

# APPLIED MATH AND COMPUTER SCIENCE, BS (COLLEGE OF LETTERS AND SCIENCE, DEPARTMENT OF MATHEMATICAL SCIENCES)

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.

## 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.

Code	Title	Credits
<b>Core Requirements</b>		
COMPSCI 250	Introductory Computer Programming	3
COMPSCI 251	Intermediate Computer Programming	3
COMPSCI 315	Introduction to Computer Organization and Assembly Language Programming	3
COMPSCI 317	Discrete Information Structures <sup>1</sup>	3
Select the following (or an equivalent sequence):		12
MATH 231	Calculus and Analytic Geometry I	
MATH 232	Calculus and Analytic Geometry II	
MATH 233	Calculus and Analytic Geometry III	
MATH 234	Linear Algebra and Differential Equations	4
or MATH 240	Matrices and Applications	
MATH 341	Seminar: Introduction to the Language and Practice of Mathematics	3
<b>Advanced Requirements</b>		
COMPSCI 351	Data Structures and Algorithms	3
COMPSCI 535	Algorithm Design and Analysis	3
Select 9 credits in COMPSCI at the 300 level or above		9
Select 6 credits from MATH and/or MTHSTAT and/or ACTSCI at the 300 level or above		6
Select one of the following pairs:		6
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	
MATH 531 & MATH 535	Modern Algebra and Linear Algebra	
MATH 601 & MATH 602	Advanced Engineering Mathematics I and Advanced Engineering Mathematics II	

MATH 621 & MATH 622	Introduction to Analysis I and Introduction to Analysis II	
MATH 631 & MATH 632	Modern Algebra I and Modern Algebra II	
MTHSTAT 361 & MTHSTAT 362	Introduction to Mathematical Statistics I and Introduction to Mathematical Statistics II	
MTHSTAT 361 & MATH 571	Introduction to Mathematical Statistics I and Introduction to Probability Models	
Select 21 additional credits from CompSci, Math, MthStat, and ActSci courses at the 300 level or above, beyond the "Core" as well as the above "Advanced" Requirements		21
<b>Total Credits</b>		<b>79</b>

<sup>1</sup> COMPSCI 317 is waived for students who earn credit for MTHSTAT 361, which counts towards the math electives for the program. Students who have COMPSCI 317 waived in this case do not need to take any additional credits.

## Potential Course of Study

Year 1		Credits
<b>Fall</b>		
COMPSCI 250	Introductory Computer Programming	3
ENGLISH 101	Introduction to College Writing	3
MATH 115	Precalculus	4
1st semester foreign language		3-5
	<b>Credits</b>	<b>13-15</b>
<b>Spring</b>		
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
	<b>Credits</b>	<b>16-18</b>
<b>Year 2</b>		
<b>Fall</b>		
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
	<b>Credits</b>	<b>16</b>
<b>Spring</b>		
COMPSCI 317	Discrete Information Structures	3
MATH 233	Calculus and Analytic Geometry III	4
MATH 234 or MATH 240	Linear Algebra and Differential Equations or Matrices and Applications	3-4
Natural Science with lab		4-5
	<b>Credits</b>	<b>14-16</b>
<b>Year 3</b>		
<b>Fall</b>		
COMPSCI 535	Algorithm Design and Analysis	3
CompSci advanced elective		3
Math or Comp Sci advanced elective		3
Math sequence course		3

Natural Science		3-4
	<b>Credits</b>	<b>15-16</b>
<b>Spring</b>		
CompSci advanced elective		3
Math sequence course		3
Math advanced elective		3
Math or Comp Sci advanced elective		3
Social Science		3
	<b>Credits</b>	<b>15</b>
<b>Year 4</b>		
<b>Fall</b>		
CompSci advanced elective		3
Math advanced elective		3
Math or CompSci advanced elective		3
Humanities + OWCB		3
	<b>Credits</b>	<b>12</b>
<b>Spring</b>		
CompSci or Math advanced electives <sup>1</sup>		12
Social Science		3
	<b>Credits</b>	<b>15</b>
	<b>Total Credits</b>	<b>116-123</b>

<sup>1</sup> 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.

Students who believe they may qualify for honors in Applied Mathematics & Computer Science should apply to the Department of Mathematical Sciences during their last semester of study.

## Honors in the College of Letters and Science

### Dean's Honor List

GPA of 3.750 or above, earned on a full-time student's GPA on 12 or more graded credits in a given semester.

### Honors College Degree and Honors College Degree with Distinction

Granted to graduating seniors who complete Honors College requirements, as listed in the Honors College (<http://catalog.uwm.edu/opportunities-resources/honors-college/>) section of this site.

### Commencement Honors

Students with a cumulative GPA of 3.500 or above, based on a minimum of 40 graded UWM credits earned prior to the final semester, will receive

all-university commencement honors and be awarded the traditional gold cord at the December or May Honors Convocation. Please note that for honors calculation, the GPA is **not** rounded and is truncated at the third decimal (e.g., 3.499).

### **Final Honors**

Earned on a minimum of 60 graded UWM credits: Cum Laude - 3.500 or above; Magna Cum Laude - 3.650 or above; Summa Cum Laude - 3.800 or above.

### **Contact Information**

Current Students contact Professor Suzanne Boyd, [sboyd@uwm.edu](mailto:sboyd@uwm.edu)  
Prospective Students contact a Letters & Science Admissions Counselor  
at  
(414) 229-7711 or [let-sci@uwm.edu](mailto:let-sci@uwm.edu)

<http://uwm.edu/math/undergraduate/majors/applied-mathematics-computer-science/>