INTEGRATED SCIENCE GROUP MAJOR IN COMBINATION WITH BIOLOGY MINOR FOR SECONDARY TEACHING

October 2019

The **Integrated Science major** (State Code: DI) for Secondary Certification consists of **40 credits** distributed over three areas of emphasis: Life Science, Earth and Space Science, and Physical Science. The courses must include significant laboratory experiences.

Teacher candidates for certification in Integrated Science at the Secondary level must pass the Michigan Test for Teacher Certification (MTTC) in Secondary Integrated Science (Test #094). MTTC content exams should not be taken until 90% of course work in the subject area has been completed. A study guide is available at the MTTC website: (http://www.mttc.nesinc.com/PDFs/MI_field094_SG.pdf).

The courses below meet State standards and have been selected so that teacher candidates will be well prepared for the test. Knowledge must be demonstrated in the following categories in order to successfully pass the MTTC subject area exam:

	Subarea	Approximate % of Questions
1.	Constructing and Reflecting on Scientific Knowledge	25%
2.	Life Science	25%
3.	Earth and Space Sciences	25%
4.	Physical Sciences	25%

PLEASE REFER TO YOUR DEGREE EVALUATION IN KNOWHOPE PLUS IN ADDITION TO THIS DOCUMENT TO DETERMINE FULFILLMENT OF COURSE REQUIREMENTS

LIFE SCIENCE COURSES (12 Credits) – Required

SUBJECT/ COURSE	TITLE	CR. HRS.	SEMESTER TAKEN	SUBSTITUTION
BIOL 105 & BIOL 107	Introduction to Biology I & Introduction to Biology I Lab	3 & 1		
BIOL 106 & BIOL 108	General Biology II & General Biology II Lab	3 & 1		
BIOL 221	Human Physiology	4		

EARTH AND SPACE SCIENCE COURSES (12 Credits) – Required

SUBJECT/ COURSE	TITLE	CR. HRS.	SEMESTER TAKEN	SUBSTITUTION
GEMS 130	Introduction to Environmental Science	4		
GEMS 157 (GES 100)	The Planet Earth	4		
GES 203	Historical Geology	4		

PHYSICAL SCIENCE COURSES (16 Credits) - Required

SUBJECT/ COURSE	TITLE	CR. HRS.	SEMESTER TAKEN	SUBSTITUTION
PHYS 121* & PHYS 141*	General Physics I & Physics Lab I	3 1		
PHYS 122* & PHYS 142*	General Physics II & Physics Lab II	3 1		
CHEM 125 & CHEM 127	General Chemistry I & Lab of General & Analytic Chemistry I	3 1		
CHEM 126 & CHEM 128	General Chemistry II & Lab of General & Analytic Chemistry II	3 1		
*MATH 126 or MATH131 is a corequisite or prerequisite for PHYS 121/141 and MATH 132 is a prerequisite or corequisite for PHYS122/142				

OTHER COURSES (4 Credits)

(The required Science methods course is considered pedagogy and will be counted with your education courses for certification.)

SUBJECT/ COURSE	TITLE	CR. HRS.	SEMESTER TAKEN	SUBSTITUTION
EDUC 331	Teaching of Science in the Secondary School (offered Fall Semester Only)	3		
EDUC 332	Teaching of Science in the Secondary School Field Placement (offered Fall Semester Only)	1		

This MUST be completed prior to the student teaching semester!

BIOLOGY MINOR WORKSHEET AND "SAMPLE" 4 YEAR PLAN

ON THE FOLLOWING PAGES BELOW

BIOLOGY MINOR IN COMBINATION WITH INTEGRATED SCIENCE GROUP MAJOR FOR SECONDARY TEACHING

The **minor in Biology for Secondary teachers** (State code: DA) consists of a minimum of 20 credits.

Teacher candidates for certification in Biology at the Secondary level must pass the Michigan Test for Teacher Certification (MTTC) in Biology (Test #017). MTTC content exams should not be taken until 90% of course work in the subject area has been completed. A study guide is available at the MTTC website: (http://www.mttc.nesinc.com/PDFs/MI_field017_SG.pdf).

The courses below meet State standards and have been selected so that teacher candidates will be well prepared for the test. Knowledge must be demonstrated in the following categories in order to successfully pass the MTTC subject area exam:

Subarea	Approximate Percentage of Questions on Test
1. Foundations of Scientific Inquiry	19%
2. Cellular Function	15%
3. Heredity and Evolutionary Changes	22%
4. Organization of Living Things	22%
5. Ecological Systems	22%

The following chart is intended to provide you a guide for scheduling your semesters and for keeping track of your grade point average.

PLEASE REFER TO YOUR DEGREE EVALUATION IN KNOWHOPE PLUS IN ADDITION TO THIS DOCUMENT TO DETERMINE FULFILLMENT OF COURSE REQUIREMENTS

CORE COURSES IN BIOLOGY (Only 8 of 12 credits may be double counted with DI major)

SUBJECT/ COURSE	TITLE	CREDIT HOURS	SEMESTER	GRADE
BIOL 105 & BIOL 107	Introduction to Biology I & Introduction to Biology I Lab	3 1		
BIOL 106 & BIOL 108	General Biology II & General Biology II Lab	3 1		
BIOL 221	Human Physiology	4		

ADVANCED COURSES IN BIOLOGY (Choose 12 additional credits selected from the following advanced courses in Biology, upon consultation with your Biology Advisor.)

SUBJECT/ COURSE	TITLE	CREDIT HOURS	SEMESTER	GRADE
BIO 301	General Microbiology*	4		
BIO 315	Topics in Ecology	4		
BIO 320	Plant Physiology	4		
BIO 330	Marine Biology and Biophysics	4		
BIO 332	Comparative Anatomy of Vertebrates*	4		
BIO 340	Topics in Plant Biology	4		
BIO 343	Vascular Plant Systematics*	4		
BIO 348	Topics in Cell Biology-Lecture	3		

BIO 349	Topics in Cell Biology-Lab	1		
BIO 355	Developmental Biology	4		
BIO 356	Genetics ()	3		
BIO 357	Genetics lab	1		
BIO 366	Molecular Biology	4		
BIO 370	Animal Behavior	4		
BIO 374	Biology of Insects*	4		
BIO 380	Field Studies in Biology*	1-4		
BIO 390	Independent Study of Biology	1-3		
BIO 421	Evolutionary Biology	4		
BIO 422	Invertebrate Zoology*	4		
BIO 432	Vertebrate Zoology*	4		
BIO 442	Topics in Physiology	4		
BIO 490	Independent Research	1-2		
BIO 495	Advanced Topics in Biology	1-4		

*This course meets the biodiversity requirement in Biology

“SAMPLE” 4 YEAR PLAN

ON THE FOLLOWING PAGE BELOW

SAMPLE
Integrated Science Major (DI) with a Biology Minor
FOR SECONDARY CERTIFICATION
4 year plan

Note:
1. In order to student teach a minimum G.P.A. of 2.75 is required in your major, minor, education classes, and overall.
2. Students earning a Secondary Major must complete field placements in middle and high school, and in both major and minor areas of study.
3. Students earning a Secondary Major must complete field placements in racially/ethnically and socio-economically diverse classrooms.

November 2021

	Fall			Spring			Summer		
	CLASS	**CR**	**ATTRIBUTES**	**CLASS**	**CR**	**ATTRIBUTES**	**CLASS**	**CR**	**ABBRIBUTES**
FRESHMAN	IDS 100	2	GE – FYS	PHYS 121/141**	4	DI & GE (NSL)			
	ENGL 113	4	GE – EW	GES 100	4	DI & GE (NSL)			
	KIN 140	2	GE – HD	For. Lang. 2	4	GE – FL2			
	IDS 172	4	GE – CH2	IDS 171	4	GE – CH1, GLI			
	REL II	4	GE						
	Total	16		Total	16				
SOPHMORE	CHEM 125/127	4	DI	CHEM 126/128	4	DI			
	BIOL 105	3	DI	BIOL 106/108	3 +1	DI & m			
	BIOL 107	1	DI	EDUC 225/226	4	ED			
	GEMS 130	4	DI	EDUC 270	4	ED			
	EDUC 200/201	4	ED & GLD	Math	2	GE			
	Total	16		Total	18				
JUNIOR	BIOL 221	4	DI & m	EDUC 285/286	4	ED			
	BIOL elective	4	m	GES 203	4	DI			
	EDUC 275/276	3	ED	BIOL elective	4	M			
	PHYS 122/142**	4	DI	EDUC 287	2	ED			
	REL I	2	GE	Fine Arts II	2	GE			
	Total	17		Total	16				
SENIOR	EDUC 360/361	3	ED	EDUC 455	1	ED			
	BIOL elective	4	m	EDUC 480	10	ED			
	Social Science 2	2	GE	EDUC 500	1	ED & GE – SSI			
	Fine Arts I	4	GE	IDS 452	4	GE – SRS			
	EDUC 331/332	4	DI/ED						
	Total	17		Total	16				

Note: G.L.I. (global learning international) possibilities – check Degree Works, FYS, ENGL 113, IDS 171, Rel2 and select History and Literature courses

*Increasingly we see students bringing in AP credits for English, Math, and some of the social sciences (Psychology or Sociology being most common). If a student does bring in some of these credits, it could eliminate the need for summer courses.

**MATH 126 or MATH131 is a corequisite or prerequisite for PHYS 121/141 and MATH 132 is a prerequisite or corequisite for PHYS122/142.

Key:
GE – General Education
DI – Integrated Science Major
ED – Education
GLD – Global Learning Domestic
GLI – Global Learning International
m – minor

1. Please see an education faculty member for personal advising. This sample is simply *one* way to plan your schedule, and your selection of a minor might allow for additional double counting.
2. Please consult the Hope College Catalogue for semesters when courses are offered, as these may vary.