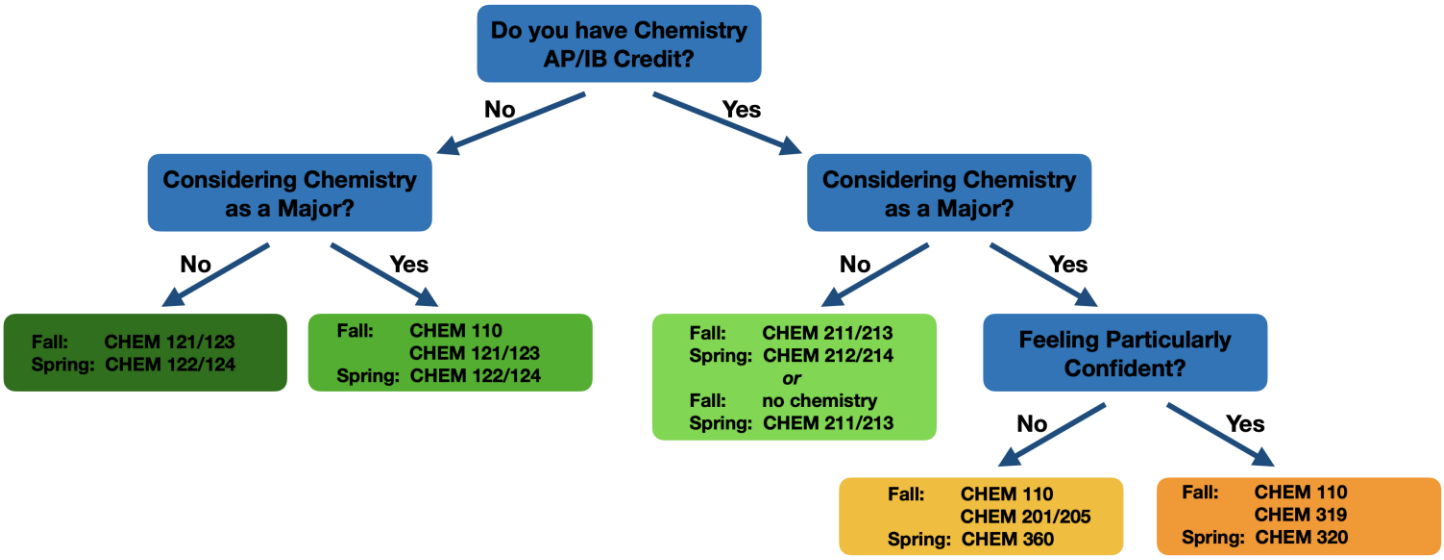
Freshmen Year: Which Class is Right for Me?

The Department of Chemistry offers several pathways for completing the core curriculum required for chemistry majors as well for the many students who need these courses for other majors and pre-med requirements. These paths are summarized in the flow chart below. Students without AP/IB or equivalent credit have the simplest decision making process: enroll in CHEM 121/123 in the Fall semester. Students considering a chemistry major should add to this CHEM 110 which is a one credit hour seminar which introduces students to research opportunities in the department of chemistry. Students entering with AP credit or other equivalent preparation have additional flexibility in course selection as described below.



Option 1: Take none of your AP Chemistry credit
Fall: CHEM 121/123 - General Chemistry I and General Chemistry Lab I
Spring: CHEM 122/124 - General Chemistry II and General Chemistry Lab II
This is the standard introductory chemistry sequence and the classes that **most students** will take. If you took AP Chemistry, but you do not feel confident in the level of your chemistry preparation from your AP or equivalent work, this is the best option for you. One advantage of this approach is that you will see many of the same topics which you covered in AP Chemistry again and will have an opportunity to reinforce your existing knowledge. This should also make this course somewhat easier for new matriculates. The disadvantage is that you can not use credit for both your AP work and CHEM 121 / 123.

Option 2: Take one semester of your AP Chemistry credit
Fall: CHEM 201/205 - Advanced Topics in General Chemistry and Advanced Topics in General Chemistry Lab
Spring: CHEM 360 - Inorganic Chemistry
This pathway is recommended for students with AP or equivalent credit who are considering a major (BA or BS) in chemistry. CHEM 201/205 is a more advanced version of General Chemistry and it is designed for incoming students with AP or equivalent credit. The course assumes that you have a good background in introductory chemistry and it will focus on the more advanced topics for upper-level chemistry courses. CHEM 201/205 is one semester long, compared to CHEM 121/122/123/124, which is two semesters. This option allows you to take your AP credit for first semester general chemistry and replaces your second semester of general chemistry AP credit. CHEM 201/205 satisfies the prerequisites for any course requiring CHEM 121/122 /123 /124. Upon completing this course, students intending to major in chemistry are recommended to take CHEM 360 in the Spring.

Option 3: Take both semesters of your AP Chemistry credit
Fall: CHEM 211/213 or CHEM 319 - Organic Chemistry I
Spring: CHEM 212/214 or CHEM 320 - Organic Chemstry II

These are the organic chemistry I and II options. Students intending to major in chemistry should enroll in CHEM 319/320, while other students should enroll in CHEM 211/212. Taking organic chemistry in the first year is only available to students who have AP or equivalent credit for General Chemistry. The advantage of taking the full year of Chemistry AP credit is that it facilitates students seeking to take additional upper level courses, double major or reduce their courseload during their junior/senior years. The disadvantage is the challenge presented by the organic curriculum for new matriculates. Students not intending to major in chemistry, but who have AP or equivalent credit, can also consider taking no chemistry course in the Fall semester and starting CHEM 211 in the Spring semester.

Two notes for students considering a chemistry major:

- CHEM 110 is recommended for chemistry majors to introduce them to research opportunities, but is not required.
- While CHEM 201/205, CHEM 319 and CHEM 320 are courses designed for students intending to major in chemistry, CHEM 121/122/123/124 and CHEM 211/212/213/214 satisfy all the same requirements and prererquisites and provide an excellent basis for the upper level courses required for the chemistry major.

Note about AP and equivalent credit: Students with AP credit will receive credit for CHEM 111/112/113/114. These credits are the equivalent to CHEM 121/122/123/124 for any prerequisites, but they do not count towards the Group 3 distribution requirement.

Note for pre-medical students: Please consult with the Office of Academic Advising (OAA) for advice on which path is best for you, as some medical schools do not accept Chemistry AP credit.

For Current Chemistry Majors:

Should I take CHEM 211/212 or CHEM 319/320? In brief, chemistry majors should take CHEM 319/320. However, both CHEM 211/212 and CHEM 319/320 count toward the undergraduate chemistry degrees, and both are excellent sequences that have been well-liked by students in recent years. CHEM 211/212 is primarily taught as a large lecture course with smaller discussion groups, while CHEM 319/320 are much smaller courses —12 to 25 students — and are intended for students considering chemistry as a major and those in closely related fields with a strong interest in chemical research. Taught in small groups, CHEM 319/320 minimizes traditional lecture time, and significant course time is spent on small group problem-solving work and applying fundamental concepts to new application, mechanism and arrow-pushing, and multistep synthesis. Memorization is de-emphasized. Both courses use the same textbook, though CHEM 319/320 may cover 1-2 additional chapters of material that are more important to chemists than a general audience. CHEM 320 also serves as an introduction to the department and to independent research in chemistry. Some class discussion is designed to help students find a research lab in chemistry and to work toward a career related to chemistry.

Can I pursue summer school, study abroad, and internship opportunities as a CHEM major? Chemistry course credit earned from summer school and study abroad programs is allowed. Interested students should refer to the Transfer Credit Policy found in this booklet and obtain approval from the transfer credit advisor in advance of enrolling in summer coursework. The Department encourages student participation in study abroad programs. Course substitutions completed through summer school and study abroad programs must be approved through the Office of the Registrar and the Department of Chemistry. Most students who want to do internships complete them in the summer, but academic-year internships are also possible. Please consult with the Study Abroad office and an academic advisor to design a four-year schedule that allows for study abroad and/or internship opportunities.

If I'm not doing well in one of my prerequisites, should I not be a CHEM major? Many successful chemists have struggled in undergraduate courses. You can overcome adversity if chemistry is the field you want to study. There are many reasons why students do not perform at their best, and there are tremendous resources at Rice to help. However, it is the student's responsibility to take initiative when they are struggling in a course, and their greatest mistake is to wait too long before seeking academic assistance. Students should consult their professor for help with a specific course, utilize their residential college's Academic Fellows/Mentor Society, and see an academic advisor to discuss options if they are struggling with multiple courses.

Can I Pass/Fail a chemistry course as a CHEM major? Courses taken as Pass/Fail cannot be used to meet major requirements. If required courses are taken pass/fail, the Registrar will replace the P with the letter grade earned during the final degree audit. If you have multiple courses that could be used to fulfill the same major requirement, address any potential problems with your major advisor prior to your final degree audit.

Can I earn credit for chemistry research? Yes, you may enroll in Research for Undergraduates (CHEM 391/491/492/493) to earn credit for independent research. B.S. students must complete 8 credit hours of chemistry research (corresponding research courses in other departments in Science and Engineering may only be used towards this requirement with prior departmental approval). CHEM 391 is the standard independent research course for first-time research students, while CHEM 491 is for continuing research students that is repeatable for credit. The Chemistry Honors Research Program, CHEM 492/493, offers students in their final year at Rice the opportunity to perform a two-semester, individual chemistry research project. These courses function as a pair and must be taken in the same academic year. Students must formally apply into CHEM 492/493 with the recommendation of their research professor. The course requires students to complete a research proposal, a public presentation of findings, and a formal report or thesis. For more information, refer to the Undergraduate Research Opportunities section.

How do I get involved in chemistry research? There are many ways to find research opportunities as a Rice undergraduate. The most common method to join a lab in the Chemistry Department is to contact the faculty member directly about working in their lab for course credit. CHEM 110 Freshman Chemistry Seminar and CHEM 320 Organic Chemistry II are both classes which actively help students find a suitable research lab. For more information and suggestions, please refer to the "How Do I Find a Research Opportunity?" section.

How do I find a teaching opportunity? Chemistry majors who are interested in gaining experience in teaching can often TA for an introductory course. Many find this experience to be exceptionally rewarding and it helps prepare students who are considering a future in all levels of academia. TA opportunities may be advertised on the Chemistry Undergraduate listserv. However, interested students are also strongly encouraged to contact the course instructor directly to ask about TA opportunities in upcoming semesters.

Life After Rice:

What are some post-graduation options for me if I graduate with a CHEM degree (aside from medical school or graduate school)? You have many options, especially if you are not geographically limited. Often, these are jobs in chemical industry (including biotechnology) or science education. Other relevant career paths include conservation, science writing, science policy, scientific/medical illustration, forensic science, management consulting, and patent law. Please meet with your Chemistry major advisor and the Center for Career Development for more information.

Which graduate programs have recent CHEM undergraduates been accepted to? In the past five years, our recent Chemistry majors have gone on to graduate school (Harvard, MIT, Northwestern, Caltech, UC Berkeley, and more), as well as medical, pharmacy, and dental schools.

How important is my GPA for getting into graduate school? Admissions committees typically place considerable weight on the GPA, especially in math and science courses. The admission committee will also place a heavy emphasis on undergraduate research experience and the recommendation of the student's research mentor. However, every part of each student's application is examined closely by the admissions committee, so there is no single element that would make or break a student's admission. Among other factors, students with a strong research record that includes publication in a peer-reviewed journal are looked upon especially favorably.

What are good resources for investigating my options and choosing graduate schools to apply to? First, examine the American Chemical Society website. Second, speak with your Chemistry major advisor and research advisor to find ideal graduate programs to which you should apply that best match your research interests and career path.