

# 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. Students may be given the AMCS classification at any point in their studies; however, they are not formally admitted to the major until their junior year. Admission to the junior year of 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 80 must be taken from the College of Letters and Science. Students must satisfy the general education requirements (GER) of the University. They must complete at least 6 credits each from humanities and social sciences, 3 credits from the arts, and 6 additional credits in any of these three areas

or in foreign languages. Students also must take at least 8 credits of natural sciences outside of mathematics or mathematical statistics, including at least one laboratory course from biological sciences, chemistry, or physics. A cultural diversity course must be included among the humanities and social science courses selected.

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 315	Introduction to Computer Organization and Assembly Language Programming	3
COMPSCI 317	Discrete Information Structures	3
COMPSCI 251	Intermediate Computer Programming	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 at the 300 level or above		6
Select one of the following sequences:		6
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 521 & MATH 522	Advanced Calculus I and Advanced Calculus II	
MATH 531 & MATH 535	Modern Algebra and Linear Algebra	
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	21
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		Credits
<b>Fall</b>		
COMPSCI 250	Introductory Computer Programming	3
ENGLISH 101	Introduction to College Writing	3
MATH 116	College Algebra	3
MATH 117	Trigonometry	2
Humanities or Social Science		3
Credits		14
<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
Humanities or Social Science		3
Credits		16
<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 or Social Science		3
Credits		16
<b>Spring</b>		
COMPSCI 317	Discrete Information Structures	3
MATH 233	Calculus and Analytic Geometry III	4
MATH 234	Linear Algebra and Differential Equations	4
Natural Science with lab		3-4
Credits		14-15
<b>Year 3</b>		
<b>Fall</b>		
COMPSCI 535	Algorithm Design and Analysis	3
CompSci or Math elective		6
Math sequence course		3
Natural Science		3
Credits		15
<b>Spring</b>		
CompSci advanced elective		3
Math sequence course		3
Math advanced elective		3
Math advanced elective		3
Math or CompSci elective		3
Credits		15
<b>Year 4</b>		
<b>Fall</b>		
CompSci advanced elective		3
Math advanced elective		3
Math or CompSci elective		3

Humanities or Social Science	6
Credits	15
<b>Spring</b>	
CompSci or Math advanced electives	12
Elective <sup>1</sup>	1-3
Credits	13-15
Total Credits	118-121

<sup>1</sup> Select a sufficient number of elective credits from the College of Letters and Science to earn a minimum of 80 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.