

CHEMISTRY COMPREHENSIVE, BACHELOR OF SCIENCE

Offered by Department of Chemistry (<http://catalog.unk.edu/undergraduate/departments-programs/chemistry/>)

Code	Title	Credit Hours
General Studies		
<i>Foundational Requirements (LOPERs 1-4)</i>		14
Including:		
LOPER 4: Mathematics, Statistics, and Quantitative Reasoning		
MATH 115	Calculus I with Analytic Geometry ¹	
<i>Broad Knowledge Requirements (LOPERs 5-8)</i>		13
Including:		
LOPER 8: Natural Sciences		
BIOL 106	Biology II	
<i>Dispositional Requirements (LOPERs 9-10)²</i>		6
<i>Wellness (LOPER 11) Optional</i>		0
BS Science-related course requirements		3-10
Take ONE of the following options:		
Take (for Professional Chemist Emphasis):		
MATH 202	Calculus II with Analytic Geometry	
PHYS 276	General Physics II (Calculus)	
PHYS 276L	General Physics II (Calculus) Laboratory	
OR take (for Biochemistry Emphasis):		
MATH 202	Calculus II with Analytic Geometry	
PHYS 276 & 276L	General Physics II (Calculus) and General Physics II (Calculus) Laboratory	
or PHYS 206 General Physics II & 206L and Physics Laboratory II		
OR take (for Health Science or Pharmacy Emphasis):		
STAT 241	Elementary Statistics	
or BIOL 305 BioStatistics		
OR take (for General Emphasis):		
Take one course:		
MATH 202	Calculus II with Analytic Geometry	
STAT 241	Elementary Statistics	
or BIOL 305 BioStatistics		
Program Specific Requirements		5
Take ONE of the following options:		
Take (for Professional Chemist Emphasis):		
PHYS 275	General Physics I (Calculus)	
PHYS 275L	General Physics I (Calculus) Laboratory	
OR take (for Biochemistry, General, Health Science OR Pharmacy Emphasis):		
PHYS 205 & 205L	General Physics I and Physics I Laboratory	

or PHYS 275 General Physics I (Calculus) & 275L and General Physics I (Calculus) Laboratory

Major Option	
Complete all required courses	60-62
Unrestricted electives	
Needed to reach 120 credit hour minimum	19-12
Total Credit Hours	
<i>Total Credit Hours</i>	120

Major Option

Code	Title	Credit Hours
Chemistry Comprehensive Foundation Requirements		
CHEM 160	General Chemistry	3
CHEM 160L	General Chemistry Laboratory	1
CHEM 161	General Chemistry	3
CHEM 161L	General Chemistry Laboratory	1
CHEM 169	Chemistry Foundations and Careers	1
CHEM 301	Analytical Chemistry	3
CHEM 301L	Analytical Chemistry Lab	1
CHEM 310	Safety in Chemistry	1
CHEM 351	Biochemistry I	4
CHEM 360	Organic Chemistry	4
CHEM 360L	Organic Chemistry Laboratory	1
CHEM 469	Advanced Seminar in Chemistry	1
Chemistry Emphasis Requirements		
Select one of the following:		36-38
Biochemistry Emphasis (p. 1)		
Health Sciences Emphasis (p. 2)		
Pharmacy Emphasis		
Professional Chemist Emphasis		
General Emphasis		
Total Credit Hours		60-62

Biochemistry Emphasis

Code	Title	Credit Hours
Biochemistry In-Depth Courses		
CHEM 352	Biochemistry II	2
CHEM 352L	Advanced Biochemistry Lab	2
CHEM 361	Organic Chemistry	4
CHEM 361L	Organic Chemistry Laboratory	1
CHEM 490L	Advanced Chemistry Laboratory	3
CHEM 499L	Research in Chemistry	1
CHEM 430A	Inorganic Reactions & Mechanisms	1
CHEM 430B	Inorganic Structures & Properties	2
Take 3 hours from		3
CHEM 480A	Chemical Thermodynamics	
CHEM 480B	Chemical Kinetics	
CHEM 481A	Quantum Mechanics	
CHEM 481B	Spectroscopy	
Take 6 hours from		6
CHEM 300	Environmental Chemistry	

CHEM 451	Advanced Biochemistry	
CHEM 499L	Research in Chemistry	
OR any 400-level CHEM lecture(s)		
Biochemistry Supporting Course Requirements		
Select 11 credit hours of the following:		11
BIOL 105	Biology I	
BIOL 211	Human Microbiology	
BIOL 309	Cellular & Molecular Biology	
BIOL 360	Genetics	
BIOL 450	Advanced Molecular Biology	
BIOL 452	Techniques in Molecular Biology	
BIOL 485	Molecular Genetics	
Total Credit Hours		36

Health Sciences Emphasis

Code	Title	Credit Hours
Health Sciences In-Depth Courses		
CHEM 352	Biochemistry II	2
CHEM 352L	Advanced Biochemistry Lab	2
CHEM 361	Organic Chemistry	4
CHEM 361L	Organic Chemistry Laboratory	1
CHEM 490L	Advanced Chemistry Laboratory	3
CHEM 499L	Research in Chemistry	1
or HSCI 475	Internship in Health Sciences	
Select 5 hours of the following:		5
CHEM 451	Advanced Biochemistry	
CHEM 430A	Inorganic Reactions & Mechanisms	
CHEM 430B	Inorganic Structures & Properties	
CHEM 480A	Chemical Thermodynamics	
CHEM 480B	Chemical Kinetics	
CHEM 481A	Quantum Mechanics	
CHEM 481B	Spectroscopy	
Health Sciences Supporting Course Requirements		
BIOL 211	Human Microbiology	4
BIOL 225	Anatomy and Physiology	4
BIOL 226	Anatomy and Physiology	4
BIOL 309	Cellular & Molecular Biology	4
or BIOL 360	Genetics	
Health Sciences Elective Requirements		
Select 4 credit hours of the following:		4
KSS 459	Special Topics Gross Anatomy	
KSS 460	Gross Anatomy of Movement	
BIOL 300-BIOL 499		
CHEM 300-CHEM 499L		
PHYS 300-PHYS 499L		
Total Credit Hours		38

Pharmacy Emphasis

Code	Title	Credit Hours
Pharmacy In-Depth Courses		
CHEM 361	Organic Chemistry	4
CHEM 361L	Organic Chemistry Laboratory	1
BIOL 225	Anatomy and Physiology	4
BIOL 226	Anatomy and Physiology	4
HSCI 475	Internship in Health Sciences	1
or CHEM 499L	Research in Chemistry	
Students must successfully complete a minimum of 24 credit hours at an approved pharmacy school in areas related to biology, biochemistry, chemistry (including pharmochemistry) which would be equivalent to upper division baccalaureate level courses. Up to 5 additional hours may be counted as electives toward the UNK degree.		24
Total Credit Hours		38

Professional Chemist Emphasis

Code	Title	Credit Hours
Professional Chemist In-Depth Courses		
CHEM 352	Biochemistry II	2
CHEM 352L	Advanced Biochemistry Lab	2
CHEM 361	Organic Chemistry	4
CHEM 361L	Organic Chemistry Laboratory	1
CHEM 430A	Inorganic Reactions & Mechanisms	1
CHEM 430B	Inorganic Structures & Properties	2
CHEM 475A	Instrumental Analysis: Chromatography, NMR, & Mass Spectrometry	1
CHEM 475B	Instrumental Analysis: Spectroscopic Techniques	1
CHEM 475C	Instrumental Analysis: Electroanalytical Techniques	1
CHEM 480A	Chemical Thermodynamics	2
CHEM 480B	Chemical Kinetics	1
CHEM 481A	Quantum Mechanics	2
CHEM 481B	Spectroscopy	1
CHEM 490L	Advanced Chemistry Laboratory	3
CHEM 499L	Research in Chemistry	2
Take 5 hours from		5
Any 300/400-level CHEM, PHYS, MATH lecture(s)		
Professional Chemist Supporting Course Requirements		
MATH 260	Calculus III	5
Total Credit Hours		36

General Emphasis

Code	Title	Credit Hours
General In-Depth Courses		
CHEM 430A	Inorganic Reactions & Mechanisms	1
CHEM 430B	Inorganic Structures & Properties	2
Take 3 hours from		3

CHEM 480A	Chemical Thermodynamics	
CHEM 480B	Chemical Kinetics	
CHEM 481A	Quantum Mechanics	
CHEM 481B	Spectroscopy	
CHEM 490L	Advanced Chemistry Laboratory	3
CHEM 499L	Research in Chemistry	1
Select 6 credit hours of the following:		6
Any 300/400 level CHEM lecture		
Select 20 credit hours of the following:		20
BIOL 105	Biology I	
BIOL 200 - BIOL 499		
CHEM 300-CHEM 499L		
PHYS 200 - PHYS 499		
MGT 300 - MGT 499		
MKT 300 - MKT 499		
ACCT 250 - ACCT 499		
Total Credit Hours		36

1

Students without sufficient preparation will also need to take the following, increasing the total credit hours needed:

- MATH 102
- MATH 103

2

Designated courses with the appropriate content may be approved to satisfy one of the Broad Knowledge requirements plus LOPER 9 or Broad Knowledge plus LOPER 10. Courses may be approved to satisfy LOPER 9 or LOPER 10 alone. (*Courses satisfying LOPER 9 or LOPER 10 alone must be 3 credit hours.*) Students applying this option will need to take additional hours in other categories to meet the required GS hours.

This document represents a sample 4-year plan for degree completion with this major. Actual course selection and sequence may vary and should be discussed individually with your academic advisor. Advisors can also help you plan other experiences to enrich your undergraduate education such as internships, education abroad, undergraduate research, learning communities, and service learning and community-based learning.

Code	Title	Credit Hours
Semester 1		
CHEM 160 & 160L	General Chemistry and General Chemistry Laboratory	4
MATH 115	Calculus I with Analytic Geometry	5
LOPER 2: Writing Skills		3
LOPER 1: First-year Seminar		3
Total Credit Hours		15

Code	Title	Credit Hours
Semester 2		
CHEM 161 & 161L	General Chemistry and General Chemistry Laboratory	4
BIOL 106	Biology II	4
MATH 202	Calculus II with Analytic Geometry	3-5

or STAT 241	Elementary Statistics	
or BIOL 305	BioStatistics	
CHEM 169	Chemistry Foundations and Careers	1
LOPER 5: Visual or Performing Arts		3

Total Credit Hours	15-17
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Code	Title	Credit Hours
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Semester 3

CHEM 360 & 360L	Organic Chemistry and Organic Chemistry Laboratory	5
LOPER 3: Oral Communication Skills		3
Major Elective		3
Major Elective		3
Total Credit Hours		14

Code	Title	Credit Hours
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Semester 4

CHEM 310	Safety in Chemistry	1
Upper Division Chemistry Elective		3
Major Elective		3
LOPER 6: Humanities		3
LOPER 10: Respect for Human Diversity		3
CHEM 430A	Inorganic Reactions & Mechanisms	1
Total Credit Hours		14

Code	Title	Credit Hours
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Semester 5

CHEM 351	Biochemistry I	4
PHYS 205 & 205L	General Physics I and Physics I Laboratory	5
CHEM 430B	Inorganic Structures & Properties	2
LOPER 7: Social Science		3
Total Credit Hours		14

Code	Title	Credit Hours
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Semester 6

CHEM 301 & 301L	Analytical Chemistry and Analytical Chemistry Lab	4
CHEM 499L	Research in Chemistry	1
LOPER 9: Civic Competency and Engagement		3
Major Elective		3
Major Elective		3
Total Credit Hours		14

Code	Title	Credit Hours
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Semester 7

CHEM 469	Advanced Seminar in Chemistry	1
CHEM 480	Physical Chemistry	3
or CHEM 481	Physical Chemistry II	
CHEM 490L	Advanced Chemistry Laboratory	3

Upper Division Chemistry Elective	3
Unrestricted Elective	3
Unrestricted Elective	3
Total Credit Hours	16

Code	Title	Credit Hours
Semester 8		
Major Elective		5
Unrestricted Elective		3
Unrestricted Elective		3
Unrestricted Elective		3
Unrestricted Elective		3
Total Credit Hours		17

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Code	Title	Credit Hours
Semester 1		
CHEM 160 & 160L	General Chemistry and General Chemistry Laboratory	4
MATH 115	Calculus I with Analytic Geometry	5
ENG 101	Introduction to Academic Writing	3
LOPER 1: First-year Seminar		3
Total Credit Hours		15

Code	Title	Credit Hours
Semester 2		
CHEM 161 & 161L	General Chemistry and General Chemistry Laboratory	4
MATH 202	Calculus II with Analytic Geometry	5
BIOL 106	Biology II	4
CHEM 169	Chemistry Foundations and Careers	1
Total Credit Hours		14

Code	Title	Credit Hours
Semester 3		
CHEM 360 & 360L	Organic Chemistry and Organic Chemistry Laboratory	5
BIOL Elective		4
PHYS 205 & 205L	General Physics I and Physics I Laboratory	5
Total Credit Hours		14

Code	Title	Credit Hours
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Semester 4		
CHEM 361 & 361L	Organic Chemistry and Organic Chemistry Laboratory	5
BIOL Elective		4
PHYS 206 & 206L	General Physics II and Physics Laboratory II	5
CHEM 310	Safety in Chemistry	1
Total Credit Hours		15

Code	Title	Credit Hours
Semester 5		
CHEM 351	Biochemistry I	4
CHEM 430B	Inorganic Structures & Properties	2
CHEM 480B	Chemical Kinetics	1
Major Elective		3
SPCH 100	Fundamentals of Speech Communication	3
LOPER 5: Visual or Performing Arts		3
Total Credit Hours		16

Code	Title	Credit Hours
Semester 6		
CHEM 352 & 352L	Biochemistry II and Advanced Biochemistry Lab	4
CHEM 499L	Research in Chemistry	1
CHEM 301 & 301L	Analytical Chemistry and Analytical Chemistry Lab	4
LOPER 6: Humanities		3
Unrestricted Elective		3
Total Credit Hours		15

Code	Title	Credit Hours
Semester 7		
CHEM 430A	Inorganic Reactions & Mechanisms	1
CHEM 480A	Chemical Thermodynamics	2
CHEM 490L	Advanced Chemistry Laboratory	3
CHEM 469	Advanced Seminar in Chemistry	1
LOPER 7: Social Science		3
LOPER 9: Civic Competency and Engagement		3
Unrestricted Elective		3
Total Credit Hours		16

Code	Title	Credit Hours
Semester 8		
BIOL Elective		3
Major Elective		3
LOPER 10: Respect for Human Diversity		3
Unrestricted Elective		3

Unrestricted Elective	3
Total Credit Hours	15

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Code	Title	Credit Hours
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Semester 1

CHEM 160 & 160L	General Chemistry and General Chemistry Laboratory	4
MATH 115	Calculus I with Analytic Geometry	5
ENG 101	Introduction to Academic Writing	3
LOPER 1: First-year Seminar		3
Total Credit Hours		15

Code	Title	Credit Hours
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Semester 2

CHEM 161 & 161L	General Chemistry and General Chemistry Laboratory	4
BIOL 106	Biology II	4
SPCH 100	Fundamentals of Speech Communication	3
CHEM 169	Chemistry Foundations and Careers	1
LOPER 5: Visual or Performing Arts		3
Total Credit Hours		15

Code	Title	Credit Hours
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Semester 3

CHEM 360 & 360L	Organic Chemistry and Organic Chemistry Laboratory	5
BIOL 225	Anatomy and Physiology	4
BIOL 211	Human Microbiology	4
LOPER 6: Humanities		3
Total Credit Hours		16

Code	Title	Credit Hours
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Semester 4

CHEM 361 & 361L	Organic Chemistry and Organic Chemistry Laboratory	5
CHEM 310	Safety in Chemistry	1
BIOL 226	Anatomy and Physiology	4
STAT 241	Elementary Statistics	3
or BIOL 305	BioStatistics	
LOPER 7: Social Science		3
Total Credit Hours		16

Code	Title	Credit Hours
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Semester 5

CHEM 351	Biochemistry I	4
CHEM 499L	Research in Chemistry	1-5
or HSCI 475	Internship in Health Sciences	
BIOL 309	Cellular & Molecular Biology	4
or BIOL 360	Genetics	
PHYS 205 & 205L	General Physics I and Physics I Laboratory	5
Total Credit Hours		14-18

Code	Title	Credit Hours
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Semester 6

CHEM 352 & 352L	Biochemistry II and Advanced Biochemistry Lab	4
CHEM 301 & 301L	Analytical Chemistry and Analytical Chemistry Lab	4
CHEM 451	Advanced Biochemistry	3
LOPER 9: Civic Competency and Engagement		3
Total Credit Hours		14

Code	Title	Credit Hours
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Semester 7

CHEM 480	Physical Chemistry	3
or CHEM 430	Inorganic Chemistry	
CHEM 490L	Advanced Chemistry Laboratory	3
CHEM 469	Advanced Seminar in Chemistry	1
LOPER 10: Respect for Human Diversity		3
Unrestricted Elective		3
Unrestricted Elective		3
Total Credit Hours		16

Code	Title	Credit Hours
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Semester 8

Major Elective		4
Unrestricted Elective		3
Unrestricted Elective		3
Unrestricted Elective		3
Unrestricted Elective		2
Total Credit Hours		15

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Code	Title	Credit Hours
Semester 1		
CHEM 160 & 160L	General Chemistry and General Chemistry Laboratory	4
MATH 115	Calculus I with Analytic Geometry	5
ENG 101	Introduction to Academic Writing	3
LOPER 1: First-year Seminar		3
Total Credit Hours		15

Code	Title	Credit Hours
Semester 2		
CHEM 161 & 161L	General Chemistry and General Chemistry Laboratory	4
MATH 202	Calculus II with Analytic Geometry	5
BIOL 106	Biology II	4
CHEM 169	Chemistry Foundations and Careers	1
Total Credit Hours		14

Code	Title	Credit Hours
Semester 3		
CHEM 360 & 360L	Organic Chemistry and Organic Chemistry Laboratory	5
MATH 260	Calculus III	5
SPCH 100	Fundamentals of Speech Communication	3
LOPER 5: Visual or Performing Arts		3
Total Credit Hours		16

Code	Title	Credit Hours
Semester 4		
CHEM 361 & 361L	Organic Chemistry and Organic Chemistry Laboratory	5
CHEM 301 & 301L	Analytical Chemistry and Analytical Chemistry Lab	4
PHYS 275 & 275L	General Physics I (Calculus) and General Physics I (Calculus) Laboratory	5
CHEM 310	Safety in Chemistry	1
Total Credit Hours		15

Code	Title	Credit Hours
Semester 5		
CHEM 351	Biochemistry I	4
CHEM 430B	Inorganic Structures & Properties	2
CHEM 480B	Chemical Kinetics	1
PHYS 276 & 276L	General Physics II (Calculus) and General Physics II (Calculus) Laboratory	5
LOPER 6: Humanities		3
Total Credit Hours		15

Code	Title	Credit Hours
Semester 6		
CHEM 352 & 352L	Biochemistry II and Advanced Biochemistry Lab	4
CHEM 475A & CHEM 475B & CHEM 475C	Instrumental Analysis: Chromatography, NMR, & Mass Spectrometry and Instrumental Analysis: Spectroscopic Techniques and Instrumental Analysis: Electroanalytical Techniques	3
CHEM 499L	Research in Chemistry	2
LOPER 7: Social Science		3
Unrestricted Elective		3
Total Credit Hours		15

Code	Title	Credit Hours
Semester 7		
CHEM 430A	Inorganic Reactions & Mechanisms	1
CHEM 480A	Chemical Thermodynamics	2
CHEM 490L	Advanced Chemistry Laboratory	3
CHEM 469	Advanced Seminar in Chemistry	1
LOPER 9: Civic Competency and Engagement		3
Unrestricted Elective		3
Unrestricted Elective		3
Total Credit Hours		16

Code	Title	Credit Hours
Semester 8		
CHEM 481 & 481B	Physical Chemistry II and Spectroscopy	4
Major Elective		5
LOPER 10: Respect for Human Diversity		3
Unrestricted Elective		3
Total Credit Hours		15

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Code	Title	Credit Hours
Semester 1		
CHEM 160 & 160L	General Chemistry and General Chemistry Laboratory	4
MATH 115	Calculus I with Analytic Geometry	5
ENG 101	Introduction to Academic Writing	3
LOPER 1: First-year Seminar		3
Total Credit Hours		15

Code	Title	Credit Hours
Semester 2		
CHEM 161 & 161L	General Chemistry and General Chemistry Laboratory	4
BIOL 106	Biology II	4
SPCH 100	Fundamentals of Speech Communication	3
CHEM 169	Chemistry Foundations and Careers	1
LOPER 5: Visual or Performing Arts		3
Total Credit Hours		15

Code	Title	Credit Hours
Semester 3		
CHEM 360 & 360L	Organic Chemistry and Organic Chemistry Laboratory	5
BIOL 225	Anatomy and Physiology	4
LOPER 6: Humanities		3
Unrestricted Elective		3
Unrestricted Elective		3
Total Credit Hours		18

Code	Title	Credit Hours
Semester 4		
CHEM 361 & 361L	Organic Chemistry and Organic Chemistry Laboratory	5
CHEM 310	Safety in Chemistry	1
BIOL 226	Anatomy and Physiology	4
STAT 241	Elementary Statistics	3
or BIOL 305	BioStatistics	
LOPER 7: Social Science		3
Total Credit Hours		16

Code	Title	Credit Hours
Semester 5		
CHEM 351	Biochemistry I	4
CHEM 469	Advanced Seminar in Chemistry	1
CHEM 499L	Research in Chemistry	1-5
or HSCI 475	Internship in Health Sciences	
PHYS 205 & 205L	General Physics I and Physics I Laboratory	5
LOPER 9: Civic Competency and Engagement		3
Unrestricted Elective		3
Total Credit Hours		17-21

Code	Title	Credit Hours
Semester 6		
CHEM 301 & 301L	Analytical Chemistry and Analytical Chemistry Lab	4
LOPER 10: Respect for Human Diversity		3
Unrestricted Elective		4

Unrestricted Elective	4
Total Credit Hours	15

Code	Title	Credit Hours
Semester 7		
Pharmacy Electives		12
Total Credit Hours		12

Code	Title	Credit Hours
Semester 8		
Pharmacy Electives		12
Total Credit Hours		12