

Department of Geological, Environmental, and Marine Sciences (GEMS)

Introduction to the Integrated Sciences and Math (ISM) Major

The Bachelor of Arts Degree in Integrated Sciences and Math (ISM) is designed primarily as a second major for Elementary Education majors interested in teaching science or math at the middle school level. The program is tailored to meet the New Jersey certification requirements for middle school science or math teachers and to facilitate the timely completion of the dual graduation requirements for education majors in the College of Education and the College of Liberal Arts and Sciences (CLAS). This program is **not** designed to prepare students for further study in science or math disciplines at the graduate or professional level, or to teach science or math at the high school level. Although placed in GEMS for administrative purposes, the ISM major is truly interdisciplinary in nature, both in its curriculum and in its participating faculty.

PLEASE NOTE: Some of the requirements for the ISM major may be satisfied by taking similar coursework through a Rider Approved Study Abroad Program. Contact your ISM academic advisor, the GEMS department chair, and/or Rider's Center for International Education (CIE) for further information.

Program Faculty Advisors

<u>Advisor</u>	<u>Extension</u>	<u>Room #</u>	<u>E-mail*</u>
Dr. Kathleen Browne , GEMS <i>GEMS Department Chair</i>	5408	SCI324C	browne
Dr. Danielle Jacobs , Dept. of Chemistry and Physics <i>Physical Sciences Concentration CLAS Advisor</i>	5667	SCI336F	djacobs
Dr. Peter Hester , Dept. of Teacher Education <i>Math and Science Concentrations Education Advisor</i>	5694	MEM102F	phester
Dr. Jonathan Karp , Dept. of Biology <i>Life Sciences Concentration CLAS Advisor</i>	5658	SCI339C	jkarp
Dr. Anthony Bahri	5431	SCI337C	bahri
Dr. Andrew Markoe	5432	SCI337D	markoe
Dr. Charles Schwartz , Dept. of Mathematics <i>Mathematics Concentration CLAS Advisors</i>	5091	SCI337E	schwartz
Dr. Reed Schwimmer , GEMS <i>Earth Sciences Concentration CLAS Advisor</i>	5346	SCI323E	rschwimmer

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REQUIREMENTS FOR THE INTEGRATED SCIENCES AND MATH MAJOR

1. REQUIRED COURSES FOR ALL ISM MAJORS

A. ISM courses (7 credits)		Credits
_____	ISM-100 Introduction to the Integrated Sciences and Math	4
_____	ISM-410 Seminar in the Integrated Sciences and Math	3
B. Inquiry-based science courses (8 credits)		
<u>Two</u> courses from different categories (A, B, or C), neither from area of concentration.		
A. <u>Life Sciences</u>		
_____	BIO-110 Life Science: Inquiry Approach	4
_____	BIO-250 Field Natural History	4
B. <u>Earth Sciences</u>		
_____	GEO-100/102 Earth Systems Science and Earth Materials Lab	3/1
_____	MAR-120/121 Oceanography and Inquiry-based Lab	3/1
C. <u>Physical Sciences</u>		
_____	CHE-118 Exploration of Chemical Principles	4
_____	PHY-105 Matter, Forces and Energy	4
C. Math courses (15-16 credits)		
<u>Required:</u>		
_____	MTH-210 Calculus I	4
_____	MTH-230 Discrete Mathematics	4
<u>Two of the following:</u>		
_____	MTH-102 Elements of Finite Mathematics, inquiry section	3
_____	MTH-105 Algebra and Trigonometry	4
_____	MTH-211 Calculus II	4
_____	MTH-212 Calculus III	4

2. REQUIRED COURSES FOR CONCENTRATION AREAS

A. Earth Sciences (20 credits)		
<u>Required:</u>		
_____	GEO-100/102 Earth Systems Science and Earth Materials Lab	3/1
_____	MAR-120/121 Oceanography and Inquiry-based Lab	3/1
<u>Three of the following:</u>		
_____	ENV-200 Statistical and Computer Applications in the Natural Sci.	4
_____	ENV-220 Weather and Climate Change	3
_____	GEO-407 Hydrology and Water Resources	4
_____	MAR-210 Marine Life Through Time	4
_____	MAR-380 The Learning and Teaching of Marine Science	4

B. Life Sciences (20 Credits)

Required:

_____	BIO-115	Principles of Biology: Animals	4
_____	BIO-116	Principles of Biology: Plants	4

Three of the following (at least one at the 300-level):

_____	BIO-117	Principles of Biology: Cells	4
_____	BIO-250	Field Natural History	4
_____	BIO-272/L	Introduction to Marine Biology and Lab	3/1
_____	BIO-265	Genetics	4
_____	BIO-305	Vertebrate Physiology	4
_____	BIO-315	Medical Microbiology	4
_____	BIO-321	Environmental Microbiology	4
_____	BIO-340	Evolutionary Biology	4
_____	BIO-350	General Ecology	4
_____	BIO-370	Immunology	4
_____	BIO-372	Behavior of Marine Organisms	4
_____	BNS-310	Neurobiology	4
_____	BNS-375	Neuroethology	4
_____	MAR-325	Marine Vertebrates: Fish to Mammals	4

C. Physical Sciences (20 Credits)

Required:

_____	CHE-120/121	Principles of Chemistry and Lab	3/1
_____	CHE-122/123	Introduction to Chemical Systems and Lab	3/1
_____	PHY-200	General Physics I	4

One of the following pairs:

_____	CHE-211/213	Organic Chemistry I and Lab	3/1
_____	PHY-105	Matter, Forces and Energy	4
or			
_____	CHE-118	Exploration of Chemical Principles	4
_____	PHY-201	General Physics II	4

D. Mathematics (18-20 Credits; six courses total)

Courses selected in 1C may not also be used to fulfill these requirements.

Required:

_____	MTH-211	Calculus II	4
_____	MTH-212	Calculus III	4
_____	MTH-240	Linear Algebra	3

Three or more of the following:

_____	MTH-250	Differential Equations	3
_____	MTH-308	Advanced Calculus	3
_____	MTH-315	Modern Geometry	3
_____	MTH-340	Probability and Statistical Analysis I	3
_____	MTH-341	Probability and Statistical Analysis II	3
_____	MTH-401	Modern Algebra	3
_____	MTH-410	Complex Analysis	3
_____	MTH-420	Number Theory	3
_____	MTH-430	Introduction to Topology	3
_____	MTH-440	Real Analysis	3

Total credits = 49-51