

**MAJOR: CHEMISTRY, B.S.**

DEPARTMENT OF CHEMISTRY AND BIOCHEMISTRY

Chemistry is a body of knowledge that helps explain the physical world and its processes. Chemists study substances: their composition, structures, properties, and reactions. The Department of Chemistry and Biochemistry provides classroom and laboratory learning opportunities and research experience across the discipline to meet the needs of students in liberal arts and preprofessional programs as well as of students who wish to pursue careers in the field.

TYPICAL PROGRAM OF STUDY			
FIRST YEAR			
FALL SEMESTER		SPRING SEMESTER	
MATH 1296 Calculus I <sup>1</sup>	5 cr	MATH 1297 Calculus II <sup>1</sup>	5 cr
CHEM 1151 General Chemistry I or CHEM 1161 Honors General Chemistry I	5 cr	CHEM 1152 General Chemistry II or CHEM 1162 Honors General Chemistry II	5 cr
WRIT 1120 College Writing	3 cr	Liberal education or minor field courses	<u>6 cr</u>
Liberal education or minor field course	<u>3 cr</u>		Total: 16 cr
	Total: 16 cr		
SECOND YEAR			
CHEM 2541 Organic Chemistry I	3 cr	CHEM 2542 Organic Chemistry II	3 cr
CHEM 2543 Organic Chemistry I lab	1 cr	CHEM 2545 Organic Chem. II lab for BS Chemistry majors	2 cr
PHYS 2011 General Physics I	4 cr	PHYS 2012 General Physics II	4 cr
MATH 3280 Differential Equations w/ Linear Algebra	4 cr	CHEM 2222 Quantitative Analysis <sup>2</sup>	3 cr
Liberal education or minor field course	<u>3 cr</u>	CHEM 2223 Quantitative Analysis Lab <sup>2</sup>	1 cr
	Total: 15 cr	Liberal education or minor field course	<u>3 cr</u>
			Total: 16 cr
THIRD YEAR			
CHEM 4641 Physical Chemistry I	3 cr	CHEM 3432 Descriptive Inorganic Chemistry	2 cr
CHEM 4643 Physical Chemistry Laboratory I	1 cr	CHEM 3322 Biochemistry	3 cr
WRIT 31XX Advanced Composition	3 cr	CHEM 3324 Biochemistry lab	1 cr
Liberal education or minor field courses	<u>7 cr</u>	CHEM 4642 Physical Chemistry II	3 cr
	Total: 14 cr	CHEM 4644 Physical Chemistry Laboratory II	1 cr
		Liberal education or minor field courses	<u>6 cr</u>
			Total: 16 cr
FOURTH YEAR			
CHEM 4436 Inorganic Chemistry	3 cr	CHEM 4242 Instrumental Analysis	3 cr
CHEM 4435 Inorganic Chemistry Laboratory	1 cr	CHEM 4243 Instrumental Chemistry Laboratory	2 cr
CHEM 4184 Undergraduate Seminar	1 cr	CHEM 4185 Undergraduate Seminar II	1 cr
Liberal education or minor field courses	<u>8 cr</u>	Liberal education or minor field courses	<u>8 cr</u>
	Total: 13 cr		Total: 14 cr

<sup>^</sup>First math course is determined by math placement exam. This schedule presupposes placement into MATH 1296.

<sup>1</sup>Students may take MATH 1596 and 1597, Honors Calculus I and II, in place of MATH 1296 and 1297.

<sup>2</sup>Chem 2242 Analytical Chemistry Applied to Environmental Problems in Eastern Europe (4 cr) may be substituted for CHEM 2222 Quantitative Analysis (3 cr) and CHEM 2223 Quantitative Analysis Lab (1 cr)

FOR ADDITIONAL INFORMATION:

Department of Chemistry and Biochemistry  
246 Chemistry Building  
726-7212 or 726-8163  
chem@d.umn.edu  
<http://www.d.umn.edu/chem>

## CHEMISTRY, B.S.

MAJOR REQUIREMENTS	CREDITS	PREREQUISITES	SEMESTER TO BE COMPLETED	GRADE
<b>YEAR 1</b>				
CHEM 1151 General Chemistry I and CHEM 1152 General Chemistry II	5 5	1 year HS chemistry; HS algebra CHEM 1151		
<b>OR</b>				
CHEM 1161 Honors Chemistry I and CHEM 1162 Honors Chemistry II	5 5	1 year HS chemistry; placement CHEM 1161		
WRIT 1120 College Writing	3			
MATH 1296 Calculus I <sup>1</sup>	5	Math placement or MATH 1250 with a 'C-' or better		
MATH 1297 Calculus II <sup>1</sup>	5	MATH 1296 or 1596 with a 'C-' or better		
<b>YEAR 2</b>				
CHEM 2222 Quantitative Analysis	3	CHEM 1152 or 1162		
CHEM 2223 Quantitative Analysis lab	1	Concurrent registration in CHEM 2222		
CHEM 2541 Organic Chemistry I	3	CHEM 1152 or 1162		
CHEM 2543 Organic Chemistry I lab	1	CHEM 1152 or 1162; concurrent reg. in CHEM 2541		
CHEM 2542 Organic Chemistry II	3	CHEM 2521 or 2541/2543		
CHEM 2545 Org. Chem. II lab for BS Chem. major	2	CHEM 2521 or 2541/2543; concurrent reg. CHEM 2542		
MATH 3280 Diff Equations with Linear Algebra	4	MATH 1297 with a grade of 'C-' or better		
PHYS 2011 General Physics I	4	MATH 1290 or MATH 1296 or 1596		
PHYS 2012 General Physics II	4	PHYS 2011; MATH 1297 or 1597		
<b>YEAR 3</b>				
CHEM 3322 Biochemistry	3	CHEM 2522 or 2532 or 2542/2545		
CHEM 3324 Biochemistry laboratory	1	Concurrent registration in CHEM 3322		
CHEM 3432 Descriptive Inorganic Chemistry	2	CHEM (2222 & 2223) or (2242 & 2542) and (2544 or 2545)		
CHEM 4641 Physical Chemistry I	3	2 yrs chemistry, MATH 3280, PHYS 2012		
CHEM 4643 Physical Chemistry laboratory I	1	Concurrent registration in CHEM 4641		
CHEM 4642 Physical Chemistry II	3	CHEM 4641		
CHEM 4644 Physical Chemistry laboratory II	1	Concurrent registration in CHEM 4642		
WRIT 31xx Advanced Writing	3	WRIT 1120; 60 credits		
<b>YEAR 4</b>				
CHEM 4184 Undergraduate Seminar I	1	BS Chem or BMB major; min 90 credit		
CHEM 4185 Undergraduate Seminar II	1	CHEM 4184		
CHEM 4242 Instrumental Analysis	3	CHEM 2222, 4632 or 4634 or 4642		
CHEM 4243 Instrumental Chemistry laboratory	2	CHEM 2223, concurrent registration in CHEM 4242		
CHEM 4436 Inorganic Chemistry	3	CHEM 3432 and (4632 or 4642)		
CHEM 4435 Inorganic Chemistry laboratory	1	Concurrent registration in CHEM 4436		

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<sup>1</sup>Students may take MATH 1596 and 1597, Honors Calculus I and II, in place of MATH 1296 and 1297.

<sup>2</sup>Chem 2242 Analytical Chemistry Applied to Environmental Problems in Eastern Europe (4 cr) may be substituted for CHEM 2222 Quantitative Analysis (3 cr) and CHEM 2223 Quantitative Analysis Lab (1 cr)

NOTE: In addition to the above requirements, students must complete the liberal education program and a minor (or a second major) to earn a B.S. degree.