

Notes on the Degree Requirements

If you consider yourself a chemistry major, you should be sure that the chemistry department knows about it and that you have a chemistry faculty member as an adviser. This recommendation applies to students at all levels, and is especially important for transfer students and double majors.

1. **Freshman Seminar:** All freshmen are required to take a first-year seminar sometime during their first year. Although the University's rule is satisfied no matter what seminar you take, we strongly encourage students majoring in chemistry to take the seminar offered by the chemistry department. This one-credit course is offered only in the fall in two sections (Sections 200 and 201 of PSU 016). The goal of the seminar is to inform you about the opportunities available to undergraduates at Penn State and in the chemistry department and provide you with an opportunity to get to know your fellow majors.

2. **Entry to Major & Grade Requirements:** Formal admission to the chemistry major usually occurs after the fourth semester and requires a grade of C or better in the courses CHEM 110, 111, 112, 113, 210, and MATH 140 and 141. An overall grade point average of 2.50 or better in this set of courses, and an overall cumulative grade point average of 2.0 are also required.

To graduate with a degree in chemistry, a minimum grade of C is required in all prescribed chemistry courses with the exception of CHEM 316. An overall GPA of at least 2.0 is also required.

3. **ACS Certification:** The American Chemical Society (ACS) gives its stamp of approval to undergraduate degrees if certain course and lab criteria are met. An ACS-approved degree enables you to become a member of the ACS immediately upon graduation instead of an associate member during your first three years of professional experience. If you desire ACS approval you should include in your 16 credits of chemistry electives: (i) CHEM 476 Biological Chemistry or BMB 401 General Biochemistry; (ii) either a 400-level laboratory course beyond the minimum requirements or 2 credits of CHEM 494 or 1 credit each of SC 295, 395, and 495.

4. **Alternative Choices for Chemistry Electives:** It is possible to substitute 400-level courses in biochemistry, materials science, or other chemistry-related disciplines for 400-level chemistry elective credits. 500-level courses may also be used. See pp. 12–14 for details.

Most advanced courses are offered in either the fall or spring semesters and a few are only offered in alternating years. See the schedule on p.9 and plan accordingly.

5. **Research for Credit:** CHEM 494, Chemical Research, is highly recommended for all chemistry majors. It involves participation in a research project, usually under supervision of a member of the chemistry faculty. Faculty members from other departments may also supervise CHEM 494 with the approval of the assistant head for undergraduate education. Students interested in CHEM 494 should discuss this option with their advisor and begin interviewing faculty no later than their fifth semester in residence. See pp. 19-22 for more details.

Up to eight credits of CHEM 494 can be used in the category of 400-level chemistry electives (less if co-op credits are being used). CHEM 494 (and CHEM 496) cannot be used in the general electives category.

CHEM 294 is meant for research performed in a student's first two years of study, during a time when he/she would not typically be enrolled in 400-level courses. For this reason CHEM 294 cannot be used for 400-level chemistry elective credit, but it can be used for general elective credit.

6. **General Education Requirements:** Penn State requires nine credits of writing and speech coursework, three credits of Health and Physical Activity (GHA) courses, and six credits in each in the arts, humanities, and social and behavioral sciences. Instead of the usual 6-6-6 pattern in the knowledge domains of arts (GA), humanities (GH), and social and behavioral sciences (GS) students

may petition to distribute these courses in a 9-6-3 credit pattern of any grouping. Students may also substitute, without petition, three credits in foreign/second language at the third or higher level for three credits in any one of these three categories provided that this substitution will not lead to the complete elimination of any category. Additionally, students must also have at least three credits of US and three credits of IL course work to satisfy the US Cultures and International Cultures requirement.

7. **Health and Physical Activity** (GHA) courses are often hard to schedule. Have alternative choices selected and be flexible. Try to satisfy this requirement before your senior year. Note that you cannot repeat a given GHA course.
8. **ENGL 015** may be taken either during the fall or spring semesters. University scholars must schedule ENGL 030 instead of ENGL 015, and may schedule ENGL 030 in either fall or spring. If you have taken ENGL 015 in the fall, then schedule a GA/GH/GS course in the spring and *vice versa*.
9. **CAS 100A** may be scheduled at any time. Fourth semester standing is required to register for ENGL 202C. It is best to schedule **ENGL 202C** prior to the writing intensive laboratory courses (CHEM 457, 423W, and 431W).
10. Excluded courses: Some courses are considered inappropriate for general elective credit and therefore cannot be counted toward the total number of credits required for the degree. These courses are:
 CHEM 001, 003, 020, 101, 108, 202, 203, and no more than 3 credits of CHEM 106 or 110.
 MATH 001, 002, 003, 004, 017, 018, 021, 022, 026, 030, 035, 036, 037, 040, 041, 081-083, 110, 111, 200, AND only 4 credits of Math 140A

BI SC001, 002, 003, 004	BMB 001
CAS 126	CMPSC 001, 100
ENGL 004, 005	LL ED 005, 010
PH SC 007	PHYS 001, 150, 151, 250, 251
STAT 100	
11. **CHEM 227** and **CHEM 310** are sophomore-junior level courses that are only offered once a year: CHEM 227 in the fall and CHEM 310 in the spring. University Park students should enroll in both CHEM 227 and CHEM 310 during their sophomore year. Students transferring to UP from other campuses where these courses are not offered should enroll as soon as possible after transferring.
12. **CHEM 316** is offered only in the fall semester and should be scheduled at the beginning of your junior year. If your schedule is off-sequence, so that your junior year does not start in the fall, schedule CHEM 316 at the end of your sophomore year. ***If you are transferring to UP from another campus, it is especially important you take CHEM 316 immediately***, because it will help to orient you to the program and introduce you to your fellow chemistry majors.
13. **CHEM 423W, CHEM 431W, and CHEM 459W** are writing-intensive capstone laboratory courses in the areas of analytical, synthetic, and physical chemistry, respectively. Only one of these courses is required, but students may take as many as desired. These courses are only offered once a year (423W and 459W in spring and 431W in fall) and should be taken in the junior year if possible.
 These labs are highly time intensive and ***no more than one 400-level chemistry lab course should ever be scheduled in the same semester.***