

## Content Guidelines/Standards Matrix

<b>College/University</b>	The University of Detroit Mercy	<b>Code</b>	EX
<b>Source of Guidelines/Standards</b>	Michigan State Board of Education, 2000	<b>Program/Subject Area</b>	7 – 12 Mathematics

**DIRECTIONS:** List required courses on matrix and provide additional narrative to explain how standards are met. If electives are included, they should be clearly indicated. Adjust size of cells as needed.

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
1.0	MATHEMATICS PREPARATION		
1.1	<p>Problem Solving: Submit a narrative that describes how the requirements of your program provide opportunities for your candidates to mature in their problem solving ability. What evidence indicates that this is being accomplished?</p>	<p><b>Major:</b>  MTH 480 Analysis for Teachers  MTH 141 Calculus 1  MTH 142 Calculus 2</p> <p>Applications problems are common in these courses. They require students to interpret, set-up a problem, then choose the correct tool for solving it and then analyze the results. These courses also make use of the Computer Algebra System (CAS) Maple. Maple assignments allow the students to focus on the set-up and analysis of the problem.</p> <p>MTH 241 Most of the topics in this course involve solving problems in 3-dimensional calculus.</p> <p>MTH 482 Students determine whether systems of linear equations have solutions, whether sequences of vectors are linearly independent, etc. (<i>Majors may elect instead to take MTH 402 Linear Algebra with Applications.</i>)</p> <p>MTH 483 Students tackle numerous problems involving computation of areas, volumes, angle measures, etc.</p> <p>MTH 485 Students occasionally have opportunities to work in small groups to solve selected problems. (<i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i>)</p> <p>Evidence: Solutions to mathematical problems, class dialogue and debriefing.</p>	<p><b>Minor:</b>  MTH 141 Calculus 1  MTH 142 Calculus 2</p> <p>Applications problems are common in these courses. They require students to interpret, set-up a problem, then choose the correct tool for solving it and then analyze the results.</p> <p>These courses also make use of the Computer Algebra System (CAS) Maple. Maple assignments allow the students to focus on the set-up and analysis of the problem.</p> <p>MTH 483 Students tackle numerous problems involving computation of areas, volumes, angle measures, etc.</p>

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1.2	Reasoning: Submit a narrative that describes how the requirements of your program provide opportunities for your candidates to make and evaluate mathematical conjectures, arguments, and to validate their own mathematical thinking. What evidence indicates that this is being accomplished?	<p>Major:</p> <p>MTH 480 Analysis for Teachers  MTH 141 Calculus 1  MTH 142 Calculus 2</p> <p>These courses also make use of the Computer Algebra System (CAS) Maple. Maple assignments allow the students to focus on the set-up and analysis of the problem. These assignments often require students to find a solution and then verify answers graphically or numerically, as well. Students have to be able to interpret their answers in different forms.</p> <p>MTH 483/MED 583 Students make conjectures about geometric properties, and then verify/refute their conjectures by performing precise constructions. They learn to give clear, concise definitions of geometry terms and to use them effectively in oral and written explanations. Graduate students write a 2000-3000 words term paper about "Applications of Geometry in ...." Topics are chosen from astronomy, astrology, surveying, architecture, chemistry, physics, biology or another area with permission of the instructor.</p> <p>MTH 486 Projects involving continued fractions, code breaking, and the density of primes offer students the opportunity to make conjectures, and test them through guided experimentation.</p>	<p><b>Minor</b></p> <p>MTH 141 Calculus 1  MTH 142 Calculus 2</p> <p>These courses also make use of the Computer Algebra System (CAS) Maple. Maple assignments allow the students to focus on the set-up and analysis of the problem. These assignments often require students to find a solution and then verify answers graphically or numerically, as well. Students have to be able to interpret their answers in different forms.</p> <p>MTH 483/MED 583 Students make conjectures about geometric properties, and then verify/refute their conjectures by performing precise constructions. They learn to give clear, concise definitions of geometry terms and to use them effectively in oral and written explanations. Graduate students write a 2000-3000 words term paper about "Applications of Geometry in ...." Topics are chosen from astronomy, astrology, surveying, architecture, chemistry, physics, biology or another area with permission of the instructor.</p>

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1.3	<p>Communication:</p> <p>Submit a narrative that describes how the requirements of your program provide opportunities for your candidates to use both oral and written discourse between teacher and candidates and among candidates to develop and extend candidates' mathematical understanding. What evidence indicates that this is being accomplished?</p>	<p><b>Major:</b>  MTH 141 Calculus 1  MTH 142 Calculus 2  MTH 480 Analysis for Teachers  These courses also make use of the Computer Algebra System (CAS) Maple. Maple assignments allow the students to focus on the set-up and analysis of the problem. These assignments require that students analyze the output given and interpret results. Answers must be explained in complete sentences, giving students practice in communicating mathematically.  MTH 483/MED 583 Students make conjectures about geometric properties, and then verify/refute their conjectures by performing precise constructions. They learn to give clear, concise definitions of geometry terms and to use them effectively in oral and written explanations. Graduate students write a 2000-3000 words term paper about "Applications of Geometry in ...." Topics are chosen from astronomy, astrology, surveying, architecture, chemistry, physics, biology or another area with permission of the instructor.  MTH 484 Students give presentations before the class, and respond to questions about their presentations, thus engaging in interactive dialogue regarding the highlights of math history.</p>	<p><b>Minor:</b>  MTH 480 Analysis for Teachers  MTH 141 Calculus 1  MTH 142 Calculus 2  These courses also make use of the Computer Algebra System (CAS) Maple. Maple assignments allow the students to focus on the set-up and analysis of the problem. These assignments require that students analyze the output given and interpret results. Answers must be explained in complete sentences, giving students practice in communicating mathematically.  MTH 483/MED 583 Students make conjectures about geometric properties, and then verify/refute their conjectures by performing precise constructions. They learn to give clear, concise definitions of geometry terms and to use them effectively in oral and written explanations. Graduate students write a 2000-3000 words term paper about "Applications of Geometry in ...." Topics are chosen from astronomy, astrology, surveying, architecture, chemistry, physics, biology or another area with permission of the instructor.</p>

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1.4	<p>Connections:</p> <p>Submit a narrative that describes how the requirements of your program provide opportunities for your candidates to demonstrate an understanding of mathematical relationships across disciplines and connections within mathematics. What evidence indicates that this is being accomplished?</p>	<p><b>Major:</b>  MTH 485 Students share strategies used in solving mathematical problems and demonstrate their understanding through homework, discussions, four projects—one is an analysis of the media’s use of statistics, and examinations. (<i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i>)  Evidence: Class dialogue  MTH 241 Applications to physics and engineering abound, particularly in assigned projects.  MTH 483/MED 583 Many geometry problems lend themselves to applications in architecture, physics, astronomy, surveying, etc. Students learn to give clear, concise definitions of geometry terms and to use them effectively in oral and written explanations. Graduate students write a 2000-3000 words term paper about “Applications of Geometry in ....” Topics are chosen from astronomy, astrology, surveying, architecture, chemistry, physics, biology or another area with permission of the instructor.  MTH 484 In discussing the history of mathematics, many related disciplines are discussed as motivating factors in the development of many branches of mathematics.  MTH 485 The selection of examples allows students to make connections with real world statistics. (<i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i>)  Evidence: Instructor and students share information on the use of statistics in news reports and magazines.</p>	<p><b>Minor:</b>  MTH 483/MED 583 Many geometry problems lend themselves to applications in architecture, physics, astronomy, surveying, etc. Students learn to give clear, concise definitions of geometry terms and to use them effectively in oral and written explanations. Graduate students write a 2000-3000 words term paper about “Applications of Geometry in ....” Topics are chosen from astronomy, astrology, surveying, architecture, chemistry, physics, biology or another area with permission of the instructor.</p>

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1.5	Programs prepare prospective teachers who can:		
1.5.1	apply concepts of number, number theory, and number systems;	<p><b>Major:</b>  MTH 481 Topics include modular arithmetic, as well as groups and fields, using many different number systems to demonstrate properties of number sets and operations. (<i>Secondary Majors may elect instead MTH 405 Introduction to Modern Algebra.</i>)  MTH 486 This is a thorough course in Number Theory; highlights include modular arithmetic, divisibility, primality, and factor trees.</p>	<p><b>Minor:</b>  MTH 481 Topics include modular arithmetic, as well as groups and fields, using many different number systems to demonstrate properties of number sets and operations. (<i>Secondary Minors may elect instead MTH 405 Introduction to Modern Algebra.</i>)</p>
1.5.2	apply numerical computation and estimation techniques and extend them to algebraic expressions;	<p><b>Major:</b>  MTH 480 Analysis for Teachers  MTH 141 Calculus 1  MTH 142 Calculus 2  Each topic in these courses is taught numerically, graphically and algebraically. Students see a variety of approaches to solving problems, including numerical approaches.  MTH 241 Differentials are studied, with emphasis on how to use them as linear approximations to functions for which direct computations are difficult or inconvenient.  MTH 485 Prior to using algebraic expressions, estimation is consistently used to determine whether or not a solution is reasonable. (<i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i>)</p>	<p><b>Minor:</b>  MTH 141 Calculus 1  MTH 142 Calculus 2  Each topic in these courses is taught numerically, graphically and algebraically. Students see a variety of approaches to solving problems, including numerical approaches.</p>
1.5.3	apply the process of measurement to two- and three-dimensional objects using non-standard, customary and metric units;	<p><b>Major:</b>  MTH 483 More than a week of this class is spent reviewing tactile experiments teachers can conduct to emphasize measurement and computation of standard geometric figures.</p>	<p><b>Minor:</b>  MTH 483 More than a week of this class is spent reviewing tactile experiments teachers can conduct to emphasize measurement and computation of standard geometric figures.</p>

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1.5.4	use geometric concepts and relationships to describe and model mathematical ideas and real-world constructs;	<p><b>Major:</b>  MTH 480 Analysis for Teachers  MTH 141 Calculus 1  MTH 142 Calculus 2  Many topics in these courses require geometric as well as algebraic modeling of problems.  MTH 241 Geometric reasoning is essential in every aspect of this course.  MTH 482 Lines and planes are used to visualize the concepts of linear independence.  <i>(Majors may elect instead to take MTH 402 Linear Algebra with Applications.)</i>  MTH 483 This is a course in the teaching of Euclidean geometry. In addition to emphasis being placed on definitions, problem solving strategies, and constructions with an introduction to axiomatic reasoning, students complete 5 exploration-styled assignments. Most of the projects involve geometric construction with the students expected to draw conclusions based on their observations. Students must submit constructions that pre precise and constructed by straight edge and compass.</p>	<p><b>Minor:</b>  MTH 141 Calculus 1  MTH 142 Calculus 2  Many topics in these courses require geometric as well as algebraic modeling of problems.  MTH 483 This is a course in the teaching of Euclidean geometry. In addition to emphasis being placed on definitions, problem solving strategies, and constructions with an introduction to axiomatic reasoning, students complete 5 exploration-styled assignments. Most of the projects involve geometric construction with the students expected to draw conclusions based on their observations. Students must submit constructions that pre precise and constructed by straight edge and compass.</p>
1.5.5	understand the major concepts of Euclidean geometry from a variety of perspectives including coordinate and transformational;	<p><b>Major:</b>  MTH 480 Analysis for Teachers  MTH 141 Calculus 1  Transformations of functions are covered in these courses.  MTH 482 Polygons are depicted before and after linear transformations are applied to their vertices, as a demonstration of the geometric significance of the determinant of a matrix. <i>(Majors may elect instead to take MTH 402 Linear Algebra with Applications.)</i>  MTH 483 This is a course in the teaching of Euclidean geometry</p>	<p><b>Minor:</b>  MTH 141 Calculus 1  Transformations of functions are covered in this course.  MTH 483 This is a course in the teaching of Euclidean geometry.</p>

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1.5.6	use both descriptive and inferential statistics to analyze data, make predictions, and make decisions;	<b>Major:</b> MTH 485 Data is described, interpreted and analyzed for trends and patterns upon which predictions and decisions can be made. ( <i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i> )	<b>Minor:</b> Minors are encouraged to take MTH 485 Statistics for Teachers as their elective to ensure their acquisition of inferential statistics and its uses.
1.5.7	understand the concepts of random variable, distribution functions, and theoretical versus experimental probability and apply them to real-world situations;	<b>Major:</b> MTH 485 Explorations and comparisons are made with theoretical and experimental probabilities. Selected problems allow students to investigate random variables and a variety of distributions related to real-world situations. ( <i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i> )	<b>Minor:</b> Minors are encouraged to take MTH 485 Statistics for Teachers as their elective to ensure their acquisition of random variable, distribution functions, and theoretical versus experimental probability and their uses.
1.5.8	use algebra to describe patterns, relations, and functions, and to model and solve problems;	<b>Major:</b> MTH 480 Analysis for Teachers MTH 141 Analytical Geometry and Calculus 1 MTH 142 Analytical Geometry and Calculus 2 Many topics in these courses require geometric as well as algebraic modeling of problems. Students determine many of the formulas taught, by looking for patterns in earlier results. MTH 481 Homomorphisms are studied to demonstrate similar patterns of interactions of elements in various groups and fields. ( <i>Secondary Majors may elect instead MTH 405 Introduction to Modern Algebra.</i> ) MTH 483 Pattern recognition is used as a device for deriving many useful formulas. MTH 485 Algebraic expressions are use to describe, analyze and make inferences and predictions about statistical probabilities. ( <i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i> )	<b>Minor:</b> MTH 141 Calculus 1 MTH 142 Calculus 2 Many topics in these courses require geometric as well as algebraic modeling of problems. Students determine many of the formulas taught, by looking for patterns in earlier results. MTH 481 Homomorphisms are studied to demonstrate similar patterns of interactions of elements in various groups and fields. ( <i>Secondary Minors may elect instead MTH 405 Introduction to Modern Algebra.</i> ) MTH 483 Pattern recognition is used as a device for deriving many useful formulas

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1.5.9	understand the role of axiomatic systems and understand the use of proofs in different branches of mathematics, such as algebra and geometry;	<p><b>Major:</b>  MTH 481 Students prove many theorems and properties of number systems and permutations. (<i>Secondary Majors may elect instead MTH 405 Introduction to Modern Algebra.</i>)  MTH 483 Euclidean axiomatic theory is discussed, and the main geometry theorems of Euclid's Elements are explored through construction projects.  MTH 486 Students prove many theorems and properties of the natural numbers.</p>	<p><b>Minor:</b>  MTH 481 Students prove many theorems and properties of number systems and permutations. (<i>Secondary Minors may elect instead MTH 405 Introduction to Modern Algebra.</i>)  MTH 483 Euclidean axiomatic theory is discussed, and the main geometry theorems of Euclid's Elements are explored through construction projects.  MTH 486 Students prove many theorems and properties of the natural numbers.</p>
1.5.10	have a firm conceptual grasp of limit, continuity, differentiation and integration, and a thorough background in the techniques and application of calculus;	<p><b>Major:</b>  MTH 141 Calculus 1  MTH 142 Calculus 2  These topics are covered in depth in these courses.  MTH 241 These are standard topics in the course in calculus of several variables.</p>	<p><b>Minor:</b>  MTH 141 Calculus 1  MTH 142 Calculus 2  These topics are covered in depth in these courses.</p>
1.5.11	have a knowledge of discrete mathematics and its concepts and applications of graph theory, recurrence relations, linear programming, difference equations, matrices, and combinatorics;	<p><b>Major:</b>  MTH 241 Determinants of matrices are necessary for computing cross-products of vectors.  MTH 482 Simple problems in linear programming are solved using the Simplex Method and tableaux. (<i>Majors may elect instead to take MTH 402 Linear Algebra with Application.</i>)  MTH 485 Using discrete and continuing statistical data, in depth explorations are made. Problems in a real world context dealing with permutations and combinatorics are solved. (<i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i>)</p>	<p><b>Minor:</b>  Minors enhance their understanding of discrete mathematics concepts initially studied in MTH 140, 141, and 142 if they select MTH 276 Discrete Structures as an elective.</p>

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1.5.12	use mathematical modeling to solve problems from fields such as natural sciences, social sciences, business, and engineering; and	<b>Major:</b> MTH 480 Analysis for Teachers MTH 141 Calculus 1 MTH 142 Calculus 2 These topics are covered in these courses. MTH 241 Mathematical modeling is featured in projects involving elliptical orbits, curvature, Lagrange Multipliers, etc. MTH 485 Selected statistical problems from various disciplines are investigated. . (Majors may elect instead to take MTH 427 Applied Probability and Statistics.)	<b>Minor:</b> MTH 141 Calculus 1 MTH 142 Calculus 2 These topics are covered in these courses.
1.5.13	(Not applicable at this level)		
1.5.14	understand and apply the concepts of linear and nonlinear algebra, and the major concepts of abstract algebra.	<b>Major:</b> MTH 241 Vectors and determinants of matrices are discussed early in this course. MTH 481 This is a course in modern (abstract) algebra. (Majors may elect instead to take MTH 405 Introduction to Modern Algebra.) MTH 482 This is a course in linear algebra. (Majors may elect instead to take MTH 402 Linear Algebra with Applications.)	<b>Minor:</b> MTH 481 This is a course in modern (abstract) algebra. . (Minors may elect instead to take MTH 405 Introduction to Modern Algebra.)
1.6	Programs prepare prospective teachers who have a knowledge of historical development in mathematics that includes the contributions of under- represented groups and diverse cultures.	<b>Major:</b> MTH 484 Topics in math history are discussed chronologically. Early in the course, the origin of many areas of mathematics, particularly in China, India, and the Middle East, is studied in detail. Papers are assigned on famous female mathematicians and African-American mathematicians. MTH 485 As mathematical ideas are presented, recognition of contributing diverse cultures is noted and discussed. (Majors may elect instead to take MTH 427 Applied Probability and Statistics.)	<b>Minor:</b> Instructors in core mathematics courses such as MTH 141 and 142 provide knowledge about the historical development in mathematics through lecture and discussion as topics are introduced and/or completed.

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2.0	TEACHING PREPARATION		
2.1	<p>Diverse Learner</p> <p>Submit a narrative that describes how the requirements of your program prepare teachers of mathematics to develop and use their knowledge of student diversity to affirm and support full participation and continued study of mathematics by all students. This diversity includes gender, ethnicity, socioeconomic background, language, special needs, and mathematical learning styles.</p>	<p><b>Major:</b></p> <p>MTH 141 Calculus 1 MTH 142 Calculus 2</p> <p>These courses require group projects, which give students exposure to students different than themselves.</p> <p>MTH 484 Topics in math history are discussed chronologically. Early in the course, the origin of many areas of mathematics, particularly in China, India, and the Middle East, is studied in detail. Papers are assigned on famous female mathematicians and African-American mathematicians.</p> <p>Through inclusion of diversity issues in Education courses, students are provided many opportunities to learn about gender, ethnicity, socioeconomic background, language, special needs, and mathematical learning styles and to learn and practice inclusive teaching strategies to ensure that all students will learn mathematical content and skills. These examples are illustrative of such opportunities. EDU 401/402 Introduction to Elementary and Secondary Education engages the students in activities based upon LISA Delpit's book <i>Other People's Children</i>. Their action research and case study require observation, participation, and reflections in diverse K-12 school settings. Mathematic majors and minors concentrate their efforts on how children respond to mathematical instruction. EDU 420 Philosophy of Education and EDU 525 Educational Policy Studies celebrate diversity through small group discussions of class handouts that focus on issues of race, culture, gender, and socio-economic diversity. In EDU 440 School and Society and EDU 514 Society and Education gender role stereotypes are studied, discussed, and used in projects and other</p>	<p><b>Minor:</b></p> <p>MTH 141 Calculus 1 MTH 142 Calculus 2</p> <p>These courses require group projects, which give students exposure to students different than themselves. Through inclusion of diversity issues in Education courses, students are provided many opportunities to learn about gender, ethnicity, socioeconomic background, language, special needs, and mathematical learning styles and to learn and practice inclusive teaching strategies to ensure that all students will learn mathematical content and skills. These examples are illustrative of such opportunities. EDU 401/402 Introduction to Elementary and Secondary Education engages the students in activities based upon Lisa Delpit's book <i>Other People's Children</i>. Their action research and case study require observation, participation, and reflections in diverse K-12 school settings. Mathematic majors and minors concentrate their efforts on how children respond to mathematical instruction. EDU 420 Philosophy of Education and EDU 525 Educational Policy Studies celebrate diversity through small group discussions of class handouts that focus on issues of race, culture, gender, and socio-economic diversity. In EDU 440 School and Society and EDU 514 Society and Education gender role stereotypes are studied, discussed, and used in projects and other assignments. In EDU 478 Reading in the Content Areas, readings, videos/movies/dvd's are used to understand cultural differences and to show K-12</p>
2.1			

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(cont.)		<p>assignments. In EDU 478 Reading in the Content Areas, readings, videos/movies/dvd's are used to understand cultural differences and to show 7-12 classroom teachers modeling strategies that are successful with students from different cultural backgrounds. Attention to special needs students is particularly addressed in SED 460 Education and Mainstreaming of Exceptional Persons and in SED 560 Exceptional Persons where candidates learn and practice how to adapt lessons to the special needs of 7-12 grade students, both in the general classroom and a tutorial classroom. In EDU 469 Curriculum and Methods of Teaching in Secondary Schools I, students must address issues of differences in the assignments, projects, lesson/unit plans, and in their reflective writing journals. EDU 471 Curriculum and Methods of Teaching in Secondary Schools II: Mathematics requires candidates to create lessons that meet the cognitive and emotional needs for students in grades 7-12 with diverse backgrounds, needs, and abilities. In their Student Teaching experiences (EDU 490, 474, and/or 484), candidates are placed in settings with professionals of diverse backgrounds and work with students with diverse backgrounds and various mathematical abilities.</p>	<p>classroom teachers modeling strategies that are successful with students from different cultural backgrounds. Attention to special needs students is particularly addressed in SED 460 Education and Mainstreaming of Exceptional Persons and in SED 560 Exceptional Persons where candidates learn and practice how to adapt lessons to the special needs of 7-12 grade students, both in the general classroom and a tutorial classroom. In EDU 469 Curriculum and Methods of Teaching in Secondary Schools I, students must address issues of differences in the assignments, projects, lesson/unit plans, and in their reflective writing journals. EDU 471 Curriculum and Methods of Teaching in Secondary Schools II: Mathematics requires candidates to create lessons that meet the cognitive and emotional needs for students in grades 7-12 with diverse backgrounds, needs, and abilities. In their Student Teaching experiences (EDU 490, 474, and/or 484), candidates are placed in settings with professionals of diverse backgrounds and work with students with diverse backgrounds and various mathematical abilities.</p>

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2.2	<p>Technology</p> <p>Submit a narrative that describes how the requirements of your program prepare teachers of mathematics to use appropriate technology to support the learning of mathematics. This technology includes, but is not limited to, computers and computer software, calculators, interactive</p>	<p><b>Major:</b></p> <p>MTH 480 Analysis for Teachers  MTH 141 Calculus 1  MTH 142 Calculus 2</p> <p>These courses use graphing calculators and the CAS Maple. Students are taught when it is appropriate to use these tools as well as how to use them effectively.</p> <p>MTH 485 The selected textbook is embedded with calculator and computer technology. (<i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i>)</p> <p>While all Education courses require use of appropriate technology to facilitate learning and professors model and use a variety of technology in their teaching, three courses focus on helping candidates learn and demonstrate their ability to apply electronic tools and software for teaching 7-12 students subject matter: EDU 469 Curriculum and Methods of Teaching in Secondary Schools I, EDU 471 Curriculum and Methods of Teaching in Secondary Schools II: Mathematics, and the education technology courses, EDU 459 and 600. Education professors rely on their colleagues in the Mathematics courses to provide the foundation for use of calculators, graphing calculators, and mathematical software programs. In EDU 469 students study subject specific curriculum and use MDE Web sites to design lessons and units that are aligned with the state standards, products, and tests. Projects and lesson/unit plans must incorporate technology appropriately. In EDU 459 and 600 candidates are taught how to integrate technology into instruction, which is modeled by the professor. Mathematics majors and minors concentrate on preparing to use a variety of technology tools in the</p>	<p><b>Minor:</b></p> <p>MTH 141 Calculus 1  MTH 142 Calculus 2</p> <p>These courses use graphing calculators and the CAS Maple. Students are taught when it is appropriate to use these tools as well as how to use them effectively. While all Education courses require use of appropriate technology to facilitate learning and professors model and use a variety of technology in their teaching, three courses focus on helping candidates learn and demonstrate their ability to apply electronic tools and software for teaching 7-12 students subject matter: EDU 469 Curriculum and Methods of Teaching in Secondary Schools I, EDU 471 Curriculum and Methods of Teaching in Secondary Schools II: Mathematics, and the education technology courses, EDU 459 and 600. Education professors rely on their colleagues in the Mathematics courses to provide the foundation for use of calculators, graphing calculators, and mathematical software programs. In EDU 469 students study subject specific curriculum and use MDE Web sites to design lessons and units that are aligned with the state standards, products, and tests. Projects and lesson/unit plans must incorporate technology appropriately. In EDU 459 and 600 candidates are taught how to integrate technology into instruction, which is modeled by the professor. Mathematics</p>

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(cont.)		<p>math 7-12 classrooms. During their student teaching experience, candidates are expected to infuse technology into their instruction and to demonstrate that their students did learn mathematical content and skills from their lessons. The candidates' formal assessments by their Co-operating Teacher and UDM Supervisors include assessment of their technology expertise.</p>	<p>majors and minors concentrate on preparing to use a variety of technology tools in the math 7-12 classrooms. During their student teaching experience, candidates are expected to infuse technology into their instruction and to demonstrate that their students did learn mathematical content and skills from their lessons. The candidates' formal assessments by their Co-operating Teacher and UDM Supervisors include assessment of their technology expertise</p>
2.3	<p>Assessment Submit a narrative that describes how the requirements of your program prepare teachers of mathematics to use:</p>		
2.3.1	<p>formative and summative methods to determine students' understanding of mathematics and to monitor their own teaching effectiveness. How do you ensure that teacher candidates can carefully align their instructional and assessment practices?</p>	<p><b>Major:</b> MTH 485 When students work in pairs or in small groups, the instructor, acting as a facilitator can observe student interaction and stimulate thought by asking key questions or making thought provoking comments such as: What if...? (<i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i>) Education professors build on the assessment practices of their colleagues in Mathematics and teach candidates how to design assessments that are objective driven for use in their future K-12 classrooms. Lesson and unit plans designed, implemented, and presented in the various education classes (EDU 449—Mathematics; SED 460 or SED 513—Exceptional Persons; EDU 443—Reading; EDU 459 or 600—Technology) and the student teaching experience (EDU 489, 474, and/or 484) must follow the “Lesson Plan Format” located in the appendix area</p>	<p><b>Minor:</b></p>

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2.3.1 (cont.)		of the <i>Student Teaching Handbook</i> (a link on the web site). The form calls for both formative and summative student assessment that is tied to the lesson objectives as well as reflection by the candidate about her/his practice. The evaluation forms in the same area of the <i>Handbook</i> show that ongoing assessment of the student teaching experience is ensured.	
2.3.2	formative assessment to monitor student learning and to adjust instructional strategies and activities. Formative assessment includes, but is not limited to, questioning strategies, student writing, student products, and student performance.	<p><b>Major:</b> As explained in Standard 2.3.1 formative assessment of student learning occurs regularly in the mathematics courses, and results are used by the students themselves and the instructors to monitor learning and teaching. Projects in MTH 484, 485, and 486 include more reflective writing, especially in the required projects for the courses.</p> <p>MTH 485 During the first class, students work in small groups to discuss what statistics might look like in K-12 classrooms. Debriefing occurs. Following the debriefing, students are given the National Council of Teachers of Mathematics (NCTM) four grade level bands for statistics and the related State Benchmarks. (<i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i>) Such practices are easily adapted by the candidates to their own 7-12 teaching practice.</p> <p>In EDU 469 (Secondary Curriculum) and EDU 471 (Math Methods), education students receive formal instruction and complete assignments that demonstrate their mastery of a variety of assessment strategies that will help their students understand what they know as well as inform their instructional practice. The education and technology courses (EDU 459 and EDU 600) include projects that help candidates learn to use technology as a formative assessment tool for their students and themselves as teachers. EDU 432 Psychology of Education develops knowledge and understanding of measurement and evaluation in the teaching/learning process. Additional insights about</p>	<p><b>Minor:</b> As explained in Standard 2.3.1 formative assessment of student learning occurs regularly in the mathematics courses, and results are used by the students themselves and the instructors to monitor learning and teaching. Projects in MTH 486 include more reflective writing, especially in the required projects for the courses.</p> <p>Such practices are easily adapted by the candidates to their own 7-12 teaching practice. In EDU 469 (Secondary Curriculum) and EDU 471 (Math Methods), education students receive formal instruction and complete assignments that demonstrate their mastery of a variety of assessment strategies that will help their students understand what they know as well as inform their instructional practice. The education and technology courses (EDU 459 and EDU 600) include projects that help candidates learn to use technology as a formative assessment tool for their students and themselves as teachers. EDU 432 Psychology of Education develops knowledge and understanding of measurement and evaluation in the teaching/learning process. Additional insights about the use of formative assessments is gained in EDU 478/578 Reading in the Content areas when candidates demonstrate ways to integrate instruction with assessment and assess reading needs for a math textbook.</p>
2.3.2			

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
(cont.)		<p>the use of formative assessments is gained in EDU 478/578 Reading in the Content areas when candidates demonstrate ways to integrate instruction with assessment and assess reading needs for a math textbook. Just As their Mathematics colleagues practice sound formative assessment practices in their courses, so do the Education instructors. Reflective journal writing, interviews, review of draft copies of assignments, rubrics, peer review, discussion and traditional quizzes and examinations are assessment staples in Education courses.</p>	<p>Just As their Mathematics colleagues practice sound formative assessment practices in their courses, so do the Education instructors. Reflective journal writing, interviews, review of draft copies of assignments, rubrics, peer review, discussion and traditional quizzes and examinations are assessment staples in Education courses.</p>
2.3.3	<p>summative assessment to determine student achievement and to evaluate the mathematics program. Summative assessment includes, but is not limited to, teacher-designed tests, criterion-referenced tests, norm-referenced tests, portfolios, projects, and other open-ended student products.</p>	<p><b>Major:</b> MTH 485 Students are given paper and pencil assessments. . (<i>Majors may elect instead to take MTH 427 Applied Probability and Statistics.</i>) Summative assessment practices are presented and modeled in the Education courses in ways similar to those explained in the previous two standards. Assessment and evaluation practices are the subject of at least two meetings in EDU 469 and all unit and lesson plans must include summative assessments related to the learning objectives of each. The activities and projects in the secondary mathematics curriculum and methods course, EDU 471, require that assessment practices and tools are included in them. It also includes a lesson on using writing to promote mathematical reflection and as an assessment tool. During their student teaching experience, candidates are to practice the summative assessment practices used in the assigned classroom to monitor and assess their students' learning. The candidates' performances are assessed by the Cooperating Teacher and College Supervisor using the forms in the <i>Student Teaching Handbook</i>.</p>	<p><b>Minor:</b> Summative assessment practices are presented and modeled in the Education courses in ways similar to those explained in the previous two standards. Assessment and evaluation practices are the subject of at least two meetings in EDU 469 and all unit and lesson plans must include summative assessments related to the learning objectives of each. The activities and projects in the secondary mathematics curriculum and methods course, EDU 471, require that assessment practices and tools are included in them. It also includes a lesson on using writing to promote mathematical reflection and as an assessment tool. During their student teaching experience, candidates are to practice the summative assessment practices used in the assigned classroom to monitor and assess their students' learning. The candidates' performances are assessed by the Cooperating Teacher and College Supervisor using the forms in the <i>Student Teaching Handbook</i>.</p>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
2.4	<p>Programs prepare prospective teachers who can identify, teach, and model problem solving in grades 7-12. How do you ensure that teacher candidates can do this effectively?</p>	<p><b>Major:</b>  MTH 141 Calculus 1  MTH 142 Calculus 2  MTH 480 Analysis for Teachers  Instructors of these courses model appropriate problem solving behavior.  Teaching problem-solving is a key aspect of activities, assignments, and products in EDU 471, Math Methods. We ensure that our candidates can teach mathematics this way through continuous evaluation of their work in the course. Student Teaching, EDU 490) provides final proof that candidates can teach mathematics from a problem solving perspective. Informal and formal assessments by the Cooperating Teacher in the assigned 7-12 classroom and the UDM Student Teacher Supervisors as well as through the candidates' self reflection practices provide evidence of success and concerns about the candidates' skills. As soon as a student teacher appears to be lacking in her/his ability to teach and model problem solving by the Cooperating teacher or University Supervisor, the candidate is provided additional assistance to improve her/his performance. If at the end of the Student Teaching experience, the candidate does not meet UDM standards, he/she receives an Incomplete for the course and a plan for remediation is designed and implemented. The candidate then is assigned to another student teaching experience. If the student fails to meet the standard, he/she is counseled out of the teaching program.</p>	<p><b>Minor:</b>  MTH 141 Calculus 1  MTH 142 Calculus 2  Instructors of these courses model appropriate problem solving behavior.  Teaching problem-solving is a key aspect of activities, assignments, and products in EDU 471, Math Methods. We ensure that our candidates can teach mathematics this way through continuous evaluation of their work in the course. Student Teaching, EDU 490) provides final proof that candidates can teach mathematics from a problem solving perspective. Informal and formal assessments by the Cooperating Teacher in the assigned 7-12 classroom and the UDM Student Teacher Supervisors as well as through the candidates' self reflection practices provide evidence of success and concerns about the candidates' skills. As soon as a student teacher appears to be lacking in her/his ability to teach and model problem solving by the Cooperating teacher or University Supervisor, the candidate is provided additional assistance to improve her/his performance. If at the end of the Student Teaching experience, the candidate does not meet UDM standards, he/she receives an Incomplete for the course and a plan for remediation is designed and implemented. The candidate then is assigned to another student teaching experience. If the student fails to meet the standard, he/she is counseled out of the teaching program.</p>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
2.5	<p>Programs prepare prospective teachers who use a variety of physical and visual materials for exploration and development of mathematical concepts in grades 7-12 (see Michigan Curriculum Framework, 1996, pages 46-62, and its successor documents). How is this evaluated?</p>	<p><b>Major:</b>  MTH 483 Students use compass and straight edge to construct physical representations of important concepts in Euclidean geometry.  MTH 484 Students use overhead projectors and/or Powerpoint demonstrations on laptops connected with projectors during their in-class presentations, and often distribute manipulatives and teach short lessons with them.  Education courses and professors assume that Teacher Education candidates have experienced a variety of physical and visual materials for learning these mathematics concepts in their Mathematics courses; reinforce the methods; and teach the candidates how to design, adapt, and implement such strategies in their 7-12 classrooms. Candidates are introduced to the <i>Michigan Curriculum Framework</i> in EDU 401/402 Introduction to Elementary and Secondary Education as they explore pursuing education as a career and while they conduct their field study in the subject areas they believe they may wish to teach. Students become familiar with the <i>MCF</i> through web based and text based activities in their secondary methods courses (EDU 469 Curriculum and Methods and EDU 471 Mathematics) as well as in the core Education Courses (EDU 420-Philosophy or EDU 525-Policy Studies, EDU 440 or 514-Education and Society, EDU 459 and EDU 600—Technology, EDU 432 or EDU 513—Psychology, and SED 460 or 560—Exceptional Persons). Finally, they are assigned to 7-12 schools that have aligned their mathematics and other curricula to the State standards, materials, and tests.  The use of the <i>MCF</i> and other state materials is evaluated through the use of rubrics and other evaluation formats that require that the students site such sources and demonstrate their use of them in discussions; preparation of and presentation of projects, lesson and unit plans; and in their teaching.</p>	<p><b>Minor:</b>  MTH 483 Students use compass and straight edge to construct physical representations of important concepts in Euclidean geometry. Education courses and professors assume that Teacher Education candidates have experienced a variety of physical and visual materials for learning these mathematics concepts in their Mathematics courses; reinforce the methods; and teach the candidates how to design, adapt, and implement such strategies in their 7-12 classrooms. Candidates are introduced to the <i>Michigan Curriculum Framework</i> in EDU 401/402 Introduction to Elementary and Secondary Education as they explore pursuing education as a career and while they conduct their field study in the subject areas they believe they may wish to teach. Students become familiar with the <i>MCF</i> through web based and text based activities in their secondary methods courses (EDU 469 Curriculum and Methods and EDU 471 Mathematics) as well as in the core Education Courses (EDU 420-Philosophy or EDU 525-Policy Studies, EDU 440 or 514-Education and Society, EDU 459 and EDU 600—Technology, EDU 432 or EDU 513—Psychology, and SED 460 or 560—Exceptional Persons). Finally, they are assigned to 7-12 schools that have aligned their mathematics and other curricula to the State standards, materials, and tests. The use of the <i>MCF</i> and other state materials is evaluated through the use of rubrics and other evaluation formats that require that the students site such sources and demonstrate their use of them in discussions; preparation of and presentation of projects, lesson and unit plans; and in their teaching.</p>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
2.6	<p>Programs prepare prospective teachers who use a variety of print and electronic resources (e.g. calculators and computers).</p>	<p><b>Major:</b>            Calculators, graphing calculators, and computers are used by students in all mathematics courses.            MTH 484 Students conduct research on the internet in preparing their in-class presentations.            Education candidates learn the benefits of technology to maximize student learning and facilitate higher order thinking skills and how to enrich their teaching and their students' learning in EDU 459 Instructional Technology or EDU 600 Computer Use in Education. In EDU 471, Secondary Math Methods, candidates learn and practice the appropriate use of calculators, computers, and other electronic tools in mathematics teaching. During the candidates' Student Teaching experience, they are expected to use the electronic tools of the assigned school and to enhance, as appropriate and possible, the resources provided with their own electronic tools and/or University equipment and software. An Education computer laboratory is available in the UDM library for independent use by candidates and for professors to use with their courses and students. The UDM Library Liaison to Education is available to make presentations in the library computer labs as well as in the regular classrooms.</p>	<p><b>Minor:</b>            Calculators, graphing calculators, and computers are used by students in all mathematics courses.            Education candidates learn the benefits of technology to maximize student learning and facilitate higher order thinking skills and how to enrich their teaching and their students' learning in EDU 459 Instructional Technology or EDU 600 Computer Use in Education. In EDU 471, Secondary Math Methods, candidates learn and practice the appropriate use of calculators, computers, and other electronic tools in mathematics teaching. During the candidates' Student Teaching experience, they are expected to use the electronic tools of the assigned school and to enhance, as appropriate and possible, the resources provided with their own electronic tools and/or University equipment and software. An Education computer laboratory is available in the UDM library for independent use by candidates and for professors to use with their courses and students. The UDM Library Liaison to Education is available to make presentations in the library computer labs as well as in the regular classrooms.</p>
2.7	<p>Programs prepare prospective teachers who know when and how to use student groupings such as collaborative groups, cooperative learning, and peer teaching.</p>	<p><b>Major:</b>            Mathematics professors regularly engage their students in collaborative groups with individual responsibilities for submitting their own work for evaluation. The following mathematics classes are especially effective about instructors requiring collaboration: MTH 241, MTH 481/MED581, MTH 482/MED 582, MTH 483/MED 583, MTH 485/MED 585, and MTH 486/586. Students review and give oral and written reflections about classmates' work. In the Education Department, collaborative groups are an integral part of the instructional methods used by the professors. In addition, candidates are taught and</p>	<p><b>Minor:</b>            Mathematics professors regularly engage their students in collaborative groups with individual responsibilities for submitting their own work for evaluation. The following mathematics classes are especially effective about instructors requiring collaboration: MTH 481/MED581, MTH 483/MED 583, and MTH 486/586. Students review and give oral and written reflections about classmates' work. In the Education Department, collaborative groups are an integral part of the instructional methods used by the professors. In addition,</p>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
2.7 (cont.)	Programs prepare prospective teachers who know when and how to use student groupings such as collaborative groups, cooperative learning, and peer teaching.	<p>demonstrate through class discussions, presentations, and their documents how to use student groupings, cooperative learning, and peer teaching. In EDU 401/402 students are engaged in such in-class activities as they create a community of learners to explore the possibility of Education as a career for themselves. Their Case study must include an explanation and discussion of the criteria used within the observed classes to form groups and how they form naturally. Lectures and activities provide students with the necessary foundation to identify the qualities of effective cooperative work. The Secondary Curriculum and Methods classes (EDU 469, 471, 443, and 478/578) enhance the candidates' understanding and ability to use collaboration and peer review in their design of lesson and unit plans for 7-12 classrooms. EDU 471 provides students with repeated opportunities to work in groups and to learn the most effective ways of grouping 7-12 students in a classroom. Three class meetings are devoted to cooperative learning as an aid to mathematical insight. The Assessment forms used by the 7-12 Collaborating Teachers and the UDM Supervisors during their Student Teaching experience (EDU 490, 474, and/or 484) calls for assessment of a variety of instructional practices and class room management strategies which include appropriate and effective use of collaborative practices to facilitate mathematical learning of 7-12 grade students.</p>	<p>candidates are taught and demonstrate through class discussions, presentations, and their documents how to use student groupings, cooperative learning, and peer teaching. In EDU 401/402 students are engaged in such in-class activities as they create a community of learners to explore the possibility of Education as a career for themselves. Their Case study must include an explanation and discussion of the criteria used within the observed classes to form groups and how they form naturally. Lectures and activities provide students with the necessary foundation to identify the qualities of effective cooperative work. The Secondary Curriculum and Methods classes (EDU 469, 471, 443, and 478/578) enhance the candidates' understanding and ability to use collaboration and peer review in their design of lesson and unit plans for 7-12 classrooms. EDU 471 provides students with repeated opportunities to work in groups and to learn the most effective ways of grouping 7-12 students in a classroom. Three class meetings are devoted to cooperative learning as an aid to mathematical insight. The Assessment forms used by the 7-12 Collaborating Teachers and the UDM Supervisors during their Student Teaching experience (EDU 490, 474, and/or 484) calls for assessment of a variety of instructional practices and class room management strategies which include appropriate and effective use of collaborative practices to facilitate mathematical learning of 7-12 grade students.</p>
2.8	Programs prepare	<b>Major:</b>	<b>Minor:</b>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
	<p>prospective teachers who use instructional strategies based on current research as well as national, state (i.e. Teaching and Learning Standards from Chapter 4 of Michigan Curriculum Framework, 1996, and its successor documents), and local standards relating to mathematics instruction.</p>	<p>The courses in the Secondary Education program must adhere to the Department's <i>Conceptual Framework</i>, which is grounded in the wisdom of past and contemporary educators, practitioners, and theoreticians. The Michigan documents were among the resources for the development of the Education Department's statement. While all the Education courses involve the students in using the <i>MCF</i> and other documents from the state as well as national and professional organizations in the candidates' classroom activities, presentations, and documents; the following courses concentrate on teaching the candidates how to use such resources in their preparation and instruction in the 7-12 class room. EDU 469 Secondary Curriculum and Methods, EDU 471 Secondary Mathematics Methods, and EDU 478/578 Reading in Content areas. Candidates are expected to use these documents in their design of and presentation of practice lessons, orally and in writing. During their Student Teaching experience, candidates use the objectives and resources of the school district to which they are assigned. They are placed in districts that have aligned their curriculum to state standards.</p>	<p>The courses in the Secondary Education program must adhere to the Department's <i>Conceptual Framework</i>, which is grounded in the wisdom of past and contemporary educators, practitioners, and theoreticians. The Michigan documents were among the resources for the development of the Education Department's statement. While all the Education courses involve the students in using the <i>MCF</i> and other documents from the state as well as national and professional organizations in the candidates' classroom activities, presentations, and documents; the following courses concentrate on teaching the candidates how to use such resources in their preparation and instruction in the 7-12 class room. EDU 469 Secondary Curriculum and Methods, EDU 471 Secondary Mathematics Methods, and EDU 478/578 Reading in Content areas. Candidates are expected to use these documents in their design of and presentation of practice lessons, orally and in writing. During their Student Teaching experience, candidates use the objectives and resources of the school district to which they are assigned. They are placed in districts that have aligned their curriculum to state standards.</p>
2.9	Programs prepare	<b>Major:</b>	<b>Minor:</b>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
<p>2,9 (cont.)</p>	<p>prospective teachers who can work on an interdisciplinary team and in an interdisciplinary environment.</p> <p>Programs prepare</p>	<p>Both Mathematics and Education professors prepare students to communicate about their subject area to a variety of audiences from colleagues to parents and broader communities. MTH 141 Analytic Geometry/Calculus I prepares students to communicate calculus concepts and procedures in verbal, written, graphical, tabular, and symbolic form. Through homework presentations, quizzes, and use of Maple software, students learn to communicate their mathematical knowledge.</p> <p>MTH 241 Analytic Geometry/Calculus II requires students to work together on homework assignments and to submit their individual written work for assessment.</p> <p>MTH 483/MED 583 Fundamental Concepts of Geometry requires the students to communicate their knowledge through five group exploration-styled projects.</p> <p>MTH 484/MED 584 requires students to engage in class discussion based on pre-reading homework and to make individual short presentation on a tangential reading related to previous class material. They also work in hands-on activities regarding famous problems and theorems.</p> <p>MTH 485/MED585 requires students to complete four projects which involve communicating their knowledge to others in written, through EXCELL spreadsheets, and by oral explanations.</p> <p>Assignments and projects such as these help candidates to clarify their own knowledge and facilitate their ability to explain complex mathematical concepts and methods to others who are not mathematics experts.</p> <p>EDU 401/402 includes students from all academic areas. As they work in their groups and on their</p>	<p>Both Mathematics and Education professors prepare students to communicate about their subject area to a variety of audiences from colleagues to parents and broader communities.</p> <p>MTH 141 Analytic Geometry/Calculus I prepares students to communicate calculus concepts and procedures in verbal, written, graphical, tabular, and symbolic form. Through homework presentations, quizzes, and use of Maple software, students learn to communicate their mathematical knowledge.</p> <p>MTH 483/MED 583 Fundamental Concepts of Geometry requires the students to communicate their knowledge through five group exploration-styled projects.</p> <p>Assignments and projects such as these help candidates to clarify their own knowledge and facilitate their ability to explain complex mathematical concepts and methods to others who are not mathematics experts.</p> <p>EDU 401/402 includes students from all academic areas. As they work in their groups and on their field study, they regularly explain and discuss their ideas with students from other areas. The Education courses that all students take (EDU 420 or 525 philosophy and policy; EDU 440 or 514—schools and society; EDU 432 or 513—psychology) require students to complete projects related to specifics of their academic areas. Mathematics students must present their work to this</p>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
	<p>prospective teachers who can work on an interdisciplinary team and in an interdisciplinary environment.</p>	<p>field study, they regularly explain and discuss their ideas with students from other areas. The Education courses that all students take (EDU 420 or 525 philosophy and policy; EDU 440 or 514—schools and society; EDU 432 or 513—psychology) require students to complete projects related to specifics of their academic areas. Mathematics students must present their work to this interdisciplinary group of classmates. In SED 460 or 560, which teaches candidates to deal with students who have exceptional needs, the candidates learn how to adapt general education objectives to special needs. Mathematics majors and minors learn how to communicate with the general education teacher as well as those from other disciplines. Group projects in the education technology courses, EDU 459 or 600, are deliberately cross-disciplinary, which ensures more practice in communicating mathematical knowledge to others. Once again, the secondary methods courses (EDU 469, 471, and 478/578) encourage students to include interdisciplinary practices as they learn to teach mathematics to grades 7-12 students and the unique practices needed for reading in their specific subject areas. As both EDU 469 and EDU 478/578 are include secondary candidates from all disciplines, they learn to communicate mathematical concepts effectively to non-mathematic candidates. During their student teaching experience, candidates are involved in activities with the entire school and are evaluated on their ability to communicate with a variety of adult audiences, including parents.</p>	<p>interdisciplinary group of classmates. In SED 460 or 560, which teaches candidates to deal with students who have exceptional needs, the candidates learn how to adapt general education objectives to special needs. Mathematics majors and minors learn how to communicate with the general education teacher as well as those from other disciplines. Group projects in the education technology courses, EDU 459 or 600, are deliberately cross-disciplinary, which ensures more practice in communicating mathematical knowledge to others. Once again, the secondary methods courses (EDU 469, 471, and 478/578) encourage students to include interdisciplinary practices as they learn to teach mathematics to grades 7-12 students and the unique practices needed for reading in their specific subject areas. As both EDU 469 and EDU 478/578 are include secondary candidates from all disciplines, they learn to communicate mathematical concepts effectively to non-mathematic candidates. During their student teaching experience, candidates are involved in activities with the entire school and are evaluated on their ability to communicate with a variety of adult audiences, including parents</p>
<b>2.10</b>	Programs introduce and	<b>Major:</b>	<b>Minor:</b>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
	involve prospective teachers in the professional community of mathematics educators.	<p>Education professors encourage their students to become involved in subject specific conferences at sites as well as through use of computers and other interactive electronic means such as teleconferencing and web sites. For example, in EDU 478/578, students learn to explain strategies for teaching literacy and study skills for various content areas. Mathematics majors and minors are expected to explore sites related to their subject area. The web sites recommended in EDU 469 and used in assignments introduces candidates to the internet as a tool for working with educators throughout the world in schools, universities, and elsewhere. The other course activities are designed with an underlining focus of giving students practice in communicating and working with colleagues in a school or district. In EDU 459 and 514, students are engaged in identifying technology resources for ongoing professional development and as a means of keeping current with emerging technologies. They also work in an interdisciplinary team to design lessons, units, and curriculum that include mathematics with the other subjects. During their Student Teaching experience, candidates observe the calendar of the schools to which they are assigned. The evaluation forms include evaluation of professional behavior and participation in professional activities. Candidates, therefore, do attend district in-services and other professional activities with their Co-operating Teachers. The Student Teaching Seminars provide practical and immediate opportunities to be involved in professional communities.</p>	<p>Education professors encourage their students to become involved in subject specific conferences at sites as well as through use of computers and other interactive electronic means such as teleconferencing and web sites. For example, in EDU 478/578, students learn to explain strategies for teaching literacy and study skills for various content areas. Mathematics majors and minors are expected to explore sites related to their subject area. The web sites recommended in EDU 469 and used in assignments introduces candidates to the internet as a tool for working with educators throughout the world in schools, universities, and elsewhere. The other course activities are designed with an underlining focus of giving students practice in communicating and working with colleagues in a school or district. In EDU 459 and 514, students are engaged in identifying technology resources for ongoing professional development and as a means of keeping current with emerging technologies. They also work in an interdisciplinary team to design lessons, units, and curriculum that include mathematics with the other subjects. During their Student Teaching experience, candidates observe the calendar of the schools to which they are assigned. The evaluation forms include evaluation of professional behavior and participation in professional activities. Candidates, therefore, do attend district in-services and other professional activities with their Co-operating Teachers. The Student Teaching Seminars provide practical and immediate opportunities to be involved in professional communities.</p>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
2.11	Programs prepare prospective teachers to understand, use, and evaluate district mathematics curricula and to deliver the curriculum to each student.	<p><b>Major:</b> In EDU 469, Secondary Curriculum and Methods, students are introduced to curriculum and instructional methods. Topics include curriculum structure and content at the lesson and unit level. Students are required to design learning experiences for 7-12 grade students that complement the broader mathematics curriculum of the students for whom the lessons are intended. During their Student Teaching experience, candidates are to use the district's mathematics curriculum and textbooks to teach all students the expected mathematical knowledge and skill. "Delivery of Instruction" is the major component of all the evaluations completed by the Cooperating Teacher and University supervisor.</p>	<p><b>Minor:</b> In EDU 469, Secondary Curriculum and Methods, students are introduced to curriculum and instructional methods. Topics include curriculum structure and content at the lesson and unit level. Students are required to design learning experiences for 7-12 grade students that complement the broader mathematics curriculum of the students for whom the lessons are intended. During their Student Teaching experience, candidates are to use the district's mathematics curriculum and textbooks to teach all students the expected mathematical knowledge and skill. "Delivery of Instruction" is the major component of all the evaluations completed by the Cooperating Teacher and University supervisor.</p>
3.0	<b>FIELD-BASED EXPERIENCES</b>		
3.1	Programs provide prospective teachers with a sequence of planned opportunities prior to student teaching to observe and participate in 7-12 mathematics classrooms with qualified teachers. Experiences include observing, tutoring, mini-teaching, and planning mathematics activities and lessons for different mathematics courses and levels.	<p><b>Major:</b> As explained in Section 5 of this report, once candidates begin their Education program, they participate in a sequence of planned opportunities prior to student teaching to observe and participate in 7-12 mathematics classrooms with qualified teachers. Potential mathematics teacher candidates would choose a 7-12 mathematics classroom for observation, participation, and study in EDU 401/402 as part of their field experience and report their findings in their case study. In the other core education courses (EDU 420 or 525, EDU 440 or 514, EDU 459 or 600, SED 460 or 560, 432 or 513), students visit K-12 schools appropriate to their endorsement level and use their findings and observations in class discussions and their assigned projects. The exact requirements vary from service learning projects to interviews of school personnel to working with a 7-12 teacher. Mini-teaching presentations with peer review are included in the</p>	<p><b>Minor:</b> As explained in Section 5 of this report, once candidates begin their Education program, they participate in a sequence of planned opportunities prior to student teaching to observe and participate in 7-12 mathematics classrooms with qualified teachers. Potential mathematics teacher candidates would choose a 7-12 mathematics classroom for observation, participation, and study in EDU 401/402 as part of their field experience and report their findings in their case study. In the other core education courses (EDU 420 or 525, EDU 440 or 514, EDU 459 or 600, SED 460 or 560, 432 or 513), students visit K-12 schools appropriate to their endorsement level and use their findings and observations in class discussions and their assigned projects. The exact requirements vary from service learning projects to interviews of school personnel to working with a 7-12 teacher.</p>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
3.1 (cont.)		secondary methods courses: EDU 469, 471, and 478/578. In these courses, candidates regularly present to their classmates for critiquing carefully prepared lessons about specific mathematics topics.	Mini-teaching presentations with peer review are included in the secondary methods courses: EDU 469, 471, and 478/578. In these courses, candidates regularly present to their classmates for critiquing carefully prepared lessons about specific mathematics topics.
3.2	Programs provide prospective teachers with a full-time student teaching experience in 7-12 mathematics that is supervised by a qualified teacher and a university or college supervisor with 7-12 teaching experience and is knowledgeable regarding 7-12 mathematics.	<p><b>Major:</b> As indicated in previous standards and in Section 2 of this report, candidates complete a student teaching assignment in a 7-12 mathematics classroom. The contract consists of a full-day, 14 week contact, resulting in 8-10 semester hours of academic credit. The placement site provides opportunities for the student teacher, during the course of the semester, to assume gradually the full teaching responsibilities of the Co-operating Teacher. The student teacher is supervised by a co-operating teacher knowledgeable about mathematics subjects as well as a University Supervisor who visits the classroom at intervals to observe teaching and to make suggestions and evaluations as necessary. Both the Cooperating Teacher and the University Supervisor complete the evaluation forms displayed in the <i>Student Teaching Handbook</i> appendix.</p>	<p><b>Minor:</b> As indicated in previous standards and in Section 2 of this report, candidates complete a student teaching assignment in a 7-12 mathematics classroom. The contract consists of a full-day, 14 week contact, resulting in 8-10 semester hours of academic credit. The placement site provides opportunities for the student teacher, during the course of the semester, to assume gradually the full teaching responsibilities of the Co-operating Teacher. The student teacher is supervised by a co-operating teacher knowledgeable about mathematics subjects as well as a University Supervisor who visits the classroom at intervals to observe teaching and to make suggestions and evaluations as necessary. Both the Cooperating Teacher and the University Supervisor complete the evaluation forms displayed in the <i>Student Teaching Handbook</i> appendix.</p>

NO.	STANDARD/GUIDELINE	COURSES AND/OR EXPERIENCES THAT FULFILL THE STANDARDS FOR SECONDARY PROGRAMS	
3.3	Programs provide prospective teachers with time to confer with the supervising teacher and to do instructional planning.	<p><b>Major:</b> School districts and the Cooperating Teachers agree and provide that Student Teachers will have regular 7-12 planning time during the school day. Further, they agree to confer regularly with the Student Teacher on her/his progress and to spend time assisting the Student Teacher with planning and assessment work. They also agree to provide time for the Student Teachers to attend the Seminars, a minimum of 5 Student Teaching seminars held during the term. Students are not to be used as substitute teachers. Policies and procedures exist to manage the Student Teaching experience and to make adjustments as needed. Such action can originate with any of the participants and proceed from the Cooperating Teacher and University Supervisor to the Student Teacher Director, the Department Chair, and Associate Dean/Certification Officer.</p>	<p><b>Minor:</b> School districts and the Cooperating Teachers agree and provide that Student Teachers will have regular 7-12 planning time during the school day. Further, they agree to confer regularly with the Student Teacher on her/his progress and to spend time assisting the Student Teacher with planning and assessment work. They also agree to provide time for the Student Teachers to attend the Seminars, a minimum of 5 Student Teaching seminars held during the term. Students are not to be used as substitute teachers. Policies and procedures exist to manage the Student Teaching experience and to make adjustments as needed. Such action can originate with any of the participants and proceed from the Cooperating Teacher and University Supervisor to the Student Teacher Director, the Department Chair, and Associate Dean/Certification Officer.</p>