

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

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Plan Requirements

Code	Title	Hours
Orientation		
ED 100	Intro to Education ¹	2
	or ED 150/151 Students Advocating for Youth I	
Communication/Advanced Writing		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	
ENG 425	Analysis of Scientific and Technical Writing	
Mathematics		
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	
Life Sciences		
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity ²	4
BIO 183	Introductory Biology: Cellular and Molecular Biology ²	4
GN 301	Genetics in Human Affairs ²	3
	or GN 311 Principles of Genetics	
Plant Biology Elective ²		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	
Food & Nutrition Elective ²		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	
Physical Sciences		
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory ²	4
PY 131 or PY 211	Conceptual Physics ² College Physics I	4
Earth and Space Sciences		
MEA 101 & MEA 110	Geology I: Physical and Geology I Laboratory ²	4
MEA 130 & MEA 135	Introduction to Weather and Climate and Introduction to Weather and Climate Laboratory ²	4
PY 123 or PY 124 or MEA 240	Stellar and Galactic Astronomy ² Solar System Astronomy The Planets of Our Solar System	3
Advised Science Electives (p. 2) ²		9
Science Education		
EMS 205	Introduction to Teaching Science ³	2
EMS 373	Instructional Materials in Science ¹	3
EMS 375	Methods of Teaching Science I ³	3
EMS 475	Methods of Teaching Science II ³	3
EMS 476	Student Teaching in Science ³	10
EMS 495	Senior Seminar in Mathematics and Science Education ¹	2
General Education and Psychology		
ED 204	Introduction to Teaching in Today's Schools ¹	2
ED 311 & ED 312	Classroom Assessment Principles and Practices and Classroom Assessment Principles and Practices Professional Learning Lab ¹	3
EDP 304	Educational Psychology ¹	3
ELP 344	School and Society ¹	3
ECI 306	Middle Years Reading ¹	3
ECI 309	Teaching in the Middle Years ¹	3
ECI 416	Teaching Students with Disabilities in Inclusive Classrooms ¹	3
History and Philosophy of Science Education Elective (p. 2)		3
Free Electives		0-6
GEP Courses		
ENG 101	Academic Writing and Research	4
GEP Humanities (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/) (verify requirement)		0-6
GEP Social Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-social-sciences/) (verify requirement)		0-3
GEP Health and Exercise Studies (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		2
GEP Elective (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)		3
GEP Interdisciplinary Perspectives (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-interdisciplinary-perspectives/) (verify requirement)		
GEP Global Knowledge (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-global-knowledge/) (verify requirement)		

GEP Foundations of American Democracy (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-fad/>) (verify requirement)

World Language Proficiency (<http://catalog.ncsu.edu/undergraduate/gep-category-requirements/world-language-proficiency/>) (verify requirement)

Total Hours **120**

¹ A grade of C or higher is required.

² A grade of C or higher is required for science content courses, up to two courses with a grade below a C is permitted.

³ A grade of B- or higher is required.

⁴ Admission to the Professional Semester is required.

Advised Science Electives

Code	Title	Hours
ANY 200+ Level AEC, BIO, BCH, BSC, CH, ENT, ES, MB, MEA, PB, PY, ZO		
ANY GEP Natural Sciences (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-natural-sciences/) course (except BIO 105/106, CH 111)		
ANS 150	Introduction to Animal Science	3
ANS 205	Physiology of Domestic Animals	3
ANS 206	Anatomy of Domestic Animals Lab	1
ANS 220	Reproductive Physiology	3
ANS 221	Reproductive Physiology Lab	1
BIO 165		
CS 211	Plant Genetics	3
ES 100	Introduction to Environmental Sciences	3
ES 111	Applications of Environmental Sciences	1
ES 150	Water and the Environment	3
FOR 252	Introduction to Forest Science	3
FOR 260	Forest Ecology	4
FOR 261	Forest Communities	2
FOR 264	Forest Wildlife	1
FOR 339		
FW 353	Wildlife Management	3
FW 404	Wildlife Habitat Management	3
FW 405	Tropical Wildlife Ecology	3
FW 444	Mammalogy	3
FW 453	Principles of Wildlife Science	4
FW 460	International Wildlife Management and Conservation	3
NR 303	Humans and the Environment	3
NR 406	Conservation of Biological Diversity	3

History & Philosophy of Science Education Elective

Code	Title	Hours
Choose from:		
ECI 305	Equity and Education	3
HI 321	Scientific Revolution and European Society, 1500-1800	3
HI 322	Rise of Modern Science	3

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

Semester Sequence

This is a sample.

First Year

Fall Semester		Hours
ED 100 or ED 150/151	Intro to Education ¹ or Students Advocating for Youth I	2
BIO 181	Introductory Biology: Ecology, Evolution, and Biodiversity ¹	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 (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-humanities/)		3

Hours 16

Spring Semester

BIO 183	Introductory Biology: Cellular and Molecular Biology ²	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	
Hours		16

Second Year

Fall Semester		
MEA 101 & MEA 110	Geology I: Physical and Geology I Laboratory ²	4
PY 123 or PY 124 or MEA 240	Stellar and Galactic Astronomy ² or Solar System Astronomy or The Planets of Our Solar System	3
PY 131 or PY 211	Conceptual Physics ² or College Physics I	4
Food & Nutrition Elective ²		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 (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/gep-health-exercise-studies/)		1

Hours 15

Spring Semester

EMS 205	Introduction to Teaching Science ³	2
ED 204	Introduction to Teaching in Today's Schools ²	2
EDP 304	Educational Psychology ²	3
CH 101 & CH 102	Chemistry - A Molecular Science and General Chemistry Laboratory ²	4
MEA 130 & MEA 135	Introduction to Weather and Climate and Introduction to Weather and Climate Laboratory	4

Hours 15

Third Year

Fall Semester		
EMS 373	Instructional Materials in Science ¹	3
ECI 309	Teaching in the Middle Years ¹	3
ELP 344	School and Society ¹	3
History and Philosophy of Science Education Elective (p. 2)		3
Advised Science Elective (p. 2) ²		3

Hours 15

Spring Semester

EMS 375	Methods of Teaching Science I ³	3
ED 311 & ED 312	Classroom Assessment Principles and Practices and Classroom Assessment Principles and Practices Professional Learning Lab ¹	3
ECI 306	Middle Years Reading ¹	3
Advised Science Elective (p. 2) ²		3
GEP Elective (http://catalog.ncsu.edu/undergraduate/gep-category-requirements/)		3

Hours 15

Fourth Year**Fall Semester**

EMS 475	Methods of Teaching Science II ³	3
ECI 416	Teaching Students with Disabilities in Inclusive Classrooms ¹	3
GN 301	Genetics in Human Affairs ²	3
Advised Science Elective (p. 2) ²		3
Free Elective		4
Hours		16

Spring Semester

EMS 476	Student Teaching in Science ^{3, 4}	10
EMS 495	Senior Seminar in Mathematics and Science Education ^{1, 4}	2
Hours		12
Total Hours		120

¹ 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.

² A grade of C or higher is required.

³ B- or better is required

Career Opportunities

Career Titles

- Atmospheric, Earth, Marine, and Space Sciences Teachers, Postsecondary
- Biology Professor
- Chemistry Professor
- Elementary School Teacher
- Environmental Science Professor
- High School Teacher
- Middle School Teacher
- Physics Professor

Learn More About Careers

NCcareers.org (<https://nccareers.org/>)

Explore North Carolina's central online resource for students, parents, educators, job seekers and career counselors looking for high quality job and career information.

Occupational Outlook Handbook (<https://www.bls.gov/ooh/>)

Browse the Occupational Outlook Handbook published by the Bureau of Labor Statistics to view state and area employment and wage statistics. You can also identify and compare similar occupations based on your interests.

Career One Stop Videos (<https://www.careeronestop.org/>)

View videos that provide career details and information on wages, employment trends, skills needed, and more for any occupation. Sponsored by the U.S. Department of Labor.

Focus 2 Career Assessment (<https://careers.dasa.ncsu.edu/explore-careers/career-assessments/>) (NC State student email address required)

This career, major and education planning system is available to current NC State students to learn about how your values, interests, competencies, and personality fit into the NC State majors and your future career. An NC State email address is required to create an

account. Make an appointment with your career counselor (<https://careers.dasa.ncsu.edu/about/hours-appointments/>) to discuss the results.

Focus 2 Apply Assessment (<https://www.focus2career.com/Portal/Register.cfm?SID=1929>) (Available to prospective students)

A career assessment tool designed to support prospective students in exploring and choosing the right major and career path based on your unique personality, interests, skills and values. Get started with Focus 2 Apply and see how it can guide your journey at NC State.