

APPLIED MATHEMATICS (MS)

Program Requirements	Quarter Hours
Core	28
Electives	20
Degree Requirements	48 hours

Learning Outcomes

Students will be able to:

- Demonstrate knowledge of the mathematical basis and foundations of probability and statistics necessary to develop and implement appropriate mathematical models.
- Solve a computational problem by using appropriate numerical and statistical procedures with a focus on accuracy, error control, and efficiency.
- Implement a variety of mathematical and statistical structures to model and analyze complex problems.
- Identify, formulate, abstract, and solve mathematical problems using tools from a variety of mathematical areas including calculus, linear algebra, algebra, analysis, probability, and statistics.
- Use computational and statistical software platforms to develop and execute various mathematical procedures and numerical algorithms.
- Communicate mathematical ideas professionally, in verbal and visual form, by using appropriate terminology and notation.

Degree Requirements

Required Core Courses - 7 courses / 28 credit hours

Course	Title	Quarter Hours
MAT 451	PROBABILITY AND STATISTICS I	4
MAT 452	PROBABILITY AND STATISTICS II	4
MAT 470	ADVANCED LINEAR ALGEBRA	4
MAT 484	MATHEMATICAL MODELING	4
MAT 485	NUMERICAL ANALYSIS I	4
MAT 486	NUMERICAL ANALYSIS II	4
MAT 487	OPERATIONS RESEARCH: LINEAR PROGRAMMING	4
Total Hours		28

Electives - 5 courses / 20 credit hours

It is recommended that students concentrate on one or two focus areas to achieve depth, but they are not required to do so. Students are encouraged to discuss course selection with the program director or a faculty advisor.

FOCUS AREAS

1) Computational Mathematics

Course	Title	Quarter Hours
MAT 437	COMPLEX ANALYSIS	
MAT 450	ADVANCED STATISTICAL COMPUTING	
MAT 459	SIMULATION MODELS AND MONTE CARLO METHOD	

MAT 481	FOURIER ANALYSIS AND SPECIAL FUNCTIONS
MAT 482	PARTIAL DIFFERENTIAL EQUATIONS
MAT 494	GRAPH THEORY

2) Optimization and Operations Research

Course	Title	Quarter Hours
MAT 450	ADVANCED STATISTICAL COMPUTING	
MAT 453	PROBABILITY AND STATISTICS III	
MAT 455	STOCHASTIC PROCESSES	
MAT 459	SIMULATION MODELS AND MONTE CARLO METHOD	
MAT 468	MATHEMATICS FOR FINANCE	
MAT 488	OPERATIONS RESEARCH: OPTIMIZATION THEORY	
MAT 494	GRAPH THEORY	

3) Financial Mathematics

Course	Title	Quarter Hours
MAT 453	PROBABILITY AND STATISTICS III	
MAT 455	STOCHASTIC PROCESSES	
MAT 456	APPLIED REGRESSION ANALYSIS	
MAT 459	SIMULATION MODELS AND MONTE CARLO METHOD	
MAT 468	MATHEMATICS FOR FINANCE	
MAT 469	STOCHASTIC CALCULUS	
MAT 488	OPERATIONS RESEARCH: OPTIMIZATION THEORY	
MAT 512	APPLIED TIME SERIES AND FORECASTING	
MAT 515	FINANCIAL MODELING	

4) Applied Mathematical Analysis

Course	Title	Quarter Hours
MAT 435	MEASURE THEORY	
MAT 436	FUNCTIONAL ANALYSIS	
MAT 437	COMPLEX ANALYSIS	
MAT 455	STOCHASTIC PROCESSES	
MAT 469	STOCHASTIC CALCULUS	
MAT 481	FOURIER ANALYSIS AND SPECIAL FUNCTIONS	
MAT 482	PARTIAL DIFFERENTIAL EQUATIONS	
MAT 488	OPERATIONS RESEARCH: OPTIMIZATION THEORY	

5) Actuarial Science

Course	Title	Quarter Hours
MAT 453	PROBABILITY AND STATISTICS III	
MAT 461	ACTUARIAL SCIENCE I: THEORY OF INTEREST	
MAT 462	ACTUARIAL SCIENCE II: BASIC CONTINGENCIES	

MAT 463	ACTUARIAL SCIENCE III: ADVANCED CONTINGENCIES
MAT 464	LOSS MODELS I
MAT 465	LOSS MODELS II
MAT 468	MATHEMATICS FOR FINANCE

Time Limitation

The degree is expected to be completed in a maximum of six years.

Computer Usage

The department places strong emphasis on computation and is well supported with equipment and software necessary for research. Computers are used for data analysis and to find solutions to problems that arise in numerical analysis, simulations, and mathematical modeling. The computer packages used in these courses are likely to play an important role in the solution of the problems students will encounter in their places of employment.

Student Handbook

Academic Probation

A student will be placed on academic probation at the time when his/her cumulative GPA falls below 2.70.

Academic Dismissal

A graduate student may be academically dismissed under one or more of the following violations of satisfactory progress: his/her cumulative GPA remains below 2.70 after one year of coursework while being on academic probation, or lack of progress toward degree completion.

Conditional Admission

Students whose undergraduate degrees were in majors other than mathematics or related fields may be conditionally admitted provided they complete the following minimum prerequisites as conditions: two years of calculus [the equivalent of MAT 150-MAT 152], multivariable calculus and linear algebra [the equivalent of MAT 260-MAT 262], and a course in statistics. Additionally, a course in computer programming is required.

Readmission

The same readmission standards outlined in the Graduate Student Handbook and approval of the program director are observed for students in these programs.

Transfer Credit

No more than two graduate courses (8 quarter credit hours or its semester equivalent) may be transferred from another DePaul program or institution provided that they are equivalent to courses offered in DePaul's graduate program, and they did not count toward another degree either at DePaul or another institution. Written approval must come from graduate program director and associate dean for graduate studies.

Undergraduate Courses

No undergraduate courses shall count toward the graduate degree.

Graduation Requirements

Requirements include, but are not limited to, twelve graduate courses (48 credit hours) at a minimum cumulative GPA of 2.70.

Graduation with Distinction

A minimum cumulative GPA of 3.83 for coursework applied toward the applied mathematics degree is required for graduation with distinction.