

APPLIED MATHEMATICS AND STATISTICS (B.S.)

Unless otherwise noted, 120 credits of coursework is required for the baccalaureate degree with a minimum 2.0 overall GPA, and a minimum 2.0 major GPA.

Program Requirements Overview

Code	Title	Credits
	General Education Requirements	32-36
	World Languages and Cultures Requirements	3-9
	Major Requirements	64-65
	Free Electives	21-10
	Total Credits	120

Major Requirements

Code	Title	Credits
Common Courses		
AMAT 120	Applied Calculus A	4
AMAT 220	Applied Calculus B	4
AMAT 240	Introduction to Linear Algebra	4
AMAT 345	Applied Probability	3
AMAT 350	Applied Mathematics I	3
AMAT 356	Mathematical Modeling	3
MATH 222	Calculus III	4
STAT 230	Data Science and Statistics	3
STAT 330	Fundamentals of Modern Statistics I	4
Collateral Requirements		
CSIT 104	Python Programming I	3
CSIT 114	Python Programming II	3
	Choose one of the following sequences:	8-9
ACCT 204 & ECON 101 & FINC 221	Fundamentals of Accounting and Applied Macroeconomics and Introduction to Finance	
BIOL 112 & BIOL 113	Principles of Biology I and Principles of Biology II	
CHEM 120 & CHEM 121	General Chemistry I and General Chemistry II	
CSIT 213 & CSIT 357	Data Structures and Algorithms in Python and Artificial Intelligence	
CSIT 213 & CSIT 356 & CSIT 456	Data Structures and Algorithms in Python and Introduction to Data Science and Advanced Techniques in Data Science	
EAES 101 & EAES 201	Planet Earth and Understanding Weather and Climate	
PHYS 191 & PHYS 192	University Physics I and University Physics II	

Specialized Courses

Complete one track (Applied Mathematics, Statistics or Mathematics of Finance) from the list below.

Major Elective

Students choosing the Applied Mathematics or Statistics track must choose one elective, not already being used elsewhere in the major, from the list below.

Total Credits 64-65

Applied Mathematics Track

Code	Title	Credits
AMAT 360	Numerical Computing	3
AMAT 368	Mathematical Biology I	3
or AMAT 472	Dynamics and Bifurcation	
AMAT 430	Applied Analysis	3
AMAT 450	Applied Mathematics II	3
AMAT 497	Applied Mathematics Research I	3
or AMAT 499	Co-Op in Applied Mathematics	
	Total Credits	15

Statistics Track

Code	Title	Credits
STAT 341	Statistical Computing	3
STAT 442	Fundamentals of Modern Statistics II	3
STAT 443	Theory of Statistics	3
STAT 481	Introduction to Statistical Data Mining	3
STAT 497	Statistical Science Research I	3
or STAT 499	Co-Op in Statistics	
	Total Credits	15

Mathematics of Finance Track

Code	Title	Credits
AMAT 360	Numerical Computing	3
or STAT 341	Statistical Computing	
AMAT 262	Mathematics of Finance I	3
AMAT 430	Applied Analysis	3
AMAT 460	Mathematics of Portfolio Theory	3
AMAT 362	Mathematics of Finance II	3
AMAT 497	Applied Mathematics Research I	3
or AMAT 499	Co-Op in Applied Mathematics	
	Total Credits	18

Major Electives

Code	Title	Credits
AMAT 262	Mathematics of Finance I	3
AMAT 360	Numerical Computing	3
AMAT 362	Mathematics of Finance II	3
AMAT 368	Mathematical Biology I	3
AMAT 430	Applied Analysis	3
AMAT 450	Applied Mathematics II	3
AMAT 460	Mathematics of Portfolio Theory	3
AMAT 466	Continuous-Time Financial Mathematics	3
AMAT 468	Mathematical Biology II	3
AMAT 472	Dynamics and Bifurcation	3
AMAT 490	Seminar	1
AMAT 495	Special Topics in Applied Mathematics	3
AMAT 497	Applied Mathematics Research I	1-3

AMAT 498	Applied Mathematics Research II	1-3
BIOL 112	Principles of Biology I	4
BIOL 113	Principles of Biology II	4
BIOL 213	Introduction to Ecology	4
CHEM 120	General Chemistry I	4
CHEM 121	General Chemistry II	4
CHEM 220	Descriptive Inorganic Chemistry	3
CHEM 230	Organic Chemistry I	3
CSIT 213	Data Structures and Algorithms in Python	3
CSIT 230	Computer Systems	3
CSIT 356	Introduction to Data Science	3
CSIT 359	Data Visualization	3
CSIT 456	Advanced Techniques in Data Science	3
MATH 323	Complex Variables	3
MATH 431	Foundations of Modern Algebra	3
MATH 433	Theory of Numbers	3
MATH 451	Topology	3
MATH 461	General Relativity	3
MATH 485	Applied Combinatorics and Graph Theory	3
MATH 487	Introduction to Mathematical Cryptography	3
PHYS 191	University Physics I	4
PHYS 192	University Physics II	4
PHYS 210	Intermediate Mechanics	3
PHYS 220	Oscillations, Waves, and Optics	3
PHYS 230	Intermediate Physics Laboratory	4
PHYS 325	Computational Physics	3
PHYS 368	Fluid Mechanics	3
PHYS 461	General Relativity	3
STAT 341	Statistical Computing	3
STAT 442	Fundamentals of Modern Statistics II	3
STAT 443	Theory of Statistics	3
STAT 471	Time Series Analysis	3
STAT 472	Missing Data Analysis	3
STAT 481	Introduction to Statistical Data Mining	3
STAT 486	Multivariate Analysis	3
STAT 487	Statistical Genomics	3
STAT 490	Seminar	1
STAT 495	Special Topics in Statistical Science	3
STAT 497	Statistical Science Research I	1-3
STAT 498	Statistical Science Research II	1-3

General Education Requirements

Click here for a list of courses that fulfill General Education categories. (<http://catalog.montclair.edu/programs/general-education-requirements-ba-bs/>)

Code	Title	Credits
A. New Student Seminar		
	Complete a 1 credit New Student Seminar course.	1
C. Communication		
	1. Writing	3
	2. Literature	3
	3. Communication	3

D. Fine and Performing Arts

Complete a 3 credit Fine and Performing Arts course. 3

F. Humanities

1. *Great Works and Their Influences* 3

2. *Philosophical and Religious Perspectives* 3

G. Computer Science

CSIT 104 Python Programming I (Fulfilled in the major.)

H. Mathematics

AMAT 120 Applied Calculus A (Fulfilled in the major.)

I. Natural Science Laboratory

May be satisfied through the application-area sequence in the major. 0-4

J. Physical Education

Complete a 1 credit Physical Education course. 1

K. Social Science

1. *American and European History* 3

2. *Global Cultural Perspectives* 3

3. *Social Science Perspectives* 3

L. Interdisciplinary Studies

Complete a 3 credit Interdisciplinary Studies course. 3

Total Credits 32-36

World Languages and Cultures Requirements

Click here for a list of courses that fulfill World Languages and Cultures categories. (<http://catalog.montclair.edu/programs/world-languages-and-cultures-requirements/>)

Code	Title	Credits
World Languages		
	Based on language placement exam, complete one or two sequential courses in the same language. Requirement is automatically fulfilled by language major courses.	3-6
World Cultures		
	Requirement may be fulfilled by course selected in General Education - Social Science: Global Cultural Perspectives. Requirement may also be fulfilled by major coursework. See list of courses.	0-3
Total Credits		3-9

Recommended Roadmap to Degree Completion

This recommended four-year plan is provided as an outline for students to follow in order to complete their degree requirements within four years. This plan is a recommendation and students should only use it in consultation with their academic advisor.

Applied Mathematics Track

First Year				
Fall	Credits	Spring	Credits	
GENERAL EDUCATION: (A) New Student Seminar		1 GENERAL EDUCATION: (C2) Literature	3	
GENERAL EDUCATION: (C1) Writing		3 GENERAL EDUCATION: (J) Physical Education	1	
AMAT 120		4 AMAT 220	4	

AMAT 240	4	CSIT 114	3
CSIT 104	3	STAT 230	3
15		14	

Second Year

Fall	Credits	Spring	Credits
GENERAL EDUCATION: (C3) Communication	3	General Education course	3
MATH 222	4	World Language 1	3
STAT 330	4	World Cultures	3
Application Area Sequence course	4	AMAT 345	3
		Application Area Sequence course	4
15		16	

Third Year

Fall	Credits	Spring	Credits
General Education course	3	General Education course	3
General Education course	3	World Language 2	3
AMAT 350	3	AMAT 356	3
AMAT 360	3	AMAT 368 or 472	3
Major Elective course	3	AMAT 450	3
15		15	

Fourth Year

Fall	Credits	Spring	Credits
General Education course	3	General Education course	3
General Education course	3	AMAT 497 or 499	3
AMAT 430	4	Free Elective	4
Free Elective	4	Free Elective	4
Free Elective	3		
16		14	

Total Credits 120**Statistics Track****First Year**

Fall	Credits	Spring	Credits
GENERAL EDUCATION: (A) New Student Seminar	1	GENERAL EDUCATION: (C2) Literature	3
GENERAL EDUCATION: (C1) Writing	3	GENERAL EDUCATION: (J) Physical Education	1
AMAT 120	4	AMAT 220	4
AMAT 240	4	CSIT 114	3
CSIT 104	3	STAT 230	3
15		14	

Second Year

Fall	Credits	Spring	Credits
GENERAL EDUCATION: (C3) Communication	3	General Education Course	3
MATH 222	4	World Languages 1	3

STAT 330	4	World Cultures	3
Application Area Sequence course	4	AMAT 345	3

		Application Area Sequence course	4
15		16	

Third Year

Fall	Credits	Spring	Credits
General Education course	3	General Education course	3
General Education course	3	World Language 2	3
AMAT 350	3	AMAT 356	3
STAT 341	3	STAT 442	3
Major Elective	3	STAT 443	3
15		15	

Fourth Year

Fall	Credits	Spring	Credits
General Education course	3	General Education course	3
General Education course	3	STAT 497 or 499	3
STAT 481	4	Free Elective	4
Free Elective	4	Free Elective	4
Free Elective	3		
16		14	

Total Credits 120**Mathematics of Finance Track****First Year**

Fall	Credits	Spring	Credits
GENERAL EDUCATION: (A) New Student Seminar	1	GENERAL EDUCATION: (C2) Literature	3
GENERAL EDUCATION: (C1) Writing	3	GENERAL EDUCATION: (J) Physical Education	1
AMAT 120	4	AMAT 220	4
AMAT 240	4	CSIT 114	3
CSIT 104	3	STAT 230	3
15		14	

Second Year

Fall	Credits	Spring	Credits
GENERAL EDUCATION: (C3) Communication	3	General Education course	3
MATH 222	4	World Language 1	3
STAT 330	4	World Cultures	3
Application Area Sequence course	4	AMAT 345	3
		Application Area Sequence course	4
15		16	

Third Year

Fall	Credits	Spring	Credits
General Education course		3 General Education course	3
General Education course		3 General Education course	3
AMAT 262		3 World Language 2	3
AMAT 350		3 AMAT 356	3
AMAT 360 or STAT 341		3 AMAT 362	3
	15		15

Fourth Year

Fall	Credits	Spring	Credits
General Education course		3 AMAT 497 or 499	3
AMAT 430		3 General Education course	3
AMAT 460		3 Free Elective	4
Free Elective		3 Free Elective	4
Free Elective		4	
	16		14

Total Credits 120