CHEMISTRY MAJOR'S HANDBOOK

DEPARTMENT OF CHEMISTRY
UNIVERSITY OF NEVADA, RENO

www.unr.edu/chemistry

Revised October 2015

Contents

1. Faculty and Staff

Academic Faculty (area of specialization indicated)

Dr. Mario Alpuche	Analytical Chemistry
Dr. Thomas Bell	Organic Chemistry
Dr. Sean Casey	Physical Chemistry
Dr. Vincent Catalano	Inorganic Chemistry
Dr. Wesley Chalifoux	Organic Chemistry
Dr. Sarah Cummings	Organic Chemical Education
Dr. Craig Dodson	Analytical Chemical Education
Dr. Kent Ervin	Physical Chemistry
Dr. Brian Frost	Inorganic Chemistry
Dr. Laina Geary	Organic Chemistry
Dr. Christopher Jeffrey	Organic Chemistry
Dr. Benjamin King	Organic Chemistry (Chair)
Dr. David Leitner	Theoretical Chemistry
Dr. Lyndsay Munro	General Chemical Education
Dr. Jason Shearer	Inorganic Chemistry
Dr. Robert Sheridan	Organic Chemistry
Dr. Yftah Tal-Gan	Bioorganic Chemistry
Dr. Matthew Tucker	Physical Chemistry
Dr. Sergey Varganov	Theoretical Chemistry

Administrative Faculty

Viktoriya Weirauch	Director of Laboratories
Dr. Stephen Spain	Director of Instrumentation

Technical Staff

Chris Carson	Research Stockroom Manager
Phillip Keller	Advanced Chemistry Stockroom Manager
Keith Kikawa	Organic Chemistry Stockroom Manager
Jared Townsend	General Chemistry Stockroom Manager
Frank Felix	Electronics and Instrument Repair
Walt Weaver	Machinist/Development Technologist

Office Staff

David Kaczorowski	Office Manager
Jennifer Heck	Administrative Assistant
Susan Kinder	Administrative Assistant

2. Departmental Contact Information

Department Chair	Dr. Benjamin King	(775) 784-6041 king@chem.unr.edu
Chemistry Major Advisor (A-M)	Dr. Sarah Cummings	(775) 682-6457 sac@unr.edu
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3. General Information and Department Resources

3.1. Department Office (CB 213)

The Chemistry Department Office in room CB 213 (775-784-6041) is a general source of information about course schedules, enrollment conflicts, locating your instructors (or their mailboxes), recovering lost and found items, and contacting the Director of Laboratories about safety issues. CB 213 is also the location of the Department Chair's office.

3.2. What's happening in the department?

There is a lot going on in the Chemistry Department beyond your chemistry lecture and laboratory courses. Internationally recognized scientific research is a major part of the department's activity. Your professors and graduate student teaching assistants are practicing scientists, and you can become involved in their research activity as an undergraduate.

Seminars. Each week during the academic year the department hosts research-oriented seminars, many of which feature prominent chemists from across the country and around the world. Other department seminars, which can be just as enlightening, are given by graduate students (your Teaching Assistants) reporting on their research activity towards Master's or Doctoral degrees. Even though these seminars are not a part of your formal coursework, you should be sure to attend at least a few seminars of interest during your studies at Nevada. Both research seminars and hands-on undergraduate research can provide you with a taste of the excitement at the periphery of chemical knowledge. These seminars can inform your choice of career or future study. Seminar times and locations are posted throughout the building, and always on the bulletin boards outside the Department Office in room CB 213. Graduate student seminars are generally held Tuesday and Thursday afternoons. Seminars given by external scientists are typically held Friday afternoons, but may be other times of the week as well.

3.3. UNR Chemistry Website

The UNR Chemistry Website (www.unr.edu/chemistry) should be a primary information resource during your chemistry studies. Information you will find there includes:

- Detailed information about your professors, including office numbers, email addresses, and phone numbers. Also available are synopses of their research interests and recent scientific publications.

- Chemistry course homepages are maintained by some professors instead of or in addition to WebCampus. Assignments, schedules, and study aids are among some of the useful information found there.

- The latest listing of chemistry courses and requirements for the chemistry major.

- Downloadable forms for your degree.

- Safety information.

- Links to a variety of other internet resources for chemistry, on campus and beyond.

3.4 Instructional Facilities

3.4.1. Chemistry Building

The Chemistry Department is housed in the Chemistry Building (CB), a four-story structure located on the New Quad of the central campus, adjoining the Leifson Physics Building (LP), the Schulich Lecture Hall (SLH), and near the engineering research complex. The Chemistry Building is both an instructional and a research facility. Chemistry research relies heavily on modern facilities, instrumentation, and technical support personnel. The Chemistry Building is endowed with a full complement of support services, shops for fabrication of research equipment, and specialized research laboratories.

3.4.2. Davidson Mathematics and Science Center

The Davidson Mathematics and Science Center houses the undergraduate instructional laboratories for General Chemistry (4th floor) and Organic and Analytical Chemistry (3rd floor).

3.4.3. DeLaMare Library

The DeLaMare Library (see www.delamare.unr.edu for schedule and further information) is located in the Mackay Mines Building, room MM 113. It houses the majority of the University's library materials in the areas of chemistry and physics. We currently have approximately 140 scientific journal subscriptions in chemistry and physics and 30,000 monographic volumes. Available from the Circulation Desk of the DeLaMare Library are chemistry course-specific reserve materials, which include supplementary texts and readings, practice review exams, course notes, and solution keys for exams and problem sets. Many course reserve materials are also available online (knowledgecenter.unr.edu/classes/reserves/). Online Resources provided by the DeLaMare Library include access to the online library catalog and the other NEON (Nevada Education Online Network) databases, such as SciFinder Scholar (Chemical Abstracts) and Web of Science (Science Citation Index). Nearly all of our current journal subscriptions and thousands more titles are available online. Additionally, most of our major reference works, including the CRC Handbook of Chemistry and Physics, are online.

3.4.4. Undergraduate Research Facilities

Undergraduate research activity is generally conducted in the specialized laboratory of your research mentor, and you will gain access to this laboratory when you choose a mentor. In addition to these specialized laboratories, there are other shops and labs that can be used by all researchers in the department:

- Shared Instruments Laboratory (CB 006, 007, 008, 103, 108, SLH L6, L7, L11) The department houses several NMR spectrometers and other specialized analytical equipment. Dr. Stephen Spain manages this facility.

- Machine Shop (LP B16) This facility is devoted to the fabrication of scientific research instruments. Walt Weaver is the professional machinist contact for chemistry projects.

• Electronics Shop (LP B18) This facility is devoted to the fabrication of research electronic equipment and electronics repair. Frank Felix is the electronics technician contact for chemistry projects.

3.5. Scholarships for Chemistry Majors

The following scholarships are available to UNR Chemistry Majors ranging in amounts from $100 up to $5000. The scholarship application deadline is in the early part of the Spring semester of each year. Contact the Chemistry Office for details regarding the application deadline.

- Ann and Thomas Howell Scholarship
- Ben and Beatrice Edward Chemistry Scholarship
- Cyanco Chemistry Scholarship
- Hach Scholarship (for students pursuing a career teaching chemistry in K-12 schools)
- Hans R. Wolfe Scholarship
- Jack T. Thurston Memorial Scholarship
- Jonathan H. Reeder Chemistry Scholarship
- Kenneth D. Kemp Chemistry Scholarship

4. Advisement

4.1. Chemistry Major Advisor

The chemistry major academic advisor can help you choose among the various chemistry degree options, help select courses, and help design a Course Schedule Plan that plots your progress towards timely graduation. The 2014-2015 chemistry major academic advisors are as follows:

For students with surnames beginning with A-M:
Prof. Sarah Cummings, sac@unr.edu, 775-682-6457
For students with surnames beginning with N-Z:
Prof. Lyndsay Munro, lmunro@unr.edu, 775-784-1942

Email is the recommended method for contacting your advisor to ask a question or set up an appointment.

4.2. Undergraduate Research Advisor

If you become involved in undergraduate research, your research mentor is the faculty member who directs your senior thesis and other research projects, and provides laboratory space for your work. Your research mentor will normally assume the role of your advisor regarding selection of elective courses and career planning. Questions regarding degree requirements or course substitutions should be referred to Dr. Cummings or Dr. Munro.

4.3. Chemistry Degree Timeline

Below is a suggested timeline for completion of your degree in four years, listing a number of important tasks that must be completed on schedule. Use the timeline in conjunction with your Course Schedule Plan (Recommended Schedules for each of the four degree Emphases are linked in section 5.3). In using this timeline, keep in mind that undergraduate research with a Senior Thesis

is required for the Professional Chemistry Emphasis and the Environmental Chemistry Emphasis, and is highly recommend for the General Emphasis and Pre-Medical Emphasis.

Year 1	Fall	– Choose the Emphasis chemistry degree (default is the General Emphasis). – Create your Course Schedule Plan (see appropriate example in Sec. 5).
	Spring	– Meet with academic advisor to discuss your Plan. – Progress meeting with academic advisor.
Year 2	Fall	– Progress meeting with academic advisor.
	Spring	– Progress meeting with academic advisor. – Mid-stream preparation evaluation in CHEM 348 (Major's Organic Lab).
Year 3	Fall	– Progress meeting with academic advisor. – Interview prospective undergraduate research advisors.
	Spring	– Progress meeting with academic advisor. – Choose undergraduate research advisor.
	Summer	– Possibly start undergraduate research.
Year 4	Fall	– Progress meeting with academic advisor. – Take professional exams (GRE, MCAT, etc.).
		– Apply to graduate programs or for employment. – Submit Application for Graduation Form before deadline (see Sec. 4.5). – Should be well into Senior Thesis research.
	Spring	– Present Senior Thesis. – Graduate at end of semester. Congratulations!
	Summer/Fall	– Start graduate study or employment.

4.4. Important University publications and web pages

UNR General Catalog

The current official General Catalog is published online at catalog.unr.edu. The catalog contains the official policies and requirements regarding students and degrees. It also contains detailed descriptions of all courses offered at the University, the Academic Calendar, and much more.

MyNevada

The MyNevada system is used to enroll in classes, to keep track of your status toward degree completion, and for other UNR enrollment functions. Using MyNevada, you can obtain reports or your academic progress to completion of your degree. This is the University's official record of your academic progress. It can also be used to verify that you are registered under the proper degree code.

UNR Class Schedule

The class schedule is published three times a year (for the Fall, Spring, and Summer academic terms). It lists the courses offered each semester; course meeting times, meeting places, instructor names, and final exam schedules. You can access it online at MyNevada.

4.5. Important forms and paperwork

There are a few forms that are typically required as you progress toward your degree. These forms will require you to indicate the name of your Bachelor of Science in Chemistry degree Emphasis option. The four chemistry Emphases are: General Emphasis, Professional Chemistry Emphasis, Environmental Chemistry Emphasis, and Pre-Medical Emphasis.

Request for Major/College Substitution/Exception

Use this form to make any substitution or to gain approval for any deviations from the standard degree requirements. Submitting the completed form requires approval from your academic advisor and the Department Chair
(See www.unr.edu/Documents/academic-central/forms/sub_waiver_major.pdf).

Change of Major Declaration Form

If you are changing your major to chemistry, if you are a chemistry major who wants to switch to a different Emphasis, or if you want to pursue a second major in addition to chemistry, then you need to complete the Change of Major Declaration Form (See www.unr.edu/Documents/academic-central/forms/Declaration_Change_of_Plan_Major_20120423(0).pdf).

Application for Graduation Form

You must submit the Application for Graduation Form approximately one semester prior to the anticipated graduation date. The exact due date for this form is printed in the University Calendar. The application is available in MyNevada. Only Admissions and Records can certify that a student has officially met all graduation requirements.

4.6. FAQ – Frequently Asked Questions

#1. I took the Advanced Placement (AP) Chemistry Exam or higher level International Baccalaureate (IB) Exam and tested out of CHEM121A (or 121A/122A). What should I take my first year?

Detailed procedures for assigning AP credit are given in the UNR General Catalog (catalog.unr.edu/content.php?catoid=12&navoid=3070). For the AP Chemistry Exam, depending upon your AP score and whether you have taken the CHEM 121L and 122L laboratories at UNR, credit may be given for all or parts of CHEM 121A and 122A (but not CHEM 201 and 202). Students who have AP credit may still want to take CHEM 201 and 202 as this sequence is better preparation for more advanced chemistry courses. Detailed procedures for assigning IB exam credits are similar and also appear the UNR General Catalog Chemistry AP or IB credit is awarded as summarized in the following table:

Score on AP or IB Chem exam	Credit granted	Passed AP labs held at UNR while in high school	Course to take in year 1 at UNR
AP: 1 or 2; IB: < 5	None	none	CHEM 121A/121L or 201, 122A/122L or 202
		121L	CHEM 121A, 122A/122L
		121L&122L	CHEM 121A, 122A
AP: 3; IB: 5	CHEM 121A (3 credits)‡	none	CHEM 121L, 122A/122L
		CHEM 121L	CHEM 122A/122L
		CHEM 121L&122L	CHEM 122A
AP: 4 or 5; IB: 6 or 7	CHEM 121A, 122A (6 credits)◆	none	CHEM 121L, 122L
		CHEM 121L	CHEM 122L, 330
		CHEM 121L&122L	CHEM 330, 341

Notes:

‡ Core science requirement is satisfied only after successful completion of CHEM 121L.
◆Core science requirement is satisfied only after successful completion of CHEM 121L and 122L.

#2. I have transferred to UNR from another college or university. How can I receive credit for courses taken at another institution?

You need to contact the Transfer Center (www.unr.edu/transfer). The Transfer Center can review your academic record and determine how your coursework will transfer to UNR.

#3. Can I make substitutions for certain courses listed in the degree requirements?

Course substitutions may be made only in special circumstances with the approval of your advisor and the Chemistry Department Chair. You should first discuss the proposed substitution with your chemistry advisor. If your advisor agrees the substitution is reasonable then it is appropriate to seek approval through the chair of the Undergraduate Studies Committee.

#4. Do I have to take the courses in the listed sequence? How much flexibility do I have?

The chemistry curriculum is relatively rigid, and the course sequences shown in the Recommended Schedules in the catalog are highly recommended for completion of the degree in four years. A few courses can be moved: for example CHEM 330 can be taken any time after General Chemistry, and Organic Chemistry Laboratory might be moved into the junior year. Of course, there is flexibility in your scheduling of the required humanities core courses. However, it is a good idea to complete these courses early so that you can satisfy your evolving interests with electives in the senior year. Note that completing CHEM 201/202/341/342 in the first two years requires placement into MATH 181 (Calculus I) in the first semester and postponing some lower-division core requirements into the junior year. However, it is also possible to complete a chemistry degree with all lower-division requirements met in the first two years, either at UNR or at a community college.

#5. How can I earn a "double major"?

To establish your intent to pursue more than one major, you must complete and file the "Change of Major Declaration" form, as described in Sec. 4.6. At UNR, a "double major" is called either multiple bachelor's degrees or multiple undergraduate majors within a degree. The details which apply are given in the UNR General Catalog. Links to the relevant catalog pages are listed here:

- Multiple Bachelor's Degrees
  catalog.unr.edu/content.php?catoid=12&navoid=3013
- Multiple Undergraduate Majors
  catalog.unr.edu/content.php?catoid=12&navoid=3014
- Degrees, Majors, and Minors within the College of Science
  catalog.unr.edu/content.php?catoid=12&navoid=2913

Note that the "Bachelor of Science in Chemistry" (with any of four Emphases) is a separate named degree. A "Bachelor of Science" or "Bachelor of Arts" with a different major or other named degree may be obtained as a dual degree. Therefore, if you are pursuing a chemistry major simultaneously with another major then, you must do a multiple degree program. You must satisfy the requirements of both degrees, but overlapping course requirements are allowed.

6. How do I find a research mentor, and/or when can I start doing research?

Undergraduate research (including a Senior Thesis) is a requirement for Professional Chemistry Emphasis and Environmental Chemistry Emphasis, and is highly recommended for the General Emphasis and Pre-Medical Emphasis.

Undergraduates often make research arrangements with professors teaching chemistry courses they have taken. This is fine, but you may miss out on opportunities in the research groups of professors you have not happened to meet. A good approach is to discuss your general chemistry interests with your chemistry academic advisor or another favorite chemistry professor, who can then recommend professors with similar interests. This chemistry faculty can also give you a Chemistry Department research brochure, which lists the research interests of all the chemistry faculty.

You should select a few professors with the research you find most interesting, and then arrange appointments with them to discuss their work and possible research projects you would undertake under their supervision. This is an important decision and worth making carefully. Your relationship with your research mentor is likely to be the closest faculty contact you will make at UNR, and is often a relationship that will continue throughout your professional career. There is an expectation of mutual commitment to the research project by both the student and the professor. It is not uncommon for undergraduate students to share authorship on research papers published in scientific journals.

You can start doing research at any time, and undergraduate research projects can begin as early as your freshman year. If you have an interest in starting on research immediately then don't hesitate! However, it is also often the case that a certain degree of experience in coursework and in laboratory techniques is necessary to make progress on a research project. Your prospective research mentor will evaluate your training. Generally you should

be seeking research mentor no later than your first semester with junior standing. This will give you adequate time to select a research mentor, and time for your research mentor to put together a plan for your research project. Most chemistry majors doing research begin in their junior year.

Academic credit can be obtained for undergraduate research. CHEM 495 and 496 (Senior Thesis in Chemistry I and II) are the courses taken for undergraduate research at the senior level.

CHEM 292 (Selected Topics in Chemistry), CHEM 392 (Special Problems in Chemistry). and CHEM 490 (Independent Study) can be used to obtain academic credit for undergraduate research work in the sophomore and junior years.

#7. What capstone courses must I take?

All students are required to take two capstone courses. CHEM 495 (Senior Thesis in Chemistry I) is the chemistry capstone and is a required course for the Professional Chemistry Emphasis and the Environmental Chemistry Emphasis. For the General Emphasis or Pre-Medical Emphasis, CHEM 495 is highly recommended as one of your capstone courses, but a non-chemistry capstone course can be taken instead. For all degrees, the second capstone must be taken outside the Chemistry Department.

#8. Are there jobs available in the department?

Yes, work study employment in the stockrooms or other laboratories is sometimes available. Contact the Director of Laboratories in the Chemistry Office for availability information. Some undergraduates are also employed as research assistants by their research mentors. Occasionally there is the opportunity for undergraduates to work as grading or laboratory teaching assistants.

4.7. Guidelines for Senior Theses

Individual faculty mentors have the primary responsibility to set requirements and grading standards for their Senior Thesis students. Before commencing work, the student and mentor should have a clear understanding of expectations. The following guidelines serve as general recommendations:

CHEM 495

Senior Thesis in Chemistry I should involve laboratory and library research culminating in a written thesis, typically 10-20 pages in length. If the student is planning to take CHEM 496 (Senior Thesis in Chemistry II), the first-semester thesis may emphasize the introduction, literature background, and proposed methods or initial results.

CHEM 496

Senior Thesis in Chemistry II should involve laboratory and library research culminating in a written thesis, typically 25-30 pages in length. The final thesis may expand and update the thesis from CHEM 495. A formal oral presentation of the research, perhaps in a group meeting setting, should be required.

The senior thesis should have the general structure and style of a graduate thesis. The faculty mentor should set the due dates for initial drafts and the final thesis. Senior theses from both CHEM 495 and 496 are to be kept in a departmental file. A final copy of each thesis must be submitted to the department office by the date grades are due each semester. If the final copy is not received by the department office by the due date then a grade of "incomplete" will be recorded for Senior Thesis.

5. Undergraduate Chemistry Degree Programs

5.1. Overview: Which degree should I choose?

Undergraduate chemistry majors complete courses providing a solid background in the physical sciences and mathematics, together with a sequence of courses in general, organic, inorganic and physical chemistry. Lecture classes are complemented by laboratories that give hands-on experience in chemical methods and instrumentation. The department also strongly encourages undergraduate students to become involved in laboratory research under the supervision of a faculty member. Undergraduate research is an outstanding learning opportunity that cannot be found in classwork alone.

Four different Emphases in the **Bachelor of Science in Chemistry** are available for undergraduate students majoring in chemistry:

– The ***Professional Chemistry Emphasis*** is designed for students who are interested in a career as a chemist in industry or government, or in graduate school in chemistry or related areas. The Bachelor of Science in Chemistry with the Professional Chemistry Emphasis features rigorous training in both experimental and theoretical methods in modern chemistry. Students proceed through a sequence of courses that includes general, organic, physical, inorganic, and biological chemistry, with specialized laboratory courses in instrumental analysis, analytical chemistry, and chemical synthesis supplementing these areas. In addition, undergraduates in this program become involved in laboratory research under the supervision of one of the faculty and write a Senior Thesis. This provides students with outstanding opportunities that cannot be found in the classroom alone. This degree meets the certification requirements of the American Chemical Society.

– The ***Environmental Chemistry Emphasis*** is recommended for students in employment as an environmental chemist or in graduate study in environmental science. The Bachelor of Science in Chemistry degree with the Environmental Chemistry Emphasis is a rigorous plan in chemistry that will prepare students for careers in government or the private sector as environmental chemists, or for graduate school in environmental science. In addition to basic and advanced chemistry courses, additional courses in environmental chemistry or related areas are required. It includes undergraduate research (Senior Thesis) and specialized courses chosen according to the student's interests. This degree meets the certification requirements of the American Chemical Society.

– The ***General Emphasis*** has a more flexible curriculum that provides basic training for careers in chemistry or other areas, such as health sciences or teaching. Undergraduate Senior Thesis research is encouraged but not required.

– The ***Pre-Medical Emphasis*** provides a strong training in Chemistry and also the courses in Biology, Biochemistry, and other fields that are required for admission to most medical, dental, and pharmacy schools.

The chemistry courses taken for the four Emphases are very similar through the sophomore year. The Professional Chemistry Emphasis and Environmental Emphasis require more upper-division courses and two full years of mathematics. These two Emphases provide a better background if you plan to enter the chemical industry or go to graduate school in chemistry. The General Emphasis allows for more flexibility in elective courses, which may be an advantage for someone intending to go into K-12 teaching, allied health fields, or pursuing a second major. While any of the Emphasis can be combined with elective course needed for admission to professional schools, the Pre-Medical Emphasis will ensure that you take the courses typically required for admission. Because medical and dental school requirements vary, however, you should still consult a professional school advisor to make sure you are on track for applying. General pre-professional and graduate school curriculum recommendations are given on the College of Science pre-professional advising page (www.unr.edu/science/academic-advising/psa).

Pre-law chemistry majors also should consult the pre-professional advising homepage for detailed information and personal assistance. Chemistry majors seeking employment as professional chemists or who plan to continue into graduate study in the sciences should discuss their choices of upper-division chemistry and other science electives with their chemistry advisor. Your selection of upper-division chemistry electives will depend upon your area of chemistry specialization.

5.2. Degree Requirements – General

The requirements for each Emphasis in the General Catalog are linked in Section 5.3. The General Catalog is the authoritative reference for course requirements; please inform the Chemistry Department of any discrepancies you detect between the listing in this Section and the General Catalog.

All chemistry degrees are designed to be completed within four years for full-time students taking courses during the Fall and Spring semesters. The advanced chemistry courses and many in other departments require completion of prerequisite courses. To complete the degrees within four years, you must take the necessary prerequisite courses early in your curriculum – careful planning during the first few semesters is crucial to the timely completion of your degree.

Along with the formal requirements listed for each degree, there are given Sample Schedules you can use as models (see section 5.3 for links). Using the appropriate model as a guide, you must design your own Course Schedule Plan. You should then schedule an appointment with your academic advisor to discuss your personal plan. This meeting should be done during your first semester of undergraduate study. (Be sure to write out your proposed plan in advance of the appointment with your academic advisor.)

The Sample Schedules have been constructed so that the necessary prerequisites are fulfilled in the proper sequence. The plans assume that you are a typical freshman chemistry major entering UNR:

• Your ACT or SAT math scores or math placement tests place you into MATH 181 (Calculus I).
• Your ACT or SAT verbal scores or placement examination place you into ENG 101 (Composition I).
• You have not tested out of any other requirements.

The Sample Schedule B for the General Emphasis assumes that you are a typical entering student at a Nevada community college who will transfer to UNR after two years, and that your mathematics entrance examination score requires you to take MATH 128 (Precalculus and Trigonometry) before calculus.

If your entering qualifications give you a different starting point than that assumed in the example plans, then you will need to modify your personal Course Schedule Plan accordingly. In designing your Plan, you need to be aware of the following:

• All chemistry, physics, and mathematics courses, and many courses in other fields beyond the introductory level, have prerequisites or corequisites. You need to consult the catalog course description to discover these requirements so that needed prerequisites are completed on schedule.

• Some courses, especially upper division courses with small enrollments, are not taught every semester. In these cases the course will usually be taught in alternate semesters – every Fall or every Spring. However, you should be sure to consult the University Class Schedule to verify course availability.

• It is possible to replace required courses with approved substitutions (see FAQ #3 in section 4.6). Officially recognized substitutions for some courses are listed in the degree requirements. For other substitutions, you should consult your academic advisor. The Department Chair must ultimately approve any such substitutions in advance.

5.3. **Bachelor of Science in Chemistry** degree requirements and sample schedules

Links to the section of the online General Catalog with degree requirements and sample four-year schedules are provided below.

Please note that requirements may vary by the year of the General Catalog, so check that you select the correct catalog year. Your catalog year is usually the year you selected Chemistry as a major or your year of graduation. Check MyNevada for your Bachelor of Science in Chemistry degree (plan), Emphasis (subplan), and catalog year as well as individualized course requirements.

5.3.1. Professional Chemistry Emphasis

catalog.unr.edu/preview_program.php?catoid=12&poid=5575&returnto=2900

5.3.2. Environmental Chemistry Emphasis

catalog.unr.edu/preview_program.php?catoid=12&poid=5576&returnto=2900

5.3.3. General Emphasis

catalog.unr.edu/preview_program.php?catoid=12&poid=5577&returnto=2900

5.3.4. Pre-Medical Emphasis

catalog.unr.edu/preview_program.php?catoid=12&poid=5695&returnto=2900

5.4. Previous Chemistry degree options (for catalog years prior to 2013)

5.4.1. *Bachelor of Science in Chemistry* with the Professional Chemistry Option (BS-CHP) MyNevada designation: "Plan 3999 Professional Chemistry BSCHEM"
catalog.unr.edu/preview_program.php?catoid=1&poid=227&returnto=24

5.4.2. *Bachelor of Science in Chemistry* with the Environmental Chemistry Option (BS-CHE) MyNevada designation: "Plan 1216 Chemistry (Enviro Chem) BSCHEM"
catalog.unr.edu/preview_program.php?catoid=1&poid=228&returnto=24

5.4.3. *Bachelor of Science* with a Field of Concentration in Chemistry (BS-CH) MyNevada designation: "Plan 3236 Chemistry BS"
catalog.unr.edu/preview_program.php?catoid=1&poid=229&returnto=24