

FISHER COLLEGE OF SCIENCE AND MATHEMATICS

Inspiring Student Exploration in Science and Mathematics for the 21st Century

The Jess and Mildred Fisher College of Science and Mathematics at Towson University offers a wide variety of undergraduate and graduate majors, as well as interdisciplinary programs. We take pride in our ability to provide an educational environment in which students work closely with faculty and receive quality instruction in small classes.

Science and mathematics are becoming increasingly important as our world evolves and confronts the challenge of rapid technological transformations. Science and mathematics will determine the road into the future, and the Fisher College of Science and Mathematics is helping to build that road through its educational programs and its commitment to teaching, research and scholarship. Our college has a fourfold mission: to prepare students for careers and advanced professional training in the biological or physical sciences, mathematics, computer information systems or computer science; to participate fully in the education mission of the campus; to foster significant scholarly research; and to serve the well-being of the community, state and nation. To accomplish this mission, our college maintains high standards and expectations of performance for its faculty and students. Each student is provided the opportunity to develop competence in a special field of knowledge by learning its principles and perspectives, mastering its methods and acquiring much of its accumulated knowledge.

In addition to offering formal course work, the college is committed to providing students with opportunities to learn through their participation in mentored research, independent study, internships and honors programs. Students gain experience in laboratories, interact with the environment through field studies, conduct student research and receive training in technologically advanced instrumentation. We believe that there is no stronger means of learning than by active participation at the frontiers of scientific knowledge, and we encourage our entire faculty to provide research opportunities for students so that they may embrace the discovery of the secrets in the world around us. A combination of student participation and rigorous classroom instruction gives majors in the college a competitive advantage in career advancement or in the selection of professional or graduate schools. Students majoring outside the college are assured the opportunity to acquire ample scientific knowledge in order to make informed decisions essential to citizens in a science-oriented, technological world.

We recognize our obligation to contribute to the cultural, scientific, educational and economic well-being of our geographic region. Part of this commitment is to improve K-12 science and mathematics education in the Baltimore Metropolitan area. We have established programs to attract more students to STEM (Science, Technology, Engineering and Mathematics) majors and to prepare STEM teachers who will be energized to teach in area schools in these much needed discipline areas. These include the Towson UTEACH program, the Hackerman Academy of Mathematics and Science, and cooperative programs with other metropolitan two- and four-year colleges and universities.

Although we offer degrees in the sciences and mathematics, we recognize that the Towson University experience encompasses more than an academic diploma. We strive to create enriching extracurricular and educational experiences for all in the greater Towson University

community. We recognize the importance of science and mathematics, not merely as an aid to understanding the natural world, but also as an aid to understanding ourselves. Each person can benefit greatly from the scientific experience, and it is this sort of experience that we provide our students.

David A. Vanko, Dean
Vonnie Shields, Associate Dean

- Biology (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/biological-sciences>)
- Chemistry (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/chemistry>)
- Computer Science (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/computer-information-sciences>)
- Earth-Space Science (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/physics-astronomy-geosciences>)
- Environmental Science and Studies (with CLA) (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/environmental-science-studies>)
- Forensic Chemistry (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/chemistry>)
- Geology (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/physics-astronomy-geosciences>)
- Information Systems (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/computer-information-sciences>)
- Information Technology (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/computer-information-sciences>)
- Mathematics (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/mathematics>)
- Molecular Biology, Biochemistry and Bioinformatics (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/molecular-biology-biochemistry-bioinformatics>)
- Physics (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/physics-astronomy-geosciences>)
- "4+1" B.S. Physics/M.S. Computer Science (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/physics-astronomy-geosciences>)
- Dual-Degree Engineering Program (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/combined-degree-programs>)
- PreMedical/PreDental (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/preprofessional-programs>)
- Prepharmacy (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/preprofessional-programs>)
- Preveterinary Medicine (<http://catalog.towson.edu/undergraduate/fisher-science-mathematics/preprofessional-programs>)

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Students interested in teaching Middle School (Grades 4 through 9) should contact Dr. Terry Berkeley (tberkeley@towson.edu), Chair of the Department of Secondary Education or Dr. Molly Mee, Coordinator of the Middle School Major (mmee@towson.edu). Students select two content areas to focus on from the following: English, Mathematics, Science, and Social Studies/History which leads to Maryland State Teacher Certification in both of the content areas selected.

Students interested in Mathematics or Science and leading to Maryland State Teacher Certification in Secondary Education (Grades 7-12) in the Towson University U-Teach Program can select from one of the following subject areas: Biology, Chemistry, Earth-Space Science, Mathematics, or Physics. The students should contact the Towson University UTeach Program Director Dr. Linda Cooper (lcooper@towson.edu (<https://outlook.towson.edu/owa/redir.aspx?C=mq4TEKx12UIdP797Mupn0capC1dLB9ElxKivNzsqL-puLiW3HOuCN15JbT61EvKT4q-cEle29PE.&URL=mailto%3alcooper%40towson.edu>)) or the Master Teacher Ms. Christine Roland (croland@towson.edu).

Towson UTeach

Co-Directors: Linda Cooper (FCSM) and Christine Roland (COE)

Steering Committee: Lynn Brown (Director of Center for Professional Practice), Gary Caldwell (Assistant Director of Center for Professional Practice), Cindy Ghent (Biology), Ron Hermann (Physics, Astronomy, and Geosciences), Jeff Kenton (Assistant Dean of College of Education), Ashley Lucas (Secondary Education), Sandy Spitzer (Mathematics).

OFFICE

7800 York Road, room 368

www.towson.edu/uteach

The Program

The Towson UTeach Program is a secondary (grades 7-12) mathematics and science teacher preparation program for students majoring in mathematics, biology, chemistry, earth-space science, or physics.

- **Compact and Flexible Degree Plans**

Towson UTeach offers four-year degree plans that emphasize solid content knowledge woven with pedagogical instruction specific to science and mathematics.

- **Early and Intensive Field Experiences**

Students begin a carefully scaffolded sequence of intensive teaching opportunities in their first term of the program and continue these field experiences throughout each year in order to accelerate professional development and promote confidence.

- **Dedicated Master Teachers**

Master teachers, former secondary school teachers with exemplary teaching and leadership experience, are exclusively dedicated to student support throughout the entire program.

- **Rigorous, Research-Based Instruction**

Courses are designed to develop deep understanding of content of particular importance to future secondary STEM teachers and build strong connections between educational theory and practice.

Paths to Certification

Teaching degree plans are streamlined to allow students to complete both a Bachelor of Science degree and all course work for secondary teacher certification in Maryland in four years. Two pathways leading to teaching certification in a STEM field exist within the Towson UTeach Program. Students can choose to pursue teaching certification by majoring in Mathematics Secondary Education, Biology Secondary Education, Chemistry Secondary Education, Earth-Space Science Secondary Education, or Physics Secondary Education. The Towson UTeach sequence of courses is embedded within each of these secondary education concentrations. Alternatively, students can pursue

certification by majoring in any concentration of mathematics, biology, chemistry, or physics and separately complete the Towson UTeach sequence of courses.

The Towson UTeach Sequence of Courses (40-43 units)

Introductory Towson UTeach Courses

Students must complete either

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|---------------------|---|---|
| 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.

Core Towson UTeach Courses

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|----------|---|---|
| SEMS 230 | KNOWING AND LEARNING | 3 |
| SEMS 240 | CLASSROOMS INTERACTIONS | 3 |
| SEMS 250 | PERSPECTIVES IN SCIENCE AND MATHEMATICS | 3 |
| SEMS 360 | RESEARCH METHODS | 3 |
| SEMS 370 | PROJECT-BASED INSTRUCTION | 3 |
| SEMS 498 | INTERNSHIP IN MATHEMATICS AND SCIENCE SECONDARY EDUCATION | 3 |
| SCED 460 | USING READING AND WRITING IN THE SECONDARY SCHOOLS | 4 |
| SCED 461 | TEACHING READING IN THE SECONDARY CONTENT AREAS | 3 |

Students must complete one of the upper-level set of courses:

Towson UTeach - Mathematics

| | | |
|----------|--|----|
| MATH 310 | FUNCTIONS AND MODELING FOR SECONDARY SCHOOL TEACHERS | 3 |
| MATH 426 | INTERNSHIP IN SECONDARY EDUCATION-MATHEMATICS | 12 |
| MATH 430 | SEMINAR IN INTERNSHIP | 1 |

Towson UTeach Courses - Science

| | | |
|----------|---|----|
| SCIE 393 | INTERNSHIP IN SECONDARY EDUCATION-SCIENCE | 12 |
| SCIE 430 | SEMINAR IN STUDENT TEACHING - SCIENCE | 1 |

Formal Admission to Towson UTeach

Students should apply to Towson UTeach when they have met the following criteria:

- completion of a written application available at www.towson.edu/uteach;
- completion of at least 45 college units;
- a 2.75 cumulative GPA for all completed content courses required for the major;
- a 2.75 cumulative GPA for all completed Towson UTeach courses;
- presentation of either a passing score on Praxis I (Pre-Professional Skills Test: Reading, Writing, and Mathematics) OR an acceptable score on the Score Reporting Form for either the SAT, ACT, or GRE. Please refer to www.towson.edu/uteach for information on these assessments, including acceptable minimum passing scores.

- completion of a Criminal History Disclosure Form. This form is to be notarized and submitted to the Towson UTeach Office. It will be forwarded and kept on file with the Center for Professional Practice.

Student Teaching in Towson UTeach

Students in this concentration should be prepared to do their student teaching in their senior year. Students who wish to deviate from this policy must obtain permission from their home department prior to the beginning of their junior year. The following requirements must be met for student teaching:

- a minimum cumulative GPA of 2.75 in content courses required for the major;
- a minimum cumulative GPA of 2.75 in Towson UTeach courses.

Core Curriculum

Mathematics Secondary Education Concentration

An additional 27-31 units are needed for mathematics secondary education majors to satisfy the Core Curriculum. Specifically, students will need to take TSEM 102 to satisfy Core 1 and either ENGL 102 or ENGL 190 to satisfy Core 2. Additionally, students will need to satisfy categories 4, 6, 8 (unless PHYS 242 was chosen as a content elective), 10, 11, 12, 13, and 14.

Science Secondary Education Concentrations

An additional 27 units are needed for science secondary education majors to satisfy the Core Curriculum. Specifically, students will need to take TSEM 102 to satisfy Core 1 and either ENGL 102 or ENGL 190 to satisfy Core 2. Additionally, students will need to satisfy categories 4, 6, 10, 11, 12, 13, and 14.

Recommended Education Courses to Satisfy Core Curriculum

EDUC 202 Historical and Contemporary Perspectives on America's Urban Schools (Core 10)

EDUC 203 Teaching and Learning in a Diverse Society (Core 13)

SCED 304 Education, Ethics and Change (Core 14)