

# APPLIED MATHEMATICS AND STATISTICS (B.S.)

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

## Program Requirements Overview

Code	Title	Credits
	New Student Seminar	1
	SEEDS General Education Requirements	30-33
	Major Requirements	64-65
	Free Electives	25-21
	<b>Total Credits</b>	<b>120</b>

## Major Requirements

Code	Title	Credits
<b>Common Courses</b>		
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
<b>Collateral Requirements</b>		
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: Introduction to the Cell and Principles of Biology: Organisms and Diversity	
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 256 & CSIT 360	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	
	<b>Total Credits</b>	<b>15</b>

## 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	
	<b>Total Credits</b>	<b>15</b>

## 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	
	<b>Total Credits</b>	<b>18</b>

## 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: Introduction to the Cell	4
BIOL 113	Principles of Biology: Organisms and Diversity	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 256	Introduction to Data Science	3
CSIT 359	Data Visualization	3
CSIT 360	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

## New Student Seminar

Code	Title	Credits
Students in the Adult Learner program must take GNED 100.		
Complete one course from the following. Some courses may be restricted by major. Consult with an academic advisor.		1
ADVS 198	Pathways to Success	
CHEM 190	Freshman Seminar in Chemistry	
FYS 100	First Year Seminar	
GNED 100	Adult Academic Success Seminar	
GNED 199	New Student Seminar	

HPEM 199	Freshman Seminar in Health and Physical Education
IDS 155	Pathways to Adult Learning
JUST 199	New Student Seminar
MATH 102	New Student Experience for Mathematical Sciences
MUGN 199	Freshman Seminar for Music Majors
NURS 199	Introduction to Nursing
POLS 199	Freshman Seminar in Political Science and Law

## SEEDS General Education Requirements

Click here for a listing of courses that fulfill the SEEDS requirements. (<http://catalog.montclair.edu/programs/seeds-general-education-requirements/>)

Code	Title	Credits
<b>Foundations</b>		
<i>Effective Writing I</i>		
	Complete one Effective Writing I course.	3
<i>Effective Writing II</i>		
	Complete one Effective Writing II course.	3
<i>Interactive Communication</i>		
	Complete one Interactive Communication course.	3
<i>Quantitative Reasoning</i>		
	Complete one Quantitative Reasoning course.	3
<i>Political and Civic Life</i>		
	Complete one Political and Civic Life course.	3
<i>World Languages</i>		
	Complete two sequential classes in one World Language when starting at the Beginner I or Beginner II level. Complete one class when starting at the Intermediate/Advanced Level.	3-6
<b>Exploration</b>		
	Complete one course from four different Exploration categories.	12
<i>Analyzing Cultures and Societies</i>		
<i>Creative Expression</i>		
<i>Ethical Inquiry</i>		
<i>Historical Thinking</i>		
<i>Literary and Artistic Analysis</i>		
<i>Scientific Reasoning</i>		
<b>Total Credits</b>		<b>30-33</b>