Secondary Teacher Certification Requirements
Mathematics, M.A.T.

Candidate: _____ Personal Email: _____ Campus ID: _____

PREREQUISITES

Candidates are Required to Possess a B.A. or B.S.
All Courses Must be completed with a C or Better

	Course	Semester	Grade
Differential Calculus, Analytic Geometry, & Intro to Integration (Eq. to MATH 151)			
Integral Calculus, Calculus for Sequences and Series, &Analytic Geometry, (Eq. to MATH 152)			
Linear Algebra (Eq. to MATH 221)			
Differential Equations (Eq. to MATH 225)			
Multivariable Calculus (Eq. to MATH 251)			
Mathematical Modeling (Eq. to MATH 385)			
Euclidean/Non-Euclidean Geometry with Proofs (Eq. to MATH 306)			
Mathematical Analysis (Eq. to MATH 301)			
Computational Methods (Eq. to MATH 341)			
Probability and Statistics (Eq. to STAT 355)			
Modern Algebra and Number Theory (Eq. to MATH 407)			
History of Mathematics (Eq. to MATH 432)			
Adolescent/Developmental Psychology (Eq. to PSYC 200)			

PROFESSIONAL EDUCATION REQUIREMENTS:

Graduate students must maintain a 3.0 GPA throughout program. All students must attain a B or better in all required education courses.

		Semester	Grade
EDUC 601 Human Learning and Cognition	3		
EDUC 602 Instructional Systems Development	3		
EDUC 650 Education in Cultural Perspective	3		
EDUC 658 Reading in the Content Area I	3		
EDUC 678 Instr Strategies/Students with Diverse Needs	3		
Content Elective	3		
Content Elective	3		
FALL SEMESTER ONLY			
Phase I: Minimum 40 Half Days in Field Placement			
EDUC 659 Reading in the Content Area II	3		
EDUC 628 Instr Strategies for Teaching Secondary Math	3		
SPRING SEMESTER ONLY			
Phase II: Minimum 80 Days in Field Placement			
EDUC 791P Practicum in Education	3		
EDUC 793S Internship in Education	5		
EDUC 797 Internship Seminar in Secondary Education	1		

CERTIFICATION TEST SCORES

Praxis Core Reading (≥156)			
Praxis Core Writing (≥162)		GRE Verbal	
Praxis Core Mathematics (≥150)		GRE Quantitative	
		GRE Composite (≥297)	
		Praxis II Mathematics: Content Knowledge 5161 (≥160)	
		Praxis II Principles of Teaching and Learning: Grades 7-12; 5624 (≥157)	

ADVISING DATES (Initial Advising Date:_____)

FALL: _____ _____ _____

SPRING: _____ _____ _____

ADVISOR _____

Secondary Teacher Certification Requirements
Mathematics, M.A.T.
UMBC Secondary Mathematics MAT Program Transcript Analysis Process

The UMBC Secondary Mathematics Education program is committed to helping students become highly effective mathematics teachers. The program is accredited by the National Council of Teachers of Mathematics (NCTM) CAEP/NCATE Standards for Mathematics Teacher Preparation Programs. The current accreditation is based on NCTM's 2003 standards. The program has undergone revision in preparation for the next review cycle, which will be based on NCTM's 2012 standards (http://www.nctm.org/standards/content.aspx?id=2978).
The induction of a student into the MAT program begins with an initial analysis by the Director of Student Services in the UMBC Education Department. Following the initial analysis, the Secondary Mathematics advisor conducts a full analysis and makes final determinations regarding any questions about pre-requisites being met by courses on the student's transcript(s).
The transcript analysis begins with a comparison of course names and level (i.e., 100/200/300/400 level) of mathematics classes on the student's transcript to the UMBC undergraduate mathematics courses used to satisfy NCTM Content Standard requirements.

1a) Demonstrate and apply knowledge of major 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) as outlined in the NCTM NCATE Mathematics Content for Secondary.

a. All courses must be completed with a "C" or better.

b. Courses on transcripts that are at the same level or higher as their UMBC counterpart are accepted as meeting the same NCTM Content Standards as the UMBC course.

c. Courses on transcripts that are at a lower level than their UMBC counterpart are potentially accepted as meeting the same NCTM Content Standards as the UMBC course, pending verification of the course components (e.g., course description, syllabus, communication from the transcript institution).

d. Mathematics courses on transcripts without a clear UMBC counterpart may meet NCTM Content Standards, pending verification of the course components (e.g., course description, syllabus, communication from the transcript institution) and aligning them directly to the NCTM Content Standards.

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National Council of Teachers of Mathematics (NCTM) NCATE/CAEP Mathematics Content for Secondary (Addendum to the NCTM NCATE/CAEP Standards 2012)
A. Secondary Mathematics Teachers
UMBC Mathematics Course Alignment for Transcript Analysis

All secondary mathematics teachers should be prepared with depth and breadth in the following mathematical domains: Number, Algebra, Geometry, Trigonometry, Statistics, Probability, Calculus, and Discrete Mathematics. All teachers certified in secondary mathematics should know, understand, teach, and be able to communicate their mathematical knowledge with the breadth of understanding reflecting the following competencies for each of these domains (NCTM, 2012).

The following list identifies the NCTM Content Standards for Secondary Mathematics Teachers addressed in UMBC mathematics courses required for undergraduate secondary mathematics education majors. The alignment provided here serves as a foundation for determining how courses on a transcript meet the requisite NCTM standards for teacher content knowledge. In the event that an incoming MAT student needs additional mathematics coursework to meet NCTM content standards, this list should be used to determine which courses need to be taken. Course descriptions can be found at http://www.umbc.edu/catalog/

MATH 151 Calculus and Analytic Geometry I
A.5.1 Limits, continuity, rates of change, the Fundamental Theorem of Calculus, and the meanings and techniques of differentiation and integration

MATH 152 Calculus and Analytic Geometry II
A.5.1 Limits, continuity, rates of change, the Fundamental Theorem of Calculus, and the meanings and techniques of differentiation and integration
A.5.3 Sequences and series
A.5.5 Applications of function, geometry, and trigonometry concepts to solve problems involving calculus

MATH 221 Introduction to Linear Algebra
A.1.4 Vector and matrix operations, modeling, and applications
A.2.5 Linear algebra including vectors, matrices, and transformations

MATH 225 Introduction to Differential Equations
A.5.1 Limits, continuity, rates of change, the Fundamental Theorem of Calculus, and the meanings and techniques of differentiation and integration
A.5.3 Sequences and series

MATH 251 Multivariable Calculus
A.5.1 Limits, continuity, rates of change, the Fundamental Theorem of Calculus, and the meanings and techniques of differentiation and integration
A.5.2 Parametric, polar, and vector functions
A.5.4 Multivariate functions

MATH 301 Introduction to Mathematical Analysis I
A.5.3 Sequences and series
A.6.1 Discrete structures including sets, relations, functions, graphs, trees, and networks
A.6.2 Enumeration including permutations, combinations, iteration, recursion, and finite differences
A.6.3 Propositional and predicate logic

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MATH 306 Geometry

A.3.1 Core concepts and principles of Euclidean geometry in two and three dimensions and two-dimensional non-Euclidean geometries

A.3.2 Transformations including dilations, translations, rotations, reflections, glide reflections; compositions of transformations; and the expression of symmetry in terms of transformations

A.3.3 Congruence, similarity and scaling, and their development and expression in terms of transformations

A.3.4 Right triangles and trigonometry

A.3.5 Application of periodic phenomena and trigonometric identities

A.3.6 Identification, classification into categories, visualization, and representation of two- and three-dimensional objects (triangles, quadrilaterals, regular polygons, prisms, pyramids, cones, cylinders, and spheres)

A.3.7 Formula rationale and derivation (perimeter, area, surface area, and volume) of two- and three-dimensional objects (triangles, quadrilaterals, regular polygons, rectangular prisms, pyramids, cones, cylinders, and spheres), with attention to units, unit comparison, and the iteration, additivity, and invariance related to measurements

A.3.8 Geometric constructions, axiomatic reasoning, and proof

A.3.9 Analytic and coordinate geometry including algebraic proofs (e.g., the Pythagorean Theorem and its converse) and equations of lines and planes, and expressing geometric properties of conic sections with equations

MATH 341 Computational Methods

A.2.5 Linear algebra including vectors, matrices, and transformations

A.5.1 Limits, continuity, rates of change, the Fundamental Theorem of Calculus, and the meanings and techniques of differentiation and integration

A.5.5 Applications of function, geometry, and trigonometry concepts to solve problems involving calculus

MATH 385 Introduction to Mathematical Modeling

A.1.3 Quantitative reasoning and relationships that include ratio, rate, and proportion and the use of units in problem situations

A.1.4 Vector and matrix operations, modeling, and applications

A.2.1 Algebraic notation, symbols, expressions, equations, inequalities, and proportional relationships, and their use in describing, interpreting, modeling, generalizing, and justifying relationships and operations

A.2.2 Function classes including polynomial, exponential and logarithmic, absolute value, rational, and trigonometric, including those with discrete domains (e.g., sequences), and how the choices of parameters determine particular cases and model specific situations

A.2.4 Patterns of change in linear, quadratic, polynomial, and exponential functions and in proportional and inversely proportional relationships and types of real-world relationships these functions can model

A.6.4 Applications of discrete structures such as modeling and solving linear programming problems and designing data structures

STAT 355 Introduction to Probability &Statistics for Scientists and Engineers

A.4.1 Statistical variability and its sources and the role of randomness in statistical inference

A.4.3 Univariate and bivariate data distributions for categorical data and for discrete and continuous random variables, including representations, construction and interpretation of graphical displays (e.g., box plots, histograms, cumulative frequency plots, scatter plots), summary measures, and comparisons of distributions

A.4.4 Empirical and theoretical probability (discrete, continuous, and conditional) for both simple and compound events

A.4.5 Random (chance) phenomena, simulations, and probability distributions and their application as models of real phenomena and to decision making

A.6.2 Enumeration including permutations, combinations, iteration, recursion, and finite differences

MATH 407 Introduction to Modern Algebra and Number Theory

A.1.1 Structure, properties, relationships, operations, and representations including standard and non-standard algorithms, of numbers and number systems including integer, rational, irrational, real, and complex numbers

A.1.2 Fundamental ideas of number theory (divisors, factors and factorization, primes, composite numbers, greatest common factor, least common multiple, and modular arithmetic)

A.2.6 Abstract algebra, including groups, rings, and fields, and the relationship between these structures and formal structures for number systems and numerical and symbolic calculations

MATH 432 History of Mathematics

A.1.5 Historical development and perspectives of number, number systems, and quantity including contributions of significant figures and diverse cultures

A.2.7 Historical development and perspectives of algebra including contributions of significant figures and diverse cultures

A.3.10 Historical development and perspectives of geometry and trigonometry including contributions of significant figures and diverse cultures

A.4.6 Historical development and perspectives of statistics and probability including contributions of significant figures and diverse cultures

A.5.6 Historical development and perspectives of calculus including contributions of significant figures and diverse cultures

A.6.5 Historical development and perspectives of discrete mathematics including contributions of significant figures and diverse cultures