.63 to 3.93. This sustained academic excellence indicates that candidates successfully meet expectations in advanced undergraduate mathematics coursework (Standard 11010.4), secondary mathematics content knowledge (Standard 11010.3), and content pedagogy (Standard 11010.7).

Results from the Student Teaching Observation Tool (STOT), aligned with the InTASC standards, provide strong evidence that mathematics education candidates meet expectations across all domains. Over the past three academic years, results demonstrate that candidates consistently meet or approach the target proficiency score of 3.0 (Proficient). The alignment between the STOT outcomes and the program's standards suggests that candidates demonstrate strong pedagogical and reflective practice, effectively integrating mathematical content knowledge, communication, and instructional tools in secondary classroom settings. The increasing proficiency scores from cooperating teachers and self-assessments further suggest that candidates are well prepared to apply mathematical practices and processes (11010.1), foster connections among mathematical ideas (11010.2), and employ evidence-based instructional methods (11010.7).

Results from the EDUC 480L General Methods Field Experience STOT (InTASC) evaluations demonstrate that mathematics education candidates are developing the foundational pedagogical and professional competencies outlined in the standards. Across the three reporting years, candidates consistently met or exceeded the target proficiency score of 2.5. Scores ranged from 2.0 to 4.0, with mentor and instructor evaluations indicating growth in teaching proficiency and instructional decision-making. This data shows that candidates make steady progress toward mastering the knowledge, skills, and dispositions required to teach secondary mathematics effectively.

The STOT (InTASC) evaluation administered in EDUC 483 provides evidence that mathematics education candidates are developing the knowledge, skills, and dispositions outlined in the standards. Scores across the past three academic years demonstrate that candidates meet or exceed the program's target proficiency level of 2.5, with overall averages ranging from 2.59 to 3.61 across

evaluator groups. These results indicate that candidates are progressing in their ability to plan and implement effective mathematics instruction, engage students in problem solving and reasoning, and communicate mathematical ideas clearly. Although small variations occur year to year, the overall trend shows that candidates at this midpoint demonstrate proficiency in connecting mathematical concepts, applying pedagogy, and fostering meaningful learning experiences consistent with state expectations for teacher preparation in mathematics.

The MATH 480 Mathematics Comprehensive Final serves as a key performance assessment of candidates' mastery of both mathematical content and the professional competencies outlined in the standards. Across the three reporting years, nearly all candidates achieved the program's target of a grade of C or higher, indicating successful demonstration of content mastery and mathematical communication. These results show that candidates consistently demonstrate strong proficiency in mathematical reasoning, problem solving, and the ability to synthesize knowledge across mathematical domains. Performance on the paper and exam collectively provides clear evidence that candidates are meeting or exceeding expectations for mathematical practices, content knowledge, connections among topics, and professional communication consistent with the standards.

The Capstone Portfolio serves as a culminating assessment of candidates' ability to integrate and demonstrate the knowledge, skills, and dispositions identified across all program standards. Through the portfolio artifacts, written rationales, and professional presentations, candidates show evidence of mathematical reasoning and communication (Standard 11010.1), the ability to make and articulate mathematical connections (Standard 11010.2), and mastery of both secondary and undergraduate mathematics content (Standards 11010.3 and 11010.4). Results from 2022 – 2025 indicate consistent and high levels of performance well above the target benchmark of 3.0. These strong results demonstrate that candidates consistently meet or exceed proficiency in professional, pedagogical, and content areas and are well prepared to enter the teaching profession with the capacity to apply mathematical knowledge, instructional strategies, and reflective practices.

Across three academic years (2022–2025), all reported average scores on the supervisor survey met or exceeded the target benchmark of 3.0 on a 4-point scale. Supervisors consistently rated completers highly on their ability to effectively teach mathematical content, directly reflecting mastery of Mathematical Practices and Processes (Standard 11010.1) and Secondary School Content Knowledge (Standard 11010.3). Ratings on items related to designing activities where students engage with subject matter from multiple perspectives and helping students develop skills to solve complex problems demonstrate candidates' capacity to foster reasoning, modeling, and problem solving consistent with Mathematical Connections (Standard 11010.2) and Content Pedagogy (Standard 11010.7).

Across the 2023–2025 reporting cycles, candidates consistently rated their preparedness highly on the transition to teaching survey, with all average scores meeting or exceeding the program benchmark of 3.0 on a 4-point scale. Performance on designing activities where students engage with subject matter from multiple perspectives reflects candidates' growing ability to implement lessons that encourage reasoning from varied approaches and to support conceptual understanding aligned with Content Pedagogy (11010.7). While there is a dip in 2024–2025, the overall data trend indicates preparedness in designing rich mathematical experiences. These results demonstrate that mathematics education graduates are well prepared to design effective lessons, promote problem solving and reasoning, connect mathematics to students' lived experiences, and support diverse learners. The consistently high levels of agreement across all items confirm that program completers meet or exceed expectations for all standards.

The design and results of the Final Exam for Math 443 demonstrate that candidates consistently meet or exceed expectations aligned with Standards 11010.1–11010.4 and support 11010.7 (Content Pedagogy) through their ability to apply mathematical reasoning and communicate solutions effectively. Over the three-year reporting period, candidate performance on the final exam was well above the program benchmark of 80%. These results indicate that candidates demonstrate a deep understanding of core mathematical concepts and processes, including linear transformations, matrices, eigenvalues and eigenvectors, mathematical induction, and abstract algebraic structures such as groups, rings, and fields. Overall, consistently high performance on the MATH 443 Final Exam confirms that program completers possess the advanced mathematical knowledge, reasoning ability, and communication skills required to meet and exceed the standards.

b. Response to findings: What changes have you made in your program as a result of data analysis? Provide a rationale for your decision.

Academic year 2022–2023 (N=4) shows a 75% pass rate. Given the small cohort, percentages are sensitive to single outcomes. Students are now encouraged to take the Praxis II content test earlier in the program. They used to take it after completing all of their education courses but are now encouraged to take it after completing their math content courses or during their methods course, whichever comes first. There was also more targeted encouragement for students to prepare for taking both the Praxis II and the Math Comprehensive exam by taking and keeping good notes during all their math classes. Instructors talked openly about the exams much more often, trying to help them see the importance of preparing themselves for the exams. A Math 480 MyOpenMath component was added so students could practice problems that they wanted to review for the comprehensive exam.

In 2024–2025, one candidate completed PLT 5625 (K–12) due to testing availability/advising; most candidates completed PLT 5624 (Grades 7–12). The program's preferred PLT is 5625 to maintain reporting consistency and allow for greater flexibility in teaching different grade bands.

2022–2023 cooperating teacher and university supervisor averages were slightly below the 3.0 target on the STOT. However, these findings reflect a small number of students which can impact sensitivity. Supervisor and Transition to Teaching Survey results indicated small number of participants and some items were revised/removed across years. Beginning during the 2025–2026, instruments will be stabilized and results aggregated across cycles to strengthen reliability.

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The Math 443 course is implementing more AI. The programming journal was changed, and homework was graded to reflect how students can use AI to accomplish some of the programming goals AND how they can double check that their answers are correct. EDUC 480L was also added to the course to allow candidates more practice with applying theory to practice.

The minor requirement to earn a mathematics education major was removed. This was done to provide more flexibility in coursework for students. There was also an effort to have students complete their degrees more quickly so they could begin teaching in the field sooner. Removing the minor requirement reduced the number of credits needed to graduate.

In the undergraduate math content course Math 435, the instructor switched from having students complete homework on paper to doing more problems online in MyOpenMath. There are now more problems dealing with modular arithmetic and adding in other bases than before.