

Middle Grades Education (BS), Mathematics and Sciences Concentration

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

Plan Requirements

Middle Grades Education (BS): Mathematics and Sciences Concentration: 121 Total Units

Code	Title	Hours	Counts towards
Communication and English			
COM 112	Interpersonal Communication	3	
ENG 101	Academic Writing and Research ¹	4	
History & Philosophy of Science			
Select one of the following:		3	
HI 321	Scientific Revolution and European Society, 1500-1800		
HI 322	Rise of Modern Science		
HI 341	Technology in History		
PHI 340	Philosophy of Science		
STS 301	Science and Civilization		
Mathematics			
MA 141	Calculus I	4	
MA 241	Calculus II	4	
MA 114	Introduction to Finite Mathematics with Applications	3	
MA 225	Foundations of Advanced Mathematics	3	
MA 408	Foundations of Euclidean Geometry	3	
Select one of the following:		3	
CSC 110	Computer Science Principles - The Beauty and Joy of Computing		

CSC 112	Introduction to Computing-FORTRAN		
CSC 200			
Select one of the following:		3	
ST 101	Statistics by Example		
ST 311	Introduction to Statistics		
ST 371	Introduction to Probability and Distribution Theory		
Mathematics Elective (p. 2)		3	
Sciences			
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4	
BIO 183	Introductory Biology: Cellular and Molecular Biology	4	
CH 101	Chemistry - A Molecular Science	3	
CH 102	General Chemistry Laboratory	1	
CH 201	Chemistry - A Quantitative Science	3	
CH 202	Quantitative Chemistry Laboratory	1	
PY 131	Conceptual Physics	4	
MEA 101	Geology I: Physical	3	
MEA 110	Geology I Laboratory	1	
MEA 130	Introduction to Weather and Climate	3	
MEA 135	Introduction to Weather and Climate Laboratory	1	
Professional Education			
EMS 375	Methods of Teaching Science I	3	
EMS 476	Student Teaching in Science	4	
ECI 305	Equity and Education	3	

ECI 416	Teaching Exceptional Students in the Mainstreamed Classroom	3
ELP 344	School and Society	3
EMS 476	Student Teaching in Science	4
EMS 470	Methods and Materials for Teaching Mathematics	3
EMS 471	Student Teaching in Mathematics	4
EMS 474	Teaching Mathematics Topics in the Middle Grades	3
ECI 309	Teaching in the Middle Years	3
ECI 306	Middle Years Reading	3
EMS 373 or EMS 480	Instructional Materials in Science Teaching Mathematics with Technology	3
HESM 280	Responding to Emergencies	2
EDP 304	Educational Psychology	3
GEP Courses		
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		6
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		2
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/) (Humanities/Social Sciences/Visual and Performing Arts)		3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		2
GEP U.S. Diversity (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/) (verify requirement)		

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 Elective	2
Total Hours	123

- ¹ A grade of C- or higher is required.
- ² Students should consult their academic advisors to determine which courses fill this requirement.

Mathematics Electives

Code	Title	Hours	Counts towards
BMA 573	Mathematical Modeling of Physical and Biological Processes I	3	
BMA 574	Mathematical Modeling of Physical and Biological Processes II	3	
CSC 416	Introduction to Combinatorics	3	
CSC 427	Introduction to Numerical Analysis I	3	
CSC 428	Introduction to Numerical Analysis II	3	
CSC 565	Graph Theory	3	
CSC 580	Numerical Analysis I	3	
CSC 583	Introduction to Parallel Computing	3	
E 531	Dynamic Systems and Multivariable Control I	3	
ECG 528	Options and Derivatives Pricing	3	
FIM 528		3	
FIM 548	Monte Carlo Methods for Financial Math	3	
FIM 549	Financial Risk Analysis	3	
ISE 505	Linear Programming	3	

LOG 335	Symbolic Logic	3	MA 351	Introduction to Discrete Mathematical Models	3
MA 103	Topics in Contemporary Mathematics	3	MA 401	Applied Differential Equations II	3
MA 103A	Topics in Contemporary Mathematics	3	MA 402	Mathematics of Scientific Computing	3
MA 105	Mathematics of Finance	3	MA 403	Introduction to Modern Algebra	3
MA 114	Introduction to Finite Mathematics with Applications	3	MA 405	Introduction to Linear Algebra	3
MA 116	Introduction to Scientific Programming (Math)	3	MA 407	Introduction to Modern Algebra for Mathematics Majors	3
MA 132	Computational Mathematics for Life and Management Sciences	1	MA 408	Foundations of Euclidean Geometry	3
MA 151	Calculus for Elementary Education I	3	MA 410	Theory of Numbers	3
MA 152	Calculus for Elementary Education II	3	MA 412	Long-Term Actuarial Models	3
MA 205	Elements of Matrix Computations	3	MA 413	Short-Term Actuarial Models	3
MA 225	Foundations of Advanced Mathematics	3	MA 416	Introduction to Combinatorics	3
MA 242	Calculus III	4	MA 421	Introduction to Probability	3
MA 302	Numerical Applications to Differential Equations	1	MA 425	Mathematical Analysis I	3
MA 303	Linear Analysis	3	MA 426	Mathematical Analysis II	3
MA 305	Introductory Linear Algebra and Matrices	3	MA 427	Introduction to Numerical Analysis I	3
MA 315	Mathematics Methods in Atmospheric Sciences	4	MA 428	Introduction to Numerical Analysis II	3
MA 325	Introduction to Applied Mathematics	3	MA 430	Mathematical Models in the Physical Sciences	3
MA 331	Differential Equations for the Life Sciences	3	MA 432	Mathematical Models in Life Sciences	3
MA 335	Symbolic Logic	3	MA 437	Applications of Algebra	3
MA 341	Applied Differential Equations I	3	MA 440	Game Theory	3
			MA 444	Problem Solving Strategies for Competitions	1
			MA 450	Methods of Applied Mathematics I	3

MA 451	Methods of Applied Mathematics II	3	MA 526	Mathematical Analysis II	3
MA 491	Reading in Honors Mathematics	1-6	MA 528		3
MA 493	Special Topics in Mathematics	1-6	MA 531	Dynamic Systems and Multivariable Control I	3
MA 494	Major Paper in Math	1	MA 532	Ordinary Differential Equations I	3
MA 499	Independent Research in Mathematics	1-6	MA 534	Introduction To Partial Differential Equations	3
MA 501	Advanced Mathematics for Engineers and Scientists I	3	MA 537	Nonlinear Dynamics and Chaos	3
MA 502	Advanced Mathematics for Engineers and Scientists II	3	MA 540	Uncertainty Quantification for Physical and Biological Models	3
MA 504	Introduction to Mathematical Programming	3	MA 544	Computer Experiments In Mathematical Probability	3
MA 505	Linear Programming	3	MA 546	Probability and Stochastic Processes I	3
MA 507	Survey of Real Analysis	3	MA 547	Stochastic Calculus for Finance	3
MA 508	Survey of Geometry	3	MA 548	Monte Carlo Methods for Financial Math	3
MA 509	Survey of Abstract Algebra	3	MA 549	Financial Risk Analysis	3
MA 510	Selected Topics In Mathematics For Secondary Teachers	1-6	MA 551	Introduction to Topology	3
MA 511	Introduction to Advanced Calculus	3	MA 555	Introduction to Manifold Theory	3
MA 512	Advanced Calculus	3	MA 561	Set Theory and Foundations Of Mathematics	3
MA 513	Introduction To Complex Variables	3	MA 565	Graph Theory	3
MA 515	Analysis I	3	MA 573	Mathematical Modeling of Physical and Biological Processes I	3
MA 518	Geometry of Curves and Surfaces	3	MA 574	Mathematical Modeling of Physical and Biological Processes II	3
MA 520	Linear Algebra	3	MA 580		3
MA 521	Abstract Algebra I	3	MA 583	Introduction to Parallel Computing	3
MA 522	Computer Algebra	3			
MA 523	Linear Transformations and Matrix Theory	3			
MA 524	Combinatorics I	3			

MA 584	Numerical Solution of Partial Differential Equations--Finite Difference Methods	3
MA 587	Numerical Solution of Partial Differential Equations--Finite Element Method	3
MA 591	Special Topics	1-6
MBA 528		3
MEA 315	Mathematics Methods in Atmospheric Sciences	4
OR 504	Introduction to Mathematical Programming	3
OR 505	Linear Programming	3
OR 531	Dynamic Systems and Multivariable Control I	3
OR 565	Graph Theory	3
ST 412	Long-Term Actuarial Models	3
ST 413	Short-Term Actuarial Models	3
ST 546	Probability and Stochastic Processes I	3

Middle Grades Education (BS): Mathematics and Sciences (13MIDEDBS-13MIDEDMSD)

Semester Sequence

This is a sample.

First Year

Fall Semester		Hours
CH 101	Chemistry - A Molecular Science	3
CH 102	General Chemistry Laboratory	1
MA 141	Calculus I	4
ENG 101	Academic Writing and Research	4
COM 112	Interpersonal Communication	3
Hours		15

Spring Semester

MEA 101	Geology I: Physical	3
MEA 110	Geology I Laboratory	1
CH 201	Chemistry - A Quantitative Science	3
CH 202	Quantitative Chemistry Laboratory	1
MA 241	Calculus II	4

GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)	1
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Hours 13

Second Year

Fall Semester

BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
CSC 200		3
MEA 130	Introduction to Weather and Climate	3
MEA 135	Introduction to Weather and Climate Laboratory	1
GEP Additional Breadth (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)		3
MA 114	Introduction to Finite Mathematics with Applications	3

Hours 17

Spring Semester

BIO 183	Introductory Biology: Cellular and Molecular Biology	4
PY 131	Conceptual Physics	4
EDP 304	Educational Psychology	3
Select one of the following:		3
ST 101	Statistics by Example	
ST 311	Introduction to Statistics	
ST 371	Introduction to Probability and Distribution Theory	

Hours 14

Third Year

Fall Semester

ECI 309	Teaching in the Middle Years	3
ELP 344	School and Society	3
EMS 373 or EMS 480	Instructional Materials in Science or Teaching Mathematics with Technology	3
ECI 305	Equity and Education	3
MA 225	Foundations of Advanced Mathematics	3
HESM 280	Responding to Emergencies	2

Hours 17

Spring Semester

PSY 476	Psychology of Adolescent Development	3
EMS 375	Methods of Teaching Science I	3
ECI 416	Teaching Exceptional Students in the Mainstreamed Classroom	3
Mathematics Elective		3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1
Free Elective		2

Hours 15

Fourth Year

Fall Semester

EMS 470	Methods and Materials for Teaching Mathematics	3
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EMS 471	Student Teaching in Mathematics	4
EMS 474	Teaching Mathematics Topics in the Middle Grades	3
EMS 476	Student Teaching in Science	4
Hours		14
Spring Semester		
ECI 306	Middle Years Reading	3
Select one of the following:		3
HI 321	Scientific Revolution and European Society, 1500-1800	
HI 322	Rise of Modern Science	
HI 341	Technology in History	
PHI 340	Philosophy of Science	
STS 301	Science and Civilization	
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		6
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/)		2-3
Hours		14-15
Total Hours		119-120