

INTEGRATED SCIENCE GROUP MAJOR IN COMBINATION WITH CHEMISTRY 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!

**CHEMISTRY MINOR WORKSHEET AND “SAMPLE” 4 YEAR PLAN
ON THE FOLLOWING PAGES BELOW**



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

The **Chemistry minor** (State Code: DC) for Secondary teachers consists of a minimum of 21 credits in Chemistry.

Teacher candidates for certification in Chemistry at the Secondary level must pass the Michigan Test for Teacher Certification (MTTC) in Chemistry (Test #018). 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_field018_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. Reflecting On and Constructing Scientific Knowledge	25%
2. Using Inorganic Chemistry	32%
3. Using Physical Chemistry	27%
4. Using Organic Chemistry and Biochemistry	16%

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

Please note: Though the Chemistry Department requires a minimum GPA of 2.0 for the science major chemistry courses, students seeking the Chemistry endorsement for teacher certification must have a major and/or minor GPA of 2.75.

CHEMISTRY FOUNDATIONS - REQUIRED (13 credits) May double count courses marked with an asterisk (*) with DI major.

SUBJECT/ COURSE	TITLE	CREDIT HOURS	SEMESTER	GRADE
CHEM 125* & CHEM 127*	General Chemistry I & General Chemistry Laboratory I	3 1		
CHEM 126* & CHEM 128*	General Chemistry II & General Chemistry Laboratory II	3 1		
CHEM 221 & CHEM 255	Organic Chemistry I & Organic Chemistry Laboratory I	3 2		

REMAINING ELECTIVE COURSES (8 credits) *Choose a minimum of 8 credits from courses listed below:*

SUBJECT/ COURSE	TITLE	CREDIT HOURS	SEMESTER	GRADE
CHEM 311	Biochemistry I	3		
CHEM 322	Inorganic Chemistry	3		
CHEM 331 & CHEM 332	Analytical Chemistry Lecture & Analytical Chemistry Laboratory	3 1		
CHEM 343	Physical Chemistry I	3		
CHEM 231	Organic Chemistry II	3		
CHEM 256	Organic Chemistry Laboratory II	1-2		
CHEM 314	Biochemistry II	3		
CHEM 315	Biochemistry II Lab	1		
CHEM 324	Inorganic Laboratory	1		
CHEM 335	Neurochemistry and Disease	4		
CHEM 344	Physical Chemistry II	3		
CHEM 345	Physical Chemistry Lab I	1		
CHEM 346	Physical Chemistry Lab II	1		
CHEM 347	Chemical Modeling Laboratory	1		
CHEM 348	Advanced Spectroscopy Laboratory	1		
CHEM 421	Structure, Dynamics and Synthesis I	3		
CHEM 422	Structure, Dynamics and Synthesis II	3		
GES 430	Advanced Environmental Geochemistry	4		
CHEM 490	Research in Chemistry	1-3		
CHEM 499	Internship in Chemistry	1-2		

“SAMPLE” 4 YEAR PLAN
ON THE FOLLOWING PAGE BELOW



SAMPLE
Integrated Science Major (DI) with a Chemistry 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	ABBRIUTES
FRESHMAN	IDS 100	2	GE – FYS	PHYS 121/141**	4	DI & GE (NSL)	MATH	2	GE
	ENGL 113	4	GE – EW	IDS 171	4	GE – CH1, GLI			
	KIN 140	2	GE – HD	GES 100	4	DI & GE (NSL)			
	IDS 172	4	GE – CH2	For. Lang. 2	4	GE – FL2			
	REL 200	4	GE – REL2						
	Total	16		Total	16				
SOPHMORE	CHEM 125/127	4	DI	CHEM 126/128	4	DI			
	BIOL 105	3	DI	EDUC 225/226	4	ED			
	BIOL 107	1	DI	EDUC 270	4	ED			
	GEMS 130	4	DI	GES 203	4	DI			
	EDUC 200/201	4	ED & GLD	Fine Arts 2	2	GE			
	Total	16		Total	18				
JUNIOR	BIOL 221	4	DI	EDUC 285/286	4	ED			
	CHEM 221/255	5	m	BIOL 106	3	DI			
	EDUC 275/276	3	ED	BIOL 108	1	DI			
	PHYS 122/142**	4	DI	CHEM elective	4	M			
				EDUC 287	2	ED			
			REL 1	2	GE				
	Total	16		Total	16				
SENIOR	EDUC 360/361	3	ED	EDUC 455	1	ED			
	CHEM elective	4	m	EDUC 480	10	ED			
	Fine Arts 1	4	GE – FA1	EDUC 500	1	ED & GE – SSI			
	Social Science 2	2	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.