MATHEMATICS EDUCATION

The M.Ed. degree in Secondary Education with a concentration in Mathematics leads to

LEVEL 5 certification in mathematics. A student enrolling in this program is expected to hold a

baccalaureate-level certification. This program requires a minimum of 36 semester hours of grad-

uate work and successful completion of a comprehensive examination in the area of mathematics.

Students must confer with their advisor to design a planned program, which may include undergraduate

courses, as needed, to remedy the lack of preparation in mathematics as determined by

the Graduate Committee in the Department of Mathematics and Computer Science.

The objectives of the Master of Education program in Mathematics Education are: (1) to provide

the students with in-depth knowledge of Mathematics in the areas of algebra, analysis and

geometry and their applications; (2) to provide training in the use of technology and educational

research in the teaching and learning of mathematics; and (3) to prepare students to use and promote

logical thinking skills and problem-solving strategies in the teaching and learning of mathematics.

**Degree Requirements**

1. The Master of Education in Secondary Education with concentration in Mathematics requires a

minimum of 36 semester hours of graduate course work, at least 27 semester hours of which

are taken at Albany State University.

2. The successful completion of a comprehensive examination is a requirement in all Master’s degree

programs.

3. At least an overall average of “B” in all the Mathematics courses in the graduate program is a

prerequisite for taking the comprehensive examination in Mathematics.

**Regular Admission**

Regular admission to the M.Ed. program with concentration in Mathematics requires that an

applicant have an undergraduate degree in Mathematics or Mathematics Education and have satisfied

the regular general admission requirements for admissions set by the College of Education at

Albany State University. The student must have a 2.5 minimum overall undergraduate grade-point

average and clear renewable teaching certification for secondary Mathematics in the state of Georgia. In addition, a student

who lacks preparation in Mathematics is required, as a prerequisite to graduate admission, to take

undergraduate Mathematics courses as determined by the Graduate Committee in the Department

of Mathematics and Computer Science.

**Provisional Admission**

The student is admitted provisionally if some conditions are placed on their status because of

grade-point average, standardized test scores or lack of academic preparation in the subject area. A

student who lacks sufficient preparation in Mathematics is required as a prerequisite, to complete

specific undergraduate Mathematics courses, as determined by the Graduate Committee in the

Department of Mathematics. No graduate credit is given for courses taken at the undergraduate

level. A minimum of 3.0 grade-point average is required for the satisfactory completion of the prerequisite

courses. Additionally, the student must complete 9 semester hours of study at the graduate

level with an average of “B” or better before he/she is granted regular admission to the program.

**Non-Degree Admission**

Students may enroll with this status to complete course work for either certification renewal,

add-on certification purposes or personal enrichment provided they satisfy the prerequisite requirements

for the course. No more than 9 semester hours of credit earned in this category may subsequently

be applied toward meeting the requirements of the Master’s degree.

**Student Advisement and Program Planning**

A graduate advisor in the Department of Mathematics and Computer Science must approve in

advance all courses taken through the teacher education program. Students evaluated by the department

and found to be lacking sufficient preparation for the graduate courses in Mathematics are required

to take the necessary prerequisites as determined by the Graduate Committee in the

Department of Mathematics and Computer Science.

**Comprehensive Examination Policy**

The comprehensive examination covers three subjects: Analysis, Modern Algebra and a subject of the candidate’s choice (e.g. Geometry, Topology, or History of Mathematics etc.). Students have totally three attempts to pass the comprehensive examination. Passing score is 80% of each subject. If a student passes two subjects and fails the third one, then the student only require to take the third one in the next attempt. If a student does not pass two or three subjects, then the student is required to retake all the three subjects in the next attempt.

**Area A - Nature of the Learner (Minimum of 3 semester hours)**

PSYC 5515 Educational Psychology

PSYC 5552 Conditions of Learning

SPED 5501 Exceptional Children and Youth\*\*

**Area B - Programs and the Problems of Schools**

**(Minimum of 3 semester hours)**

EDUC 5509 Philosophy of Education

EDUC 5538 Curriculum Planning

EDUC 5533 Methods and Materials for Teaching Secondary School Mathematics

EDUC 5531 Mathematics Concepts for Secondary School Mathematics

**Area C - Teaching Field (Minimum of 15 semester hours)**

MATH 5111 Theory of Numbers

MATH 5112 Linear Algebra\*\*

MATH 5113 Modern Algebra I\*

MATH 5114 Modern Algebra II\*

MATH 5211 Fundamental Concepts of Analysis I\*

MATH 5212 Fundamental Concepts of Analysis II\*

MATH 5311 Geometry for Teachers\*\*

MATH 5312 Foundations of Geometry

MATH 5313 Modern Geometry

MATH 5314 Introduction to Topology

**Area D - Research (Minimum of 3 semester hours)**

EDUC 5501 Methods of Research in Education\*

MATH 5412 Methods of Statistical Analysis

EDUC 5500 Education Statistics\*\*

**Area E - Electives (Minimum of 3 semester hours)**

(Courses may be chosen from either the following courses or from courses in area C above.)

MATH 5202 Technology-Oriented Mathematics

MATH 5213 Complex Analysis

MATH 5214 Differential Equations

MATH 5215 Numerical Analysis

MATH 5414 Introduction to Operations Research

MATH 5511 History of Mathematics\*\*

MATH 5670 Special Topics in Mathematical Sciences

\* Required course

\*\* Required if not previously fulfilled at the undergraduate or graduate level.

**Total Hours Required........................................................................................................36 hours**

COURSE DESCRIPTIONS

**MATH 5011 - Foundations of Arithmetic for Teachers I\*\*\*.................................................3(3-0)**

Sets, whole numbers, fractions, elementary number theory, algorithms, elementary geometry

and a study of the metric system. Designed for teachers of grades K-4.

**MATH 5012 - Foundations of Arithmetic for Teachers II\*\*\*................................................3(3-0)**

Numeration systems, elementary number theory, rational numbers, real numbers, basic algorithms,

graphs and measurements. For teachers of grades 4-8.

**MATH 5110 - Algebraic Structures for Teachers\*\*\*..............................................................3(3-0)**

Elementary study of the properties of groups, integral domains and fields. *Prerequisite: 5011 or*

*consent of instructor*

**MATH 5111 - Theory of Numbers...........................................................................................3(3-0)**

Properties of integers, divisibility, congruence of numbers. LaGrange’s theorem, residues and

Diophantine equations. *Prerequisite: Graduate standing*

**MATH 5112 - Linear Algebra....................................................................................................3(3-0)**

Vector spaces and linear transformations. Other topics include equations, matrices, determinants,

characteristic values, the special theorem, linear functions and dual space. Prerequisite:

Graduate standing.

**MATH 5113-5114 - Modern Algebra I & II\*............................................................................6(3-0)**

Groups, permutation groups, finite groups, group mappings, rings, ideals, quotient rings, fields,

finite fields, polynomial rings, field extensions, vector spaces, algebra of linear

transformations. Prerequisite: Graduate standing.

**MATH 5202 - Technology-Oriented Mathematics.................................................................3(3-0)**

Applications of mathematical software and graphic calculators in doing and teaching mathematics.

Problem-solving and simulations using software such as Mathematics, Maple, Math

Lab and statistical packages.

**MATH 5211-5212 - Fundamental Concepts of Analysis I & II\*..............................................6(3-0)**

Sets and functions, real number system, topological concepts in real Cartesian spaces, sequences,

limits, continuity, uniform continuity, differentiation and integration, convergence, uniform convergence.

*Prerequisite: Graduate standing*

**MATH 5213 - Complex Analysis..............................................................................................3(3-0)**

Complex numbers, analytic functions, complex series, Cauchy’s theory, residue calculus and

conformal mappings. *Prerequisite: MATH 5211*

**MATH 5214 - Differential Equations........................................................................................3(3-0)**

Ordinary differential equations of first and higher order, solutions in series, Lapalace transforms

numerical solutions. *Prerequisite: MATH 5211 or consent of instructor*

**MATH 5215 - Numerical Analysis..........................................................................................3(3-0)**

Nature of error, Gaussian elimination for linear systems, iteration, Newton’s method, steepest

descent for nonlinear systems, zeros of polynomials and interpolation. *Prerequisite: MATH 5211*

*or consent of instructor*

**MATH 5311 - Geometry for Teachers\*\*..............................................................................3(3-0)**

Points, lines, planes, parallel and perpendicular lines, congruence, similarity, measurement, constructions,

space figures, analytical geometry and non-Euclidean Geometry. *Prerequisite: Graduate*

*standing.*

**MATH 5312 - Foundations of Geometry..................................................................................3(3-0)**

Euclidean and non-Euclidean geometry, including incidence, order and the parallel postulate.

*Prerequisite: Graduate standing*

**MATH 5313 - Modern Geometry.............................................................................................3(3-0)**

An algebraic approach to geometry using vectors and transformations. For secondary teachers.

*Prerequisite: MATH 5112 or consent of the instructor*

**MATH 5314 - Introduction to Point Set Topology................................................................3(3-0)**

Set theory, general topological spaces, product spaces, sequences, compactness, connectedness,

metric spaces and Tcychonoff theorem. *Prerequisite: Graduate standing*

**MATH 5410 - Probability and Statistics for Teachers`\*\*.......................................................3(3-0)**

Probability, gathering and recording data, construction and use of tables, tabulating and graphing

percentiles, mean and standard deviation, frequency distributions, normal distribution and

statistical interference correlation. *Prerequisite: Consent of instructor*

**MATH 5412 - Methods of Statistical Analysis.........................................................................3(3-0)**

Estimation and inference using basic probability distributions, analysis of variance, analysis of

covariance, regression, correlation and basic experimental design. Prerequisite: A previous

course in statistics.

**MATH 5414 - Introduction to Operations Research.............................................................3(3-0)**

Linear programming, the simplex method, network theory, games theory, Markov analysis, other

topics including inventory analysis and queuing theory. *Prerequisite: Graduate standing.*

**MATH 5511 - History of Mathematics....................................................................................3(3-0)**

Growth and development of the discipline of Mathematics from antiquity to modern times. Spe-

cial emphasis given to the evolutionary character of the principal ideas of modern Mathematics.

**MATH 5670 - Special Topics In Mathematical Sciences.......................................................3(3-0)**

An exploration of special topics of current interest in the Mathematical sciences. Prerequisite.

Consent of instructor

\* Required course

\*\* Required if not previously fulfilled at the undergraduate or graduate level.

\*\*\* No credit is given toward the graduate program in Mathematics Education. (See courses on

pages 78-79.