1. **Type of Change**: New Course

2. **Course Description**: ESC 771: Integrating Mathematics, Science, and Technology in Middle School Teaching and Learning. 3 hours, 3 credits.

Identification and examination of key concepts and issues in the teaching of mathematics and science to high-need culturally and linguistically diverse middle school students. Modeling and design of effective instructional strategies that incorporate mathematics and science concepts with supporting technological applications.

3. **Rationale**: This course is needed to provide specific training for middle school teachers in cross-disciplinary STEM (science, technology, engineering, mathematics) instruction. To facilitate this goal, ESC 771 will be co-taught by natural sciences faculty with education faculty. This collaborative effort intends to align disciplinary content with professional teaching standards (NCTM & NSTA), to design inquiry-based projects for science and mathematics curricula, and to model the delivery of standards-based instruction in authentic contexts.

4. **Learning Objectives**:

   * By the end of the course students will be expected to:
     * develop instructional skills that incorporate both content knowledge and pedagogical competence.
     * demonstrate mastery of instructional competence.
     * incorporate authentic scientific contexts, supporting mathematical applications, and the effective use of technology.
     * examine the theoretical frameworks that inform reformed STEM teaching practices, and apply research-based strategies in lesson design, assessments, and classroom instruction.
     * utilize reflective practices to formulate and improve upon an evolving pedagogical philosophy.

5. **Date of Departmental Approval**: March 11, 2010
LEHMANN COLLEGE
OF THE
CITY UNIVERSITY OF NEW YORK
DEPARTMENT OF MIDDLE AND HIGH SCHOOL EDUCATION
CURRICULUM CHANGE

1. **Type of Change:** Cross-Listing; Title; Description; Prerequisite

2. **From:** ESC [EDR] 529: Language, [Literacy, and Educational Technology]. 3 hours, 3 credits. [Using information technology to support the teaching of literacy to students of diverse language backgrounds and abilities through the content areas.] Social, legal, and ethical issues affecting the instructional use of technology. Curriculum development; current standards; inclusion of students with disabilities; and assessment. [No prior computing experience is necessary.] Includes field experience.

3. **To:** ESC 529: Language and Literacies Acquisition in Secondary Education. 3 hours, 3 credits. The teaching and acquisition of language and literacies through secondary content areas, including media literacy, with students of diverse language backgrounds and abilities. Curriculum development; current standards; inclusion of students with disabilities; and assessment. Includes field experience.

4. **Rationale:**
These changes will make our learning goals and objectives clearer, more accurate, and more in line with State regulations for the preparation of secondary teachers to teach language and literacies, including media literacy. Removing the course’s cross-listing with EDR 529, with the joint permission of both Curriculum Committees, will enable each department to develop the course to meet its specific needs.

5. **Date of departmental approval:** 11/12/2009
Lehman College
The City University of New York
Department of Middle and High School Education
CURRICULUM CHANGE

Hegis #: 1701.01
State Program Code #: 27817

1. Type of Change: Change in Requirements for the
   Advanced Certificate Program in Mathematics Education

2. From:
   Advanced Certificate in Mathematics Education (21-24 Credits)

This program is designed for candidates who hold a bachelor’s degree in
Mathematics and a master’s degree in Mathematics or in an approved Mathematics-
related field, and who seek New York State Certification in Mathematics, grades 7-
12.

Admission Requirements

• Possess a bachelor’s degree (or its equivalent) from an accredited college or
  university which meets New York State’s requirements for a general education core
  in liberal arts and sciences. This degree shall include a Mathematics major with a
  minimum of 36 credits in Mathematics.

• Possess a master’s degree in Mathematics or an approved Mathematics-
  related field.

• Demonstrate the ability to pursue graduate study successfully by
  having a master’s Grade Point Average of 3.0 or better.

• Satisfy the content requirements for New York State initial Certification in
  Mathematics, grades 7-12.
• Submit scores on the N.Y.S. L.A.S.T. Teacher Examination and the N.Y.S. Content Specialty Test (C.S.T.) in Mathematic.

• Submit two (2) letters of recommendation, at least one of which is from a college or university instructor of mathematics.

• Submit a 500-word essay on career goals.

• Participate in an interview.

• Meet additional Departmental, divisional, and New York State requirements, if any.

• If conditionally admitted, make up requirements starting in the first semester and finishing in no more than three consecutive semesters.

Certificate Requirements

The Certificate Program in Mathematics Education consists of 21-24 credits, as outlined below. A minimum of a B average must be maintained throughout the course of the Program. All students are to consult with an adviser in Mathematics Education before starting the program. In order to be recommended for N.Y.S. certification at the completion of the program, candidates must have passed the L.A.S.T., the C.S.T. in Mathematics, and the N.Y.S. Written Assessment of Teaching Skills (A.T.S.W.); they must also meet any additional requirements set by New York State.

Curriculum

• Foundations of Education [(9 credits)]: ESC 501 (3); ESC 502 (3).

  [ESC 529 [(3)]

• Curriculum and Instruction [(9 credits)]: ESC 532 (3); plus 6 additional credits in Mathematics Education to be selected in consultation with the
Program Coordinator.

- Practicum (3-6 credits): ESC 595 (3) OR 596 (6).

3. To:

**Advanced Certificate in Mathematics Education (21-24 Credits)**

This program is designed for candidates who hold a bachelor’s degree in Mathematics and a master’s degree in Mathematics or in an approved Mathematics-related field, and who seek New York State Certification in Mathematics, grades 7-12.

**Admission Requirements**

- Possess a bachelor’s degree (or its equivalent) from an accredited college or university which meets New York State’s requirements for a general education core in liberal arts and sciences. This degree shall include a Mathematics major with a minimum of 36 credits in Mathematics.
- Possess a master’s degree in Mathematics or an approved Mathematics-related field.
- Demonstrate the ability to pursue graduate study successfully by having a master’s Grade Point Average of 3.0 or better.
- Satisfy the content requirements for New York State initial Certification in Mathematics, grades 7-12.

- Submit scores on the N.Y.S. L.A.S.T. Teacher Examination and the N.Y.S. Content Specialty Test (C.S.T.) in Mathematics.
- Submit two (2) letters of recommendation, at least one of which is from a college or university instructor of mathematics.
- Submit a 500-word essay on career goals.
- Participate in an interview.
- Meet additional Departmental, divisional, and New York State requirements, if any.

- If conditionally admitted, make up requirements starting in the first semester and finishing in no more than three consecutive semesters.

Certificate Requirements
The Certificate Program in Mathematics Education consists of 21-24 credits, as outlined below. A minimum of a B average must be maintained throughout the course of the Program. All students are to consult with an adviser in Mathematics Education before starting the program. In order to be recommended for N.Y.S. certification at the completion of the program, candidates must have passed the L.A.S.T., the C.S.T. in Mathematics, and the N.Y.S. Written Assessment of Teaching Skills (A.T.S.W.); they must also meet any additional requirements set by New York State.

Curriculum
- **Foundations of Education (6 credits):** ESC 501 (3); ESC 502 (3).

- Curriculum and Instruction (12 credits): ESC 532 (3); ESC 740 (3); plus 6 additional credits in Mathematics Education to be selected in consultation with the Program Coordinator.

- Practicum (3-6 credits): ESC 595 (3) OR 596 (6).

4. Rationale
ESC 529 was eliminated from all other graduate programs in Mathematics Education several years ago, since N.Y.S. requirements in technology for Mathematics candidates were easily met in other courses in the program.

ESC 740 is required in all other graduate programs in Mathematics Education since it allows candidates to bridge the gap between Mathematics instruction on the middle school level and the high school level.

5. Date of Departmental Approval: March 10, 2010
Lehman College
The City University of New York
Department of Middle and High School Education
CURRICULUM CHANGE

Hegis #: 1701.01
State Program Code #: 25827

1. Type of Change: New Sequence in an Existing Program, Leading to Additional Certification

2. From:

M.S.ED. PROGRAM IN MATHEMATICS EDUCATION, MIDDLE CHILDHOOD EDUCATION (5-9) OR ADOLESCENT EDUCATION (7-12)

The graduate program for middle and high school mathematics teachers leads to a Master of Science in Education degree. Registered with the State Education Department, this program leads to both initial and professional certification to teach mathematics in grades 5-9 or 7-12, provided all other requirements have been satisfied.

To be eligible for the Master's in Mathematics Education for Grades 5-9, candidates must fall into one of the following categories:

Sequence 1 (33-39 credits). For liberal arts and sciences graduates who have completed 18 credits in mathematics, including Calculus I and Calculus II, but who lack professional education coursework.

Sequence 2 (32-35 credits). For teachers who hold a Transitional B certificate in Mathematics from New York State through special CUNY and N.Y.C.D.O.E. programs.

Admission Requirements

1. A bachelor's degree (or its equivalent) from an accredited college or university with an overall index of 2.7 or better.

2. Mathematics course work of at least 18 credits that include Calculus I and II, with an overall index of 2.7 or better in all mathematics courses taken.

3. For Sequence 2, must be eligible for a valid Transitional B Certificate from N.Y.S.E.D.

4. Provide evidence of having taken the New York State Liberal Arts and Sciences Test (L.A.S.T.) and the New York State Content Specialty Test (C.S.T.) in Mathematics.
5. If conditionally admitted, make up requirements starting in the first semester and finishing in no more than three consecutive semesters.

6. Two letters of recommendation, at least one of which is from a college or university instructor of mathematics.

7. A 500 word essay on career goals.

8. A personal interview.

Degree Requirements (5-9)

Students must consult with a Mathematics Education advisor before starting their master's program and must plan their overall program with the advisor during their semester of attendance. Students must complete one of the two sequences outlined below

Sequence 1,(1)30 credits of prescribed course work; (2)3-6 credits of supervised fieldwork; (3)A comprehensive examination OR research project (3); and (4) Maintain B average.

Sequence 2,(1)30 credits of prescribed course work; (2)2 credits of supervised fieldwork; (3)A comprehensive examination OR research project (3); and (4) Maintain B average.

Overview of the Program (5-9)

Sequence 1: Students must successfully complete:

- 12-15 credits of Core Education Courses, including 3-6 credits of supervised fieldwork.
- 9 credits in pedagogical content in mathematics education.
- 12 credits in mathematics.
- A comprehensive written examination or research project after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Sequence 2 (Transitional B-Grades 5-9). Students must successfully complete:

- 11 credits of Core Education Courses, including 2 credits of supervised fieldwork.
- 9 credits in pedagogical content in mathematics education.
- 12 credits in mathematics.
- A comprehensive written examination or research project after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Curriculum Sequence 1(Grades 5-9)33-39 credits

Core Education Courses: (12-15 credits)
ESC 501: Educational Psychology (3)
ESC 502: Historical and Social Foundations of Education (3)
ESC 532: Teaching Mathematics in Middle and High School (3)
AND ESC 595: Internship in Mathematics (3) OR ESC 596: Student Teaching in Mathematics (6)

*Pedagogical Content in Mathematics Education (9 credits)*

ESC 740: Teaching Mathematics in Grades 7-10 (3)
ESC 742: Research in Mathematics Education (3)
ESC 748: Teaching Problem Solving in Mathematics in Middle & High School (3)

*Mathematics (12 credits)*

MAT 601: Secondary Mathematics from an Advanced Standpoint (3)
MAT 602: Introduction to Number Theory & Modern Algebra (3)
MAT 655: Exploring Mathematics Using Technology (2)
MAT 661: History of Mathematics (4)

*Culminating Experience (0-3 credits)*

ESC 706: Research in Problems of Teaching a Specialized Subject (1)
ESC 707: Project Seminar (2) OR Comprehensive Examination (0 credit)

**Sequence 2 (Transitional B Sequence for Grades 5-9)** 32-35 credits

*I. Core Education Courses: (11 credits)*

ESC 501: Educational Psychology (3)
ESC 502: Historical and Social Foundations of Education (3)
ESC 532: Teaching Mathematics in Middle and High School (3)
AND ESC 595: Internship in Classroom Teaching (2)

*II. Pedagogical Content in Mathematics Education (9 credits)*

ESC 740: Teaching Mathematics in Grades 7-10 (3)
ESC 742: Research in Mathematics Education (3)
ESC 748: Teaching Problem Solving in Mathematics in Middle & High School (3)

*III. Mathematics (12 credits)*

MAT 601: Secondary Mathematics from an Advanced Standpoint (3)
MAT 602: Introduction to Number Theory & Modern Algebra (3)
MAT 655: Exploring Mathematics Using Technology (2)
MAT 661: History of Mathematics (4)

IV. Culminating Experience (0-3 credits)

ESC 706: Research in Problems of Teaching a Specialized Subject (1)

ESC 707: Project Seminar (2) OR Comprehensive Examination (0 credit)

Continuation Requirements

Students must maintain a 3.0 grade point average throughout the course of study.

To be eligible for the Master's in Mathematics Education for Grades 7-12, candidates must fall into one of the following categories:

Sequence 3 (39-45 credits). For liberal arts and sciences graduates who do not hold a bachelor's degree in mathematics but who have completed 15 credits in mathematics, including Statistics, Calculus I, Calculus II, Linear Algebra, and History of Mathematics, but who lack professional education coursework.

Sequence 4 (33-39 credits). For candidates who hold a bachelor degree in mathematics only, but who lack professional education coursework.

Sequence 5 (32-35 credits). For teachers who hold a bachelor's degree in mathematics AND are eligible for a Transitional B Certificate in Mathematics from New York State through special CUNY and N.Y.C.D.O.E. programs.

Sequence 6 (38-41 credits). For liberal arts and sciences graduates who do not hold a bachelor's degree in mathematics but who are eligible for a Transitional B Certificate in Mathematics from N.Y.S. through special CUNY and N.Y.C.D.O.E. programs and have completed 15 credits in mathematics, including Statistics, Calculus I, Calculus II, Linear Algebra, and History of Mathematics, but who lack professional education coursework.

Admission Requirements

1. A bachelor's degree (or its equivalent) from an accredited college or university with an overall index of 2.7 or better.

2. For Sequence 3: Mathematics course work to include Statistics; Calculus I; Calculus II; Linear Algebra; and History of Mathematics; with an overall index of 2.7 or better in all mathematics courses taken

3. For Sequence 4: Mathematics major

4. For Sequence 5: Mathematics major AND N.Y.S. Transitional B Certificate

5. For Sequence 6: Mathematics course work to include Statistics; Calculus I; Calculus II; Linear Algebra; and History of Mathematics; with an overall index of 2.7 or better in all mathematics courses taken; and N.Y.S. Transitional B Certificate.
6. Provide evidence of having taken the New York State Liberal Arts and Sciences Test (L.A.S.T.) and the New York State Content Specialty Test (C.S.T.) in Mathematics.

7. If conditionally admitted, make up requirements starting in the first semester and finishing in no more than three consecutive semesters.

8. Two letters of recommendation, at least one of which is from a college or university instructor of mathematics.

9. A 500-word essay on career goals.

10. A personal interview.

Degree Requirements (Grades 7-12)

Students must consult with a Mathematics Education advisor before starting their master's program and must plan their overall program with the advisor during their first semester of attendance. Students must complete one of the three sequences outlined below:

Sequence 3. (1) 36 credits of prescribed course work; (2) 3-6 credits of supervised fieldwork; (3) A comprehensive examination OR research project (3); and (4) Maintain B average.

Sequence 4. (1) 30 credits of prescribed course work; (2) 3-6 credits of supervised fieldwork; (3) A comprehensive examination OR research project (3); and (4) Maintain B average.

Sequence 5. (1) 30 credits of prescribed course work; (2) 2 credits of supervised fieldwork; (3) A comprehensive examination OR research project (3); and (4) Maintain B average.

Sequence 6. (1) 36 credits of prescribed course work; (2) 2 credits of supervised fieldwork; (3) A comprehensive examination OR research project (0-3); and (4) Maintain B average.

Overview of the Program

Sequence 3 (Grades 7-12)

Students must successfully complete:

- 12-15 credits of Core Education Courses, including 3-6 credits of supervised fieldwork.
- 12 credits in pedagogical content in mathematics education.
- 15 credits in mathematics. Students who lack History of Mathematics as a prerequisite must register for MAT 661.
A comprehensive written examination or research project after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Note: Students who lack full-time experience as a mathematics teacher in grades 7-12 prior to completion of the program must register for 6 credits of supervised student teaching in lieu of the 3 credits of supervised fieldwork.

Sequence 4

Math Majors who do NOT hold a N.Y.S. Transitional B Certificate, 7-12). Students must successfully complete:

- 12-15 credits of Core Education Courses, including 3-6 credits of supervised fieldwork.
- 12 credits in pedagogical content in mathematics education.
- 9 credits in mathematics electives to be chosen in consultation with a program advisor.
- A comprehensive written examination or research project is required after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Note: Students who lack full-time experience as a mathematics teacher in grades 7-12 prior to completion of the program must register for 6 credits of supervised student teaching in lieu of the 3 credits of supervised fieldwork.

Sequence 5

Math Majors who are eligible for a N.Y.S. Transitional B Certificate, 7-12. Students must successfully complete:

- 9 credits of Core Education Courses
- 12 credits in pedagogical content in mathematics education.
- 9 credits in mathematics electives to be chosen in consultation with a program advisor.
- A comprehensive written examination or research project after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Sequence 6

Non Math Majors who are eligible for a N.Y.S. Transitional B Certificate - Grades 7-12. Students must successfully complete:

- 11 credits of Core Education Courses, including 2 credits of supervised fieldwork.
- 12 credits in pedagogical content in mathematics education.
• 15 credits in mathematics. Students who lack History of Mathematics as a prerequisite must register for MAT 661.
• A comprehensive written examination or research project after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Curriculum

Sequence 3(Grades 7-12) 39-45 credits

1. Core Education Courses: (12-15 credits): ESC 501 (3); ESC 502 (3); ESC 532 (3); AND ESC 595 (3) OR ESC 596 (6);
2. Pedagogical Content in Mathematics Education (12 credits): ESC 740 (3); ESC 742 (3); ESC 748 (3); ESC 749 (3);
3. Mathematics (15 credits): MAT 601 (3); MAT 604 (3); MAT 637 (4); MAT 655 (2); MAT 615 (3).
4. Culminating Experience (0-3 credits): Research project or comprehensive examination. Students who elect to write a Master’s thesis must concurrently enroll in ESC 706 (1) and ESC 707 (2).

Sequence 4(Grades 7-12) 33-39 credits

1. Core Education Courses: (12-15 credits): ESC 501 (3); ESC 502 (3); ESC 532 (3); AND ESC 595 (3) OR ESC 596 (6);
2. Pedagogical Content in Mathematics Education (12 credits): ESC 740 (3); ESC 742 (3); ESC 748 (3); ESC 749 (3);
3. Mathematics (9 credits): Three graduate electives in mathematics chosen in consultation with a program advisor;
4. Culminating Experience (0-3 credits). Research project or comprehensive examination. Students who elect to write a Master’s thesis must concurrently enroll in ESC 706 (1) and ESC 707 (2).

Sequence 5 (Math Majors who are eligible for a N.Y.S. Transitional B Certificate, 7-12) 32-35 credits

1. Core Education Courses: (11 credits): ESC 501 (3); ESC 502 (3); ESC 532 (3); ESC 595 (2);
2. Pedagogical Content in Mathematics Education (12 credits): ESC 740 (3); ESC 742 (3); ESC 748 (3); ESC 749 (3);
3. Mathematics (9 credits): Three graduate electives in mathematics chosen in consultation with a program advisor;
4. Culminating Experience (0-3 credits). Research project or comprehensive examination. Students who elect to write a Master’s thesis must concurrently enroll in ESC 706 (1) and ESC 707 (2).
Sequence 6 (Non Math Majors who are eligible for a N.Y.S. Transitional B Certificate - Grades 7-12) (38- 41 credits)

1. **Core Education Courses** (11 credits): ESC 501 (3); ESC 502 (3); ESC 532 (3); AND ESC 595 (2);

2. **Pedagogical Content in Mathematics Education** (12 credits): ESC 740 (3); ESC 742 (3); ESC 748 (3); ESC 749 (3);

3. **Mathematics** (15 credits): MAT 601 (3); MAT 604 (3); MAT 637 (4); MAT 655 (2); MAT 615 (3).

4. **Culminating Experience** (0-3 credits): Research project or comprehensive examination. Students who elect to write a Master's thesis must concurrently enroll in ESC 706 (1) and ESC 707 (2).

3: To:

**M.S.ED. PROGRAM IN MATHEMATICS EDUCATION, MIDDLE CHILDHOOD EDUCATION (5-9) OR ADOLESCENT EDUCATION (7-12) AND EXTENSION PROGRAM IN MATHEMATICS EDUCATION (7-12)**

The graduate program for middle and high school mathematics teachers leads to a Master of Science in Education degree. Registered with the State Education Department, this program leads to both initial and professional certification to teach mathematics in grades 5-9 or 7-12, provided all other requirements have been satisfied.

A 17-credit extension program for candidates also is offered for candidates who already possess New York State Initial certification to teach mathematics in grades 5-9 (middle childhood education) and who wish to extend their certification to include grades 7-12 (adolescent education). (Note: This extension does not lead to a M.S.ED in Mathematics Education and only leads to New York State teaching certification in grades 7-12).

To be eligible for the Master's in Mathematics Education for Grades 5-9, candidates must fall into one of the following categories:

**Sequence 1 (33-39 credits).** For liberal arts and sciences graduates who have completed 18 credits in mathematics, including Calculus I and Calculus II, but who lack professional education coursework.

**Sequence 2 (32-35 credits).** For teachers who hold a Transitional B certificate in Mathematics from New York State through special CUNY and N.Y.C.D.O.E. programs.

**Admission Requirements**

9. A bachelor's degree (or its equivalent) from an accredited college or university with an overall index of 2.7 or better.

10. Mathematics course work of at least 18 credits that include Calculus I and II, with an overall index of 2.7 or better in all mathematics courses taken.
11. For Sequence 2, must be eligible for a valid Transitional B Certificate from N.Y.S.E.D.

12. Provide evidence of having taken the New York State Liberal Arts and Sciences Test (L.A.S.T.) and the New York State Content Specialty Test (C.S.T.) in Mathematics.

13. If conditionally admitted, make up requirements starting in the first semester and finishing in no more than three consecutive semesters.

14. Two letters of recommendation, at least one of which is from a college or university instructor of mathematics.

15. A 500 word essay on career goals.

16. A personal interview.

Degree Requirements (5-9)

Students must consult with a Mathematics Education advisor before starting their master's program and must plan their overall program with the advisor during their semester of attendance. Students must complete one of the two sequences outlined below.

Sequence 1. (1) 30 credits of prescribed course work; (2) 3-6 credits of supervised fieldwork; (3) A comprehensive examination OR research project; and (4) Maintain B average.

Sequence 2. (1) 30 credits of prescribed course work; (2) 2 credits of supervised fieldwork; (3) A comprehensive examination OR research project; and (4) Maintain B average.

Overview of the Program (5-9)

Sequence 1: Students must successfully complete:

- 12-15 credits of Core Education Courses, including 3-6 credits of supervised fieldwork.
- 9 credits in pedagogical content in mathematics education.
- 12 credits in mathematics.
- A comprehensive written examination or research project after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Sequence 2 (Transitional B-Grades 5-9). Students must successfully complete:

- 11 credits of Core Education Courses, including 2 credits of supervised fieldwork.
- 9 credits in pedagogical content in mathematics education.
- 12 credits in mathematics.
A comprehensive written examination or research project after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

**Curriculum Sequence 1 (Grades 5-9) 33-39 credits**

*Core Education Courses: (12-15 credits)*

ESC 501: Educational Psychology (3)
ESC 502: Historical and Social Foundations of Education (3)
ESC 532: Teaching Mathematics in Middle and High School (3)
AND ESC 595: Internship in Mathematics (3) OR ESC 596: Student Teaching in Mathematics (6)

*Pedagogical Content in Mathematics Education (9 credits)*

ESC 740: Teaching Mathematics in Grades 7-10 (3)
ESC 742: Research in Mathematics Education (3)
ESC 748: Teaching Problem Solving in Mathematics in Middle & High School (3)

*Mathematics (12 credits)*

MAT 601: Secondary Mathematics from an Advanced Standpoint (3)
MAT 602: Introduction to Number Theory & Modern Algebra (3)
MAT 655: Exploring Mathematics Using Technology (2)
MAT 661: History of Mathematics (4)

*Culminating Experience (0-3 credits)*

ESC 706: Research in Problems of Teaching a Specialized Subject (1)
ESC 707: Project Seminar (2) OR Comprehensive Examination (0 credit)

**Sequence 2 (Transitional B Sequence for Grades 5-9) 32-35 credits**

*I. Core Education Courses: (11 credits)*

ESC 501: Educational Psychology (3)
ESC 502: Historical and Social Foundations of Education (3)
ESC 532: Teaching Mathematics in Middle and High School (3)
AND ESC 595: Internship in Classroom Teaching (2)

*II. Pedagogical Content in Mathematics Education (9 credits)*

ESC 740: Teaching Mathematics in Grades 7-10 (3)
ESC 742: Research in Mathematics Education (3)
ESC 748: Teaching Problem Solving in Mathematics in Middle & High School (3)

III. Mathematics (12 credits)
MAT 601: Secondary Mathematics from an Advanced Standpoint (3)
MAT 602: Introduction to Number Theory & Modern Algebra (3)
MAT 655: Exploring Mathematics Using Technology (2)
MAT 661: History of Mathematics (4)

IV. Culminating Experience (0-3 credits)
ESC 706: Research in Problems of Teaching a Specialized Subject (1)
ESC 707: Project Seminar (2) OR Comprehensive Examination (0 credit)

Continuation Requirements
Students must maintain a 3.0 grade point average throughout the course of study.

To be eligible for the Master's in Mathematics Education for Grades 7-12, candidates must fall into one of the following categories:

Sequence 3 (39-45 credits). For liberal arts and sciences graduates who do not hold a bachelor's degree in mathematics but who have completed 15 credits in mathematics, including Statistics, Calculus I, Calculus II, Linear Algebra, and History of Mathematics, but who lack professional education coursework.

Sequence 4 (33-39 credits). For candidates who hold a bachelor degree in mathematics only, but who lack professional education coursework.

Sequence 5 (32-35 credits). For teachers who hold a bachelor's degree in mathematics AND are eligible for a Transitional B Certificate in Mathematics from New York State through special CUNY and N.Y.C.D.O.E. programs.

Sequence 6 (38-41 credits). For liberal arts and sciences graduates who do not hold a bachelor's degree in mathematics but who are eligible for a Transitional B Certificate in Mathematics from N.Y.S. through special CUNY and N.Y.C.D.O.E. programs and have completed 15 credits in mathematics, including Statistics, Calculus I, Calculus II, Linear Algebra, and History of Mathematics, but who lack professional education coursework.

Admission Requirements

11. A bachelor's degree (or its equivalent) from an accredited college or university with an overall index of 2.7 or better.
12. For Sequence 3: Mathematics course work to include Statistics; Calculus I; Calculus II; Linear Algebra; and History of Mathematics; with an overall index of 2.7 or better in all mathematics courses taken
13. For Sequence 4: Mathematics major
14. **For Sequence 5:** Mathematics major AND N.Y.S. Transitional B Certificate

15. **For Sequence 6:** Mathematics course work to include Statistics; Calculus I; Calculus II; Linear Algebra; and History of Mathematics; with an overall index of 2.7 or better in all mathematics courses taken; and N.Y.S. Transitional B Certificate.

16. Provide evidence of having taken the New York State Liberal Arts and Sciences Test (L.A.S.T.) and the New York State Content Specialty Test (C.S.T.) in Mathematics.

17. If conditionally admitted, make up requirements starting in the first semester and finishing in no more than three consecutive semesters.

18. Two letters of recommendation, at least one of which is from a college or university instructor of mathematics.

19. A 500-word essay on career goals.

20. A personal interview.

**Degree Requirements (Grades 7-12)**

Students must consult with a Mathematics Education advisor before starting their master’s program and must plan their overall program with the advisor during their first semester of attendance. Students must complete one of the three sequences outlined below:

**Sequence 3.** (1) 36 credits of prescribed course work; (2) 3-6 credits of supervised fieldwork; (3) A comprehensive examination OR research project (3); and (4) Maintain B average.

**Sequence 4.** (1) 30 credits of prescribed course work; (2) 3-6 credits of supervised fieldwork; (3) A comprehensive examination OR research project (3); and (4) Maintain B average.

**Sequence 5.** (1) 30 credits of prescribed course work; (2) 2 credits of supervised fieldwork; (3) A comprehensive examination OR research project (3); and (4) Maintain B average.

**Sequence 6.** (1) 36 credits of prescribed course work; (2) 2 credits of supervised fieldwork; (3) A comprehensive examination OR research project (0-3); and (4) Maintain B average.

**Overview of the Program**

**Sequence 3 (Grades 7-12)**

Students must successfully complete:

- 12-15 credits of Core Education Courses, including 3-6 credits of supervised fieldwork.
12 credits in pedagogical content in mathematics education.
15 credits in mathematics. Students who lack History of Mathematics as a prerequisite must register for MAT 661.
A comprehensive written examination or research project after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Note: Students who lack full-time experience as a mathematics teacher in grades 7-12 prior to completion of the program must register for 6 credits of supervised student teaching in lieu of the 3 credits of supervised fieldwork.

Sequence 4
Math Majors who do NOT hold a N.Y.S. Transitional B Certificate, 7-12). Students must successfully complete:

- 12-15 credits of Core Education Courses, including 3-6 credits of supervised fieldwork.
- 12 credits in pedagogical content in mathematics education.
- 9 credits in mathematics electives to be chosen in consultation with a program advisor.
- A comprehensive written examination or research project is required after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Note: Students who lack full-time experience as a mathematics teacher in grades 7-12 prior to completion of the program must register for 6 credits of supervised student teaching in lieu of the 3 credits of supervised fieldwork.

Sequence 5
Math Majors who are eligible for a N.Y.S. Transitional B Certificate, 7-12. Students must successfully complete:

- 9 credits of Core Education Courses
- 12 credits in pedagogical content in mathematics education.
- 9 credits in mathematics electives to be chosen in consultation with a program advisor.
- A comprehensive written examination or research project after all course work has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Sequence 6
Non Math Majors who are eligible for a N.Y.S. Transitional B Certificate - Grades 7-12. Students must successfully complete:
11 credits of Core Education Courses, including 2 credits of supervised fieldwork.

- 12 credits in pedagogical content in mathematics education.
- 15 credits in mathematics. Students who lack History of Mathematics as a prerequisite must register for MAT 661.
- A comprehensive written examination or research project after all coursework has been completed. Students who elect to conduct a research project must enroll in 3 additional credits of research-related course work.

Curriculum

Sequence 3(Grades 7-12) 39-45 credits

5. **Core Education Courses**: (12-15 credits): ESC 501 (3); ESC 502 (3); ESC 532 (3); AND ESC 595 (3) OR ESC 596 (6);

6. **Pedagogical Content in Mathematics Education** (12 credits): ESC 740 (3); ESC 742 (3); ESC 748 (3); ESC 749 (3);

7. **Mathematics** (15 credits): MAT 601 (3); MAT 604 (3); MAT 637 (4); MAT 655 (2); MAT 615 (3).

8. **Culminating Experience** (0-3 credits): Research project or comprehensive examination. Students who elect to write a Master’s thesis must concurrently enroll in ESC 706 (1) and ESC 707 (2).

Sequence 4(Grades 7-12) 33-39 credits

5. **Core Education Courses**: (12-15 credits): ESC 501 (3); ESC 502 (3); ESC 532 (3); AND ESC 595 (3) OR ESC 596 (6);

6. **Pedagogical Content in Mathematics Education** (12 credits): ESC 740 (3); ESC 742 (3); ESC 748 (3); ESC 749 (3);

7. **Mathematics** (9 credits): Three graduate electives in mathematics chosen in consultation with a program advisor;

8. **Culminating Experience** (0-3 credits). Research project or comprehensive examination. Students who elect to write a Master’s thesis must concurrently enroll in ESC 706 (1) and ESC 707 (2).

Sequence 5 (Math Majors who are eligible for a N.Y.S. Transitional B Certificate, 7-12) 32-35 credits

5. **Core Education Courses**: (11 credits): ESC 501 (3); ESC 502 (3); ESC 532 (3); ESC 595 (2);

6. **Pedagogical Content in Mathematics Education** (12 credits): ESC 740 (3); ESC 742 (3); ESC 748 (3); ESC 749 (3);

7. **Mathematics** (9 credits): Three graduate electives in mathematics chosen in consultation with a program advisor;
8. **Culminating Experience** (0-3 credits). Research project or comprehensive examination. Students who elect to write a Master's thesis must concurrently enroll in ESC 706 (1) and ESC 707 (2).

**Sequence 6 (Non Math Majors who are eligible for a N.Y.S. Transitional B Certificate - Grades 7-12) (38- 41 credits)**

5. **Core Education Courses** (11 credits): ESC 501 (3); ESC 502 (3); ESC 532 (3); AND ESC 595 (2);
6. **Pedagogical Content in Mathematics Education** (12 credits): ESC 740 (3); ESC 742 (3); ESC 748 (3); ESC 749 (3);
7. **Mathematics** (15 credits): MAT 601 (3); MAT 604 (3); MAT 637 (4); MAT 655 (2); MAT 615 (3).
8. **Culminating Experience** (0-3 credits): Research project or comprehensive examination. Students who elect to write a Master's thesis must concurrently enroll in ESC 706 (1) and ESC 707 (2).

**Extension to the New York State Initial Certificate to Teach Mathematics in grades 5-9 (middle childhood education)**

**Extension Program in Mathematics Education** [17 credits]

This program is designed for candidates who hold New York State initial certification to teach Mathematics in grades 5-9 (Middle Childhood Education) and wish to extend their certification to include grades 7-12 (Adolescent Education).

**Admission Requirements**

1. Possess New York State initial certification to teach mathematics in grades 5-9.
2. Have at least two semesters of successful experience teaching mathematics in grades 7, 8, or 9; or one semester of supervised student teaching in mathematics in grades 7, 8, or 9 (with a grade of B or better).
3. Present coursework in Calculus I, Calculus II, Linear Algebra, Statistics, and History of Mathematics with a GPA of 3.0 or better.
4. Submit scores on the NYS Content Specialty (C.S.T.) Test in Mathematics.
5. Submit two (2) letters of recommendation, at least one of which is from a college or university instructor of mathematics.
6. Submit a 500-word essay on career goals.
7. Participate in an interview.
8. Meet additional departmental, divisional, and New York State requirements, if any.
9. If conditionally admitted, make up requirements starting in the first semester and finishing in no more than three consecutive semesters.

Continuation Requirements

1. Students must maintain a 3.0 grade point average throughout the course of study.

Certificate Requirements

The Extension Program in Mathematics Education consists of 17 credits, as outlined below. A minimum of a B average must be maintained throughout the course of the Program. All students are to consult with an adviser in Mathematics Education before starting the Program.

Overview of the Program

Curriculum

- Curriculum and Instruction (6 credits): ESC 748 (3) and ESC 749 (3).
- Mathematics Content (11 credits): MAT 604 (3), MAT 615 (4), and MAT 637 (4).

4. Rationale

The proposed program will afford middle school mathematics teachers the opportunity to teach their subject on any grade level throughout the high school years. Not only will the program participants have increased employment possibilities, but, for some, the potential satisfaction of teaching mathematics on a level more commensurate with the depth of the undergraduate and graduate mathematics content they themselves have studied.
5. Date of Departmental Approval: March 10, 2010