

# MATHEMATICS EDUCATION M.S.

Degree: Master of Science  
<https://www.towson.edu/fcsm/departments/mathematics/grad/education/>

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The Master of Science in Mathematics Education program at Towson University provides mathematics teachers with advanced study in mathematics, mathematics education and general education. The program offers teachers additional experience in higher-level mathematics to enhance their teaching with additional depth and breadth of content. At the same time, it strengthens their backgrounds in the school mathematics curriculum, instructional practices, assessment and technology. It also provides them a relevant way of satisfying their in-service requirements for professional advancement.

The program offers two tracks: Secondary School and Middle School. Both tracks require students to take four courses in Mathematics Education (with a focus on pedagogy, integration of technology, and the context of school mathematics), three general education electives, and five mathematics content courses. The two tracks differ primarily in the content focus and level of the mathematics courses. The program was designed with on-the-job teachers in mind, with part-time studies in the evenings and summers available; however, full-time students are also welcome.

## Secondary School Track

The Secondary School Track is aimed at current secondary mathematics teachers. Students in this track take mathematics courses to extend their knowledge beyond a bachelor's degree in secondary mathematics, giving them access to powerful mathematics ideas to take into the classroom.

It is expected that graduates of this program will become leaders in mathematics education as master teachers, curriculum developers, mathematics supervisors and other positions that improve the teaching of mathematics in secondary schools. The special strength of this program is the opportunity to study higher mathematics content without leaving the field of school mathematics.

## Middle School Track

The Middle School Track is designed to target current and future middle school mathematics teachers who are elementary or middle school certified. Students in this program will broaden and deepen their mathematical content knowledge through courses that target the conceptual ideas of middle school mathematics and beyond.

It is expected that graduates of this program will become leaders in mathematics education in positions that improve the teaching of mathematics in middle schools. The particular benefit of this track is the opportunity to learn mathematics concepts and skills that are meaningful and applicable for classroom teachers in grades 3-8. Professors will model best practices in instructional techniques to enhance students' learning of both mathematics and pedagogical skills.

## Requirements Admission Requirements

Application deadlines and a full listing of materials required for admission for the Middle School track and Secondary School track can be found on the website.

## Degree Requirements

The student is required to successfully complete a total of at least 30 units of course work (with no more than 9 units below the 600 level), as outlined below.

### Secondary School Track

| Code  | Title   | Units |
|---|---|-------|
| <b>Section A: Core Required Courses in Mathematics Education, School Mathematics and Pedagogy</b>             |   |       |
| MATH 602  | MATHEMATICS IN SOCIETY: PAST AND PRESENT                              | 3     |
| MATH 626  | MAKERSPACE TECHNOLOGY IN SCHOOL MATHEMATICS                           | 3     |
| <b>Section B: Courses in General Education and Pedagogy</b>   |   |       |
| Students complete a total of two education-related courses. The following are examples of such courses:       |   | 6     |
| MATH 622  | SEMINAR IN TEACHING ADVANCED PLACEMENT CALCULUS                       |       |
| EDUC 601  | CONCEPTS AND ISSUES IN EDUCATION                                      |       |
| EDUC 605  | INFORMING EDUCATIONAL PRACTICE TO EFFECT CHANGE                       |       |
| EDUC 660  | MATTERS OF DIVERSITY, EQUITY, AND EMPOWERMENT IN LEARNING COMMUNITIES |       |
| SCED 647  | ADVANCED PROCESSES OF TEACHING AND LEARNING                           |       |
| <b>Section C: Mathematics Foundation</b>  |   |       |
| Students complete five courses, one course from each of category and one additional course from any category: |   | 15    |
| Algebra   |   |       |
| MATH 563  | LINEAR ALGEBRA  |       |
| MATH 565  | NUMBER THEORY   |       |
| MATH 568  | ALGEBRAIC STRUCTURES  |       |
| Analysis  |   |       |
| MATH 535  | NUMERICAL ANALYSIS I  |       |
| MATH 576  | INTRODUCTORY REAL ANALYSIS  |       |
| or MATH 628   | REAL ANALYSIS FOR TEACHERS  |       |
| MATH 577  | COMPLEX ANALYSIS  |       |
| MATH 578  | TOPOLOGY  |       |
| MATH 579  | FOURIER ANALYSIS WITH APPLICATIONS                                    |       |
| Geometry  |   |       |
| MATH 557  | DIFFERENTIAL GEOMETRY   |       |
| MATH 653  | TOPICS IN GEOMETRY  |       |
| MATH 671  | CHAOTIC DYNAMICS AND FRACTAL GEOMETRY                                 |       |
| Statistics/Probability  |   |       |
| MATH 531  | PROBABILITY   |       |
| MATH 532  | MATHEMATICAL STATISTICS   |       |

|                                       |   |           |
|---------------------------------------|---|-----------|
| MATH 630                              | STATISTICS THEORY AND APPLICATIONS FOR TEACHERS |           |
| <b>Section D: Mathematics Methods</b> |   |           |
| MATH 625                              | ADVANCED PEDAGOGY FOR SECONDARY MATHEMATICS     | 3         |
| <b>Total Units</b>                    |   | <b>30</b> |

## Middle School Track

| Code  | Title   | Units |
|---|---|-------|
| <b>Section A: Core Required Courses in Mathematics Education, School Mathematics and Pedagogy</b>       |   |       |
| MATH 602  | MATHEMATICS IN SOCIETY: PAST AND PRESENT                              | 3     |
| MATH 626  | MAKERSPACE TECHNOLOGY IN SCHOOL MATHEMATICS                           | 3     |
| <b>Section B: Courses in General Education and Pedagogy</b>   |   |       |
| Students complete a total of two education-related courses. The following are examples of such courses. |   | 6     |
| MATH 622  | SEMINAR IN TEACHING ADVANCED PLACEMENT CALCULUS                       |       |
| EDUC 601  | CONCEPTS AND ISSUES IN EDUCATION                                      |       |
| EDUC 605  | INFORMING EDUCATIONAL PRACTICE TO EFFECT CHANGE                       |       |
| EDUC 660  | MATTERS OF DIVERSITY, EQUITY, AND EMPOWERMENT IN LEARNING COMMUNITIES |       |
| SCED 647  | ADVANCED PROCESSES OF TEACHING AND LEARNING                           |       |
| <b>Section C: Mathematics Foundation</b>  |   |       |
| MTED 611  | ALGEBRA IN THE SCHOOL CURRICULUM                                      | 3     |
| MTED 613  | MATHEMATICAL MODELING IN THE SCHOOL CLASSROOM                         | 3     |
| Students complete three courses, one from each category:  |   | 9     |
| Analysis  |   |       |
| MATH 535  | NUMERICAL ANALYSIS I  |       |
| MATH 576  | INTRODUCTORY REAL ANALYSIS  |       |
| or MATH 628   | REAL ANALYSIS FOR TEACHERS  |       |
| MATH 577  | COMPLEX ANALYSIS  |       |
| MATH 578  | TOPOLOGY  |       |
| MATH 579  | FOURIER ANALYSIS WITH APPLICATIONS                                    |       |
| MTED 614  | CALCULUS THROUGH TECHNOLOGY FOR MIDDLE SCHOOL TEACHERS                |       |
| Geometry  |   |       |
| MATH 557  | DIFFERENTIAL GEOMETRY   |       |
| MATH 653  | TOPICS IN GEOMETRY  |       |
| MATH 671  | CHAOTIC DYNAMICS AND FRACTAL GEOMETRY                                 |       |
| MTED 615  | GEOMETRY FOR MIDDLE SCHOOL TEACHERS                                   |       |
| Statistics/Probability  |   |       |
| MATH 531  | PROBABILITY   |       |
| MATH 532  | MATHEMATICAL STATISTICS   |       |
| MATH 630  | STATISTICS THEORY AND APPLICATIONS FOR TEACHERS                       |       |

|                                       |  |           |
|---------------------------------------|--|-----------|
| MTED 612                              | DATA ANALYSIS FOR MIDDLE SCHOOL TEACHERS               |           |
| <b>Section D: Mathematics Methods</b> |  |           |
| MTED 605                              | MIDDLE SCHOOL MATHEMATICAL METHODS AND PROBLEM SOLVING | 3         |
| <b>Total Units</b>                    |  | <b>30</b> |

## Learning Outcomes

1. Students will develop deep and connected knowledge of mathematics content across multiple domains aligned with their teaching level (such as number, algebra, statistics and probability, geometry).
2. Students will integrate their knowledge of instructional technology to inform their lesson planning and pedagogical approaches, in support of effective and equitable mathematics teaching.
3. Students will use evidence-based practices to reflect on their teaching to promote continuous improvement for student learning of mathematics, with the goal of supporting effective and equitable teaching.