Applied Mathematics (BS): Financial Mathematics Concentration

To see more about what you will learn in this program, visit the Learning Outcomes website (https://apps.oirp.ncsu.edu/pgas/)!

The B.S in Applied Mathematics with a Financial Mathematics Concentration is a refinement of the B.S in Applied Mathematics degree (http://catalog.ncsu.edu/undergraduate/sciences/mathematics/applied-mathematics-bs/). This program prepares students for careers in financial mathematics, actuarial science and portfolio management.

For more information about this program visit our website (https://math.sciences.ncsu.edu/undergraduate/undergraduate-programs/applied-mathematics-financial-concentration/).

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Plan Requirements

Code	Title	Hours	Counts towards
Orientation			
COS 100	Science of Change (Verify Requirement)	0	
or E 115	Introduction to Computing Environments		
Advanced Writing			
Select one of the following Advanced Writing courses:		3	
ENG 331	Communication for Engineering and Technology		
ENG 332	Communication for Business and Management		
ENG 333	Communication for Science and Research		
ENG 101	Academic Writing and Research [1]	4	
Basic Mathematics [4]			
MA 141	Calculus I [1]	4	
MA 241	Calculus II [1]	4	
MA 242	Calculus III [1]	4	
MA 225	Foundations of Advanced Mathematics [1]	3	
MA 341	Applied Differential Equations I [1]	3	
Basic Science			
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory [1]	4	
PY 205 & PY 206	Physics for Engineers and Scientists I and Physics for Engineers and Scientists I Laboratory	4	
or PY 201	University Physics I		
Basic Science Elective (p. 2) [1]		4	
Statistics Electives (p. 3) [1]		6	
Select one of the following Introduction to Programming courses: [1]		3	
CSC 111	Introduction to Computing: Python		
CSC 112	Introduction to Computing- FORTRAN		
CSC 113	Introduction to Computing - MATLAB		
CSC 116	Introduction to Computing - Java		
MA 116	Introduction to Scientific Programming (Math)		
ST 114	Statistical Programming		
Advanced Mathematics [4]			
MA 401	Applied Differential Equations II [1]	3	
or MA 501	Advanced Mathematics for Engineers and Scientists I		
MA 405	Introduction to Linear Algebra [1]	3	
MA 407	Introduction to Modern Algebra for Mathematics Majors [1]	3	
MA 425	Mathematical Analysis I [1]	3	

Financial Math Electives (p. 3) [1]		6
MA 421	Introduction to Probability	3
Math Electives (p. 3) [1]		6
Major Paper Co-Requirement (verify requirement) (p. 3) [2]		
Advised Electives		
Advised Electives [2]		12
Advised electives are ST, ACC, or EC courses at 300-level or above designed to allow students to concentrate in a specific area related to their academic goals. Courses used to fulfill this requirement should use advanced mathematical tools and are selected by students after consultation and approval by their advisors or the Director of the Undergraduate Program. At least one course must be chosen from the Major Paper course list.		
Concentration Requirements		
EC 201	Principles of Microeconomics	3
or EC 205	Fundamentals of Economics	
EC 301	Intermediate Microeconomics	3
EC 302	Intermediate Macroeconomics	3
ST 307	Introduction to Statistical Programming-SAS	1
ST 308	Introduction to Statistical Programming - R	1
GEP Courses		
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		6
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		2
GEP US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)		3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		5
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)		
Foreign Language Proficiency (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/) (verify requirement)		
Free Electives		
Free Electives (12 Hr S/U Lmt) [2,3]		5
Total Hours		**120**

[1] A grade of C- or higher is required.
[2] Students should consult their academic advisors to determine which courses fill this requirement.
[3] Free electives courses cannot be MA 100, MA 101, MA 103, MA 107, MA 108, MA 111, MA 121, MA 131, MA 231, PY 131, PY 211, PY 212, ENG 100, 100-level Foreign Language Course (FL*, LAT, GRK, PER).
[4] No grade below a C- is permitted

Basic Science Electives

Code	Title	Hours	Counts towards
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4	
BIO 183	Introductory Biology: Cellular and Molecular Biology	4	
CH 201 & CH 202	Chemistry - A Quantitative Science and Quantitative Chemistry Laboratory	4	
PY 202	University Physics II	4	
PY 208 & PY 209	Physics for Engineers and Scientists II and Physics for Engineers and Scientists II Laboratory	4	

Statistics Electives

Code	Title	Hours	Counts towards
Statistics Sequence 1			
ST 371 & ST 372	Introduction to Probability and Distribution Theory and Introduction to Statistical Inference and Regression	6	
Statistics Sequence 2			
ST 305 & ST 422	and Introduction to Mathematical Statistics II	3	
Statistics Sequence 3			
ST 370 & ST 422	Probability and Statistics for Engineers and Introduction to Mathematical Statistics II	6	

Financial Math Electives

Code	Title	Hours	Counts towards
FIM 548	Monte Carlo Methods for Financial Math	3	
FIM 549	Financial Risk Analysis	3	
MA 412	Long-Term Actuarial Models	3	
MA 413	Short-Term Actuarial Models	3	
MA 540	Uncertainty Quantification for Physical and Biological Models	3	
MA 546	Probability and Stochastic Processes I	3	
MA 547	Stochastic Calculus for Finance	3	
MA 548	Monte Carlo Methods for Financial Math	3	
MA 549	Financial Risk Analysis	3	
ST 412	Long-Term Actuarial Models	3	
ST 413	Short-Term Actuarial Models	3	

Code	Title	Hours	Counts towards
ST 546	Probability and Stochastic Processes I	3	

Math Electives

Code	Title	Hours	Counts towards
CSC 427	Introduction to Numerical Analysis I	3	
CSC 428	Introduction to Numerical Analysis II	3	
ISE 505	Linear Programming	3	
MA 402	Mathematics of Scientific Computing	3	
MA 426	Mathematical Analysis II	3	
MA 427	Introduction to Numerical Analysis I	3	
MA 428	Introduction to Numerical Analysis II	3	
MA 505	Linear Programming	3	
OR 505	Linear Programming	3	

Major Paper Co-Requirement

Code	Title	Hours	Counts towards
CSC 427	Introduction to Numerical Analysis I	3	
CSC 428	Introduction to Numerical Analysis II	3	
MA 402	Mathematics of Scientific Computing	3	
MA 427	Introduction to Numerical Analysis I	3	
MA 428	Introduction to Numerical Analysis II	3	
MA 491	Reading in Honors Mathematics	1-6	
MA 494	Major Paper in Math	1	

Semester Sequence

This is a sample.

First Year

Fall Semester		Hours
MA 141	Calculus I	4
COS 100	Science of Change	2
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3
CH 101	Chemistry - A Molecular Science	3
CH 102	General Chemistry Laboratory	1
EC 205	Fundamentals of Economics	3
	Hours	**16**
Spring Semester		
MA 241	Calculus II	4
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
ENG 101	Academic Writing and Research	4
Introduction to Programming Elective (p. 1)		3
Select one of the following:		3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		
	Hours	**15**

Second Year

Fall Semester		
MA 242	Calculus III	4
MA 225	Foundations of Advanced Mathematics	3
PY 205	Physics for Engineers and Scientists I	3
PY 206	Physics for Engineers and Scientists I Laboratory	1
Free Electives		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
	Hours	**15**
Spring Semester		
MA 341	Applied Differential Equations I	3
MA 405	Introduction to Linear Algebra	3
ST 371	Introduction to Probability and Distribution Theory	3
EC 301	Intermediate Microeconomics	3
Select one of the following:		3
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/)		
	Hours	**15**

Third Year

Fall Semester		
MA 401	Applied Differential Equations II	3
MA 421	Introduction to Probability	3
EC 302	Intermediate Macroeconomics	3
ST 372	Introduction to Statistical Inference and Regression	3
ST 307	Introduction to Statistical Programming-SAS	1
Advised Electives (p. 1)		3
	Hours	**16**
Spring Semester		
Advised Electived (p. 1)		3
MA 402	Mathematics of Scientific Computing	3
ST 308	Introduction to Statistical Programming - R	1
ENG 332	Communication for Business and Management	3
Basic Science Elective (p. 2)		4
	Hours	**14**

Fourth Year

Fall Semester		
MA 412	Long-Term Actuarial Models	3
Advised Electives (p. 1)		3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		3
MA 425	Mathematical Analysis I	3
Free Elective		2
	Hours	**14**
Spring Semester		
MA 413	Short-Term Actuarial Models	3
Advised Electives (p. 1)		6
MA 407	Introduction to Modern Algebra for Mathematics Majors	3
GEP US Diversity, Equity, and Inclusion (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-usdei/)		3
	Hours	**15**
	Total Hours	**120**