APPLIED MATH AND COMPUTER SCIENCE, BS (COLLEGE OF ENGINEERING AND APPLIED SCIENCE, DEPARTMENT OF COMPUTER SCIENCE)

The Applied Mathematics and Computer Science (AMCS) program is a special degree program that blends courses from both the College of Letters & Science and the College of Engineering & Applied Science. It is a structured curriculum offering courses from both applied math and computer science so that students get the benefit of both majors without having to double major.

The job outlook for individuals with math majors is extremely favorable, as is the job outlook for computer science majors. A student with combined knowledge in both areas is likely to be in high demand on the job market.

Our program is highly technical in nature yet still retains elements of a classic liberal arts degree. Students take courses in the humanities, social sciences, and natural sciences on their way to a degree. Why? Because math and computer science are not applied in a world without humans. Regardless of the type of industry, the applications being worked on have impact and consequences for human beings. A broad world view of cultures, history, and society only leads to better decision-making in scientific careers, and strong communication skills only make our graduates even more attractive.

Requirements
Applied Math and Computer Science Major Requirements

Students who intend to complete the program in four years will need to begin taking mathematics in their first semester. Such students should have a University of Wisconsin-Milwaukee mathematics placement level of 30 (ready for precalculus) or better.

Admission

As soon as students realize their interest in the AMCS degree, they should consult with an AMCS advisor either in College of Engineering and Applied Science or College of Letters and Science, who assists in planning a program. Admission to the program requires a GPA of at least 2.500 in 8 credits of mathematics courses at or above the 200 level and 6 credits of computer science courses at or above the 200 level.

Degree Requirements

For the BS (AMCS) degree, 120 credits are required, of which 75 must be taken from the College of Letters and Science. Students must satisfy the general education requirements (GER) (http://catalog.uwm.edu/policies/undergraduate-policies/#generaleducationtext) of the University. Students must take at least 8 credits of natural sciences outside of mathematics or mathematical statistics.

An overall GPA of 2.000 on all coursework attempted at UWM is required for this degree. In addition, students must achieve a 2.000 GPA on all coursework attempted, including transfer work. A minimum 2.000 GPA must be earned on all 300-level and above courses taken to satisfy the advanced requirements. Students satisfy the residency requirement for the degree by completing at UWM both a minimum of 15 credits of the required advanced courses and one of the following:

- The last 30 credits;
- 45 of the last 60 credits;
- Any 90 credits.

<table>
<thead>
<tr>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>COMPSCI 250</td>
<td>Introductory Computer Programming</td>
<td>3</td>
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<tr>
<td>COMPSCI 251</td>
<td>Intermediate Computer Programming</td>
<td>3</td>
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<tr>
<td>COMPSCI 315</td>
<td>Introduction to Computer Organization and Assembly Language Programming</td>
<td>3</td>
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<tr>
<td>COMPSCI 317</td>
<td>Discrete Information Structures</td>
<td>3</td>
</tr>
<tr>
<td>MATH 231</td>
<td>Calculus and Analytic Geometry I</td>
<td>4</td>
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<tr>
<td>MATH 232</td>
<td>Calculus and Analytic Geometry II</td>
<td>4</td>
</tr>
<tr>
<td>MATH 233</td>
<td>Calculus and Analytic Geometry III</td>
<td>4</td>
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<tr>
<td>MATH 234</td>
<td>Linear Algebra and Differential Equations</td>
<td>4</td>
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<tr>
<td>MATH 341</td>
<td>Seminar: Introduction to the Language and Practice of Mathematics</td>
<td>3</td>
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<tr>
<td>COMPSCI 351</td>
<td>Data Structures and Algorithms</td>
<td>3</td>
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<tr>
<td>COMPSCI 535</td>
<td>Algorithm Design and Analysis</td>
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Select 9 credits in COMPSCI at the 300 level or above
Select 6 credits from MATH and/or MTHSTAT at the 300 level or above
Select one of the following pairs:

- MATH 305 & MATH 405: Introduction to Mathematical and Computational Modeling and Mathematical Models and Applications
- MATH 313 & MATH 315: Linear Programming and Optimization and Mathematical Programming and Optimization
- MATH 320 & MATH 322: Introduction to Differential Equations and Introduction to Partial Differential Equations
- MATH 413 & MATH 415: Introduction to Numerical Analysis and Introduction to Scientific Computing
- MATH 413 & MATH 417: Introduction to Numerical Analysis and Computational Linear Algebra
- MATH 415 & MATH 417: Introduction to Scientific Computing and Computational Linear Algebra
- MATH 431 & MATH 531: Modern Algebra with Applications and Modern Algebra
- MATH 521 & MATH 522: Advanced Calculus I and Advanced Calculus II
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<tr>
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<tbody>
<tr>
<td>MATH 531</td>
<td>Modern Algebra and Linear Algebra</td>
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<td>&amp; MATH 535</td>
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<tr>
<td>MATH 601</td>
<td>Advanced Engineering Mathematics I and Advanced</td>
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<tr>
<td>&amp; MATH 602</td>
<td>Engineering Mathematics II</td>
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<tr>
<td>MATH 621</td>
<td>Introduction to Analysis I and Introduction to</td>
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<tr>
<td>&amp; MATH 622</td>
<td>Analysis II</td>
<td></td>
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<tr>
<td>MATH 631</td>
<td>Modern Algebra I</td>
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<tr>
<td>&amp; MATH 632</td>
<td>Modern Algebra II</td>
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<tr>
<td>MTHSTAT 361</td>
<td>Introduction to Mathematical Statistics I</td>
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<tr>
<td>&amp; MTHSTAT 362</td>
<td>and Introduction to Mathematical Statistics II</td>
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<tr>
<td>MTHSTAT 361</td>
<td>Introduction to Mathematical Statistics I</td>
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<tr>
<td>&amp; MTHSTAT 571</td>
<td>and Introduction to Probability Models</td>
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Select 21 additional credits from CompSci, Math, and MthStat courses at the 300 level or above, beyond the "Core" as well as the above "Advanced" Requirements

Total Credits 79

## Potential Course of Study

### Year 1

#### Fall
- COMPSCI 250 Introductory Computer Programming 3
- ENGLISH 101 Introduction to College Writing 3
- MATH 115 Precalculus 4

1st semester foreign language 3-5

Credits 13-15

#### Spring
- COMPSCI 251 Intermediate Computer Programming 3
- ENGLISH 102 College Writing and Research 3
- MATH 231 Calculus and Analytic Geometry I 4

Arts 3

2nd semester foreign language 3-5

Credits 16-18

### Year 2

#### Fall
- COMPSCI 315 Introduction to Computer Organization and Assembly Language Programming 3
- COMPSCI 351 Data Structures and Algorithms 3
- MATH 232 Calculus and Analytic Geometry II 4
- MATH 341 Seminar: Introduction to the Language and Practice of Mathematics 3

Humanities + Cultural Diversity 3

Credits 16

#### Spring
- COMPSCI 317 Discrete Information Structures 3
- MATH 233 Calculus and Analytic Geometry III 4
- MATH 234 Linear Algebra and Differential Equations or MATH 240 Matrices and Applications 3-4

Natural Science with lab 4-5

Credits 14-16

### Year 3

#### Fall
- COMPSCI 535 Algorithm Design and Analysis 3

CompSci advanced elective 3

Math or Comp Sci advanced elective 3

Math sequence course 3

### Year 4

#### Fall

Select a sufficient number of elective credits from the College of Letters and Science to earn a minimum of 75 L&S credits.

#### Honors in the Degree

Students in AMCS who meet all of the following criteria can be awarded honors in the degree upon graduation:

1. A 3.000 cumulative GPA in all UWM graded credits;
2. A 3.500 GPA over all UWM courses attempted that count toward the AMCS degree;
3. A 3.500 GPA over all upper division UWM courses counting toward the AMCS degree;
4. A grade of B+ or better in one of: MATH 599, MATH 699, COMPSCI 595, or COMPSCI 699;
5. Completion of 3 credits in Mathematical Sciences (curricular areas MATH or MTHSTAT) or Computer Science in a course numbered 600 or higher that is different from MATH 699 and COMPSCI 699.