Chemistry

The following matrix indicates those courses deemed transferable among institutions listed across the top of the matrix. The numbers on the matrix represent the number of semester hours associated with the course at each institution and which institutions have agreed to transfer the commonly numbered course in each row.

You can view the group leaders at the bottom of the page. If you are interested in printing this page, please note that it is best to print in landscape mode.

Prefix	Number	Gerta	Course Title	BSC	LRSC	NDSCS	WSC	DCB	DSU	MASU	MISU	NDSU	UND	VCSU	UTTC
CHEM	110	ND:LABSC	Survey of Chemistry	3							4		4		
CHEM	110L	ND:LABSC	Survey of Chemistry Lab	1											
CHEM	112	ND:LABSC	Introduction to Forensic Science	3			3								
CHEM	112L	ND:LABSC	Introduction to Forensic Science Lab	1			1								
CHEM	115	ND:LABSC	Introductory Chemistry	4	4	3	3	4	3		4		3	4	3
CHEM	115L	ND:LABSC	Introductory Chemistry Lab	1		1	1		1				1		1
CHEM	116	ND:LABSC	Introduction to Organic & Biochemistry	4	4	3	3	4	3				3	4	4
CHEM	116L	ND:LABSC	Introduction to Organic & Biochemistry Laboratory	1		1	1		1				1		
CHEM	117	ND:LABSC	Chemical Concepts and Applications		4							3			

Prefix	Number	Gerta	Course Title	BSC	LRSC	NDSCS	WSC	DCB	DSU	MASU	MISU	NDSU	UND	VCSU	UTTC
CHEM	117L	ND:LABSC	Chemical Concepts and Applications Laboratory									1			
CHEM	121	ND:LABSC	General Chemistry I	4	5	4	4	4	4	4	5	3	3	5	3
CHEM	121L	ND:LABSC	General Chemistry I Lab	1		1	1		1			1	1		1
CHEM	122	ND:LABSC	General Chemistry II	4	5	4	4	4	4	4	5	3	3	5	3
CHEM	122L	ND:LABSC	General Chemistry II Lab	1		1	1		1			1	1		1
CHEM	140		Organic Chemical Concepts and Applications									1			
CHEM	219		Analytical Chemistry for Chemical Technology												
CHEM	219L		Analytical Chemistry for Chemical Technology Lab												
CHEM	230/330		Quantitative Analysis/lab				3/1		4	3/1	3			4	
CHEM	240/340		Survey of Organic Chemistry				4				4	3	4		
CHEM	240/340L		Survey of Organic Chemistry Lab				1				1		1		
CHEM	241/341	ND:LABSC	Organic Chemistry I	4	3	4	3	4	4	5	4	3	4	5	
CHEM	241/341L	ND:LABSC	Organic Chemistry I Laboratory	1	1	1	1		1		1	1	1		
CHEM	242/342	ND:LABSC	Organic Chemistry II	4		4	3	4	4	5	4	3	4	5	

Prefix	Number	Gerta	Course Title	BSC	LRSC	NDSCS	WSC	DCB	DSU	MASU	MISU	NDSU	UND	VCSU	UTTC
CHEM	242/342L	ND:LABSC	Organic Chemistry II Laboratory	1		1	1		1		1	1	1		
CHEM	260/360/L	ND:LABSC	Elements of Biochemistry	3	4	3	3		3	4		4		3	

CHEM 110 Survey of Chemistry
Course designed for non-science majors who wish to obtain a basic understanding of chemistry as applied in the world today. Includes laboratory.

CHEM 110L Survey of Chemistry Lab
Laboratory to accompany Chemistry 110.

CHEM 112 Introduction to Forensic Science
Introduces the basic principles and relationships between the applications of chemistry to forensic science as they relate to the criminal investigative process. Areas included are blood analysis, hair analysis, firearm identification, fiber comparisons, paints, glass compositions, soil comparison, and seminal fluid analysis. Upon completion of this course students should understand the potential value of forensic science and also the limitations.

CHEM 112L Introduction to Forensic Science Lab
Laboratory to accompany CHEM 112.

CHEM 115 Introductory Chemistry
- Students will gain an understanding of the nature of atoms, molecules, elements, compounds, etc.
- Students will gain a basic understanding of the changes that take place in chemical reactions. Ability to perform simple stoichiometry calculations.
- Students will gain an understanding of the phases of matter.
- Students will gain an elementary understanding of chemical bonds.
- Students will gain an elementary understanding of the nature of acids and bases.

CHEM 115L Introductory Chemistry Lab
- Students will develop familiarity with basic equipment and techniques used in chemical laboratories.

- Students will learn about the process of scientific inquiry.
- Students will develop an awareness of safety issues in a chemical laboratory.
- Students will gain an understanding of quantitative measurements, significant figures.
- Students will gain the ability to perform a variety of introductory chemistry experiments, for example involving determining chemical formulae, characterizing solutions, acids and bases, etc.

CHEM 116 Introduction to Organic & Biochemistry

- Students will gain a fundamental understanding of nomenclature, reactions, and properties of organic molecules by function groups, including alkanes, alkenes, aromatics, alcohols, ethers, amines, aldehydes, ketones, carboxylic acids, and their derivatives.
- Students will gain a fundamental understanding of the application of the reactions and properties of organic chemistry in the context of major biomolecules, including proteins and amino acids, carbohydrates, and lipids.
- Students will gain a fundamental understanding of biochemistry concepts of structure-function relationships, enzymes, nucleic acids, and energy generation.

CHEM 116L Introduction to Organic & Biochemistry Laboratory

- Students will develop familiarity with properties of and qualitative tests for various classes of organic molecules, such as hydrocarbons, alcohols, amines, aldehydes, ketones, carboxylic acids, and their derivatives.
- Students will develop familiarity with qualitative tests for major biomolecules such as carbohydrates and proteins.
- Students will gain an understanding of safety issues important in an organic chemistry laboratory.

CHEM 117 Chemical Concepts and Applications

- Students will gain an understanding of the nature of atoms, molecules, elements, compounds, etc.
- Students will gain a basic understanding of the changes that take place in chemical reactions. Ability to perform simple stoichiometry calculations.
- Students will gain an understanding of the phases of matter.
- Students will gain an elementary understanding of chemical bonds.
- Students will gain an elementary understanding of the nature of acids and bases.

CHEM 117L Chemical Concepts and Applications Laboratory

- Students will develop familiarity with basic equipment and techniques used in chemical laboratories.
- Students will learn about the process of scientific inquiry.
- Students will develop an awareness of safety issues in a chemical laboratory.

- Students will gain an understanding of quantitative measurements, significant figures.
- Students will gain the ability to perform a variety of introductory chemistry experiments, for example involving determining chemical formulae, characterizing solutions, acids and bases, etc.

CHEM 121 General Chemistry I

- Students will gain a fundamental understanding of the nature of atoms, ions, and molecules.
- Students will gain a detailed understanding of the quantitative relationships governing chemical reactions, including the ability to perform a variety of stoichiometry calculations.
- Students will gain a fundamental understanding of the behavior and properties of ideal gases.
- Students will gain an understanding of elementary thermochemistry (Hess' Law calculations, heats of reaction, heats of formation, etc.)
- Students will gain an elementary understanding of electronic structure of atoms, including a bit of quantum theory, and periodic relationships of the chemical elements.
- Students will gain an understanding of chemical bonding, including knowledge of different types of bonding, predictions of molecular geometry from VSEPR theory, and hybridization.
- Students will be able to identify fundamental reaction types, especially acid-base, precipitation, and oxidation-reduction, as well as descriptive chemistry of simple inorganic ions and molecules.

CHEM 121L General Chemistry I Lab

- Student will develop familiarity with equipment and techniques used in chemical laboratories.
- Students will learn about the process of scientific inquiry.
- Students will develop an awareness of safety issues in a chemical laboratory.
- Students will gain an understanding of quantitative measurements, significant figures.
- Students will gain the ability to perform a variety of chemistry experiments, for example involving determining chemical formulae, characterizing solutions, thermochemical measurements, elementary synthesis reactions, solubility measurements.

CHEM 122 General Chemistry II

- Students will gain an understanding of intermolecular forces, including how such forces affect bulk properties, and an understanding of the properties of different phases of matter.
- Students will gain an understanding of the physical properties of solutions, including the ability to use quantitative concentration measurements.
- Students will gain an elementary understanding of chemical kinetics.

- Students will gain an understanding of chemical equilibria, including the ability to perform equilibrium calculations on a variety of chemical reactions, including gas phase reactions, acid/base reactions, and solubility product calculations.
- Students will gain an understanding of the nature of acids and bases, including acid/base equilibria and buffers.
- Students will gain an understanding of the concepts of entropy, free energy, and how these affect chemical reactions.
- Students will gain an elementary understanding of electrochemistry.
- Students will gain an understanding of descriptive chemistry of simple inorganic ions and molecules.

CHEM 122L General Chemistry II Lab

- Students will develop familiarity with basic equipment and techniques used in chemical laboratories.
- Students will learn to interpret data using graphical analysis and spreadsheets.
- Students will use equipment and chemical reagents in a safe manner.
- Students will gain the ability to perform a variety of chemistry experiments, for example involving enthalpy measurements and phase changes, elementary chromatography, colligative properties of solutions, rates of chemical reactions, titration analysis, etc.

CHEM 140 Organic Chemical Concepts and Applications

Introduction to organic chemistry for pre-nursing, transfer students and other students who need to meet the prerequisite for BIOC 260. NDSU only.

CHEM 219 Analytical Chemistry for Chemical Technology

Includes experimental procedures not normally covered in quantitative analysis. Concurrent registration CHEM 219L is required. Prerequisite: CHEM 230.

CHEM 219L Analytical Chemistry for Chemical Technology Lab

Includes experimental procedure not normally covered in quantitative analysis. Concurrent registration in CHEM 219 is required.

CHEM 230/330 Quantitative Analysis/lab

Statistical treatment of data and error analysis; gravimetric analysis: solution chemistry and solubility equilibria; volumetric analyses: acid-base neutralization, complexometric and redox methods.

CHEM 240/340 Survey of Organic Chemistry

- Students will gain an understanding of chemical bonding, structure, and functional groups.
- Students will gain an understanding of acid-base properties of organic compounds.
- Students will gain an understanding of basic principles of stereochemistry.
- Students will gain an understanding the structure, and some reactions, of major classes of organic molecules, including alkanes, alkenes, alkynes, alcohols, ethers, amines, aldehydes, ketones, organic acids, aromatic compounds.

CHEM 240/340L Survey of Organic Chemistry Lab

- Students will develop familiarity with equipment and techniques of an organic chemistry laboratory.
- Students will learn about the process of scientific inquiry.
- Students will use equipment and reagents in a safe manner.
- Students will gain the ability to perform a variety of experiments in organic chemistry, with examples primarily including synthesis and characterization of organic compounds. Characterization methods including chromatography.
- Students will gain the ability to describe experiments and results in a well-written laboratory report.

CHEM 241/341 Organic Chemistry I

- Students will gain an understanding of Chemical Structure and Bonding.
- Students will gain an understanding of acid-base properties of organic compounds.
- Students will gain a detailed understanding of the structure, properties, and chemical reactivity of the basic classes of organic compounds: alkanes, alkenes, alkynes, alkyl halides.
- Students will gain an understanding of the basics of stereochemistry, including chirality.

CHEM 241/341L Organic Chemistry I Laboratory

- Students will develop familiarity with equipment and techniques of an organic chemistry laboratory.
- Students will learn about the process of scientific inquiry.
- Students will use equipment and reagents in a safe manner.
- Students will gain the ability to perform a variety of experiments in organic chemistry, with examples primarily including synthesis and characterization of organic compounds. Characterization methods including chromatography.
- Students will gain the ability to describe experiments and results in a well-written laboratory report.

CHEM 242/342 Organic Chemistry II

- Students will gain an understanding of spectrometric techniques for the determination of organic structure.
- Students will gain a detailed understanding of the structure, properties, and chemical reactivity of the basic classes of organic compounds: aromatic compounds, alcohols, ethers, aldehydes, ketones, carboxylic acids, amines.
- Students will gain an understanding of the methodology of organic synthesis.

CHEM 242/342L Organic Chemistry II Laboratory

- Students will develop further familiarity with equipment and techniques of an organic chemistry laboratory.
- Students will learn about the process of scientific inquiry.
- Students will use equipment and reagents in a safe manner.
- Students will gain the ability to perform a variety of experiments in organic chemistry, with examples including advanced organic synthesis and chromatographic analysis.
- Students will gain the ability to describe experiments and results in a well-written laboratory report.

CHEM 260/360/L Elements of Biochemistry

- Students will gain the fundamental understanding of the structure and properties of several classes of organic compounds.
- Students will gain an understanding of the structure and properties of molecules of biological importance, including carbohydrates, lipids, proteins, nucleotides, nucleic acids, etc.
- Students will gain an elementary understanding of biochemical mechanisms in metabolism, biosynthesis, gene expression, etc.
- Students will gain an elementary understanding of the biochemistry of cancer.

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