

Bachelor of Science in Chemistry (ACS Certified Program)

Required 120 credits (36 of which must be numbered 300 or above and 30 of which must be from UND) including:

I. Essential Studies Requirements (see University ES guidelines and course listings.) The following courses must be taken as part of the Essential Studies requirement:

Code	Title	Credits
ENGL 110	College Composition I	3
ENGL 130	Composition II: Writing for Public Audiences	3
COMM 110	Fundamentals of Public Speaking	3

II. The Following Curriculum: Students may choose one the the ACS tracks listed below. The student must complete the requirements for:

- Introductory Courses: Orientation to Chemistry (CHEM 101) and either Fundamentals of Chemistry Concepts and Lab (CHEM 221 and CHEM 221L) OR the combination of General Chemistry I and II with Labs (CHEM 121, CHEM 121L, CHEM 122, and CHEM 122L)
- Foundational Courses: 5 one-semester courses at least three credits each. One class in each area of Chemistry: Analytical, Biochemistry, Inorganic, Organic, Physical
- In-Depth Courses: Four courses that add up to at least 12 credits. For a course to be considered in-depth, it must have a Foundational Course pre-requisite.
- Research and Capstone: Students must complete Senior Research (CHEM 494) and a capstone, typically Chemistry Capstone (CHEM 495). A capstone from another department may be considered.

ACS Tracks

Each of the ACS track options listed below requires the following Introductory Courses:

Introductory Courses

Code	Title	Credits
CHEM 101	Orientation to Chemistry ¹	1
CHEM 221 & 221L	Fundamentals of Chemistry - Concepts and Fundamentals of Chemistry Laboratory ^{2,3}	4
or CHEM 121 & 121L & CHEM 122 & CHEM 122L	General Chemistry I and General Chemistry I Laboratory and General Chemistry II and General Chemistry II Laboratory	

CHEM 101 may be waived for transfer students or students who add or change their major to Chemistry beyond their first year.

Biochemistry Track

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Code		Credits
Foundational Cou		
CHEM 254 & 254L	Inorganic Chemistry I and Inorganic Chemistry I Laboratory	4
CHEM 333 & 333L	Analytical Chemistry and Analytical Chemistry Laboratory	4
CHEM 341 & 341L & CHEM 361	Organic Chemistry I and Organic Chemistry I Laboratory and Problem Solving in Organic Chemistry I	5
CHEM 466	Fundamentals of Physical and Biophysical Chemistr	у 3
CHEM 466L	Fundamentals of Physical and Biophysical Chemistr Laboratory	y 1
BIMD 301	Biochemistry	3
In-Depth Courses		
CHEM 342 & 342L & CHEM 362	Organic Chemistry II and Organic Chemistry II Laboratory and Problem Solving in Organic Chemistry II	5
CHEM 441	Instrumental Analysis I - Spectroscopy	2
CHEM 442	Instrumental Analysis II - Electrochemistry	2
or CHEM 443	Instrumental Analysis III - Chromatography/Mass Spectrometry	
BIOL 341 & 341L	Cell Biology and Cell Biol Lab	4
BIMD 401	Advanced Biochemistry	3
Required Research	ch and Capstone	
CHEM 494	Senior Research	1-3
CHEM 495	Chemistry Capstone	3
Suggested Electiv	ves:	
CHEM 370	Drug Chemistry and Toxicology	3
CHEM 294	Introduction to Undergraduate Research	1-3
CHEM 455	Spectroscopy and Structure	3
CHEM 475	Materials Chemistry	3
BIOL 315	Genetics	3
BIOL 369	Histology	4
& 369L	and Histology Lab	
BIOL 364 & 364L	Parasitology and Parasitology Laboratory	4
N&D 441	Nutritional Biochemistry	4
	d Biology Requirements	
MATH 146	Applied Calculus I	3
or MATH 165	Calculus I	
SOC 326	Sociological Statistics	3
or MATH 166	Calculus II	
PHYS 211	College Physics I	4
or PHYS 251	University Physics I	
PHYS 212 or PHYS 252	College Physics II University Physics II	4
BIOL 150	General Biology I	4
& 150L	and General Biology I Laboratory	
BIOL 151 & 151L	General Biology II and General Biology II Laboratory	4

Biological Track

Code	Title	Credits
Foundational Co.	urses:	
CHEM 254 & 254L	Inorganic Chemistry I and Inorganic Chemistry I Laboratory	4
CHEM 333 & 333L	Analytical Chemistry and Analytical Chemistry Laboratory	4
CHEM 466	Fundamentals of Physical and Biophysical Chemis	try 3

The combination of Chem 121, Chem 121L, Chem 122 and Chem 122L OR Chem 221 and Chem 221L are pre-requisites for Chem 254 and Chem 254L.

³ Chem 121 is 3 credits, Chem 121L is 1 credit. Chem 122 is 3 credits, Chem 122L is 1 credit.



BIMD 301 Biochemistry Organic Chemistry Organic Chemistry Organic Chemistry Survey of Organic Chemistry Say40L and Survey of Organic Chemistry Laboratory Say40L and Organic Chemistry I Say41L and Organic Chemistry I Laboratory Say41L and Organic Chemistry I Laboratory Say41L and Organic Chemistry I Laboratory Say41L and Organic Chemistry II Laboratory Say41L and Cell Biol Lab CHEM 362 Cell Biology Say41L and Cell Biol Lab CHEM 370 Drug Chemistry and Toxicology 30 CHEM 370 Drug Chemistry and Toxicology 30 CHEM 455 Spectroscopy and Structure 30 Required Research and Capstone CHEM 494 Senior Research Say41L Senior Research Say41L Senior Research Say41L Say41L Senior Research Say41L Senior Research Say41L Senior Research Say41L Say41L Senior Research Say41L Say41L Senior Research Say41L Sa	CHEM 466L	Fundamentals of Physical and Biophysical Chemistry Laboratory	1
CHEM 340 Survey of Organic Chemistry and Survey of Organic Chemistry Laboratory OR CHEM 341 Organic Chemistry I shade and Survey of Organic Chemistry Laboratory & GHEM 341 Organic Chemistry I Laboratory & CHEM 361 and Organic Chemistry I Laboratory & CHEM 362 and Problem Solving in Organic Chemistry I & 342L and Organic Chemistry II Laboratory & CHEM 362 and Problem Solving in Organic Chemistry II P & 342L and Organic Chemistry II Laboratory & CHEM 362 and Problem Solving in Organic Chemistry II P & 342L and Cell Biol Lab CHEM 366 Polymers and the Environment CHEM 370 Drug Chemistry and Toxicology CHEM 401 Nanotechnology Nanomaterials CHEM 455 Spectroscopy and Structure Required Research and Capstone CHEM 494 Senior Research CHEM 495 Chemistry Capstone CHEM 496 Chemistry Capstone CHEM 294 Introduction to Undergraduate Research CHEM 491 Instrumental Analysis I - Spectroscopy CHEM 442 Instrumental Analysis II - Electrochemistry CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I or MATH 165 Calculus I SOC 326 Sociological Statistics or MATH 166 Calculus II PHYS 211 College Physics I PHYS 212 College Physics I PHYS 215 University Physics II BIOL 150 General Biology I & 150L BIOL 151 General Biology II & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 3BIOL 369 Histology & 369L BIOL 364 Parasitology 4 4 4 9 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	BIMD 301	•	3
8 340L and Survey of Organic Chemistry Laboratory OR CHEM 341 Organic Chemistry I A341L and Organic Chemistry I Laboratory 8 CHEM 361 and Problem Solving in Organic Chemistry I AND CHEM 342 Organic Chemistry II Laboratory 8 CHEM 342 and Organic Chemistry II Laboratory 8 CHEM 342 and Organic Chemistry II Laboratory 8 CHEM 362 and Problem Solving in Organic Chemistry II I In-Depth Courses BIOL 341 Cell Biology 4 A 341L and Cell Biol Lab CHEM 366 Polymers and the Environment 3 CHEM 370 Drug Chemistry and Toxicology 3 CHEM 455 Spectroscopy and Structure 3 CHEM 455 Spectroscopy and Structure 3 CHEM 494 Senior Research 2-3 CHEM 495 Chemistry Capstone CHEM 494 Introduction to Undergraduate Research 1-3 CHEM 294 Introduction to Undergraduate Research 1-3 CHEM 441 Instrumental Analysis II - Spectroscopy 2 CHEM 442 Instrumental Analysis III - Chromatography/Mass 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass 2 CHEM 444 Instrumental Analysis III - Chromatography/Mass 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass 2 CHEM 445 Spectroscopy Requirements: MATH 146 Applied Calculus I Or MATH 165 Calculus I Or PHYS 251 University Physics I DHYS 211 College Physics I Or PHYS 252 University Physics II BIOL 150 General Biology I A 150L and General Biology II Laboratory BIOL 151 General Biology II A 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology A 369L and Histology BIOL 364 Parasitology 4	Organic Chemist	ry Options (Choose 1 option below)	
CHEM 341 Organic Chemistry I		· · · · · · · · · · · · · · · · · · ·	5
& CHEM 361 and Organic Chemistry I Laboratory and Problem Solving in Organic Chemistry I AND CHEM 342 Organic Chemistry II saboratory and Problem Solving in Organic Chemistry II & 342L and Organic Chemistry II Laboratory and Problem Solving in Organic Chemistry II 2 In-Depth Courses BIOL 341 Cell Biology and Cell Biol Lab CHEM 366 Polymers and the Environment 3 CHEM 370 Drug Chemistry and Toxicology 3 CHEM 401 Nanotechnology Nanomaterials 3 CHEM 455 Spectroscopy and Structure 3 Required Research and Capstone CHEM 494 Senior Research 22-3 CHEM 495 Chemistry Capstone 3 Choose at least 4 credits from the following courses: CHEM 294 Introduction to Undergraduate Research 1-3 CHEM 441 Instrumental Analysis II - Spectroscopy 2 CHEM 442 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I 3 or MATH 165 Calculus I Or PHYS 251 University Physics I PHYS 211 College Physics I or PHYS 252 University Physics II BIOL 150 General Biology I Laboratory BIOL 151 General Biology II & 151 And General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology & 369L and Histology Lab BIOL 364 Parasitology 4	OR		
CHEM 342 Organic Chemistry II & 342L and Organic Chemistry II Laboratory & CHEM 362 and Problem Solving in Organic Chemistry II 2 In-Depth Courses BIOL 341 Cell Biology 4 & 341L and Cell Biol Lab CHEM 366 Polymers and the Environment 3 CHEM 370 Drug Chemistry and Toxicology 3 CHEM 401 Nanotechnology Nanomaterials 3 CHEM 455 Spectroscopy and Structure 3 Required Research and Capstone CHEM 494 Senior Research 2-3 CHEM 495 Chemistry Capstone 3 CHEM 495 Chemistry Capstone 3 CHEM 494 Introduction to Undergraduate Research 1-3 CHEM 494 Instrumental Analysis I - Spectroscopy 2 CHEM 441 Instrumental Analysis II - Electrochemistry 2 CHEM 442 Instrumental Analysis III - Chromatography/Mass 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass 2 CHEM 443 Calculus I CHEM 441 Calculus I CHEM 442 Instrumental Analysis III - Chromatography/Mass 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass 2 CHEM 445 Instrumental Analysis III - Chromatography/Mass 3 Chem 446 Applied Calculus I CHEM 45 Calculus I CHEM 46 Applied Calculus I Chem 47 Instrumental Analysis III - Chromatography/Mass 3 Chem 48 Instrumental Analysis II - Chromatography/Mass 3 Chem 48 Instrumental An	& 341L	and Organic Chemistry I Laboratory	5
8 342L and Organic Chemistry II Laboratory and Problem Solving in Organic Chemistry II 2 In-Depth Courses BIOL 341 Cell Biology and Cell Biol Lab CHEM 366 Polymers and the Environment 3 CHEM 370 Drug Chemistry and Toxicology 3 CHEM 401 Nanotechnology Nanomaterials 3 CHEM 455 Spectroscopy and Structure 3 Required Research and Capstone CHEM 494 Senior Research 2-3 CHEM 495 Chemistry Capstone 3 CHEM 491 Instrumental Analysis I - Spectroscopy 2 CHEM 441 Instrumental Analysis II - Electrochemistry 2 CHEM 442 Instrumental Analysis II - Electrochemistry 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 165 Calculus I PHYS 211 College Physics I or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology II and General Biology II and General Biology II Laboratory Suggested Electives: BIOL 369 Histology And Histology Lab BIOL 364 Parasitology 4 8 369L and Farsitology 4 BIOL 364 Parasitology 4 A 542 A paraitology And First Chemistry II 2 Cell Biology II Aboratory 4 A parasitology 4 A 369L and Histology Lab BIOL 364	AND		
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& 341L and Cell Biol Lab CHEM 366 Polymers and the Environment 3 CHEM 370 Drug Chemistry and Toxicology 3 CHEM 401 Nanotechnology Nanomaterials 3 CHEM 495 Spectroscopy and Structure 3 Required Research and Capstone 2-3 CHEM 494 Senior Research 2-3 CHEM 495 Chemistry Capstone 3 Chem 495 Introduction to Undergraduate Research 1-3 CHEM 294 Introduction to Undergraduate Research 1-3 CHEM 441 Instrumental Analysis II - Spectroscopy 2 CHEM 442 Instrumental Analysis III - Chromatography/Mass 2 Spectrometry Math, Physics, and Biology Requirements: 3 MATH 146 Applied Calculus I 3 SOC 326 Sociological Statistics 3 or MATH 166 Calculus II 4 PHYS 25	In-Depth Courses		
CHEM 370 Drug Chemistry and Toxicology CHEM 401 Nanotechnology Nanomaterials 3 CHEM 455 Spectroscopy and Structure 3 Required Research and Capstone CHEM 494 Senior Research CHEM 495 Chemistry Capstone 3 Choose at least 4 credits from the following courses: CHEM 294 Introduction to Undergraduate Research CHEM 441 Instrumental Analysis II - Spectroscopy 2 CHEM 442 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I SOC 326 Sociological Statistics or MATH 166 Calculus II PHYS 211 College Physics I or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I & 150L BIOL 151 General Biology I Laboratory BIOL 151 General Biology II Laboratory Suggested Electives: BIOL 315 Genetics BIOL 369 Histology and Histology A 369L BIOL 364 Parasitology 4 BIOL 364 BIOL 367 BIOL 364 BIOL 364 BIOL 364 BIOL 369 BIOL 364 BIOL 364 BIOL 364 BIOL 367 BIOL 368 BIOL 368 BIOL 369 BIOL 369 BIOL 364 BIOL 369 BIOL 364 BIOL 369 BIOL 364 BIOL 369 BIOL 364 BIOL 364 BIOL 367 BIOL 367 BIOL 367 BIOL 367 BIOL 367 BIOL 368 BIOL 369 BIOL			4
CHEM 401 Nanotechnology Nanomaterials 3 CHEM 455 Spectroscopy and Structure 3 Required Research and Capstone CHEM 494 Senior Research 2-3 CHEM 495 Chemistry Capstone 3 Choose at least 4 credits from the following courses: CHEM 294 Introduction to Undergraduate Research 1-3 CHEM 441 Instrumental Analysis I - Spectroscopy 2 CHEM 442 Instrumental Analysis II - Electrochemistry 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I or MATH 165 Calculus I SOC 326 Sociological Statistics 3 or MATH 166 Calculus II PHYS 211 College Physics I or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I & 150L and General Biology I Laboratory BIOL 151 General Biology II & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology and Histology Lab BIOL 364 Parasitology 4 BIOL 364	CHEM 366	Polymers and the Environment	3
CHEM 455 Spectroscopy and Structure 3 Required Research and Capstone CHEM 494 Senior Research 2-3 CHEM 495 Chemistry Capstone 3 Choose at least 4 credits from the following courses: CHEM 294 Introduction to Undergraduate Research 1-3 CHEM 441 Instrumental Analysis I - Spectroscopy 2 CHEM 442 Instrumental Analysis II - Electrochemistry 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I 3 or MATH 165 Calculus I SOC 326 Sociological Statistics 3 or MATH 16 Calculus II PHYS 211 College Physics I 4 or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I 4 & 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology & 369L and Histology Lab BIOL 364 Parasitology 4	CHEM 370	Drug Chemistry and Toxicology	3
Required Research and Capstone CHEM 494 Senior Research 2-3 CHEM 495 Chemistry Capstone 3 Choose at least 4 credits from the following courses: CHEM 294 Introduction to Undergraduate Research 1-3 CHEM 441 Instrumental Analysis I - Spectroscopy 2 CHEM 442 Instrumental Analysis III - Electrochemistry 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I 3 or MATH 165 Calculus I SOC 326 Sociological Statistics 3 or MATH 166 Calculus II PHYS 211 College Physics I 4 or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I 4 & 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology & 369L and Histology Lab BIOL 364 Parasitology 4 BIOL 364	CHEM 401	Nanotechnology Nanomaterials	3
CHEM 494 Senior Research CHEM 495 Chemistry Capstone Choose at least 4 credits from the following courses: CHEM 294 Introduction to Undergraduate Research CHEM 294 Instrumental Analysis I - Spectroscopy CHEM 441 Instrumental Analysis II - Electrochemistry CHEM 442 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I SOC 326 Sociological Statistics or MATH 165 Calculus II PHYS 211 College Physics I or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I and General Biology I Aboratory BIOL 151 General Biology II A 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics BIOL 369 Histology & 369L and Histology Lab BIOL 364 Parasitology 4	CHEM 455	Spectroscopy and Structure	3
CHEM 495 Chemistry Capstone 3 Choose at least 4 credits from the following courses: CHEM 294 Introduction to Undergraduate Research 1-3 CHEM 441 Instrumental Analysis I - Spectroscopy 2 CHEM 442 Instrumental Analysis II - Electrochemistry 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I SOC 326 Sociological Statistics 3 or MATH 165 Calculus II PHYS 211 College Physics I or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I and General Biology I 4 biol 151 General Biology II biol 151 General Biology II biol 151 General Biology II biol 315 Genetics 3 BIOL 369 Histology and Histology and Histology Lab BIOL 364 Parasitology 4 BIOL 364	Required Research	ch and Capstone	
Choose at least 4 credits from the following courses: CHEM 294 Introduction to Undergraduate Research 1-3 CHEM 441 Instrumental Analysis I - Spectroscopy 2 CHEM 442 Instrumental Analysis II - Electrochemistry 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass 2 Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I 3 or MATH 165 Calculus I 3 SOC 326 Sociological Statistics 3 or MATH 166 Calculus II 7 PHYS 211 College Physics I 4 or PHYS 251 University Physics I 4 or PHYS 212 College Physics I 4 or PHYS 252 University Physics II 4 IBIOL 150 General Biology I 4 ISOL 151 6	CHEM 494	Senior Research	2-3
CHEM 294 Introduction to Undergraduate Research CHEM 441 Instrumental Analysis I - Spectroscopy CHEM 442 Instrumental Analysis II - Electrochemistry CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I Or MATH 165 Calculus I SOC 326 Sociological Statistics Or MATH 166 Calculus II PHYS 211 College Physics I Or PHYS 251 University Physics I PHYS 212 College Physics II Or PHYS 252 University Physics II BIOL 150 General Biology I & 150L and General Biology I Laboratory BIOL 151 General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology & 369L and Histology Lab BIOL 364 Parasitology 4	CHEM 495	Chemistry Capstone	3
CHEM 441 Instrumental Analysis I - Spectroscopy CHEM 442 Instrumental Analysis II - Electrochemistry CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I SOC 326 Sociological Statistics or MATH 166 Calculus II PHYS 211 College Physics I or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I and General Biology I Laboratory BIOL 151 General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology & 369L and Histology Lab BIOL 364 Parasitology 4	Choose at least 4	credits from the following courses:	
CHEM 442 Instrumental Analysis III - Electrochemistry 2 CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I Or MATH 165 Calculus I SOC 326 Sociological Statistics 3 Or MATH 166 Calculus II PHYS 211 College Physics I Or PHYS 251 University Physics I PHYS 212 College Physics II Or PHYS 252 University Physics II BIOL 150 General Biology I & 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology & 369L and Histology Lab BIOL 364 Parasitology 4	CHEM 294	Introduction to Undergraduate Research	1-3
CHEM 443 Instrumental Analysis III - Chromatography/Mass Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I or MATH 165 Calculus I SOC 326 Sociological Statistics 3 or MATH 166 Calculus II PHYS 211 College Physics I or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I and General Biology I Laboratory BIOL 151 General Biology II 4 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology & 369L and Histology Lab BIOL 364 Parasitology 4	CHEM 441	Instrumental Analysis I - Spectroscopy	2
Spectrometry Math, Physics, and Biology Requirements: MATH 146 Applied Calculus I or MATH 165 Calculus I SOC 326 Sociological Statistics 3 or MATH 166 Calculus II PHYS 211 College Physics I or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I & 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology & 369L and Histology Lab BIOL 364 Parasitology 4	CHEM 442	Instrumental Analysis II - Electrochemistry	2
MATH 146 Applied Calculus I 3 or MATH 165 Calculus I 3 SOC 326 Sociological Statistics 3 or MATH 166 Calculus II 4 PHYS 211 College Physics I 4 or PHYS 251 University Physics I 4 PHYS 212 College Physics II 4 or PHYS 252 University Physics II 4 BIOL 150 General Biology I 4 & 150L and General Biology I Laboratory BIOL 151 General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4	CHEM 443		2
or MATH 165 Calculus I SOC 326 Sociological Statistics 3 or MATH 166 Calculus II PHYS 211 College Physics I or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I & 150L and General Biology I Laboratory BIOL 151 General Biology II & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology & 369L and Histology Lab BIOL 364 Parasitology 4	Math, Physics, ar	nd Biology Requirements:	
SOC 326 Sociological Statistics 3 or MATH 166 Calculus II PHYS 211 College Physics I 4 or PHYS 251 University Physics I 4 PHYS 212 College Physics II 4 or PHYS 252 University Physics II 4 BIOL 150 General Biology I 4 & 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4	MATH 146	Applied Calculus I	3
or MATH 166 Calculus II PHYS 211 College Physics I 4 or PHYS 251 University Physics I PHYS 212 College Physics II 4 or PHYS 252 University Physics II BIOL 150 General Biology I 4 & 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4	or MATH 165	Calculus I	
or PHYS 251 University Physics I PHYS 212 College Physics II or PHYS 252 University Physics II BIOL 150 General Biology I & 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4		-	3
PHYS 212 College Physics II 4 or PHYS 252 University Physics II BIOL 150 General Biology I 4 & 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4	PHYS 211	College Physics I	4
or PHYS 252 University Physics II BIOL 150 General Biology I 4 & 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4	or PHYS 251	University Physics I	
BIOL 150 General Biology I 4 & 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4	PHYS 212	College Physics II	4
& 150L and General Biology I Laboratory BIOL 151 General Biology II 4 & 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4	or PHYS 252	University Physics II	
& 151L and General Biology II Laboratory Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4	& 150L	and General Biology I Laboratory	4
Suggested Electives: BIOL 315 Genetics 3 BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4		· ·	4
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BIOL 369 Histology 4 & 369L and Histology Lab BIOL 364 Parasitology 4			
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BIOL 364 Parasitology 4			4
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Computational Track

Code	Title	Credits
Foundational Cou	urses	
CHEM 254 & 254L	Inorganic Chemistry I and Inorganic Chemistry I Laboratory	4
CHEM 333 & 333L	Analytical Chemistry and Analytical Chemistry Laboratory	4
CHEM 470 & 470R	Thermodynamics Kinetics and Thermodynamics Kinetics Recitation	4
BIMD 301	Biochemistry	3
Organic Chemistry Options (Choose 1 option below)		
CHEM 340 & 340L	Survey of Organic Chemistry and Survey of Organic Chemistry Laboratory	5

OR		
CHEM 341 & 341L	Organic Chemistry I and Organic Chemistry I Laboratory	5
& CHEM 361	and Problem Solving in Organic Chemistry I	
AND		
CHEM 342	Organic Chemistry II	5
& 342L	and Organic Chemistry II Laboratory	
& CHEM 362	and Problem Solving in Organic Chemistry II	
In-Depth Courses		
CHEM 401	Nanotechnology Nanomaterials	3
CHEM 441	Instrumental Analysis I - Spectroscopy	2
CHEM 442	Instrumental Analysis II - Electrochemistry	2
CHEM 454	Inorganic Chemistry II	4
& 454L	and Inorganic Chemistry II Laboratory	
CHEM 455	Spectroscopy and Structure	3
CHEM 470L	Physical Chemistry Laboratory	1
CHEM 471	Quantum Mechanics Spectroscopy	4
& 471R	and Quantum Mechanics Spectroscopy Recitation	
Required Research	ch and Capstone	
CHEM 494	Senior Research	2-3
CHEM 495	Chemistry Capstone	3
Math and Physics	Requirements:	
MATH 165	Calculus I	4
MATH 166	Calculus II	4
PHYS 251	University Physics I	4
PHYS 252	University Physics II	4
Suggested Electiv	/es:	
CSCI 242	Algorithms and Data Structures	3
CSCI 270	Programming for Data Science	3

Environmental Track

Code	Title	Credits
Foundational Cou	ırses	
CHEM 254 & 254L	Inorganic Chemistry I and Inorganic Chemistry I Laboratory	4
CHEM 333 & 333L	Analytical Chemistry and Analytical Chemistry Laboratory	4
CHEM 466	Fundamentals of Physical and Biophysical Chemist	ry 3
CHEM 466L	Fundamentals of Physical and Biophysical Chemist Laboratory	ry 1
BIMD 301	Biochemistry	3
Organic Chemist	ry Options (Choose 1 option below)	
CHEM 340 & 340L	Survey of Organic Chemistry and Survey of Organic Chemistry Laboratory	5
OR		
CHEM 341 & 341L & CHEM 361	Organic Chemistry I and Organic Chemistry I Laboratory and Problem Solving in Organic Chemistry I	5
AND		
CHEM 342 & 342L & CHEM 362	Organic Chemistry II and Organic Chemistry II Laboratory and Problem Solving in Organic Chemistry II	5
Must include 44x	:: Choice of 12 credits from the following courses. series, up to 2 credits of 44x can be replaced by edits completed in CHEM 294.	
CHEM 366	Polymers and the Environment	3
CHEM 370	Drug Chemistry and Toxicology	3
CHEM 294	Introduction to Undergraduate Research	1-3
CHEM 402	Trends in Forensic and Environmental Analytical Chemistry	3
CHEM 441	Instrumental Analysis I - Spectroscopy	2
CHEM 442	Instrumental Analysis II - Electrochemistry	2



CHEM 443	Instrumental Analysis III - Chromatography/Mass Spectrometry	2
Required Researc	h and Capstone	
CHEM 494	Senior Research (lab research credits from other department can be considered)	3
CHEM 495	Chemistry Capstone	3
Math and Physics	Requirements:	
MATH 146	Applied Calculus I	3
or MATH 165	Calculus I	
SOC 326	Sociological Statistics	3
or MATH 166	Calculus II	
PHYS 211	College Physics I	4
or PHYS 251	University Physics I	
PHYS 212	College Physics II	4
or PHYS 252	University Physics II	
Choose at least 9	credits from the following courses as electives	
COMM 360	Communicating Science	3
ENRV 100	Environmental Studies Seminar	1
ENRV 122	Foundations of Environmental Science	3
ESSP 200	Sustainability Science	3
GEOG 274	Introduction to Geospatial Technologies	3
GEOG 454	Conservation and Sustainable Use of Natural Resources	3
GEOE 419	Groundwater Monitoring and Remediation	3
GEOL 101	Introduction to Geology	3
GEOL 103	Introduction to Environmental Issues	3

Physical Science Track

Code	Title	Credits
Foundational Co	urses	
CHEM 254 & 254L	Inorganic Chemistry I and Inorganic Chemistry I Laboratory	4
CHEM 333 & 333L	Analytical Chemistry and Analytical Chemistry Laboratory	4
CHEM 341 & 341L & CHEM 361	Organic Chemistry I and Organic Chemistry I Laboratory and Problem Solving in Organic Chemistry I	5
CHEM 470 & 470R	Thermodynamics Kinetics and Thermodynamics Kinetics Recitation	4
BIMD 301	Biochemistry	3
In-Depth Courses	3	
CHEM 342 & 342L & CHEM 362	Organic Chemistry II and Organic Chemistry II Laboratory and Problem Solving in Organic Chemistry II	5
CHEM 454 & 454L	Inorganic Chemistry II and Inorganic Chemistry II Laboratory	4
CHEM 470L	Physical Chemistry Laboratory	1
CHEM 471 & 471R	Quantum Mechanics Spectroscopy and Quantum Mechanics Spectroscopy Recitation	4
Required Resear	ch and Capstone	
CHEM 494	Senior Research	1-3
CHEM 495	Chemistry Capstone	3
Choose two cour series:	rses (four total credits) of the following in the 44x	
CHEM 441	Instrumental Analysis I - Spectroscopy	2
CHEM 442	Instrumental Analysis II - Electrochemistry	2
CHEM 443	Instrumental Analysis III - Chromatography/Mass Spectrometry	2
Suggested Electi	ves	
CHEM 401	Nanotechnology Nanomaterials	3
CHEM 475	Materials Chemistry	3
Math and Physics	s Requirements:	

MATH 165	Calculus I	4		
MATH 166	Calculus II	4		
PHYS 251	University Physics I	4		
PHYS 252	University Physics II	4		
Suggested Electiv	Suggested Electives:			
PHYS 253	University Physics III	4		
GEOL 316	Earth Materials	3		
GEOL 318 & 318L	Mineralogy and Mineralogy Lab	3		

Materials Science Track

Code	Title C	redits
Foundational Co.	ırses	
CHEM 254 & 254L	Inorganic Chemistry I and Inorganic Chemistry I Laboratory	4
CHEM 333 & 333L	Analytical Chemistry and Analytical Chemistry Laboratory	4
CHEM 341 & 341L & CHEM 361	Organic Chemistry I and Organic Chemistry I Laboratory and Problem Solving in Organic Chemistry I	5
CHEM 466	Fundamentals of Physical and Biophysical Chemistry	3
CHEM 466L	Fundamentals of Physical and Biophysical Chemistry Laboratory	1
BIMD 301	Biochemistry	3
In-Depth Courses		
CHEM 342 & 342L & CHEM 362	Organic Chemistry II and Organic Chemistry II Laboratory and Problem Solving in Organic Chemistry II	5
CHEM 366	Polymers and the Environment	3
CHEM 370	Drug Chemistry and Toxicology	3
CHEM 401	Nanotechnology Nanomaterials	3
CHEM 454 & 454L	Inorganic Chemistry II and Inorganic Chemistry II Laboratory	4
CHEM 455	Spectroscopy and Structure	3
CHEM 475	Materials Chemistry	3
Required Research	ch and Capstone	
CHEM 494	Senior Research	2-3
CHEM 495	Chemistry Capstone	3
Suggested Electi	ves: Choose at least one from below	
CHEM 441	Instrumental Analysis I - Spectroscopy	2
CHEM 442	Instrumental Analysis II - Electrochemistry	2
CHEM 294	Introduction to Undergraduate Research	1-3
Math and Physics	s Requirements:	
MATH 146	Applied Calculus I	3
or MATH 165	Calculus I	
SOC 326	Sociological Statistics	3
or MATH 166	Calculus II	
PHYS 211 or PHYS 251	College Physics I University Physics I	4
PHYS 212	College Physics II	4
or PHYS 252	University Physics II	

Research-Focused Track

This track is intended to prepare students for all foundational areas in chemistry and is highly recommended for those who consider graduate school in chemistry.

Code	Title	Credits
Foundational C	Courses	
CHEM 254 & 254L	Inorganic Chemistry I and Inorganic Chemistry I Laboratory	4



CHEM 333 & 333L	Analytical Chemistry and Analytical Chemistry Laboratory	4	
CHEM 341 & 341L & CHEM 361	Organic Chemistry I and Organic Chemistry I Laboratory and Problem Solving in Organic Chemistry I	5	
CHEM 470 & 470R	Thermodynamics Kinetics and Thermodynamics Kinetics Recitation	4	
BIMD 301	Biochemistry	3	
In-Depth Courses			
CHEM 342 & 342L & CHEM 362	Organic Chemistry II and Organic Chemistry II Laboratory and Problem Solving in Organic Chemistry II	5	
CHEM 441	Instrumental Analysis I - Spectroscopy	2	
CHEM 442	Instrumental Analysis II - Electrochemistry	2	
CHEM 443	Instrumental Analysis III - Chromatography/Mass Spectrometry	2	
CHEM 454 & 454L	Inorganic Chemistry II and Inorganic Chemistry II Laboratory	4	
CHEM 470L	Physical Chemistry Laboratory	1	
CHEM 471 & 471R	Quantum Mechanics Spectroscopy and Quantum Mechanics Spectroscopy Recitation	4	
Required Research and Capstone			
CHEM 494	Senior Research	1-3	
CHEM 495	Chemistry Capstone	3	
Suggested Electives:			
CHEM 475	Materials Chemistry	3	
CHEM 455	Spectroscopy and Structure	3	
CHEM 401	Nanotechnology Nanomaterials	3	
BIMD 401	Advanced Biochemistry	3	
Math and Physics	Requirements		
MATH 165	Calculus I	4	
MATH 166	Calculus II	4	
PHYS 251	University Physics I	4	
PHYS 252	University Physics II	4	

Teacher Licensure

Through a partnership with the College of Education and Human Development, the Department of Teaching, Leadership & Professional Practice, students may seek secondary licensure in Chemistry. The following program of study must be completed:

I. Chemistry Coursework

- Chemistry Courses required for a Chemistry degree (B.S. Chemistry or B.S. Chemistry-ACS), including level-II proficiency (two semesters) in a world language.
- 2. Essential studies coursework.

II. Admission to the Secondary Program i.e., completion of preadmission courses. See College of Education and Human Development for admission and licensing requirements (https://catalog.und.edu/undergraduateacademicinformation/departmentalcoursesprograms/chemistry/chem-bs/public.courseleaf.com/undergraduateacademicinformation/departmentalcoursesprograms/teachingandlearning/tl-bsed-se/). Including courses: T&L 250 Introduction to Education T&L 251 Understanding Individuals with Different Abilities III. The program in Secondary Education (see Department of Teaching, Leadership & Professional Practice (https://und-public.courseleaf.com/undergraduateacademicinformation/departmentalcoursesprograms/teachingandlearning/tl-bsed-se/)) Chemistry majors seeking secondary licensure must have an advisor in both the Chemistry Department and the Department of Teaching, Leadership & Professional Practice.