APPLIED MATHEMATICS, BA

Contact

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B.A. in Applied Mathematics is recommended for those students who are pursuing another quantitatively rich major which they consider their primary interest. The toolkit of applicable mathematical methods will enable them to advance further in their own field, whether in industry or in academia.

Student Learning Outcomes

1. Demonstrate facility with the techniques of single and multivariable calculus and linear algebra
2. Effectively communicate mathematical ideas orally and in writing
3. Make symbolic calculations by hand and numerical calculations using MATLAB (or other appropriate software)
4. Reproduce essential assumptions, definitions, examples, and statements of important theorems
5. Solve standard science and engineering problems by selecting and applying and appropriate mathematical model
6. Solve problems using advanced undergraduate methods from one of the following areas: differential and linear equations, analysis, probability and statistics

Preliminary and Extra-disciplinary Requirements

Preliminary and extra-disciplinary requirements for both B.A and B.S. degrees

1. Complete 18 credits in the following classes with no grade below a C: MAT 295 Calculus I, MAT 296 Calculus II, MAT 331 First Course in Linear Algebra, MAT 397 Calculus III, and MAT 375 Introduction to Abstract Mathematics or CIS 375 Introduction to Discrete Mathematics. These courses are prerequisites for most upper-division courses. The following sequence is recommended: MAT 295 Calculus I in the first semester; MAT 296 Calculus II in the second semester; MAT 331 First Course in Linear Algebra, MAT 397 Calculus III in the third semester; and MAT 375 Introduction to Abstract Mathematics/CIS 375 Introduction to Discrete Mathematics when appropriate. However, a student with knowledge of trigonometry and a year of high school calculus may be able to enter the sequence at MAT 296 Calculus II or even MAT 397 Calculus III; a student with less preparation may be advised to complete MAT 194 Precalculus before beginning the calculus sequence. Students considering becoming mathematics majors are strongly encouraged to talk to a mathematics major advisor as soon as possible to ensure appropriate selection of courses.
2. Complete a course in computing such as CPS 196 Introduction to Computer Programming, ECS 102 Introduction to Computing or ECS 104 Engineering Computational Tools. A similar course may be substituted with advisor's approval.
3. Complete two sequences of two approved science courses for a total of four different courses outside of the mathematics department, such as BIO 121 General Biology I - BIO 123 General Biology II, CHE 106 General Chemistry Lecture I (CHE 107 General Chemistry Laboratory I - CHE 116 General Chemistry Lecture II (CHE 117 General Chemistry Laboratory II), PHY 211 General Physics I (PHY 221 General Physics Laboratory I) - PHY 212 General Physics II (PHY 222 General Physics Laboratory II), ECN 101 Introductory Microeconomics - ECN 102 Introductory Macroeconomics, or ECN 101 Introductory Microeconomics - ECN 203 Economic Ideas and Issues, ECS 221 Statics - ECS 222 Dynamics, ELE 231 Electrical Engineering Fundamentals, or another, more advanced sequence with the approval of a mathematics major advisor. This requirement is waived if the student earns either
   a. a minor in Applied Statistics, Biology, Chemistry, Computer Science, Economics, Engineering disciplines, Information Management & Technology, or Physics, or
   b. a major in one of natural sciences, engineering/technology disciplines, economics or finance.

B.A. Degree Requirements

In addition to the preliminary and extra-disciplinary requirements described above, the student must earn credit for the following courses, with a grade average of at least 2.0.

Code	Title	Credits
Three Required Courses		
MAT 414	Introduction to Ordinary Differential Equations	3
MAT 532	Applied Linear Algebra	3
or MAT 531	Second Course in Linear Algebra	
MAT 581	Numerical Methods with Programming	3
Groups		
Select two courses out of one of the following groups:		6
Differential and Linear Equations		
MAT 511	Advanced Calculus	
MAT 517	Partial Differential Equations and Fourier Series	
MAT 518	Fourier Series, Transforms and Wavelets	
MAT 682	Numerical Linear Algebra (See graduate catalog for course description)	
Analysis		
MAT 412	Introduction to Real Analysis I	
MAT 511	Advanced Calculus	
MAT 512	Introduction to Real Analysis II	
MAT 513	Introduction to Complex Analysis	
MAT 554	Differential Geometry	
Probability and Statistics		

MAT 521	Introduction to Probability	
MAT 525	Mathematical Statistics	
MAT 526	Introduction to Stochastic Processes	
Total Credits		**15**

Additional Information

With consent of the mathematics major advisor, these groupings may be altered.

3 credits of elective mathematics courses:
MAT 412 Introduction to Real Analysis I or those MAT courses numbered 490 or higher, except MAT 503 Matrix Methods for Data Science. With prior approval of the student's major advisor, a mathematically rich 500+ level course in another department may be substituted for the mathematics elective.

College of Arts and Sciences Requirements
For all Arts and Sciences|Maxwell students, successful completion of a bachelor's degree in this major requires a minimum of 120 credits, 96 of which must be Arts and Sciences|Maxwell credits, completion of the Liberal Arts Core (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text) requirements, and the requirements for this major (30 credits) that are listed above.

Dual Enrollments:
Students dually enrolled in **Newhouse*** and Arts and Sciences|Maxwell will complete a minimum of 122 credits, with at least 90 credits in Arts and Sciences|Maxwell coursework and an Arts and Sciences|Maxwell major.

*Students dually enrolled in the College of Arts and Sciences|Maxwell as first year students must complete the Liberal Arts Core (https://coursecatalog.syracuse.edu/undergraduate/arts-sciences/#text). Students who transfer to the dual program after their first year as singly enrolled students in the Newhouse School will satisfy general requirements for the dual degree program by completing the Newhouse Core Requirements.

Undergraduate University Requirements
The following requirements and experiences apply to all Syracuse University Undergraduate matriculated degree programs.

- IDEA Course Requirement (https://coursecatalog.syracuse.edu/undergraduate/idea-course-requirement/)
- First Year Seminar (https://coursecatalog.syracuse.edu/undergraduate/courses/fys/)