Mathematics & Computer Science with Teaching, B.S.

The B.S. with Teaching in Mathematics and Computer Science is part of Temple's innovative "TUteach" teacher-training program. The B.S. with Teaching provides broad training in Mathematics and Computer Science, and prepares students for a career in secondary school teaching. 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. Finally, students are encouraged to complete the appropriate PRAXIS II examination prior to student teaching.

Undergraduate Contact Information:

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215-204-3628
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215-204-7841

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215-204-7852
angelone@temple.edu

Dr. Slobodan Vucetic, Chair
Department of Computer & Information Sciences
Science Education and Research Center, Room 304
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:
     - MATH 3096 Introduction to Modern Algebra
     - MATH 4096 Senior Problem Solving
     - PHIL 2196 Perspectives on Science and Mathematics
     - SECE 3796 Differentiated Literacy Instruction in the Disciplines, 7-12
   - 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).

3. Major Requirements for Bachelor of Science (94-96 s.h.)
   - At least 10 courses required for the major must be completed at Temple. At least 6 Math, 2 Computer Science, 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 SUCT 1385, SUCT 2385, or SUCT 2389. Students will also benefit from directed laboratory projects offered through SUCT 3185. These courses are offered every semester.

<table>
<thead>
<tr>
<th>Computer &amp; Information Science</th>
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</thead>
<tbody>
<tr>
<td>CIS 1068</td>
<td>Program Design and Abstraction</td>
</tr>
<tr>
<td>or CIS 1968</td>
<td>Honors Program Design and Abstraction</td>
</tr>
<tr>
<td>CIS 1166</td>
<td>Mathematical Concepts in Computing I</td>
</tr>
<tr>
<td>or CIS 1966</td>
<td>Honors Mathematical Concepts in Computing I</td>
</tr>
<tr>
<td>CIS 2107</td>
<td>Computer Systems and Low-Level Programming</td>
</tr>
<tr>
<td>CIS 2168</td>
<td>Data Structures</td>
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<table>
<thead>
<tr>
<th>Mathematics</th>
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<tr>
<td>MATH 1041</td>
<td>Calculus I</td>
</tr>
<tr>
<td>or MATH 1941</td>
<td>Honors Calculus I</td>
</tr>
<tr>
<td>MATH 1042</td>
<td>Calculus II</td>
</tr>
<tr>
<td>or MATH 1942</td>
<td>Honors Calculus II</td>
</tr>
<tr>
<td>MATH 2021</td>
<td>Functions and Modeling (S)</td>
</tr>
<tr>
<td>MATH 2043</td>
<td>Calculus III</td>
</tr>
<tr>
<td>or MATH 2943</td>
<td>Honors Calculus III</td>
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<tr>
<td>MATH 2101</td>
<td>Linear Algebra</td>
</tr>
<tr>
<td>or MATH 2103</td>
<td>Linear Algebra with Computer Lab</td>
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</table>
Mathematics & Computer Science with Teaching, B.S.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>MATH 2111</td>
<td>Basic Concepts of Math</td>
<td>3</td>
</tr>
<tr>
<td>MATH 3061</td>
<td>Modern Geometry I (F)</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>
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<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>
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**Mathematics or Computer & Information Science**

<table>
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<th>Course Title</th>
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<tr>
<td>MATH 3003</td>
<td>Theory of Numbers</td>
<td>3-4</td>
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<tr>
<td>or CIS 2166</td>
<td>Mathematical Concepts in Computing II</td>
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**Physics**

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<th>Course Title</th>
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<tbody>
<tr>
<td>PHYS 1061</td>
<td>Elementary Classical Physics I</td>
<td>4</td>
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<tr>
<td>or PHYS 1961</td>
<td>Honors Elementary Classical Physics I</td>
<td></td>
</tr>
<tr>
<td>or PHYS 2021</td>
<td>General Physics I</td>
<td></td>
</tr>
<tr>
<td>or PHYS 2921</td>
<td>Honors General Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 1062</td>
<td>Elementary Classical Physics II</td>
<td>4</td>
</tr>
<tr>
<td>or PHYS 1962</td>
<td>Honors Elementary Classical Physics II</td>
<td></td>
</tr>
<tr>
<td>or PHYS 2022</td>
<td>General Physics II</td>
<td></td>
</tr>
<tr>
<td>or PHYS 2922</td>
<td>Honors General Physics II</td>
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**College of Science & Technology**

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<th>Course Title</th>
<th>Credits</th>
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<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>
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<tr>
<td>SCTC 3312</td>
<td>Coding STEM Lessons</td>
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**Education**

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<tr>
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<td>Knowing and Learning in Mathematics and Science</td>
<td>3</td>
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<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></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></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>
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**Philosophy/History**

Select one of the following:

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHIL 2196</td>
<td>Perspectives on Science and Mathematics</td>
<td>3</td>
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<tr>
<td>SCTC 3001</td>
<td>History of Science</td>
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**Research Methods**

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<th>Credits</th>
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<tr>
<td>BIOL/CHM/EES/PHYS 3091</td>
<td>Research Methods</td>
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**Total Credit Hours**

<table>
<thead>
<tr>
<th>Credits</th>
<th>Total Credit Hours</th>
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<tr>
<td></td>
<td>94-96</td>
</tr>
</tbody>
</table>

\( \text{(F)} \) - Fall only course  
\( \text{(S)} \) - Spring only course

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 TUtach 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 TUtach web site (http://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 and Computer Science with Teaching, a student should meet the following requirements:

- Achieve a 3.50 GPA or better for the aggregate of courses required for the B.S. in Mathematics and Computer Science with Teaching.
- Achieve a 3.50 GPA or better in the Mathematics and Computer Science with Teaching content courses required for the major.
- 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.
- A student must achieve a GPA of 3.50 or higher in:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</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>
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Any additional course from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MATH 3043</td>
<td>Numerical Analysis I</td>
<td>3 to 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 4000-level course other than individual study

- Achieve a 3.90 GPA in the following courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAES 2189</td>
<td>Classroom Interactions</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</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>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>
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</table>

Suggested Academic Plan

Bachelor of Science in Mathematics & Computer Science with Teaching

Requirements for New Students starting in the 2017-2018 Academic Year

### Year 1

#### Fall

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
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</thead>
<tbody>
<tr>
<td>CIS 1068 or 1968</td>
<td>Program Design and Abstraction</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1041 or 1941</td>
<td>Calculus I</td>
<td>4</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1061</td>
<td>Elementary Classical Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 1961</td>
<td>Honors Elementary Classical Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 2021</td>
<td>General Physics I</td>
<td></td>
</tr>
<tr>
<td>PHYS 2921</td>
<td>Honors General Physics I</td>
<td></td>
</tr>
<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>
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</table>

General Education/Elective Credits

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
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<td>Term Credit Hours</td>
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#### Spring

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credit Hours</th>
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<tbody>
<tr>
<td>CIS 1166 or 1966</td>
<td>Mathematical Concepts in Computing I</td>
<td>4</td>
</tr>
<tr>
<td>MATH 1042 or 1942</td>
<td>Calculus II</td>
<td>4</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>4</td>
</tr>
<tr>
<td>PHYS 1062</td>
<td>Elementary Classical Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 1962</td>
<td>Honors Elementary Classical Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 2022</td>
<td>General Physics II</td>
<td></td>
</tr>
<tr>
<td>PHYS 2922</td>
<td>Honors General Physics II</td>
<td></td>
</tr>
<tr>
<td>General Education/Elective Credits</td>
<td>4</td>
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<tr>
<td><strong>Term Credit Hours</strong></td>
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### Year 2

#### Fall

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<tr>
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<th>Course Title</th>
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<tbody>
<tr>
<td>CIS 2168</td>
<td>Data Structures</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2043 or 2943</td>
<td>Calculus III</td>
<td>4</td>
</tr>
<tr>
<td>MATH 2101 or 2103</td>
<td>Linear Algebra</td>
<td>3-4</td>
</tr>
<tr>
<td>EDUC 2179</td>
<td>Knowing and Learning in Mathematics and Science</td>
<td>3</td>
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#### General Education/Elective Credits

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<th>Credits</th>
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| **Term Credit Hours** | 17 |

#### Spring

<table>
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<th>Credits</th>
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<tbody>
<tr>
<td>CIS 2107</td>
<td>Computer Systems and Low-Level Programming</td>
<td>4</td>
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<td>MATH 2021</td>
<td>Functions and Modeling (S)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 2111</td>
<td>Basic Concepts of Math</td>
<td>3</td>
</tr>
<tr>
<td>SPED 2231</td>
<td>Introduction to Inclusive Education</td>
<td>3</td>
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#### General Education/Elective Credits

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| **Term Credit Hours** | 17 |

### Year 3

#### Fall

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<tr>
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<td>Introduction to Modern Algebra [WI]</td>
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<td>MATH 3137</td>
<td>Real Complex Analysis I (F)</td>
<td>3</td>
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<tr>
<td>SECE 3796</td>
<td>Differentiated Literacy Instruction in the Disciplines, 7-12 [WI]</td>
<td>3</td>
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Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PHIL 2196</td>
<td>Perspectives on Science and Mathematics [WI]</td>
<td>3</td>
</tr>
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<td>SCTC 3001</td>
<td>History of Science</td>
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#### General Education/Elective Credits

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| **Term Credit Hours** | 16 |

#### Spring

Select one of the following:

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<th>Credits</th>
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<tr>
<td>MATH 3003</td>
<td>Theory of Numbers</td>
<td>3-4</td>
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<td>CIS 2166</td>
<td>Mathematical Concepts in Computing II</td>
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</tr>
<tr>
<td>MATH 3138</td>
<td>Real Complex Analysis II (S)</td>
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Select one of the following:

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<tr>
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<tbody>
<tr>
<td>MAES 2189</td>
<td>Classroom Interactions (S)</td>
<td>3</td>
</tr>
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<td>SCTC 3485</td>
<td>Science and Mathematics in the Classroom</td>
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Select one of the following:

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<th>Credits</th>
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<tbody>
<tr>
<td>BIOL 3091</td>
<td>Research Methods (S)</td>
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<td>CHEM 3091</td>
<td>Research Methods (S)</td>
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<td>EES 3091</td>
<td>Research Methods (S)</td>
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<td>Research Methods (S)</td>
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#### General Education/Elective Credits

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| **Term Credit Hours** | 15 |

### Year 4

#### Fall

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<tr>
<td>MATH 3061</td>
<td>Modern Geometry I (F)</td>
<td>3</td>
</tr>
<tr>
<td>MATH 4096</td>
<td>Senior Problem Solving [WI]</td>
<td>3</td>
</tr>
<tr>
<td>SCTC 3312</td>
<td>Coding STEM Lessons¹</td>
<td>1</td>
</tr>
</tbody>
</table>

Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MAES 4189</td>
<td>Project-Based Instruction (F)</td>
<td>3</td>
</tr>
<tr>
<td>SCTC 4485</td>
<td>Integrating STEM Practice in Diverse Teaching Environments</td>
<td></td>
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</tbody>
</table>

#### General Education/Elective Credits

<table>
<thead>
<tr>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
</tr>
</tbody>
</table>

<p>| <strong>Term Credit Hours</strong> | 16 |</p>
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 4388</td>
<td>TUteach Apprentice Teaching</td>
<td>6</td>
</tr>
<tr>
<td>EDUC 4802</td>
<td>TUteach Apprentice Teaching Seminar</td>
<td>1</td>
</tr>
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</table>

General Education/Elective Credits: 3

<table>
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<tr>
<th>Term Credit Hours</th>
<th>Total Credit Hours:</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>124</td>
</tr>
</tbody>
</table>

(F) - Fall only course
(S) - Spring only course

1 All students are required to take a minimum of one credit.