MAJOR IN MATHEMATICS - SECONDARY EDUCATION CONCENTRATION

Mathematics majors in the Secondary Education Concentration are eligible, upon graduation, to apply for certification to teach mathematics for grades 7-12 in the state of Maryland.

The mathematics secondary education concentration requires 119–122 units for completion. Students must complete 52 required units in content courses, 24 required units in Towson UTeach courses, 30 required units in Core Curriculum courses not satisfied by the major, and 13 required units in their final internship and seminar, earning a grade equivalent of 2.00 or higher in each course.

Standards for Teacher Education

The Teacher Education Executive Board, representing all initial teacher education programs at Towson University, utilizes the following **minimum** requirements as conditions for admission into teacher education programs, maintaining candidate status and formal entry into the capstone internship. Programs may include additional requirements for admission into the program and/or the capstone internship.

The College of Education admits students either as freshmen or as undergraduate transfer students from accredited, post-secondary institutions. During the freshman and sophomore years, students are generally engaged in pre-professional courses or courses that fulfill Core Curriculum requirements, as well as all identified prerequisites (e.g., specific and sequential courses in Core Curriculum) for admission to COE screened majors and programs.

All College of Education undergraduate programs are screened majors. As an integral part of the teaching/learning experience, students work with advisers in a strategic planning process across all years at TU. Accordingly, to support student success, all COE students are required to confer prior to registration each term with their assigned advisers.

I. PROCEDURES AND REQUIREMENTS FOR ADMISSION TO ALL TEACHER EDUCATION PROGRAMS

a. Complete a self-disclosure criminal background form to be submitted to the major department with the application.
b. Submit an application for formal admission to the program. Students seeking admission to teacher education programs must contact their department chairperson or program coordinator by 45 credit hours for program-specific procedures and requirements for admission to professional education programs.
c. A cumulative/overall GPA of 3.00 or higher is required for admission to an initial licensure teacher education program.
    i. Applicants with a GPA between 2.50 - 2.99 may be admitted conditionally if they provide evidence of passing scores on a Basic Skills Assessment* as identified by the Maryland State Department of Education (i.e. SAT, ACT, GRE, Praxis Core) and receive approval from the department chairperson/program coordinator.

    **Candidates may apply for a test waiver directly to the department. Such waivers should only be granted if it is predicted, based on the individual candidate's transcript data, that the candidate's final cumulative/overall GPA will be above a 3.00.*

II. REQUIREMENTS FOR MAINTAINING CANDIDATE STATUS

A. Maintain a semester GPA of 3.00 in required education courses for all programs.
    i. At the department's discretion, candidates who do not meet the above GPA requirement may continue for one additional semester under probationary status, but must meet the 3.00 GPA requirement at the end of the probationary period. If the GPA requirement is not met at the end of the probationary period, the candidate would be dismissed from the program.
B. Obtain a grade of C or better in academic major course work applicable only in programs requiring an academic major. (Middle School; Secondary; Art, Dance, Health, Music, World Languages, Physical Education).
C. Exhibit behavior that is consistent with the University's Code of Student Conduct, the Educator Preparation Program's Professional Behavior Policy, and established professional practice in educational and clinical settings. (see COE Behavior Policy)

III. PROCEDURES AND REQUIREMENTS FOR ENTRY INTO CAPSTONE INTERNSHIP FOR ALL PROFESSIONAL EDUCATION PROGRAMS.

A. Complete a criminal background check as required by the school system in which the internship is located.
B. Complete all required course work.

The Standards were revised and approved in February 1996, May 1998, February 2000, May 2007, May 2008, April 2009, December 2011, November 2012, February 2014, October 2014, February 2015, November 2015, May 2019, February 2020, and March 2021.

Mathematics Major Requirements

All Mathematics majors must take the following required courses.

Code	Title	Units
Required Courses		
MATH 265	ELEMENTARY LINEAR ALGEBRA	4
MATH 267	INTRODUCTION TO ABSTRACT MATHEMATICS	4
MATH 273	CALCULUS I	4
MATH 274	CALCULUS II	4
MATH 275	CALCULUS III	4
Total Units		**20**

Mathematics Secondary Education Requirements

In addition to the 20 units of common requirements for all Mathematics majors, the Mathematics Secondary Education concentration requires 29-31 units of concentration requirements and 40 units of Towson UTeach course requirements for a total of 89-91 units. MATH 423, MATH 426, SEMS 498 and minimum four additional upper-level courses in the major must be taken at Towson University.

Minimum requirements for admission into teacher education programs, maintaining candidate status and formal entry into the capstone internship are outlined on the Standards for Teacher Education page in the Undergraduate Catalog.

Code	Title	Units
Required Courses		
MATH 223	PEDAGOGICAL CONTENT KNOWLEDGE FOR MIDDLE SCHOOL MATHEMATICS	2
MATH 330	INTRODUCTION TO STATISTICAL METHODS	4
MATH 353	EUCLIDEAN AND NON-EUCLIDEAN GEOMETRIES	3
MATH 369	INTRODUCTION TO ABSTRACT ALGEBRA	4
MATH 420	APPLICATIONS OF TECHNOLOGY FOR SECONDARY SCHOOL TEACHERS	3
MATH 423	TEACHING MATHEMATICS IN THE SECONDARY SCHOOLS [1]	3
PHYS 241	GENERAL PHYSICS I CALCULUS-BASED	4
Electives		
Select two of the following:		6-8
MATH 315	APPLIED COMBINATORICS	
MATH 320	TEACHING ADVANCED PLACEMENT CALCULUS FOR PRESERVICE TEACHERS	
or PHYS 242	GENERAL PHYSICS II CALCULUS-BASED	
MATH 331	PROBABILITY	
MATH 372	REAL ANALYSIS I	
MATH 374	DIFFERENTIAL EQUATIONS	
MATH 451	GRAPH THEORY	
MATH 465	NUMBER THEORY	
MATH 467	ALGEBRAIC STRUCTURES	
MATH 475	COMPLEX ANALYSIS	
Total Units		**29-31**

Towson UTeach Course Requirements

Code	Title	Units
Introductory Towson UTeach Courses		
Students must complete either		
SEMS 110 & SEMS 120	INTRODUCTION TO STEM TEACHING I: INQUIRY APPROACHES TO TEACHING and INTRODUCTION TO STEM TEACHING II: INQUIRY-BASED LESSON DESIGN	2
or SEMS 130	INTRODUCTION TO STEM TEACHING I & II COMBINED	
*Permission of Towson UTeach Department required to take SEMS 130.		
Towson UTeach Courses		
SEMS 230	KNOWING AND LEARNING	3
SEMS 240	CLASSROOMS INTERACTIONS	3
SEMS 250	PERSPECTIVES IN SCIENCE AND MATHEMATICS	3
SEMS 370	PROJECT-BASED INSTRUCTION	3
SEMS 498	INTERNSHIP IN MATHEMATICS AND SCIENCE SECONDARY EDUCATION [1]	3
SCED 460	USING LITERACY IN THE SECONDARY SCHOOLS	4
SCED 461	TEACHING LITERACY IN THE SECONDARY CONTENT AREAS	3
Towson UTeach Courses - Mathematics		
MATH 310	FUNCTIONS AND MODELING FOR SECONDARY SCHOOL TEACHERS	3
MATH 426	INTERNSHIP IN SECONDARY EDUCATION - MATHEMATICS [1]	12
SEMS 430	SEMINAR IN APPRENTICE TEACHING	1
Total Units		**40**

[1] MATH 423, MATH 426 and SEMS 498 must be taken at Towson University.

Departmental Honors Program

The Department of Mathematics offers a departmental honors program for students who demonstrate exemplary abilities in mathematics. The program provides students with an opportunity to work closely with faculty mentors in an individual program of research, directed readings and independent study.

Graduation with departmental honors requires a minimum overall cumulative GPA of 3.33, and successful completion of a two-course research sequence and an honors thesis in mathematics (MATH 499). Departmental honors will be posted to the transcript shortly after the bachelor's degree is conferred.

Code	Title	Units
Required Coursework for Departmental Honors in Mathematics		
Research Sequence, Select one of the following:		6
MATH 491 & MATH 492	READINGS IN MATHEMATICS and RESEARCH IN MATHEMATICS	
MATH 493 & MATH 494	READINGS IN MATH EDUCATION and INDEPENDENT STUDY: RESEARCH IN MATHEMATICS EDUCATION	
MATH 495 & MATH 496	APPLIED MATHEMATICS LABORATORY I and APPLIED MATHEMATICS LABORATORY II	
Thesis Requirement		
MATH 499	HONORS THESIS IN MATHEMATICS	1
Total Units		**7**

Suggested Four-Year Plan

Based on course availability and student needs and preferences, the selected sequences will probably vary from those presented below. Students should consult with their adviser to make the most appropriate elective choices.

Freshman

Term 1	Units	Term 2	Units
MATH 273	4	MATH 265	4
SEMS 110	1	MATH 274 (Core 3)	4
Core 1 (or Core 2)	3	SEMS 120	1
Core 4	3	Core 2 (or Core 1)	3
Core 6	3	Core 11	3
Core 10	3		
	17		**15**

Sophomore

Term 1	Units	Term 2	Units
MATH 223	2	PHYS 241 (Core 7)	4
MATH 267	4	MATH 369	4

MATH 275	4 SEMS 240	3
SEMS 230	3 Core 13	3
Core 12	3 Core 14	3
	16	**17**
Junior		
Term 1	**Units Term 2**	**Units**
MATH 330	4 MATH 310 (Core 9)	3
MATH 353	3 MATH 420	3
SCED 460	4 MATH Elective	3-4
SEMS 250 (Core 5)	3 SEMS 370	3
Core 8	3-4	
	17-18	**12-13**
Senior		
Term 1	**Units Term 2**	**Units**
MATH 423	3 MATH 426	12
MATH Elective	3-4 SEMS 430	1
SCED 461	3	
SEMS 498	3	
	12-13	**13**

Total Units 119-122

Standard 1: Knowing and Understanding Mathematics

Candidates demonstrate and apply understandings of major mathematics concepts, procedures, knowledge, and applications within and among mathematical domains of Number; Algebra and Functions; Calculus; Statistics and Probability; Geometry, Trigonometry, and Measurement.

Standard 1 Components:

- 1a) Essential Concepts in Number
- 1b) Essential Concepts in Algebra and Functions
- 1c) Essential Concepts in Calculus
- 1d) Essential Concepts in Statistics and Probability
- 1e) Essential Concepts in Geometry, Trigonometry, and Measurement

Standard 2: Knowing and Using Mathematical Processes

Candidates demonstrate, within or across mathematical domains, their knowledge of and ability to apply the mathematical processes of problem solving; reason and communicate mathematically; and engage in mathematical modeling. Candidates apply technology appropriately within these mathematical processes.

Standard 2 Components:

- 2a) Problem Solving
- 2b) Reasoning and Communicating
- 2c) Mathematical Modeling and Use of Mathematical Models

Standard 3: Knowing Students and Planning for Mathematical Learning

Candidates use knowledge of students and mathematics to plan rigorous and engaging mathematics instruction supporting students' access and learning. The mathematics instruction developed provides equitable, culturally responsive opportunities for all students to learn and apply mathematics concepts, skills, and practices.

Standard 3 Components:

- 3a) Student Diversity
- 3b) Students' Mathematical Strengths
- 3c) Positive Mathematical Identities

Standard 4: Teaching Meaningful Mathematics

Candidates implement effective and equitable teaching practices to support rigorous mathematical learning for a full range of students. Candidates establish rigorous mathematics learning goals, engage students in high cognitive demand learning, use mathematics specific tools and representations, elicit and use student responses, develop conceptual understanding and procedural fluency, and pose purposeful questions to facilitate student discourse.

Standard 4 Components:

- 4a) Establish Rigorous Mathematics Learning Goals
- 4b) Engage Students in High Cognitive Demand Learning
- 4c) Incorporate Mathematics-Specific Tools
- 4d) Use Mathematical Representations
- 4e) Elicit and Use Student Responses
- 4f) Develop Conceptual Understanding and Procedural Fluency
- 4g) Facilitate Discourse

Standard 5: Assessing Impact on Student Learning

Candidates assess and use evidence of students' learning of rigorous mathematics to improve instruction and subsequent student learning. Candidates analyze learning gains from formal and informal assessments for individual students, the class as a whole, and subgroups of students disaggregated by demographic categories, and they use this information to inform planning and teaching.

Standard 5 Components:

- 5a) Assessing for Learning
- 5b) Analyze Assessment Data
- 5c) Modify Instruction

Standard 6: Social and Professional Context of Mathematics Teaching and Learning

Candidates are reflective mathematics educators who collaborate with colleagues and other stakeholders to grow professionally, to support student learning, and to create more equitable mathematics learning environments.

Standard 6 Components:

- 6a) Promote Equitable Learning Environments
- 6b) Promote Positive Mathematical Identities

- 6c) Engage Families and Community
- 6d) Collaborate with Colleagues

Standard 7: Secondary Field Experiences and Clinical Practice

Effective teachers of secondary mathematics engage in a planned sequence of field experiences and clinical practice in diverse settings under the supervision of experienced and highly qualified mathematics teachers. They develop a broad experiential base of knowledge, skills, effective approaches to mathematics teaching and learning, and professional behaviors across both middle and high school settings that involve a diverse range and varied groupings of students. Candidates experience a full-time student teaching/internship in secondary mathematics supervised by university or college faculty with secondary mathematics teaching experience or equivalent knowledge base.

Standard 7 Components:

- 7a) Design of Field Experiences and Clinical Practice
- 7b) Supervision of Field Experiences