

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

March 2017

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	CREDITS	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		

EARTH AND SPACE SCIENCE COURSES (12 Credits) – Required

SUBJECT/ COURSE	TITLE	CREDITS	SEMESTER	GRADE
GEMS 152	The Atmosphere and Environmental Change	4		
GEMS 157 (GES 100)	The Planet Earth	4		
GES 203	Historical Geology	4		

PHYSICAL SCIENCE COURSES (16 Credits) - Required

SUBJECT/ COURSE	TITLE	CREDITS	SEMESTER	GRADE
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		

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	CREDITS	SEMESTER	GRADE
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!

***Effective for students entering Fall 2015, EDUC 331 changed from a 2 credit course to a 3 credit course**

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



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

The **Physics minor** (State Code: DE) for Secondary teachers consists of a minimum of 20 credits in Physics.

Teacher candidates for certification in Physics at the Secondary level must pass the Michigan Test for Teacher Certification (MTTC) in Physics (Test #019). 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_field019_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.	Foundations of Scientific Inquiry	12%
2.	Mechanics	24%
3.	Electricity and Magnetism	24%
4.	Waves, Acoustics, and Optics	20%
5.	Nature of Matter, Thermodynamics, and Modern Physics	20%

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

PHYSICS REQUIRED CORE (12 credits) May double count courses marked with an asterisk (*) with DI major.

SUBJECT/ COURSE	TITLE	CREDITS	SEMESTER	GRADE
PHYS 121* & PHYS 141*	General Physics I & Physics Lab I	3 1		
PHYS 122* & PHYS 142*	General Physics II & Physics Lab II	3 1		
PHYS 270	Modern Physics	4		

ADVANCED COURSES IN PHYSICS (8 credits) At least 4 credits must be at the 300 level.

SUBJECT/ COURSE	TITLE	CREDITS	SEMESTER	GRADE
PHYS 280	Introduction to Mathematical Physics	2		
PHYS 281	Intermediate Physics Lab	2		
PHYS 342 OR PHYS 361	Electricity and Magnetism OR Analytical Mechanics	4 4		
PHYS 352	Optics	4		
PHYS 362	States of Matter	4		
PHYS 372	Quantum Theory	4		
Note: MATH 232 Multivariable Mathematics II is corequisite to PHYS 280 and prerequisite to PHYS 342 and PHYS 361. MATH 231 Multivariable Mathematics I is a prerequisite to MATH 232.				

SAMPLE
Integrated Science Major (DI) with a Physics 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.

March 2017

	Fall			Spring			Summer		
	CLASS	CR	ATTRIBUTES	CLASS	CR	ATTRIBUTES	CLASS	CR	ATTRIBUTES
FRESHMAN	IDS 100	2	GE-FYS	PHYS 121/141	4	DI & GE (NSL)	For Lang 2	4	GE-FL2
	ENGL 113	4	GE-EW	IDS 171	4	GE-CH1, GLI	Fine Arts 1	4	GE-FA1
	IDS 200	4	GE-GLD	GES 100	4	DI & GE (NSL)			
	KIN 140	2	GE-HD	MATH 231	4	GE & m			
	MATH 132**	4	GE & m						
	Total	16		Total	16		Total	8	
SOPHMORE	CHEM 125/127	4	DI	CHEM 126/128	4	DI	REL 200	4	GE-REL2
	BIOL 105	3	DI	EDUC 225/226	4	ED			
	BIOL 107	1	DI	EDUC 270	2	ED			
	GEMS 152	4	DI	GES 203	4	DI			
	EDUC 220/221	4	ED	Fine Arts 2	2	GE-FA 2			
	Total	16		Total	16		Total	4	
JUNIOR	BIOL 221	4	DI	EDUC 285/286	4	ED			
	PHYS 270	4	m	BIOL 106	3	DI			
	EDUC 275/276	3	ED	BIOL 108	1	DI			
	IDS 172	4	GE-CH2	PHYS elective	4	m			
	Social Science 2	2	GE-SS2	EDUC 287	2	ED			
				REL 1	2	GE-REL 1			
Total	17		Total	16					
SENIOR	EDUC 360/361	3	ED	EDUC 455	1	ED			
	PHYS elective	4	m	EDUC 480	10	ED			
	PHYS 122/142	4	DI	EDUC 500	1	ED & GE-SSI			
	EDUC 331/332	4	DI/ED	IDS 452	4	GE-SRS			
	Total	15		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.

**Assumes student brings in Calc I (MATH 131)

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.