INTRODUCTORY CHEMISTRY COURSES

There are multiple options for introductory chemistry, and the best choice depends on the student's academic background and goals. Choosing among the many options can be challenging for students. The information below answers many common questions. Students with additional questions are welcome to visit the chemistry consultant at SOAR or contact the chemistry advisor (https://www.chem.wisc.edu/content/undergraduate-advising) after SOAR.

The data provided for Math ACT scores and percentages of students reporting AP or IB scores are 5-year averages for students who completed the relevant course the fall semesters of 2014 through 2018.

CHEM 103 & 104 – General Chemistry I (4 credits) & II (5 credits); offered Fall, Spring, and Summer terms

This course sequence is the traditional one-year introductory chemistry sequence that the majority of students needing chemistry will take. CHEM 103 is taken first, followed by CHEM 104.

- ***Math Requisite:*** Placement out of MATH 112 on UW Math Placement Test, which means at least 470 on Math Fundamentals and 540 on Advanced Algebra; completion of MATH 112, MATH 114, MATH 171 or equivalent also satisfies the requisite, as does calculus credit from AP/IB exams.
- ***HS Chem:*** The vast majority of students have had at least one year of high school chemistry.
- ***Average Math ACT:*** 29

CHEM 108 – Chemistry in Our World (5 credits; offered Spring semester only)

This course teaches chemistry through contemporary topics such as air quality, energy, food, plastics, nuclear chemistry, and global climate change. This course is intended for students who need just one semester of chemistry with laboratory. Students majoring in nursing, business, life sciences communication, agricultural and applied economics, rehabilitation psychology, and wildlife ecology are among those who select CHEM 108. This course (like all chemistry courses) counts towards College of Letters & Science breadth requirements in physical science. CHEM 108 does not serve as a prerequisite for any further chemistry courses.

- ***Requisites:*** None

CHEM 109 – Advanced General Chemistry (5 credits; offered Fall semester only)

This course is an accelerated introductory chemistry course recommended for students with an especially strong high school chemistry and math background. CHEM 109 covers the breadth of the material from CHEM 103/104, skipping the more basic concepts and focusing in depth on the more comprehensive topics, such as atomic and molecular structure, biomolecules and polymers, equilibrium, thermodynamics, kinetics, acid-base chemistry, and electrochemistry. Students are expected and need to have strong college-level study skills for this course.

- ***Math Requisite:*** Placement into MATH 221 (1st semester calculus) on UW Math Placement test, which means at least 470 on Math Fundamentals, 540 on Advanced Algebra, and 560 on Trig and Analytic Geometry; credit for calculus from course work or AP/IB exams also satisfies the requisite.
- ***HS Chem:*** Most students who complete CHEM 109 have had two years of high school chemistry. Students with one year of high school chemistry are welcome in CHEM 109, but they will need to work harder to perform satisfactorily. About 77% of students who completed CHEM 109 reported scores from AP or IB Chemistry exams.
- ***HS Math:*** About 64% of students who completed CHEM 109 reported scores from AP or IB Calculus exams.
- ***Average Math ACT:*** 31

CHEM 109 Honors (lecture 3; 5 credits; offered Fall semester only)

The honors section of CHEM 109 introduces chemical principles within the context of current research themes, especially energy and global climate change. Fundamental concepts are applied to issues such as energy production and consumption, as well as their impact on the environment. Students need authorization from the Chemistry Consultant to enroll.

- ***Math Requisite:*** Placement into MATH 221 (1st semester calculus) or higher and a 30 or higher on the Math ACT. Students without MATH 221 credit should enroll concurrently (required).

- ***HS Chem:*** Two years of high school chemistry is required, with the second year being AP or higher level IB.
- ***HS Physics:*** One year of high school physics is strongly recommended.
- ***HS Math:*** About 83% of students who completed 109 Honors reported scores from AP or IB Calculus exams.
- ***Average Math ACT:*** 32

CHEM 115 & 116 (5 credits each; 115 offered Fall only; 116 offered Spring only)

CHEM 115/116 is a two-semester honors sequence designed for well-prepared and highly motivated students with an interest in science or engineering. The sequence satisfies both the general and analytical chemistry requirements for any major on campus. CHEM 115 includes quantum theory, molecular structure and bonding, kinetic theory of gases and phase transitions. CHEM 116 includes thermodynamics, chemical and physical equilibrium, kinetics and spectroscopy, in addition to a research-based laboratory experience. Course enrollment is by invitation.

- ***Math Requisite:*** Placement into MATH 222 (2nd semester calculus) or higher and a 33 or higher on both Math ACT and Composite ACT. First semester calculus proficiency required.
- ***HS Chem:*** One year of high school chemistry is required; two years are strongly recommended.
- ***HS Physics:*** One year of high school physics is strongly recommended.
- ***Average Math ACT:*** 34

Deciding Between CHEM 103 and CHEM 109

We recommend that students consider taking CHEM 109 instead of CHEM 103 if they:

- Placed into MATH 221 (required) or higher or have AP/IB test credit or transfer credit for calculus
- Completed two years of high school chemistry or at least one full-year of a *rigorous* chemistry course that covered only chemistry, as opposed to a course where chemistry is one of several science topics. The course(s) should have covered stoichiometry, atomic structure, thermochemistry, bonding and molecular structure, equilibrium, acids and bases, and kinetics.
- Did well in both chemistry and math in high school and enjoy learning chemistry
- Would like an accelerated and challenging chemistry course
- Have college-level study skills – includes the ability to learn content and work problems independently, seek clarification from appropriate course resources, solve novel problems, and manage time effectively

CHEM 103 is usually a better option for students who:

- Placed out of MATH 112 College Algebra (required) or have college credit for MATH 112, 114, or 171, but do not have a strong (or any) calculus background
- Completed one year of high school chemistry, but do not meet the other criteria for CHEM 109 listed above
- Prefer a less fast-paced option than CHEM 109 offers
- Did not enjoy math or chemistry courses in high school and/or found them challenging
- Are not an entering first-year student *(i.e.*, a transfer or continuing student)

Deciding Between CHEM 109 and CHEM 109 Honors

We recommend that students consider the honors section (lecture 3) of CHEM 109 if they:

- Completed two full years of high school chemistry with the second year being AP Chemistry or completed higher level IB Chemistry (required)
- Completed a calculus course in high school (Credit for or concurrent enrollment in MATH 221 is required.)
- Are interested in a less traditional approach that draws on current research themes and applies the principles of chemistry to questions of energy and global climate change
- Completed a high school physics course that covered only physics, not a course where physics is one of several science topics. AP Physics is not required. Students without physics must have credit for MATH 221.