

# Science Education (BS): Middle Grades Science Concentration

The Science Education: Middle Grades Science concentration (BS) degree is one of five undergraduate degree options in the Science Education program in the Department of STEM Education.

This degree program prepares teacher-leaders to have a deep understanding of the pedagogical strategies to teach science in the middle grades. Students complete courses focused on the sciences and science education, obtain relevant pedagogical experiences while immersed in rich field experiences in science classrooms, and emphasize teaching science with technology. Upon successful completion of the program, students are recommended for an initial North Carolina teaching license in grades 6-8. They will be able to seek employment opportunities in education and make a positive difference in their communities.

The goals and objectives of the BS degree in Science Education are:

- To enable and ensure that each prospective teacher enriches his/her life through a comprehensive university education
- To develop the professional qualities and academic background needed to teach science to all student levels in the grade for which the teacher is certified
- To develop a general knowledge foundation upon which specialized professional knowledge is built, and upon which a well-rounded university education is the base

Coursework for the degree is divided into four types of knowledge:

- General pedagogical knowledge — the nature of learners and general principles of instruction
- Content-area knowledge — knowledge of the natural sciences
- Pedagogical content knowledge — principles of curriculum, instruction and assessment directly related to the natural sciences
- Context knowledge — understanding the culture of the school, community and society in which educational institutions exist and function

Students in this program also have the opportunity to participate in:

- Undergraduate research
- The student chapter of the NC Science Teachers Association (NCSTA), and other high impact experiences such as Passport to Success, SAY Village, and study abroad
- Outreach and tutoring in local schools

For more information about this program, visit our website (<https://ced.ncsu.edu/programs/science-education-middle-school-or-secondary-bachelor/>).

## Contact

Department of STEM Education

North Carolina State University  
208 Poe Hall, 2310 Stinson Drive  
Raleigh, NC 27695

**Matt Reynolds, Ph.D.**  
Assistant Teaching Professor

Undergraduate and MAT Program Coordinator for Science Education

NC State University

Campus Box 7801

Poe Hall 326P

Raleigh, NC 27695

[ced.ncsu.edu \(http://ced.ncsu.edu/\)](http://ced.ncsu.edu/)

## Plan Requirements

Code	Title	Hours	Counts towards
<b>Orientation</b>			
ED 100	Intro to Education 1	2	
	or ED 150/151 Students Advocating for Youth I		
<b>Communication/Advanced Writing</b>			<b>3</b>
Choose from:			
COM 110	Public Speaking		
COM 112	Interpersonal Communication		
COM 211	Argumentation and Advocacy		
COM 289	Science Communication and Public Engagement		
ENG 232	Literature and Medicine		
ENG 425	Analysis of Scientific and Technical Writing		
<b>Mathematics</b>			
MA 121	Elements of Calculus	3	
	or MA 131 Calculus for Life and Management Sciences A		
MA 231	Calculus for Life and Management Sciences B	3	
	or ST 311 Introduction to Statistics		
<b>Life Sciences</b>			
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity <sup>2</sup>	4	

BIO 183	Introductory Biology: Cellular and Molecular Biology <sup>2</sup>	4
GN 301 or GN 311	Genetics in Human Affairs <sup>2</sup> Principles of Genetics	3
Plant Biology Elective <sup>2</sup>	Choose from:	3
PB 200	Plant Life	
PB 205	Our Green World	
PB 208	Agricultural Biotechnology: Issues and Implications	
PB 213	Plants and Civilization	
PB 220	Local Flora	
PB 250	Plant Biology	
Food & Nutrition Elective <sup>2</sup>	Choose from:	3
ANS 225	Principles of Animal Nutrition	
ANS 230	Animal Nutrition	
NTR 301	Introduction to Human Nutrition	
FS 201	Introduction to Food Science	
<b>Physical Sciences</b>		
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory <sup>2</sup>	4
PY 131 or PY 211	Conceptual Physics <sup>2</sup> College Physics I	4
<b>Earth and Space Sciences</b>		
MEA 101 & MEA 110	Geology I: Physical and Geology I Laboratory <sup>2</sup>	4
MEA 130 & MEA 135	Introduction to Weather and Climate and Introduction to Weather and Climate Laboratory <sup>2</sup>	4
PY 123 or PY 124 or MEA 240	Stellar and Galactic Astronomy <sup>2</sup> Solar System Astronomy The Planets of Our Solar System	3
<b>Advised Science Electives</b>		<b>9</b>
<b>(p. 3) <sup>2</sup></b>		

<b>Science Education</b>		
EMS 205	Introduction to Teaching Science <sup>3</sup>	2
EMS 373	Instructional Materials in Science <sup>1</sup>	3
EMS 375	Methods of Teaching Science I <sup>3</sup>	3
EMS 475	Methods of Teaching Science II <sup>3</sup>	3
EMS 476	Student Teaching in Science <sup>3</sup>	10
EMS 495	Senior Seminar in Mathematics and Science Education <sup>1</sup>	2
<b>General Education and Psychology</b>		
ED 204	Introduction to Teaching in Today's Schools <sup>1</sup>	2
ED 311 & ED 312	Classroom Assessment Principles and Practices and Classroom Assessment Principles and Practices Professional Learning Lab <sup>1</sup>	3
EDP 304	Educational Psychology <sup>1</sup>	3
ELP 344	School and Society <sup>1</sup>	3
ECI 306	Middle Years Reading <sup>1</sup>	3
ECI 309	Teaching in the Middle Years <sup>1</sup>	3
ECI 416	Teaching Exceptional Students in the Mainstreamed Classroom <sup>1</sup>	3
<b>History and Philosophy of Science Education Elective</b>		<b>3</b>
<b>(p. 3)</b>		
<b>Free Electives</b>		<b>0-6</b>
<b>GEP Courses</b>		
ENG 101	Academic Writing and Research	4

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> ) (verify requirement)	0-6
GEP Social Sciences ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/</a> ) (verify requirement)	0-3
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> )	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> ) (verify requirement)	
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>Total Hours</b>	<b>120</b>

<sup>1</sup> A grade of C or higher is required.  
<sup>2</sup> A grade of C or higher is required for science content courses, up to two courses with a grade below a C is permitted.  
<sup>3</sup> A grade of B- or higher is required.  
<sup>4</sup> Admission to the Professional Semester is required.

### Advised Science Electives

Code	Title	Hours	Counts towards
ANY 200+	Level AEC, BIO, BCH, BSC, CH, ENT, ES, MB, MEA, PB, PY, ZO		
ANY GEP Natural Sciences	( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-natural-sciences/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-natural-sciences/</a> ) course (except BIO 105/106, CH 111)		
ANS 150	Introduction to Animal Science		

ANS 205	Physiology of Domestic Animals
ANS 206	Anatomy of Domestic Animals Lab
ANS 220	Reproductive Physiology
ANS 221	Reproductive Physiology Lab
BIO 165	Introduction to Environmental Research
CS 211	Plant Genetics
ES 100	Introduction to Environmental Sciences
ES 111	Applications of Environmental Sciences
ES 150	Water and the Environment
FOR 252	Introduction to Forest Science
FOR 260	Forest Ecology
FOR 261	Forest Communities
FOR 264	Forest Wildlife
FOR 339	Dendrology
FW 353	Wildlife Management
FW 404	Wildlife Habitat Management
FW 405	Tropical Wildlife Ecology
FW 444	Mammalogy
FW 453	Principles of Wildlife Science
FW 460	International Wildlife Management and Conservation
NR 303	Humans and the Environment
NR 406	Conservation of Biological Diversity

### History & Philosophy of Science Education Elective

Code	Title	Hours	Counts towards
Choose from:			
ECI 305	Equity and Education		

HI 321	Scientific Revolution and European Society, 1500-1800	
HI 322	Rise of Modern Science	
HI 323	Science, American Style	
HI 341	Technology in History	
HI 481	History of the Life Sciences	3
HI 482	Darwinism in Science and Society	
HI 483	Science and Religion in European History	
HI 484	Science in European Culture	
HI 485	History of American Technology	
PHI 340	Philosophy of Science	
PHI 440	The Scientific Method	
STS 210	Women and Gender in Science and Technology	
STS 214	Introduction to Science, Technology, and Society	
STS 301	Science and Civilization	
STS 302	Contemporary Science, Technology and Human Values	
STS 471	Darwinism and Christianity	
STS 490	Issues in Science, Technology, and Society	

## Semester Sequence

This is a sample.

### First Year

Fall Semester		Hours
ED 100 or ED 150/151	Intro to Education <sup>1</sup> or Students Advocating for Youth I	2
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity <sup>1</sup>	4

MA 121 or MA 131	Elements of Calculus or Calculus for Life and Management Sciences A	3
ENG 101	Academic Writing and Research	4
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> )		3
<b>Hours</b>		<b>16</b>
<b>Spring Semester</b>		
BIO 183	Introductory Biology: Cellular and Molecular Biology <sup>2</sup>	4
MA 231 or ST 311	Calculus for Life and Management Sciences B or Introduction to Statistics	3
Plant Biology Elective		3
Choose from:		
PB 200	Plant Life	
PB 205	Our Green World	
PB 208	Agricultural Biotechnology: Issues and Implications	
PB 213	Plants and Civilization	
PB 220	Local Flora	
PB 250	Plant Biology	
Free Elective		3
Communication/Advanced Writing Req.		3
Choose from:		
COM 110	Public Speaking	
COM 112	Interpersonal Communication	
COM 211	Argumentation and Advocacy	
COM 289	Science Communication and Public Engagement	
ENG 232	Literature and Medicine	
<b>Hours</b>		<b>16</b>
<b>Second Year</b>		
<b>Fall Semester</b>		
MEA 101 & MEA 110	Geology I: Physical and Geology I Laboratory <sup>2</sup>	4
PY 123 or PY 124 or MEA 240	Stellar and Galactic Astronomy <sup>2</sup> or Solar System Astronomy or The Planets of Our Solar System	3
PY 131 or PY 211	Conceptual Physics <sup>2</sup> or College Physics I	4
Food & Nutrition Elective <sup>2</sup>		3
Choose from:		
ANS 225	Principles of Animal Nutrition	
ANS 230	Animal Nutrition	
NTR 301	Introduction to Human Nutrition	
FS 201	Introduction to Food Science	
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
<b>Hours</b>		<b>15</b>
<b>Spring Semester</b>		
EMS 205	Introduction to Teaching Science <sup>3</sup>	2

ED 204	Introduction to Teaching in Today's Schools <sup>2</sup>	2
EDP 304	Educational Psychology <sup>2</sup>	3
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory <sup>2</sup>	4
MEA 130 & MEA 135	Introduction to Weather and Climate and Introduction to Weather and Climate Laboratory	4
<b>Hours</b>		<b>15</b>
<b>Third Year</b>		
<b>Fall Semester</b>		
EMS 373	Instructional Materials in Science <sup>1</sup>	3
ECI 309	Teaching in the Middle Years <sup>1</sup>	3
ELP 344	School and Society <sup>1</sup>	3
History and Philosophy of Science Education Elective (p. 3)		3
Advised Science Elective (p. 3) <sup>2</sup>		3
<b>Hours</b>		<b>15</b>
<b>Spring Semester</b>		
EMS 375	Methods of Teaching Science I <sup>3</sup>	3
ED 311 & ED 312	Classroom Assessment Principles and Practices and Classroom Assessment Principles and Practices Professional Learning Lab <sup>1</sup>	3
ECI 306	Middle Years Reading <sup>1</sup>	3
Advised Science Elective (p. 3) <sup>2</sup>		3
GEP Additional Breadth ( <a href="http://catalog.ncsu.edu/undergraduate/gep-category-requirements/">http://catalog.ncsu.edu/undergraduate/gep-category-requirements/</a> )		3
<b>Hours</b>		<b>15</b>
<b>Fourth Year</b>		
<b>Fall Semester</b>		
EMS 475	Methods of Teaching Science II <sup>3</sup>	3
ECI 416	Teaching Exceptional Students in the Mainstreamed Classroom <sup>1</sup>	3
GN 301	Genetics in Human Affairs <sup>2</sup>	3
Advised Science Elective (p. 3) <sup>2</sup>		3
Free Elective		4
<b>Hours</b>		<b>16</b>
<b>Spring Semester</b>		
EMS 476	Student Teaching in Science <sup>3, 4</sup>	10
EMS 495	Senior Seminar in Mathematics and Science Education <sup>1, 4</sup>	2
<b>Hours</b>		<b>12</b>
<b>Total Hours</b>		<b>120</b>

<sup>1</sup> A grade of C (2.0) or better is required for core content courses, up to two courses with a grade below a C is permitted.

<sup>2</sup> A grade of C or higher is required.

<sup>3</sup> B- or better is required