Mathematics with Teaching, B.S.

Learn more about the Bachelor of Science in Mathematics with Teaching (https://www.temple.edu/academics/degree-programs/mathematics-with-teaching-major-st-matc-bs).

The B.S. with Teaching in Mathematics is part of Temple's innovative "TUteach" secondary education teacher-training program. The B.S. with Teaching provides broad training in mathematics and prepares students for a career in secondary school teaching or an entry level position in a mathematical field. The education courses in the B.S. with Teaching include supervised teaching in school district classrooms and emphasize inquiry-based approaches to learning. Students in the B.S. with Teaching degree program become eligible for a Pennsylvania teacher certification when they complete all the requirements for the degree that include theoretical and practical courses in education specifically designed for science and mathematics majors. In order to be recommended for Pennsylvania teacher certification, students must graduate with:

1. a B.S. with Teaching degree
2. meet GPA and testing requirements of the state of Pennsylvania.

Students will be scheduled once each semester to meet with the TUteach advisor to insure that students have knowledge of academic programming, internships opportunities, and testing options that include test preparation. The state of Pennsylvania has specific candidacy requirements. The TUteach advisor will also help the students complete and submit the candidacy documents. All students joining the program in their freshman year must complete the PAPA examination or acquire the PAPA waiver within their first 72 credits. Transfer students, from within Temple and those from other institutions, will build a tailored program with the academic and testing benchmarks structured for efficient degree completion with the TUteach advisor. Students are encouraged to complete the appropriate PRAXIS II examination prior to student teaching. Students are encouraged to take internship courses to expand their teaching portfolio or select elective courses that will extend their knowledge of science and teaching practice.

Undergraduate Contact Information:

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Wachman Hall, Room 638

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Wachman Hall, Room 610
angelone@temple.edu
Summary of Requirements for the Degree

1. University Requirements (124 total s.h.)
   • MATH 0701 (4 s.h.) and/or ENG 0701 (4 s.h.), if required by placement testing.
   • All Temple students must take a minimum of two writing-intensive courses at Temple as part of their major. Following is a list of courses that can be used to satisfy the writing-intensive requirement:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 3096</td>
<td>Introduction to Modern Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 3098</td>
<td>Modern Algebra</td>
<td></td>
</tr>
<tr>
<td>MATH 4096</td>
<td>Senior Problem Solving</td>
<td></td>
</tr>
<tr>
<td>PHIL 2196</td>
<td>Perspectives on Science and Mathematics</td>
<td></td>
</tr>
<tr>
<td>SECE 3796</td>
<td>Differentiated Literacy Instruction in the Disciplines, 7-12</td>
<td></td>
</tr>
</tbody>
</table>

   • Students must complete the General Education (GenEd) requirements.
     • See the General Education (http://bulletin.temple.edu/undergraduate/general-education) section of the Undergraduate Bulletin for the GenEd curriculum.
     • Students who complete TUteach majors typically receive a waiver for 1 Human Behavior (GB), 2 Science & Technology (GS) and 1 Quantitative Literacy (GQ) GenEd courses.
     • Students must satisfy general Temple University residency requirements (http://bulletin.temple.edu/undergraduate/academic-policies/academic-residency-requirements).

2. College Requirements
   • 90 credits within the College of Science & Technology (CST) or the College of Liberal Arts (CLA).
   • 45 Upper Level (2000+) credits within the College of Science & Technology (CST) or the College of Liberal Arts (CLA).
   • First Year Seminar Requirement: All students in the College of Science & Technology (CST) are required to take a 1 credit first year seminar course, SCTC 1001 CST First Year Seminar. Other courses that fulfill this requirement may be found on the CST College Requirements page. Only one course in this category may count towards graduation.

3. Major Requirements for Bachelor of Science (87-89 s.h.)
   At least 9 courses required for the major must be completed at Temple. At least 7 Math courses and 3 Education courses must be completed at Temple. Though not required, students are strongly encouraged to increase training and field work experience by enrolling in SCTC 1385, SCTC 2385, or SCTC 2389. Students will also benefit from directed laboratory projects offered through SCTC 3185. These courses are offered every semester.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Computer Programming</td>
<td>Select one of the following:</td>
<td>3-4</td>
</tr>
<tr>
<td>CIS 1053</td>
<td>Programming in Matlab</td>
<td></td>
</tr>
<tr>
<td>CIS 1057</td>
<td>Computer Programming in C</td>
<td></td>
</tr>
<tr>
<td>CIS 1068</td>
<td>Program Design and Abstraction</td>
<td></td>
</tr>
<tr>
<td>CIS 1968</td>
<td>Honors Program Design and Abstraction (F)</td>
<td></td>
</tr>
<tr>
<td>MATH 1033 &amp; PHYS 2511</td>
<td>Computing in MATLAB and Scientific Computing I</td>
<td></td>
</tr>
</tbody>
</table>

   | Mathematics | | |
   | MATH 1041 | Calculus I | 4 |
   | or MATH 1941 | Honors Calculus I | | |
   | MATH 1042 | Calculus II | 4 |
   | or MATH 1942 | Honors Calculus II | | |
   | MATH 2021 | Functions and Modeling (S) | 3 |
   | MATH 2043 | Calculus III | 4 |
   | or MATH 2943 | Honors Calculus III | | |
   | MATH 2061 | Euclidean Geometry (S) | 3 |
   | MATH 2101 | Linear Algebra | 3-4 |
   | or MATH 2103 | Linear Algebra with Computer Lab | | |
   | MATH 2111 | Basic Concepts of Math | 3 |
Mathematics with Teaching, B.S.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 3003</td>
<td>Theory of Numbers</td>
<td>3</td>
</tr>
<tr>
<td>MATH 3031</td>
<td>Probability Theory I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 3096</td>
<td>Introduction to Modern Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 3137</td>
<td>Real &amp; Complex Analysis I (F)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 3138</td>
<td>Real &amp; Complex Analysis II (S)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 4096</td>
<td>Senior Problem Solving</td>
<td>3</td>
</tr>
<tr>
<td>One Mathematics elective at the 3000 level or above</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

**Physics**

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 1061</td>
<td>Elementary Classical Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1961</td>
<td>Honors Elementary Classical Physics I (F)</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 2021</td>
<td>General Physics I</td>
<td>4</td>
</tr>
<tr>
<td>PHYS 2921</td>
<td>Honors General Physics I (F)</td>
<td>4</td>
</tr>
</tbody>
</table>

College of Science & Technology

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCTC 1389</td>
<td>Step 1 and 2: Inquiry-Based Lesson Design in Science and Mathematics Modified for English Learners</td>
<td>2</td>
</tr>
<tr>
<td>SCTC 3312</td>
<td>Coding STEM Lessons</td>
<td>1</td>
</tr>
</tbody>
</table>

**Education**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 2179</td>
<td>Knowing and Learning in Mathematics and Science</td>
<td>3</td>
</tr>
<tr>
<td>EDUC 4388</td>
<td>TUtach Apprentice Teaching</td>
<td>6</td>
</tr>
<tr>
<td>EDUC 4802</td>
<td>TUtach Apprentice Teaching Seminar</td>
<td>1</td>
</tr>
<tr>
<td>MAES 2189</td>
<td>Classroom Interactions (S)</td>
<td>3</td>
</tr>
<tr>
<td>or SCTC 3485</td>
<td>Science and Mathematics in the Classroom</td>
<td>3</td>
</tr>
<tr>
<td>MAES 4189</td>
<td>Project-Based Instruction (F)</td>
<td>3</td>
</tr>
<tr>
<td>or SCTC 4485</td>
<td>Integrating STEM Practice in Diverse Teaching Environments</td>
<td>3</td>
</tr>
<tr>
<td>SECE 3796</td>
<td>Differentiated Literacy Instruction in the Disciplines, 7-12</td>
<td>3</td>
</tr>
<tr>
<td>SPED 2231</td>
<td>Introduction to Inclusive Education</td>
<td>3</td>
</tr>
</tbody>
</table>

**Philosophy/History**

Select one of the following:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHIL 2196</td>
<td>Perspectives on Science and Mathematics</td>
<td>3</td>
</tr>
<tr>
<td>SCTC 3001</td>
<td>History of Science</td>
<td>3</td>
</tr>
</tbody>
</table>

**Research Methods**

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOL/CHEM/EES/PHYS 3091</td>
<td>Research Methods</td>
<td>3</td>
</tr>
</tbody>
</table>

**Total Credit Hours**

87-89

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1 The certification requirements need to meet Pennsylvania Department of Education standards and are subject to change. All students are strongly recommended to check with the TUteach Advisor in the College of Science and Technology, to affirm the requirements that pertain to their specific major. In addition, students should check the Undergraduate Bulletin web site for the most current information about these programs, or the TUteach web site (https://cst.temple.edu/academics/accelerated-programs/tuteach). It is also recommended that all students meet with an advisor before enrolling in classes specific to these majors and leading to certification as a teacher. This is to assure that a candidate’s intended program of study will be compatible with the new requirements.

2 All students are required to take a minimum of one credit.
Calculation of Major GPA

Courses listed under the major requirements for the degree will be included in the calculation of the major GPA. Courses that could not apply toward the major as an elective or required course would not be counted in the calculation of the major GPA. This would include MATH 1022, for example.

Distinction in Major

To graduate with a Distinction in Mathematics with Teaching, students must:

- Achieve a 3.50 GPA or better in the Mathematics courses required for the B.S. in Mathematics with Teaching.
- Achieve an overall GPA, including all college-level courses, of at least 3.25.
- Complete MATH 3141, MATH 3142 and MATH 4051 instead of MATH 3137 and MATH 3138, as well as MATH 3098 instead of MATH 3096.
- Achieve a GPA of 3.50 or higher in:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 3141</td>
<td>Advanced Calculus I</td>
<td>3</td>
</tr>
<tr>
<td>MATH 3142</td>
<td>Advanced Calculus II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 3098</td>
<td>Modern Algebra</td>
<td>3</td>
</tr>
<tr>
<td>MATH 4051</td>
<td>Complex Analysis</td>
<td>3</td>
</tr>
<tr>
<td>MATH 3043</td>
<td>Numerical Analysis I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 3044</td>
<td>Numerical Analysis II</td>
<td>3</td>
</tr>
<tr>
<td>MATH 3101</td>
<td>Topics in Modern Algebra</td>
<td>3</td>
</tr>
</tbody>
</table>

Any additional courses from the following:

- Achieve a 3.90 GPA in the following courses:

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAES 2189</td>
<td>Classroom Interactions</td>
<td>3</td>
</tr>
<tr>
<td>or SCTR 3485</td>
<td>Science and Mathematics in the Classroom</td>
<td></td>
</tr>
<tr>
<td>MAES 4189</td>
<td>Project-Based Instruction</td>
<td>3</td>
</tr>
<tr>
<td>or SCTR 4485</td>
<td>Integrating STEM Practice in Diverse Teaching Environments</td>
<td></td>
</tr>
<tr>
<td>EDUC 4802</td>
<td>TUteach Apprentice Teaching Seminar</td>
<td>1</td>
</tr>
<tr>
<td>EDUC 4388</td>
<td>TUteach Apprentice Teaching</td>
<td>6</td>
</tr>
</tbody>
</table>

Suggested Academic Plan

Bachelor of Science in Mathematics with Teaching

Requirements for New Students starting in the 2019-2020 Academic Year

Year 1

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH 1041 or 1941 Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td>3-4</td>
</tr>
<tr>
<td>CIS 1053 Programming in Matlab</td>
<td></td>
</tr>
<tr>
<td>CIS 1057 Computer Programming in C</td>
<td></td>
</tr>
<tr>
<td>CIS 1068 Program Design and Abstraction</td>
<td></td>
</tr>
<tr>
<td>CIS 1968 Honors Program Design and Abstraction (F)</td>
<td></td>
</tr>
<tr>
<td>MATH 1033 Computing in MATLAB</td>
<td></td>
</tr>
<tr>
<td>&amp; PHYS 2511</td>
<td></td>
</tr>
<tr>
<td>SCTR 1389 Step 1 and 2: Inquiry-Based Lesson Design in Science and Mathematics Modified for English Learners</td>
<td>2</td>
</tr>
<tr>
<td>SCTR 1001 CST First Year Seminar</td>
<td>1</td>
</tr>
</tbody>
</table>
### General Education/Elective Credits

<table>
<thead>
<tr>
<th>Term Credit Hours</th>
<th>6-5</th>
</tr>
</thead>
</table>

### Spring

**MATH 1042 or 1942**  
Calculus II  
4

**Select one of the following:**  
- PHYS 1061  
  Elementary Classical Physics I  
  4
- PHYS 1961  
  Honors Elementary Classical Physics I (F)  
  4
- PHYS 2021  
  General Physics I  
  3
- PHYS 2921  
  Honors General Physics I (F)  
  3
- EDUC 2179  
  Knowing and Learning in Mathematics and Science  
  3

### General Education/Elective Credits

<table>
<thead>
<tr>
<th>Term Credit Hours</th>
<th>5</th>
</tr>
</thead>
</table>

### Year 2

#### Fall

**MATH 2043 or 2943**  
Calculus III  
4

**MATH 2101 or 2103**  
Linear Algebra  
3-4

**Select one of the following:**  
- PHYS 1062  
  Elementary Classical Physics II  
  4
- PHYS 1962  
  Honors Elementary Classical Physics II (S)  
  4
- PHYS 2022  
  General Physics II  
  3
- PHYS 2922  
  Honors General Physics II (S)  
  3
- SPED 2231  
  Introduction to Inclusive Education  
  3

### General Education/Elective Credits

<table>
<thead>
<tr>
<th>Term Credit Hours</th>
<th>3-2</th>
</tr>
</thead>
</table>

### Spring

**MATH 2021**  
Functions and Modeling (S)  
3

**MATH 2061**  
Euclidean Geometry (S)  
3

**MATH 2111**  
Basic Concepts of Math  
3

### General Education/Elective Credits

<table>
<thead>
<tr>
<th>Term Credit Hours</th>
<th>7</th>
</tr>
</thead>
</table>

### Year 3

#### Fall

**MATH 3003**  
Theory of Numbers  
3

**MATH 3137**  
Real Complex Analysis I (F)  
3

**SECE 3796**  
Differentiated Literacy Instruction in the Disciplines, 7-12 [WI]  
3

**Select one of the following:**  
- PHIL 2196  
  Perspectives on Science and Mathematics [WI]  
  3
- SCTC 3001  
  History of Science  
  3

### General Education/Elective Credits

<table>
<thead>
<tr>
<th>Term Credit Hours</th>
<th>4</th>
</tr>
</thead>
</table>

### Spring

**MATH 3096**  
Introduction to Modern Algebra [WI]  
3

**MATH 3138**  
Real Complex Analysis II (S)  
3

**Select one of the following:**  
- BIOL 3091  
  Research Methods (S)  
  3
- CHEM 3091  
  Research Methods (S)  
  3
- EES 3091  
  Research Methods (S)  
  3
- PHYS 3091  
  Research Methods (S)  
  3

**Select one of the following:**  
- MAES 2189  
  Classroom Interactions (S)  
  3
- SCTC 3485  
  Science and Mathematics in the Classroom  
  3
<table>
<thead>
<tr>
<th>Year 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
</tr>
<tr>
<td>MATH 3031</td>
</tr>
<tr>
<td>MATH 4096</td>
</tr>
<tr>
<td>3000+ Math Elective</td>
</tr>
<tr>
<td>SCTC 3312</td>
</tr>
<tr>
<td>Select one of the following:</td>
</tr>
<tr>
<td>MAES 4189</td>
</tr>
<tr>
<td>SCTC 4485</td>
</tr>
</tbody>
</table>

| General Education/Elective Credits | 4 |

| Term Credit Hours | 16 |

| **Spring** |
| EDUC 4388 | TUteach Apprentice Teaching | 6 |
| EDUC 4802 | TUteach Apprentice Teaching Seminar | 1 |

| General Education/Elective Credits | 3 |

| Term Credit Hours | 10 |

| Total Credit Hours: | 124 |

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>(F)</td>
<td>Fall only course</td>
<td></td>
</tr>
<tr>
<td>(S)</td>
<td>Spring only course</td>
<td></td>
</tr>
</tbody>
</table>

\(^1\) All students are required to take a minimum of one credit.