

CHEMISTRY COURSE INFORMATION
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1. Chemistry Placement Guidelines by Program*

Major	General Chemistry	Organic Chemistry
Non-science majors	CHEM 100	
Honors Program students	CHEM 201H, 202H	
Nursing	CHEM 121	CHEM 220A, 220L
Chemistry, biochemistry, molecular biology, chemical engineering, and other physical sciences and engineering requiring advanced courses in chemistry and molecular science	CHEM 201, 202	CHEM 341, 342
Life sciences, environmental sciences, health sciences, ecology and conservation biology, and other sciences and engineering requiring general chemistry or organic chemistry	CHEM 121, 122	CHEM 241, 242
Pre-dental, pre-medicine	CHEM 121, 122, or CHEM 201, 202	CHEM 241, 242, or CHEM 341, 342

*These are general guidelines. See your major department adviser for specific requirements.

2. Chemistry Prerequisites and Placement

Course eligibility requirements are based on mathematics test scores **OR** course prerequisites and corequisites. These requirements are designed to ensure that you have the background and skills to succeed in chemistry. Exemptions from eligibility requirements in special cases may be granted only by the course instructor.

Test score requirements for CHEM 100, 121 and 201:

Registration is allowed in the following chemistry course	If your ACT math score is	OR if your SAT math score is	OR if you have obtained
CHEM 100 and 121	27 or above	610 or above	the requisite scores on the ACCUPLACER test*
CHEM 201	28 or above	630 or above	the requisite scores on the ACCUPLACER test*

Course prerequisites for enrollment in chemistry courses:

Registration is allowed in the following chemistry course	If you will have completed the following prerequisite at UNR** by the start of the term	OR if you are eligible to co-enroll in the following math corequisite
CHEM 100 and 121	MATH 120 or higher Core math course*** (MATH 127 or higher recommended)	MATH 127 or higher Core math course***
CHEM 122	CHEM 121; and MATH 127 or higher Core math course***	n/a
CHEM 201	MATH 181	MATH 181
CHEM 202	CHEM 201, or CHEM 121 with grade of A or B; and MATH 181	n/a
CHEM 220A	CHEM 121 (CHEM 122 recommended), or CHEM 201 or 202	n/a
CHEM 220L	CHEM 121 or CHEM 220A	n/a
CHEM 345	CHEM 242; prerequisite or corequisite CHEM 342	n/a
CHEM 347 ****	CHEM 122 or CHEM 202; corequisite CHEM 341	n/a
CHEM 348	CHEM 347	
Other courses	See http://www.chem.unr.edu/advising/	

Your registration in any chemistry course may be blocked or canceled:

- If you have not met any course prerequisite OR
- If you do not meet the eligibility requirements for a math corequisite OR
- If you do not meet any test score requirement OR
- If you do not attend the first laboratory meeting.

*The ACCUPLACER test is offered through the Math Center. See <http://www.unr.edu/mathcenter/placement.html> or the MATH section of the Class Schedule for instructions.

**For transfer students, registration is allowed after your records verifying the math course have been transferred to UNR (for information contact the Transfer Center at 775-682-8084).

***Core Math courses include MATH 120, 127, 128, STAT 152, 176, 181 and APST 270.

****Open to chemistry majors or with instructor's permission. (Others take CHEM 345)

3. Instructions for UNR Students with Advanced Placement (AP) Chemistry

Score on AP Chem Exam	AP credit granted	Passed AP labs held at UNR while in high school*	Courses to take at UNR for Core science credit
1 or 2	none	none	CHEM 121 or 201 (4 credits) CHEM 122 or 202 (4 credits)
		CHEM 121L (1 credit)	CHEM 121A (3 credits)* CHEM 122 (4 credits)
		CHEM 121L & 122L (2 credits)	CHEM 121A (3 credits)* CHEM 122A (3 credits)*
3	CHEM 121A (3 credits)	none	CHEM 122L (1 credit)** CHEM 122 (4 credits)
		CHEM 121L (1 credit)	CHEM 122 (4 credits)
		CHEM 121L & 122L (2 credits)	CHEM 122A (3 credits)*
4 or 5	CHEM 121A & 122A (6 credits)	none	CHEM 121L (1 credit)** CHEM 122L (1 credit)**
		CHEM 121L (1 credit)	CHEM 122L (1 credit)**
		CHEM 121L & 122L (2 credits)	Core science completed!

* Select a section of CHEM 121A or 122A from the Class Schedule. Registration is allowed only if you already have credit in CHEM 121L or 122L, respectively.

** Contact Chemistry Department for call number and lab time.

High School AP students

Enroll in CHEM 121L or 122L (one-credit labs). Obtain the call number from your AP Chemistry teacher.

4. General Chemistry Courses at UNR

There are three tracks of introductory chemistry at the University of Nevada:

A. CHEM 100

Core science course for non-science majors. This course does not serve as a prerequisite for any higher chemistry course. See Class Schedule for dates of laboratories. Currently offered in Spring semester only.

CHEM 100 MOLECULES AND LIFE IN THE MODERN WORLD (3+1) 3 credits

Introductory chemistry with emphasis on impacts on human society, environmental issues, energy sources, and life processes. Includes four laboratory experiments. Prerequisite: Core math requirement; or Corequisite: MATH 127 or higher Core math course.

B. CHEM 121 & 122 (formerly CHEM 101 & 102)

Two-semester lecture and laboratory Core science course for all majors requiring General or Organic Chemistry but not advanced courses in chemistry or molecular science. CHEM 121 & 122 serve as prerequisites for CHEM 220A Introductory Organic Chemistry or CHEM 241 & 242 Organic Chemistry I & II. Note that CHEM 201 & 202 is the preferred prerequisite for CHEM 341 & 342 Organic Chemistry for Scientists and Professionals I & II, however CHEM 121 & 122 serves as an acceptable prerequisite.

121 GENERAL CHEMISTRY I (3+3) 4 credits

Fundamentals of chemistry including reaction stoichiometry, atomic structure, chemical bonding, molecular structure, states of matter and thermochemistry. Prerequisite: Core mathematics requirement (MATH 127 or higher recommended); or corequisite: MATH 127 or higher core math course. Credit allowed only in one of CHEM 121, CHEM 121A, CHEM 121R or CHEM 201.

122 GENERAL CHEMISTRY II (3+3) 4 credits

Fundamentals of chemistry including solutions, kinetics, equilibria, thermodynamics, electrochemistry, nuclear chemistry, and properties of inorganic and organic compounds. Prerequisites: CHEM 121 and MATH 127 or higher Core math course. Credit allowed only in one of CHEM 122, CHEM 122A, CHEM 122R, or CHEM 202.

C. CHEM 201 & 202

Two-semester lecture and laboratory Core science course for chemistry, biochemistry, molecular biology, chemical engineering, and other physical sciences and engineering majors requiring advanced courses in chemistry and molecular science, and Honors Program students. CHEM 201 & 202 cover similar material as 121 & 122, but are more in-depth and mathematically more rigorous. CHEM 201 & 202 serve as prerequisites for CHEM 241 & 242 Organic Chemistry I & II or CHEM 341 & 342 Organic Chemistry for Scientists and Professionals I & II.

201 GENERAL CHEMISTRY FOR SCIENTISTS AND ENGINEERS I (3+3) 4 credits

Principles of chemistry including stoichiometry, atomic structure, chemical bonding, molecular structure, kinetic theory of gases, solutions, equilibrium, and thermochemistry. Prerequisite: 28 or above on the Math ACT examination and/or a year of high school chemistry. Prerequisite or corequisite: MATH 181. Credit allowed in only one of CHEM 121, 121A, 121R, or 201.

202 GENERAL CHEMISTRY FOR SCIENTISTS AND ENGINEERS II (3+3) 4 credits
Principles of chemistry including thermodynamics, electrochemistry, chemical kinetics, nuclear chemistry, metals and non-metals, coordination compounds, and properties of inorganic, organic, and biological molecules. Prerequisites: CHEM 201 (CHEM 121 acceptable with a grade of A or B); and MATH 181. Credit allowed in only one of CHEM 122, 122A, 122R, or 202.

5. Organic Chemistry Courses at UNR

Lecture Courses

CHEM 220A INTRODUCTORY ORGANIC CHEMISTRY

Formerly CHEM 142 (3 credit lecture). Prerequisite CHEM 121 (CHEM 122 recommended).

CHEM 241 & 242 ORGANIC CHEMISTRY I & II

3-credit lectures. Prerequisite: CHEM 122 or 202.

CHEM 341 & 342 ORGANIC CHEMISTRY FOR SCIENTISTS AND PROFESSIONALS I & II

3-credit lectures. Prerequisite: CHEM 202. CHEM 102 or 122 is also acceptable as a prerequisite, with a grade of A or B recommended as preparation.

See your departmental adviser to help select the organic chemistry sequence that is right for you. Only your major department can tell you which courses will meet major requirements. The following are advising guidelines:

Nursing majors:

Take CHEM 220A/220L Introductory Organic Chemistry and lab.
CHEM 241/242/220L is also acceptable.

Environmental science, life sciences, ecology and conservation biology majors:

CHEM 241/242 is recommended. CHEM 341/342 is acceptable. CHEM 220A is also acceptable for some Nutrition and Biology majors (see your department adviser).

Molecular biology majors:

CHEM 341/342 is recommended. CHEM 241/242 is acceptable.

Chemistry majors and minors, Biochemistry and Chemical Engineering majors:

CHEM 341/342 is required. If you have already taken CHEM 241/242 and wish to change to a Chemistry major or minor, see the department for required upper-level electives.

Pre-medicine and pre-dental students:

Either CHEM 241/242 or CHEM 341/342 is acceptable for medical and dental school. The 200-level sequence is broader and includes more biological applications. On the other hand, taking the 300-level sequence (and performing well) may be viewed favorably by professional school admissions committees.

Students who have taken CHEM 121 & 122:

CHEM 241/242 is the recommended sequence following CHEM 121/122. CHEM 341/342 may be taken if required for your major. A grade of A or B in CHEM 122 is strongly recommended as preparation for CHEM 341.

Students who have taken CHEM 201 & 202:

CHEM 341/342 is the recommended sequence following CHEM 201/202. CHEM 241/242 is acceptable if CHEM 341/342 is not required for your major.

Students who have taken CHEM 241 and need the second semester:

CHEM 242 is usually recommended. If you have changed to a major requiring CHEM 342 and obtained an A or B in CHEM 241, you may take CHEM 342. (See your dept. advisor.)

Laboratory Courses

CHEM 220L Introductory Organic Chemistry Laboratory (1 credit)

For students taking CHEM 220A. Co- or prerequisite: CHEM 220A. May also be taken with CHEM 242.

CHEM 345 Organic Chemistry Laboratory (2 credits)

Intended for students needing one two-credit lab course. Co- or prerequisite: CHEM 342; or prerequisite: CHEM 242.

CHEM 347 Laboratory Techniques of Organic Chemistry I (2 credits)

Intended for chemistry majors, as the first semester of a two-semester lab course. Co- or prerequisite: CHEM 341.

CHEM 348 Laboratory Techniques of Organic Chemistry II (2 credits)

Prerequisite: CHEM 347; and Co- or prerequisite: CHEM 342.

Organic Chemistry Lecture Course Descriptions:

CHEM 241 ORGANIC CHEMISTRY I (3 credits)

The objective of this course, together with the second-semester CHEM 242, is to give the student a broad understanding of introductory organic chemistry at a fundamental level and an appreciation of its relevance to biology. The foundation will be laid with key concepts of molecular structure and bonding. The chemistry of hydrocarbons will be surveyed and functional groups defining classes of organic compounds will be introduced. Fundamentals of stereochemistry, the 3-dimensional shapes of molecules, and relevance to biological applications will be discussed. The basics of reaction mechanisms, organic synthesis, and light-absorption spectroscopy will be covered. The prerequisite for this course is CHEM 122 or 202. **This course provides good background for students in life and environmental sciences. Chemistry and biochemistry majors, and other pre-professional majors desiring a more in-depth treatment, should enroll in CHEM 341.**

CHEM 242 ORGANIC CHEMISTRY II (3 credits)

The goal of this course, which is a continuation of CHEM 241, is to provide a comprehensive description of organic chemistry at a level sufficient for understanding biological, health, and environmental applications. The course will treat oxygen- and nitrogen-containing functional groups, fundamental multistep reaction mechanisms, reactions important in organic syntheses, and molecules and reactions of biological interest. Methods for determining the structures of natural organic compounds will be illustrated. CHEM 241 is the prerequisite for this course.

CHEM 341 ORGANIC CHEMISTRY FOR SCIENTISTS AND PROFESSIONALS I (3 credits)

Organic chemistry is a key discipline underlying biochemistry, biotechnology, chemical engineering, chemistry, medicine, pharmacy, and other fields. The goal of this course, together with the second-semester CHEM 342, is to equip students entering these areas with a thorough understanding of the concepts and facility with the skills of organic chemistry. Molecular structure and bonding will be introduced at a theoretical level to familiarize students with molecular orbitals and their use in understanding chemical phenomena. Hydrocarbons will be covered in detail. Stereochemical (3-dimensional) aspects of structure will be stressed, and organic synthesis will be emphasized by means of problem solving. Aromatic compounds will be covered, beginning with theoretical descriptions, and ultraviolet spectroscopy will be

developed by a quantum mechanical approach. The prerequisite is CHEM 202; CHEM 122 is also acceptable, with a grade of A or B in CHEM 122 strongly recommended.

CHEM 341 is intended for chemistry, biochemistry, molecular biology, chemical engineering, and other students on scientific or professional career paths, and assumes a strong background in general chemistry.

CHEM 342 ORGANIC CHEMISTRY FOR SCIENTISTS AND PROFESSIONALS II (3 credits)

The objective of this course, which is a continuation of CHEM 341, is to give students of chemistry, physical sciences and molecular biological sciences a complete and in-depth understanding of organic chemistry. The chemistry of the remaining functional groups not covered in CHEM 341 will be discincludng nomenclature, stereoisomerism, and stereoselectivity of reactions. Organic functional groups will be introduced and stratussed in detail. Problem solving will be used to give the student a working understanding of multistep reaction mechanisms, modern reagents used for organic synthesis, and synthetic strategy. Polyfunctional compounds and interactions between functional groups will also be covered, as well as applications of organic chemistry in biochemistry, biotechnology, and materials science. Modern organic analytical methods, such as mass spectrometry and nuclear magnetic resonance will be covered in detail. CHEM 341 is the prerequisite for this course, although CHEM 241 with an A or B will be accepted.

6. Restrictions on credit for similar courses

Chemistry courses from different tracks or different numbering systems with substantially similar subject-matter content may not be taken for double credit.

Credit is allowed in only one of each of the following groups of courses. Taking more than one course in each group is treated as a repeated course. This includes transfer courses.

Chemistry for non-science majors:	CHEM 100, 105
First-semester general chemistry:	CHEM 101, A101, 110, 121, 121A, 121R, 201
Second-semester general chemistry:	CHEM 102, A102, 111, 122, 122A, 122R, 202
AP chemistry lab I:	CHEM L101, 121L
AP chemistry lab II:	CHEM L102, 122L
First-semester organic:	CHEM 142, 220, 220A, 241, 341, 343
Second-semester organic:	CHEM 242, 342, 344
Organic chemistry laboratory:	CHEM 143, 220L, 241L & 242L, 245, 345, 347
Physical Chemistry I:	CHEM 353, 421
Physical Chemistry II:	CHEM 354, 422
Physical Chemistry Lab:	CHEM 355, 423
Biophysical Chemistry:	CHEM 357, 425
Advanced Inorganic Chemistry:	CHEM 415, 431, 615, 631
Inorganic chemistry laboratory:	CHEM 416, 432, 435, 461, 616, 635
Instrumental Analysis:	CHEM 443, 455, 643, 655
Polymer Chemistry:	CHEM 449, 462, 649, 662
Senior Thesis I:	CHEM 495, 497
Senior Thesis II:	CHEM 496, 498