

# CHEMISTRY MAJOR FOR SECONDARY TEACHING

Updated May 2015

The **Chemistry Major** (State Code: DC) for Secondary teachers consists of a minimum of 30 credits. In addition to this 30 hour requirement, 16 hours of cognate coursework are required for the Chemistry major.

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](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 (17-18 credits)

SUBJECT/ COURSE	TITLE	CREDIT HOURS	SEMESTER	GRADE
CHEM 125*	General Chemistry I	3		
CHEM 127*	Lab of General & Analytic Chemistry I	1		
CHEM 126*	General Chemistry II	3		
CHEM 128*	Lab of General & Analytic Chemistry II	1		
CHEM 221	Organic Chemistry I	3		
CHEM 255	Organic Chemistry Laboratory I	2		
CHEM 231	Organic Chemistry II	3		
** CHEM 256	Organic Chemistry Laboratory II	1-2		
<p>* It is possible to substitute the entire general chemistry sequence (Chem 125/126/127/128) with accelerated general chemistry (Chem 131-132)</p> <p>**If selected for one credit, student MUST take a one-hour lab from the upper level or elective offerings listed below.</p>				

**UPPER LEVEL CHEMISTRY COURSES** (6-7 credits) At least two (2) of the following elective courses must be included:

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		
<b>(Chemistry 331 and 332 must be taken together and are considered one course.)</b>				

**LAB REQUIREMENT EXPLANATION**

A minimum total of 6 lab credits is required to complete this major.

**REMAINING ELECTIVE COURSES** (5-7credits)

Electives may include CHEM 311, 322, 331 & 332, or 343 if not selected for the required upper level Chemistry coursework listed on the previous page.

SUBJECT/ COURSE	TITLE	CREDIT HOURS	SEMESTER	GRADE
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		

**Required cognate courses:**

**MATH COURSES** (8 credits, cognate)

SUBJECT/ COURSE	TITLE	CREDIT HOURS	SEMESTER	GRADE
MATH 126 OR MATH 131	Calculus with Review II Calculus I	4 4		
MATH 132	Calculus II	4		

**PHYSICS COURSES** (8 credits, cognate)

SUBJECT/ COURSE	TITLE	CREDIT HOURS	SEMESTER	GRADE
PHYS 121	General Physics I	3		
PHYS 141	Physics Lab I	1		
PHYS 122	General Physics II	3		
PHYS 142	Physics Lab II	1		
<i>** College Physics 105, 106, 107, 108 may be appropriate for the BA degree in some programs of study. Any substitution of these Physics courses must be approved by the Chemistry chairperson.</i>				

**A SCIENCE METHODS COURSE - REQUIRED** (4 credits)

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

SUBJECT/ COURSE	TITLE	CREDIT HOURS	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**