

# 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
<b>Communication and English</b>		
COM 112	Interpersonal Communication	3
ENG 101	Academic Writing and Research <sup>1</sup>	4
<b>History &amp; Philosophy of Science</b>		
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	
<b>Mathematics</b>		
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	Introduction to Computers and Their Uses	
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. 1)		3
<b>Sciences</b>		
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	Instructional Materials in Science	3
or EMS 480	Teaching Mathematics with Technology	
HESM 280	Responding to Emergencies	2
EDP 304	Educational Psychology	3

### GEP Courses

GEP Humanities ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )	6
GEP Health and Exercise Studies ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )	2
GEP Additional Breadth ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> ) (Humanities/Social Sciences/Visual and Performing Arts)	3
GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )	2
GEP U.S. Diversity ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-us-diversity/</a> ) (verify requirement)	
GEP Global Knowledge ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/</a> ) (verify requirement)	
Foreign Language Proficiency ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/foreign-language-proficiency/</a> ) (verify requirement)	

<b>Free Elective</b>	<b>2</b>
<b>Total Hours</b>	<b>123</b>

<sup>1</sup> A grade of C- or higher is required.

<sup>2</sup> Students should consult their academic advisors to determine which courses fill this requirement.

## Mathematics Electives

Code	Title	Hours
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	MA 437	Applications of Algebra	3
CSC 427	Introduction to Numerical Analysis I	3	MA 440	Game Theory	3
CSC 428	Introduction to Numerical Analysis II	3	MA 444	Problem Solving Strategies for Competitions	1
CSC 565	Graph Theory	3	MA 450	Methods of Applied Mathematics I	3
CSC 580	Numerical Analysis I	3	MA 451	Methods of Applied Mathematics II	3
CSC 583	Introduction to Parallel Computing	3	MA 491	Reading in Honors Mathematics	1-6
E 531	Dynamic Systems and Multivariable Control I	3	MA 493	Special Topics in Mathematics	1-6
ECG 528	Options and Derivatives Pricing	3	MA 494	Major Paper in Math	1
FIM 528	Options and Derivatives Pricing	3	MA 499	Independent Research in Mathematics	1-6
FIM 548	Monte Carlo Methods for Financial Math	3	MA 501	Advanced Mathematics for Engineers and Scientists I	3
FIM 549	Financial Risk Analysis	3	MA 502	Advanced Mathematics for Engineers and Scientists II	3
ISE 505	Linear Programming	3	MA 504	Introduction to Mathematical Programming	3
LOG 335	Symbolic Logic	3	MA 505	Linear Programming	3
MA 103	Topics in Contemporary Mathematics	3	MA 507	Survey of Real Analysis	3
MA 103A	Topics in Contemporary Mathematics	3	MA 508	Geometry For Secondary Teachers	3
MA 105	Mathematics of Finance	3	MA 509	Survey of Abstract Algebra	3
MA 114	Introduction to Finite Mathematics with Applications	3	MA 510	Selected Topics In Mathematics For Secondary Teachers	1-6
MA 116	Introduction to Scientific Programming (Math)	3	MA 511	Advanced Calculus I	3
MA 132	Computational Mathematics for Life and Management Sciences	1	MA 512	Advanced Calculus II	3
MA 151	Calculus for Elementary Education I	3	MA 513	Introduction To Complex Variables	3
MA 152	Calculus for Elementary Education II	3	MA 515	Analysis I	3
MA 205	Elements of Matrix Computations	3	MA 518	Geometry of Curves and Surfaces	3
MA 225	Foundations of Advanced Mathematics	3	MA 520	Linear Algebra	3
MA 242	Calculus III	4	MA 521	Abstract Algebra I	3
MA 302	Numerical Applications to Differential Equations	1	MA 522	Computer Algebra	3
MA 303	Linear Analysis	3	MA 523	Linear Transformations and Matrix Theory	3
MA 305	Introductory Linear Algebra and Matrices	3	MA 524	Combinatorics I	3
MA 315	Mathematics Methods in Atmospheric Sciences	4	MA 526	Algebraic Geometry	3
MA 325	Introduction to Applied Mathematics	3	MA 528	Options and Derivatives Pricing	3
MA 331	Differential Equations for the Life Sciences	3	MA 531	Dynamic Systems and Multivariable Control I	3
MA 335	Symbolic Logic	3	MA 532	Ordinary Differential Equations I	3
MA 341	Applied Differential Equations I	3	MA 534	Introduction To Partial Differential Equations	3
MA 351	Introduction to Discrete Mathematical Models	3	MA 537	Nonlinear Dynamics and Chaos	3
MA 401	Applied Differential Equations II	3	MA 540	Uncertainty Quantification for Physical and Biological Models	3
MA 402	Mathematics of Scientific Computing	3	MA 544	Computer Experiments In Mathematical Probability	3
MA 403	Introduction to Modern Algebra	3	MA 546	Probability and Stochastic Processes I	3
MA 405	Introduction to Linear Algebra	3	MA 547	Financial Mathematics	3
MA 407	Introduction to Modern Algebra for Mathematics Majors	3	MA 548	Monte Carlo Methods for Financial Math	3
MA 408	Foundations of Euclidean Geometry	3	MA 549	Financial Risk Analysis	3
MA 410	Theory of Numbers	3	MA 551	Introduction to Topology	3
MA 412	Long-Term Actuarial Models	3	MA 555	Introduction to Manifold Theory	3
MA 413	Short-Term Actuarial Models	3	MA 561	Set Theory and Foundations Of Mathematics	3
MA 416	Introduction to Combinatorics	3	MA 565	Graph Theory	3
MA 421	Introduction to Probability	3	MA 573	Mathematical Modeling of Physical and Biological Processes I	3
MA 425	Mathematical Analysis I	3	MA 574	Mathematical Modeling of Physical and Biological Processes II	3
MA 426	Mathematical Analysis II	3	MA 580	Numerical Analysis I	3
MA 427	Introduction to Numerical Analysis I	3	MA 583	Introduction to Parallel Computing	3
MA 428	Introduction to Numerical Analysis II	3			
MA 430	Mathematical Models in the Physical Sciences	3			
MA 432	Mathematical Models in Life and Social Sciences	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	Options and Derivatives Pricing	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.

Course	Title	Hours
<b>First Year</b>		
<b>Fall Semester</b>		
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
<b>Spring Semester</b>		
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 ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )		1
Hours		13
<b>Second Year</b>		
<b>Fall Semester</b>		
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity	4
CSC 200	Introduction to Computers and Their Uses	3
MEA 130	Introduction to Weather and Climate	3
MEA 135	Introduction to Weather and Climate Laboratory	1
GEP Additional Breadth ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )		3
MA 114	Introduction to Finite Mathematics with Applications	3
Hours		17

<b>Spring Semester</b>		
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

<b>Third Year</b>		
<b>Fall Semester</b>		
ECI 309	Teaching in the Middle Years	3
ELP 344	School and Society	3
EMS 373	Instructional Materials in Science	3
or EMS 480	or Teaching Mathematics with Technology	
ECI 305	Equity and Education	3
MA 225	Foundations of Advanced Mathematics	3
HESM 280	Responding to Emergencies	2
Hours		17

<b>Spring Semester</b>		
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 ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/</a> )		1
Free Elective		2
Hours		15

<b>Fourth Year</b>		
<b>Fall Semester</b>		
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
EMS 476	Student Teaching in Science	4
Hours		14

<b>Spring Semester</b>		
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 ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/</a> )		6

GEP Interdisciplinary Perspectives ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/</a> )	2-3
Hours	14-15
Total Hours	119-120