

Integrated Science Education - Bachelor of Science in Education

The Bachelor of Science in Education degree with an Adolescent/Young Adult (AYA) Integrated Science major provides graduates with the opportunity to teach in 7-12th grade schools in all the major science disciplines (biology, chemistry, earth science and physics) while concentrating in one science area.

Candidates are exposed to state-of-the-art teaching methods and science/math courses as well as teaching in diverse settings, taking English Language Learner (ELL) methods, experiencing elective Science, Technology, Engineering and Mathematics (STEM) Education methods and engaging in real world scientific research as part of their program.

Since National Science Teachers Association (NSTA) requires candidates to specialize in one science discipline area and have a broad understanding of the other three disciplines, this increases the total number of credit hours required for this degree. The curriculum was streamlined as much as possible in order to minimize the number of required credit hours (124-131 credit hours for the Integrated Science degree will be required).

Part of the Miami Plan (liberal education requirements) is to engage in a 9-credit hour thematic sequence outside the student's field of study. It is an essential part of the liberal education students receive while studying at Miami University. A thematic sequence is a series of three courses that build developmentally towards a more comprehensive study of a topic.

Within this proposal, the recommended thematic sequence falls within the four science disciplines of study. In addition, there is a STEM thematic sequence of courses that could be taken as electives. It prepares Miami science education majors to infuse STEM into their future schools. Other Miami majors enroll in this thematic sequence (e.g. finance, psychology, language arts, software engineering, computer science) so these courses are not methods courses but focus on issues, history, and societal topics surrounding STEM.

Other possible thematic sequences are built into these science programs, e.g. BIO 2: Molecular Processes: From Cells to Whole Plants, and are available to the students enrolled in the Integrated Science major.

Further, the Miami plan (liberal education experiences) courses will be advised to be taken throughout the four years at Miami University and not just at the end (as seen in the plans of study). The majority of the science education majors enter Miami University with an abundant number of Advanced Placement credit hours thus enabling them more flexibility in scheduling their courses. The Advanced Writing course (a Miami plan course) can be taken later in the program and meet two requirements (science content and advanced writing) thus easing the credit hour requirements of this degree if so chosen by the students.

The current science education programs have similar required credit hours and the students have been able to graduate in four years. We

don't foresee students having difficulty in managing this degree in a four-year period of time.

Program Requirements

Requirements for all Integrated Science Education Specialties

Code	Title	Credit Hours
Required Pre/Co-requisites		
BIO 115	Biological Concepts: Ecology, Evolution, Genetics, and Diversity	4
BIO 116	Biological Concepts: Structure, Function, Cellular, and Molecular Biology	4
CHM 141 & CHM 144	College Chemistry and College Chemistry Laboratory	5
CHM 142 & CHM 145	College Chemistry and College Chemistry Laboratory	5
GLG 111 & GLG 115L	The Dynamic Earth and Understanding the Earth	4
GLG 307	Water and Society	3
IES 275	Principles of Environmental Science	3
PHY 111	Astronomy and Space Physics	3
STA 261	Statistics	4
	Science Research - BIO, CHM, GLG, or PHY 277R, 377R, or 477R	3-6
Teacher Education Core		
EDL 204	Sociocultural Studies in Education	3
EDP 201	Human Development and Learning in Social and Educational Contexts	3
EDP 256	Psychology of the Exceptional Learner	3
EDT 190	Introduction to Education	3
Integrated Science Education Required Courses		
Fall field block courses - take all three concurrently		
EDP 301A	Assessment and Evaluation in Educational Settings	3
EDT 323	Teaching English Language Learners in PK-12: Instructional Theories & Practices	3
EDT 431	Adolescent Science Methods I	3
Spring field block courses - take all three concurrently		
EDT 421A	Classroom Cultures, Community, and Climate	3
EDT 432	Adolescent Science Methods II	3
EDT 446A	Integrating Literacy Across the Content Areas	3
Supervised teaching semester		
EDT 419A	Teaching Internship- Adolescent	15
Total Credit Hours		83-86

Integrated Science Education Specialties**Biology**

Code	Title	Credit Hours
Required Courses		
BIO 161	Principles of Human Physiology	4
BIO 203	Introduction to Cell Biology	3
BIO 206	Evolutionary Biology	3
BIO 209	Fundamentals of Ecology	3
BIO 342	Genetics	3
CHM 231	Fundamentals of Organic Chemistry	4
EDT 415	Inquiry Into Life Science	3
PHY 161	Physics for the Life Sciences with Laboratory I	4
PHY 162	Physics for the Life Sciences with Laboratory II	4
Total Credit Hours		31

Chemistry

Code	Title	Credit Hours
Required Courses		
BIO 206	Evolutionary Biology	3
CHM 241 & CHM 244	Organic Chemistry and Organic Chemistry Laboratory	5
CHM 242 & CHM 245	Organic Chemistry and Organic Chemistry Laboratory	5
CHM 375	Analytical Chemistry for Majors	3
CHM 415	Misconceptions in Chemistry	3
CHM 491	Chemistry in Societal Issues	3
EDT 415	Inquiry Into Life Science	3
PHY 161	Physics for the Life Sciences with Laboratory I	4
PHY 162	Physics for the Life Sciences with Laboratory II	4
Total Credit Hours		33

Earth Science

Code	Title	Credit Hours
Required Courses		
BIO 161	Principles of Human Physiology	4
CHM 231	Fundamentals of Organic Chemistry	4
EDT 415	Inquiry Into Life Science	3
GLG 201	Mineralogy	4
GLG 204	Survival on an Evolving Planet	4
GLG 211	Chemistry of Earth Systems	3
GLG 301	Sedimentology and Stratigraphy	4
PHY 161	Physics for the Life Sciences with Laboratory I	4
PHY 162	Physics for the Life Sciences with Laboratory II	4
GLG Elective		3
Total Credit Hours		37

Physics

Code	Title	Credit Hours
Required Courses		
BIO 206	Evolutionary Biology	3
MTH 151	Calculus I	5
MTH 251	Calculus II	4
MTH 252	Calculus III	4
PHY 191	General Physics with Laboratory I	5
PHY 192	General Physics with Laboratory II	5
PHY 215	Physics by Inquiry	3
or EDT 415	Inquiry Into Life Science	
PHY 281	Contemporary Physics I: Foundations	3
Total Credit Hours		32